

COST OF CAPITAL STUDY

YIELD CAPITALIZATION

2020 Assessment Year

APPENDIX C

Power Industry

EQUITY RATE						9.50%	
CAPITAL ASSET PRICING MODEL							PAGE
	CAPM Ex Ante		6.20%				4
DIVIDEND GROWTH MODELS Single Stage							
	Value Line, based on Dividends Growth		10.00%				5
	Value Line, based on Earnings Growth		NMF				6
	Value Line, based on Return on Equity		8.00%				7
FCFE GROWTH MODEL Multi Stage							8
			9.50%				
				RANGE	6.20-10.00%		
DEBT RATE						5.25%	9
MARKET CAPITAL STRUCTURE							
	Equity	50%	x	9.50%	=	4.75%	3
	Debt	50%	x	5.25%	=	2.63%	3
	Marginal Tax Rate	24%	=	(1-.24)	x	2.63%	
						<u>2.00%</u>	
WEIGHTED AVERAGE COST OF CAPITAL						6.75%	

SUPPORT FOR GUIDELINE COMPANIES

Washington State Department of Revenue

2020 Assessment Year

Power Industry

Capital Structure at Book Value

Company	Ticker	Beta	Fin'l Strength	P/E Ratio	Div'd Yield	Common Stock	%	Preferred Stock	%	Long Term Debt	%	Total Debt & Equity
AES Corp	aes	1.10	B	33.8	2.8%	3,183,631,949	14.8%			18,305,000,000	85.2%	21,488,631,949
Exelon Corp	exc	0.65	B++	20.2	3.2%	32,419,830,648	50.0%			32,446,000,000	50.0%	64,865,830,648
NextEra Energy Inc	nee	0.55	A+	42.1	2.1%	36,975,897,062	50.6%			36,144,000,000	49.4%	73,119,897,062
NRG Energy Inc	nrg	1.25	B+	1.9	0.3%	nmf		230,000,000		5,803,000,000		nmf
Southern Co	so	0.50	A	23.5	3.9%	27,476,830,512	39.3%	291,000,000	0.4%	42,098,000,000	60.3%	69,865,830,512
TransAlta Corp	ta.to	0.95	C+	42.2	2.2%	2,029,500,266	37.8%	645,000,000	12.0%	2,699,000,000	50.2%	5,373,500,266
Vistra Energy Corp	vst	0.85	B+	10.4	nmf	7,959,818,978	44.1%			10,102,000,000	55.9%	18,061,818,978
Mean		0.84		24.9	2.4%	18,340,918,236	39.4%		6.2%	21,085,285,714	58.5%	
Harmonic Mean		0.75							0.8%		56.4%	
Weighted Mean						110,045,509,414	43.5%	1,166,000,000	0.5%	147,597,000,000	58.4%	252,775,509,414
Median		0.85			2.5%				6.2%		53.1%	

SUPPORT FOR CAPITAL STRUCTURE Market Value

Washington State Department of Revenue

2020 Assessment Year

Power Industry

Company	Ticker	Stock Price	Common Shares	Common Stock	%	Preferred Stock	%	Long Term Debt	%	Total Debt & Equity
AES Corp	aes	19.90	663,256,656	13,198,807,454	39.6%	-		20,108,000,000	60.4%	33,306,807,454
Exelon Corp	exc	45.59	972,108,865	44,318,443,155	51.6%	-		41,516,000,000	48.4%	85,834,443,155
NextEra Energy Inc	nee	242.16	488,775,903	118,361,972,670	73.4%	-		42,928,000,000	26.6%	161,289,972,670
NRG Energy Inc	nrg	39.75	248,996,189	9,897,598,513	59.5%	230,000,000	1.4%	6,504,000,000	39.1%	16,631,598,513
Southern Co	so	63.70	1,048,733,989	66,804,355,099	57.9%	291,000,000	0.3%	48,339,000,000	41.9%	115,434,355,099
TransAlta Corp	ta.to	7.16	283,846,191	2,032,338,728	39.8%	645,000,000	12.6%	2,428,680,100	47.6%	5,106,018,828
Vistra Energy Corp	vst	22.99	487,734,006	11,213,004,798	51.2%	-		10,685,000,000	48.8%	21,898,004,798
Mean					53.3%				4.8%	44.7%
Harmonic Mean					51.1%				0.6%	42.2%
Weighted Mean				265,826,520,418	60.5%	1,166,000,000	0.3%	172,508,680,100	39.3%	439,501,200,518
Median					51.6%				1.4%	47.6%
Std Dev					11.8%				6.8%	10.4%
Coefficient of Variation					22.2%				143.9%	23.3%
Target					50%				50%	100%

SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT CAPITAL ASSET PRICING MODEL

2020 Assessment Year

Ex Ante

$$K_e = R_f + B (R_p)$$

Ke = Cost of Equity				6.20%
				to page 1
	Rm =	rate of return	7.15%	
	Rf =	risk free rate	2.40%	
	Rp =	risk premium	4.75%	
	B =	Beta	0.80	page 7
Rp = Risk Premium				4.75%
				to above
Shannon Pratt and Roger Grabowski			3.50% - 6.00%	
		Cost of Capital, App & Exam, 5th Ed, 2014		
Dr. Aswath Damodaran			5.20%	chart page 13
		http://pages.stern.nyu.edu/~adamodar/	4.72%	adjusted for Rf
		2020 Implied Premium		
John Graham & Campbell Harvey			6.81%	10 year expected real retu
		Duke CFO magazine Global Business Outlook survey - U.:	6.30%-7.32%	95% Interval 10 year expe
		Dec 19 pg 38	6.23%	adjusted for Rf
			1.82%	Rf rate used in survey
Rf = Risk Free Rate				2.40%
				to above
Value Line Investment Survey, Selected Yields January 10, 2020, page 1313				
	as of 12-31-19	US Treasury Securities year end data		
		5 year	1.69%	
		10 year	1.92%	
		30 year	2.39%	
		30 year Zero	2.42%	
Federal Reserve Statistical Release (http://www.federalreserve.gov/Releases/H15/Current/)				
	as of 12-31-19	Treasury Constant Maturities		
		5 year	1.69%	
		10 year	1.92%	
		20 year	2.25%	
		30 year	2.39%	
		20 year TIPS	<u>0.39%</u>	1.86%
		30 year TIPS	<u>0.58%</u>	1.81%
				TIPS inflation indication
Inflation				2.00%
				to appraisal template
Value Line Investment Survey, Economic Series January 3, 2020, page 1500				
		Consumer Price Index Annual Rate of Change 2022-2024	2.50%	
The Livingston Survey December 13, 2019, page 4, 10				
		Inflation median (measured by the CPI) over next 10 years	2.22%	
Gross Domestic Product (GDP) Nominal				3.90%
				real GDP + inflation est
Federal Reserve Projected Long Run Real GDP Growth				
		Median Projection Value From Dec 11, 2019 Report		1.90%
		https://www.federalreserve.gov/monetarypolicy/fomcproptabl20191211.htm		
Congressional Budget Office Real GDP Economic Projections				Table B-1 pg 75
		The Budget and Economic Outlook 2020-2030	2020-2024	1.80%
		Average Percentage Change Year to Year	2025-2030	1.65%
		http://www.cbo.gov/publication/55551		
Federal Reserve Bank of Philadelphia				
		The Livingston Survey, December 13, 2019, page 4, 10		
		Average Annual Real GDP Growth Rate for Next Ten Years		2.00%
		https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey		

**SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT
DIVIDEND GROWTH MODEL**

Washington State Department of Revenue

2020 Assessment Year

Power Industry

Based on Dividend Growth

$$K_e = (D1 / P_o) + G$$

- Ke = Cost of Equity
- D1 = Expected Dividends
- Po = Current Price
- G = Sustainable Growth

Company	Ticker	Stock Price (Po)	Expected Dividend (D1)	Dividend Yield (D1/Po)	Dividend Growth (G)	Ke with Short Term Growth
AES Corp	aes	19.900	0.57	2.86%	4.00%	6.86%
Exelon Corp	exc	45.590	1.53	3.36%	5.50%	8.86%
NextEra Energy Inc	nee	242.160	5.65	2.33%	10.50%	12.83%
NRG Energy Inc	nrg	39.750	1.20	3.02%	nmf	nmf
Southern Co	so	63.700	2.54	3.99%	3.00%	6.99%
TransAlta Corp	ta.to	7.160	0.20	2.79%	10.50%	13.29%
Vistra Energy Corp	vst	22.990	0.54	2.35%	27.50%	29.85%
Mean						13.11%
Harmonic Mean						10.20%
Median						10.84%
Max						29.85%
Min						6.86%
Std Dev						8.66%
Coefficient of Variation						66.03%
Say						10.00%

SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT DIVIDEND GROWTH MODEL

Washington State Department of Revenue

2020 Assessment Year

Power Industry

Based on Earnings Growth

$$K_e = (D_1 / P_0) + G$$

Ke = Cost of Equity
 D1 = Expected Dividends
 Po = Current Price
 G = Sustainable Growth

Company	Ticker	Stock Price (Po)	Expected Dividend (D1)	Dividend Yield (D1/Po)	Earnings Growth (G)	Ke with Short Term Growth
AES Corp	aes	19.900	0.57	2.86%	nmf	nmf
Exelon Corp	exc	45.590	1.53	3.36%	8.00%	11.36%
NextEra Energy Inc	nee	242.160	5.65	2.33%	10.00%	12.33%
NRG Energy Inc	nrg	39.750	1.20	3.02%	nmf	nmf
Southern Co	so	63.700	2.54	3.99%	4.00%	7.99%
TransAlta Corp	ta.to	7.160	0.20	2.79%	nmf	nmf
Vistra Energy Corp	vst	22.990	0.54	2.35%	39.00%	41.35%
Mean						18.26%
Harmonic Mean						12.56%
Median						11.84%
Max						41.35%
Min						7.99%
Std Dev						15.51%
Coefficient of Variation						84.94%

Say **NMF**

SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT DIVIDEND GROWTH MODEL

Washington State Department of Revenue

2020 Assessment Year

Power Industry

Based on Return on Equity $K_e = (D1 / P_o) + G$

- K_e** = Cost of Equity
- D1** = Expected Dividends
- E1** = Expected Earnings
- P_o** = Current Price
- G** = Sustainable Growth
- b** = Retained Earnings % = (1-Payout Ratio)
- ROE** = Return on Equity = (E1/P_o)

Company	Ticker	Stock Price (P _o)	Expected Dividend (D1)	Expected Earnings (E1)	Dividend Yield (D1/P _o)	Retained Earnings (b)	ROE (E1/P _o)	Growth (b*ROE)	K _e Dividends	K _e Earnings
AES Corp	aes	19.900	0.57	1.30	2.86%	NMF	6.53%	NMF	NMF	NMF
Exelon Corp	exc	45.590	1.53	3.15	3.36%	53.0%	6.91%	3.66%	7.02%	10.57%
NextEra Energy Inc	nee	242.160	5.65	9.00	2.33%	36.0%	3.72%	1.34%	3.67%	5.05%
NRG Energy Inc	nrg	39.750	1.20	3.40	3.02%	NMF	8.55%	NMF	NMF	NMF
Southern Co	so	63.700	2.54	3.20	3.99%	21.0%	5.02%	1.05%	5.04%	6.08%
TransAlta Corp	ta.to	7.160	0.20	0.25	2.79%	11.0%	3.49%	0.38%	3.18%	3.88%
Vistra Energy Corp	vst	22.990	0.54	2.00	2.35%	74.0%	8.70%	6.44%	8.79%	15.14%
Mean									5.54%	8.14%
Harmonic Mean									4.80%	6.40%
Median									5.04%	6.08%
Std Dev									2.35%	4.66%
Coefficient of Variation									42.38%	57.21%

Say 8.00%

**SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT
FREE CASH FLOW TO EQUITY MODEL MULTI STAGE**

Washington State Department of Revenue

2020 Assessment Year

Power Industry

Company	Ticker	Stock Price	Expected Earnings	P/E	Payout Ratio	ROE	Ke
AES Corp	aes	19.90	1.30	15.31	44.00%	27.00%	9.51%
Exelon Corp	exc	45.59	3.15	14.47	47.00%	9.00%	9.99%
NextEra Energy Inc	nee	242.16	9.00	26.91	62.00%	11.50%	3.86%
NRG Energy Inc	nrg	39.75	3.40	11.69	35.00%	NMF	12.55%
Southern Co	so	63.70	3.20	19.91	79.00%	12.00%	6.40%
TransAlta Corp	ta.to	7.16	0.25	28.64	80.00%	NMF	11.17%
Vistra Energy Corp	vst	22.99	2.00	11.50	27.00%	11.50%	13.92%
Mean				18.35	53.43%	14.20%	9.63%
Harmonic Mean				16.31	46.39%	12.33%	8.12%
Median				15.31	47.00%	11.50%	9.99%
Industry Summary				17.00	46.00%	11.50%	
						Say	9.50%

SUPPORT FOR DEBT RATING AND DEBT YIELD RATE

Washington State Department of Revenue

2020 Assessment Year

Power Industry

Company	Ticker	Mergent's Ratings	S&P Ratings
AES Corp	aes	Ba1	BB+
Exelon Corp	exc	Baa2	BBB+
NextEra Energy Inc	nee	Baa1	A-
NRG Energy Inc	nrg	Ba1	BB
Southern Co	so	Baa2	A-
TransAlta Corp	ta.to	Ba1	BB+
Vistra Energy Corp	vst	Ba1	BB
Overall Average Debt Rating		Baa3	BBB-

Mergent's Bond Record January 2020, page 234				
Corporate	Aaa	Aa	A	Baa
October	3.01%	3.13%	3.37%	3.93%
November	3.06%	3.16%	3.40%	3.94%
December	3.01%	3.11%	3.36%	3.88%
4th Qtr Average	3.03%	3.13%	3.38%	3.92%
Public Utilities	Aaa	Aa	A	Baa
October		3.24%	3.39%	3.72%
November		3.25%	3.43%	3.76%
December		3.22%	3.40%	3.73%
4th Qtr Average		3.24%	3.41%	3.74%

Industrials	Aaa	Aa	A	Baa
October	3.01%	3.01%	3.35%	4.12%
November	3.06%	3.06%	3.37%	4.12%
December	3.01%	3.00%	3.32%	4.03%
4th Qtr Average	3.03%	3.02%	3.35%	4.09%

		Ave YTM	Med YTM
S&P's Long Term Bond Yield	BBB-	5.45%	5.30%
Moody's Long Term Bond Yield	Baa3	5.36%	5.11%

Bloomberg Dec 2019	20y	25Y	30Y
BBB-	5.06%	5.38%	5.79%

Debt Yield Rate	5.25%
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to page 1

SUPPORT FOR DIRECT CAPITALIZATION EQUITY COMPONENT

2020 Assessment Year

Company	Ticker	Stock Price	Enterprise Value	EBITDA Historical	Annual Change VL	EBITDA Forecast	EV / EBITDA Forecast	Revenue Forecast	EV / Sales Forecast	Cashflow Forecast	Debt Service	EV / CF Forecast
AES Corp	aes	19.90	33,171,807,454	3,198,000,000	24.00%	3,965,520,000	8.37	10,413,129,499	3.19	1,956,607,135	1,055,670,000	11.01
Exelon Corp	exc	45.59	84,982,443,155	10,122,000,000	5.00%	10,628,100,000	8.00	36,113,844,335	2.35	9,186,428,774	2,179,590,000	7.48
NextEra Energy Inc	nee	242.16	161,289,972,670	23,682,000,000	10.98%	26,282,100,890	6.14	20,479,710,336	7.88	9,140,109,386	2,253,720,000	14.16
NRG Energy Inc	nrg	39.75	15,902,598,513	1,774,000,000	-73.83%	464,181,347	34.26	10,383,141,081	1.53	1,257,430,754	341,460,000	9.95
Southern Co	so	63.70	115,434,355,099	11,067,000,000	3.97%	11,506,166,667	10.03	22,233,160,567	5.19	6,869,207,628	2,537,797,500	12.27
TransAlta Corp	ta.to	7.16	4,933,695,628	693,908,600	-53.70%	321,253,981	15.36	2,270,769,528	2.17	354,807,739	127,505,705	10.23
Vistra Energy Corp	vst	22.99	21,898,004,798	3,869,000,000	11.01%	4,294,810,247	5.10	12,315,283,652	1.78	2,853,243,935	560,962,500	6.41
7							12.46		3.44			10.22
Mean							8.78		2.56			9.58
Harmonic Mean							8.37		2.35			10.23
Median							10.17		2.31			2.66
Std Dev												

Source:

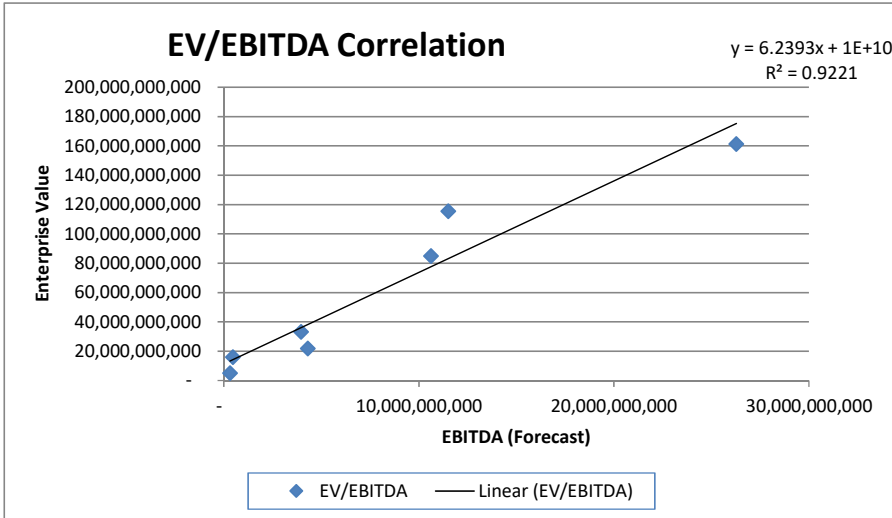
Value Line & Morning Star

Say

8.50

3.00

10.00



Forecast EV/EBITDA By Rank

Guideline Companies	EV/EBITDA forecast	
Vistra Energy Corp	5.10	6.63 Low Harmonic Mean
NextEra Energy Inc	6.14	6.90 Low Average
Exelon Corp	8.00	7.07 Low Median
AES Corp	8.37	7.00 Say
Southern Co	10.03	12.76 High Harmonic Mean
TransAlta Corp	15.36	17.00 High Average
NRG Energy Inc	34.26	12.70 High Median
		11.50 Say

SUPPORT FOR DIRECT CAPITALIZATION EQUITY COMPONENT

2020 Assessment Year

Power Industry

Company	Ticker	Stock Price	2019		2020		2019		2020	
			Actual Earnings Ratio (EPS/P)		Projected Earnings Ratio (PEPS/P)		Cash Flow Ratio (CF/P)		Projected Cash Flow Ratio	
AES Corp	aes	19.90	0.45	2.3%	1.30	6.5%	2.05	10.3%	2.95	14.8%
Exelon Corp	exc	45.59	3.00	6.6%	3.15	6.9%	9.00	19.7%	9.45	20.7%
NextEra Energy Inc	nee	242.16	7.76	3.2%	9.00	3.7%	16.85	7.0%	18.70	7.7%
NRG Energy Inc	nrg	39.75	16.81	42.3%	3.40	8.6%	19.30	48.6%	5.05	12.7%
Southern Co	so	63.70	3.10	4.9%	3.20	5.0%	6.30	9.9%	6.55	10.3%
TransAlta Corp	ta.to	7.16	0.18	2.5%	0.25	3.5%	2.70	37.7%	1.25	17.5%
Vistra Energy Corp	vst	22.99	1.86	8.1%	2.00	8.7%	5.27	22.9%	5.85	25.4%
		Mean		10.0%		6.1%		22.3%		15.6%
		Harmonic Mean		4.2%		5.5%		14.5%		13.5%
		Median		4.9%		6.5%		19.7%		14.8%
		Max		42.3%		8.7%		48.6%		25.4%
		Min		2.3%		3.5%		7.0%		7.7%
		Std Dev		14.4%		2.1%		15.6%		6.1%
		Coefficient of Variation		144.5%		34.8%		70.1%		39.4%
		Say		5.5%		5.5%		11.0%		14.0%

Source: Value Line / yr end stock price

SUPPORT FOR DIRECT CAPITALIZATION EQUITY COMPONENT

2020 Assessment Year

Power Industry

Company	Ticker	Stock Price	Revenues	Multiple	Cash Flow	Multiple	Earnings	Multiple	Book Value	Multiple
AES Corp	aes	19.90	15.35	1.30	2.05	9.71	0.45	44.22	4.80	4.15
Exelon Corp	exc	45.59	35.50	1.28	9.00	5.07	3.00	15.20	33.35	1.37
NextEra Energy I	nee	242.16	39.25	6.17	16.85	14.37	7.76	31.21	75.65	3.20
NRG Energy Inc	nrg	39.75	39.44	1.01	19.30	2.06	16.81	2.36	6.65	5.98
Southern Co	so	63.70	20.55	3.10	6.30	10.11	3.10	20.55	26.20	2.43
TransAlta Corp	ta.to	7.16	8.25	0.87	2.70	2.65	0.18	39.78	7.15	1.00
Vistra Energy Cor	vst	22.99	24.21	0.95	5.27	4.36	1.86	12.36	16.32	1.41
		Mean		2.10		6.90		23.67		2.79
		Harmonic Mean		1.34		4.48		10.03		1.96
		Median		1.28		5.07		20.55		2.43
		Max		6.17		14.37		44.22		5.98
		Min		0.87		2.06		2.36		1.00
		Say		1.50		9.00		18.00		2.00

DATA INPUT

Washington State Department of Revenue

2020 Assessment Year

Power Industry

Guideline Companies		Historic Figures (2019)													
		Stock Price 12/31/19	Beta Levered	Fin'l Strength	Revenues Per Share	Cash Flow Per Share	Earnings Per Share	Dividends Per Share	Bk Value Per Share	Common Shares	LTD (BV)	Trailing P/E Ratio	Div Yield	Operating Margin	Calculated Debt
Name	Ticker	Yahoo	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	Formula
AES Corp	aes	19.90	1.10	B	15.35	2.05	0.45	0.55	4.80	663,256,656	18,305,000,000	33.8	3.7%	16.5%	100.00%
Exelon Corp	exc	45.59	0.65	B++	35.50	9.00	3.00	1.45	33.35	972,108,865	32,446,000,000	20.2	3.2%		110.33%
NextEra Energy Inc	nee	242.16	0.55	A+	39.25	16.85	7.76	5.00	75.65	488,775,903	36,144,000,000	42.1	2.1%		108.22%
NRG Energy Inc	nrg	39.75	1.25	B+	39.44	19.30	16.81	0.12	6.65	248,996,189	5,803,000,000	1.9	3.7%	26.0%	109.20%
Southern Co	so	63.70	0.50	A	20.55	6.30	3.10	2.46	26.20	1,048,733,989	42,098,000,000	23.5	3.7%		108.48%
TransAlta Corp	ta.to	7.16	0.95	C+	8.25	2.70	0.18	0.16	7.15	283,846,191	2,699,000,000	42.2	2.5%		102.83%
Vistra Energy Corp	vst	22.99	0.85	B+	24.21	5.27	1.86	0.50	16.32	487,734,006	10,102,000,000	10.4	2.8%	30.8%	102.95%

Average

Harmonic Mean

Median

24.9 average

8.8 harmonic mean

23.5 median

ha

Value Line Mar 20, 2020

Value Line Feb 14, 2020

Mstar not available as of 20200403

			Projected (Next Year) 2020							
Payout Ratio	All Div'ds to Net Profits	Rtn on Shrhldrs Equity	Revenues Per Share	Cash Flow Per Share	Earnings Per Share	Dividends Per Share	Bk Value Per Share	All Div'ds to Net Profits	Rtn on Shrhldrs Equity	CF Projection 22-24
Formula	V L	V L	V L	V L	V L	V L	V L	V L	V L	V L
122%	NMF	10.1%	15.70	2.95	1.30	0.57	4.85	44%	27.0%	3.65
48%	47%	9.0%	37.15	9.45	3.15	1.53	35.00	47%	9.0%	11.25
64%	64%	10.0%	41.90	18.70	9.00	5.65	79.10	62%	11.5%	24.00
1%	NMF	NMF	41.70	5.05	3.40	1.20	4.85	35%	70.0%	6.55
79%	79%	12.0%	21.20	6.55	3.20	2.54	26.85	79%	12.0%	7.75
89%	89%	NMF	8.00	1.25	0.25	0.20	8.05	80%	NMF	2.45
27%	26%	11.7%	25.25	5.85	2.00	0.54	17.15	27%	11.5%	7.00
average	61%	11%						53%	24%	8.95
rmonic mean	50%	10%						46%	14%	7.00
median	64%	10.1%						47%	11.8%	5.93

STOCK PRICE

Washington State Department of Revenue

2020 Assessment Year

Power Industry

69.71
Year End

AES	aes								
Date	Open	High	Low	Close	Adj Close	Volume			
12/31/2019	20.05	20.12	19.76	19.9	19.90	6,044,800			19.90
Exelon	exc								
Date	Open	High	Low	Close	Adj Close	Volume			
12/31/2019	45.39	45.64	45.18	45.59	45.59	3,691,100			45.59
NextEra	nee								
Date	Open	High	Low	Close	Adj Close	Volume			
12/31/2019	241.57	242.59	239.92	242.16	242.16	1,727,500			242.16
NRG Energy	nrg								
Date	Open	High	Low	Close	Adj Close	Volume			
12/31/2019	39.16	39.76	39.11	39.75	39.75	1,644,500			39.75
Southern Co	so								
Date	Open	High	Low	Close	Adj Close	Volume			
12/31/2019	63.31	63.72	63.18	63.7	63.7	3,767,500			63.70
TransAlta	tac								
Date	Open	High	Low	Close	Adj Close	Volume			
12/31/2019	7.08	7.17	7.08	7.16	7.16	168,700			7.16
Vistra Energy	vst								
Date	Open	High	Low	Close	Adj Close	Volume			
12/31/2019	22.74	23.05	22.72	22.99	22.99	3,475,900			22.99

Source:

finance.yahoo.com

Historical Stock Quotes

IMPLIED PREMIUMS FOR US MARKET

Updated January 5, 2020

These implied premiums are calculated using the S&P 500.

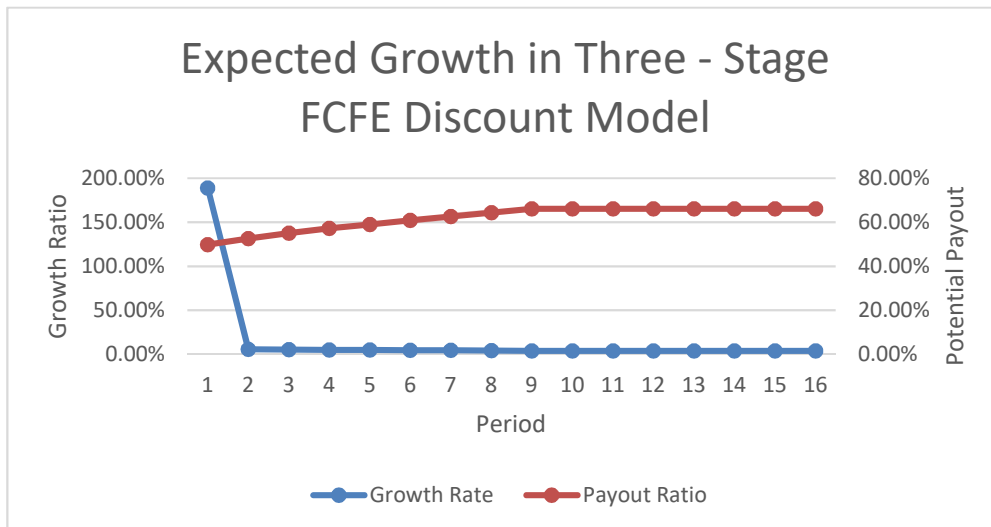
Year	Earnings Yield	Dividend Yield	S&P 500	Earnings*	Dividends*	Ends + Buy	Inge in Earn	Inge in Divid	T.Bill Rate	T.Bond Rate	Bond-Bill	bothed Grov	Premium	et Growth	sed Premium (
1960	5.34%	3.41%	58.11	3.10	1.98				2.66%	2.76%	0.10%	2.45%			
1961	4.71%	2.85%	71.55	3.37	2.04		8.60%	2.91%	2.13%	2.35%	0.22%	2.41%	2.92%		2.92%
1962	5.81%	3.40%	63.1	3.67	2.15		8.79%	5.21%	2.73%	3.85%	1.12%	4.05%	3.56%		3.56%
1963	5.51%	3.13%	75.02	4.13	2.35		12.75%	9.45%	3.12%	4.14%	1.02%	4.96%	3.38%		3.38%
1964	5.62%	3.05%	84.75	4.76	2.58		15.23%	10.08%	3.54%	4.21%	0.67%	5.13%	3.31%		3.31%
1965	5.73%	3.06%	92.43	5.30	2.83		11.20%	9.42%	3.93%	4.65%	0.72%	5.46%	3.32%		3.32%
1966	6.74%	3.59%	80.33	5.41	2.88		2.23%	1.96%	4.76%	4.64%	-0.12%	4.19%	3.68%		3.68%
1967	5.66%	3.09%	96.47	5.46	2.98		0.85%	3.37%	4.21%	5.70%	1.49%	5.25%	3.20%		3.20%
1968	5.51%	2.93%	103.86	5.72	3.04		4.81%	2.09%	5.21%	6.16%	0.95%	5.32%	3.00%		3.00%
1969	6.63%	3.52%	92.06	6.10	3.24		6.66%	6.49%	6.58%	7.88%	1.30%	7.55%	3.74%		3.74%
1970	5.98%	3.46%	92.15	5.51	3.19		-9.72%	-1.61%	6.53%	6.50%	-0.03%	4.78%	3.41%		3.41%
1971	5.46%	3.10%	102.09	5.57	3.16		1.15%	-0.74%	4.39%	5.89%	1.50%	4.57%	3.09%		3.09%
1972	5.23%	2.70%	118.05	6.17	3.19		10.76%	0.71%	3.84%	6.41%	2.57%	5.21%	2.72%		2.72%
1973	8.16%	3.70%	97.55	7.96	3.61		28.93%	13.24%	6.93%	6.90%	-0.03%	8.30%	4.30%		4.30%
1974	13.64%	5.43%	68.56	9.35	3.72		17.48%	3.14%	8.00%	7.40%	-0.60%	6.42%	5.59%		5.59%
1975	8.55%	4.14%	90.19	7.71	3.73		-17.54%	0.30%	5.80%	7.76%	1.96%	5.99%	4.13%		4.13%
1976	9.07%	3.93%	107.46	9.75	4.22		26.39%	13.10%	5.08%	6.81%	1.73%	8.19%	4.55%		4.55%
1977	11.43%	5.11%	95.1	10.87	4.86		11.53%	15.07%	5.12%	7.78%	2.66%	9.52%	5.92%		5.92%
1978	12.11%	5.39%	96.11	11.64	5.18		7.07%	6.60%	7.18%	9.15%	1.97%	8.48%	5.72%		5.72%
1979	13.48%	5.53%	107.94	14.55	5.97		25.01%	15.23%	10.38%	10.33%	-0.05%	11.70%	6.45%		6.45%
1980	11.04%	4.74%	135.76	14.99	6.44		3.01%	7.81%	11.24%	12.43%	1.19%	11.01%	5.03%		5.03%
1981	12.39%	5.57%	122.55	15.18	6.83		1.31%	6.08%	14.71%	13.98%	-0.73%	11.42%	5.73%		5.73%
1982	9.83%	4.93%	140.64	13.82	6.93		-8.95%	1.58%	10.54%	10.47%	-0.07%	7.96%	4.90%		4.90%
1983	8.06%	4.32%	164.93	13.29	7.12		-3.84%	2.76%	8.80%	11.80%	3.00%	9.09%	4.31%		4.31%
1984	10.07%	4.68%	167.24	16.84	7.83		26.69%	9.85%	9.85%	11.51%	1.66%	11.02%	5.11%		5.11%
1985	7.42%	3.88%	211.28	15.68	8.20		-6.91%	4.74%	7.72%	8.99%	1.27%	7.89%	4.03%	6.75%	3.84%
1986	5.96%	3.38%	242.17	14.43	8.19		-7.93%	-0.15%	6.16%	7.22%	1.06%	5.54%	3.36%	6.96%	3.58%
1987	6.49%	3.71%	247.08	16.04	9.17		11.10%	11.99%	5.47%	8.86%	3.39%	9.66%	4.18%	8.58%	3.99%
1988	8.20%	3.68%	277.72	24.12	10.22		50.42%	11.49%	6.35%	9.14%	2.79%	9.76%	4.12%	7.67%	3.77%
1989	6.80%	3.32%	353.4	24.32	11.73		0.83%	14.80%	8.37%	7.93%	-0.44%	9.58%	3.85%	7.46%	3.51%
1990	6.58%	3.74%	330.22	22.65	12.35		-6.87%	5.26%	7.81%	8.07%	0.26%	7.39%	3.92%	7.19%	3.89%
1991	4.58%	3.11%	417.09	19.30	12.97		-14.79%	5.03%	7.00%	6.70%	-0.30%	6.34%	3.27%	7.81%	3.48%
1992	4.16%	2.90%	435.71	20.87	12.64		8.13%	-2.59%	5.30%	6.68%	1.38%	4.67%	2.83%	9.83%	3.55%
1993	4.25%	2.72%	466.45	26.90	12.69		28.89%	0.41%	3.50%	5.79%	2.29%	4.73%	2.74%	8.00%	3.17%
1994	5.89%	2.91%	459.27	31.75	13.36		18.03%	5.34%	5.00%	7.82%	2.82%	7.23%	3.06%	7.17%	3.55%
1995	5.74%	2.30%	615.93	37.70	14.17		18.74%	6.00%	3.50%	5.57%	2.07%	5.65%	2.44%	6.50%	3.29%
1996	4.83%	2.01%	740.74	40.63	14.89		7.77%	5.10%	5.00%	6.41%	1.41%	6.13%	2.11%	7.92%	3.20%
1997	4.08%	1.60%	970.43	44.09	15.52		8.52%	4.25%	5.35%	5.74%	0.39%	5.45%	1.67%	8.00%	2.73%
1998	3.11%	1.32%	1229.23	44.27	16.20		0.41%	4.37%	4.33%	4.65%	0.32%	4.60%	1.38%	7.20%	2.26%
1999	3.07%	1.14%	1469.25	51.68	16.71		16.74%	3.16%	5.37%	6.44%	1.07%	5.75%	1.20%	12.50%	2.05%
2000	3.94%	1.23%	1320.28	56.13	16.27		8.61%	-2.65%	5.73%	5.11%	-0.62%	3.71%	1.65%	12.00%	2.87%
2001	3.85%	1.37%	1148.09	38.85	15.74	30.08	-30.79%	-3.24%	1.80%	5.05%	3.25%	3.56%	1.73%	10.30%	3.62%
2002	5.23%	1.83%	879.82	46.04	16.08	29.83	18.51%	2.15%	1.20%	3.81%	2.61%	3.57%	2.29%	8.00%	4.10%
2003	4.87%	1.61%	1111.91	54.69	17.88	31.58	18.79%	11.19%	1.00%	4.25%	3.25%	5.35%	2.12%	11.00%	3.69%
2004	5.58%	1.60%	1211.92	67.68	19.407	40.60	23.75%	8.54%	2.18%	4.22%	2.04%	4.90%	2.02%	8.50%	3.65%
2005	5.47%	1.79%	1248.29	76.45	22.38	61.17	12.96%	15.32%	4.31%	4.39%	0.08%	6.16%	2.20%	8.00%	4.08%
2006	6.18%	1.77%	1418.3	87.72	25.05	73.16	14.74%	11.93%	4.88%	4.70%	-0.18%	5.93%	1.97%	12.50%	4.16%
2007	5.62%	1.89%	1468.36	82.54	27.73	95.36	-5.91%	10.70%	3.31%	4.02%	0.71%	5.03%	2.06%	5.00%	4.37%
2008	7.24%	3.11%	903.25	65.39	28.05	67.52	-20.78%	1.15%	1.59%	2.21%	0.62%	2.11%	4.05%	4.00%	6.43%
2009	5.35%	2.00%	1115.10	59.65	22.31	37.43	-8.78%	-20.46%	0.14%	3.84%	3.70%	0.28%	2.60%	7.20%	4.36%
2010	6.65%	1.84%	1257.64	83.66	23.12	55.53	40.25%	3.63%	0.13%	3.29%	3.16%	3.33%	2.24%	6.95%	5.20%
2011	7.72%	2.07%	1257.60	97.05	26.02	71.28	16.01%	12.54%	0.03%	1.88%	1.85%	2.75%	2.71%	7.18%	6.01%
2012	7.18%	2.13%	1426.19	102.47	30.44	75.90	5.58%	16.99%	0.05%	1.76%	1.71%	2.93%	2.47%	5.27%	5.78%
2013	5.81%	1.96%	1848.36	107.45	36.28	88.13	4.86%	19.19%	0.07%	3.04%	2.97%	5.01%	2.03%	4.28%	4.96%
2014	5.49%	1.92%	2058.90	113.01	39.44	101.98	5.17%	8.71%	0.05%	2.17%	2.12%	2.77%	2.24%	5.58%	5.78%
2015	5.20%	2.11%	2043.94	106.32	43.16	106.10	-5.92%	9.43%	0.21%	2.27%	2.06%	2.96%	2.46%	5.51%	6.12%
2016	4.86%	2.01%	2238.83	108.86	45.03	108.67	2.39%	4.33%	0.51%	2.45%	1.94%	2.64%	2.41%	5.54%	5.69%
2017	4.67%	1.86%	2673.61	124.94	49.73	108.28	14.77%	10.44%	1.39%	2.41%	1.02%	3.22%	2.36%	7.05%	5.08%
2018	5.92%	2.14%	2506.85	148.34	53.61	136.65	18.73%	7.80%	2.37%	2.68%	0.31%	3.24%	2.50%	4.12%	5.96%

Three Stage Free Cash Flow to Equity Discount Model

Company	AES Corp	3.90%	GDP
Ticker	aes	17.0	Industry P/E
		46.0%	Target Dividend Payout Ratio
		11.5%	Target ROE

	Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
Historic	0		1642.51%	-1542.51%	0.45			(19.90)
Stage 1	1	#####	50.17%	49.83%	1.30	0.65		0.65
	2	5.77%	47.43%	52.57%	1.38	0.72		0.72
	3	5.45%	44.98%	55.02%	1.45	0.80		0.80
	4	5.17%	42.77%	57.23%	1.53	0.87		0.87
	5	4.92%	41.00%	59.00%	1.60	0.94		0.94
Stage 2	6	4.71%	39.22%	60.78%	1.68	1.02		1.02
	7	4.51%	37.45%	62.55%	1.75	1.10		1.10
	8	4.31%	35.68%	64.32%	1.83	1.17		1.17
	9	4.10%	33.91%	66.09%	1.90	1.26		1.26
	10	3.90%	33.91%	66.09%	1.98	1.31	34.89	36.20
Stage 3	11+	3.90%	33.91%	66.09%	2.05	1.36		

$K_e = 9.51\%$

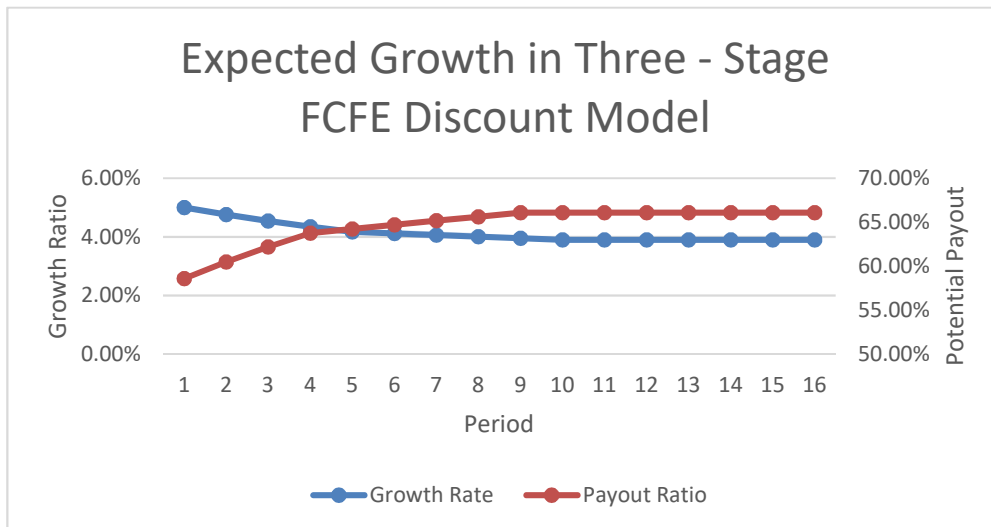


Three Stage Free Cash Flow to Equity Discount Model

Company **Exelon Corp** **3.90%** GDP
 Ticker **exc** **17.0** Industry P/E
46.0% Target Dividend Payout Ratio
11.5% Target ROE

	Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
Historic	0		43.48%	56.52%	3.00			(45.59)
Stage 1	1	5.00%	41.41%	58.59%	3.15	1.85		1.85
	2	4.76%	39.53%	60.47%	3.30	2.00		2.00
	3	4.55%	37.81%	62.19%	3.45	2.15		2.15
	4	4.35%	36.23%	63.77%	3.60	2.30		2.30
	5	4.17%	35.77%	64.23%	3.75	2.41		2.41
Stage 2	6	4.11%	35.30%	64.70%	3.90	2.53		2.53
	7	4.06%	34.84%	65.16%	4.06	2.65		2.65
	8	4.01%	34.38%	65.62%	4.23	2.77		2.77
	9	3.95%	33.91%	66.09%	4.39	2.90		2.90
	10	3.90%	33.91%	66.09%	4.56	3.02	80.61	83.63
Stage 3	11+	3.90%	33.91%	66.09%	4.74	3.13		

$K_e = 9.99%$

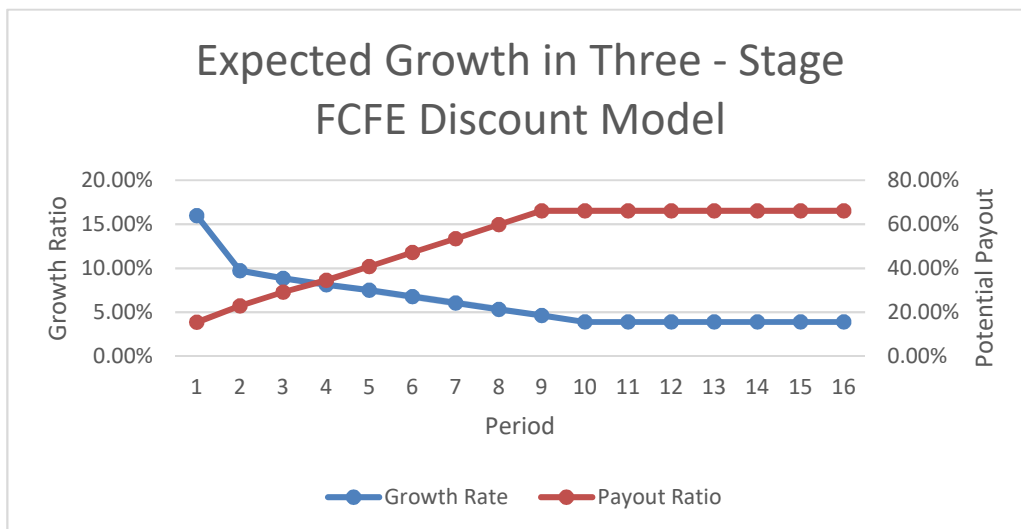


Three Stage Free Cash Flow to Equity Discount Model

Company **NextEra Energy** 3.90% GDP
 Ticker **nee** 17.0 Industry P/E
 46.0% Target Dividend Payout Ratio
 11.5% Target ROE

	Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
Historic	0		138.95%	-38.95%	7.76			(242.16)
Stage 1	1	15.98%	84.54%	15.46%	9.00	1.39		1.39
	2	9.72%	77.05%	22.95%	9.88	2.27		2.27
	3	8.86%	70.78%	29.22%	10.75	3.14		3.14
	4	8.14%	65.45%	34.55%	11.63	4.02		4.02
	5	7.53%	59.14%	40.86%	12.50	5.11		5.11
Stage 2	6	6.80%	52.84%	47.16%	13.35	6.30		6.30
	7	6.08%	46.53%	53.47%	14.16	7.57		7.57
	8	5.35%	40.22%	59.78%	14.92	8.92		8.92
	9	4.63%	33.91%	66.09%	15.61	10.32		10.32
	10	3.90%	33.91%	66.09%	16.22	10.72	286.46	297.18
Stage 3	11+	3.90%	33.91%	66.09%	16.85	11.14		

$K_e = 3.86\%$

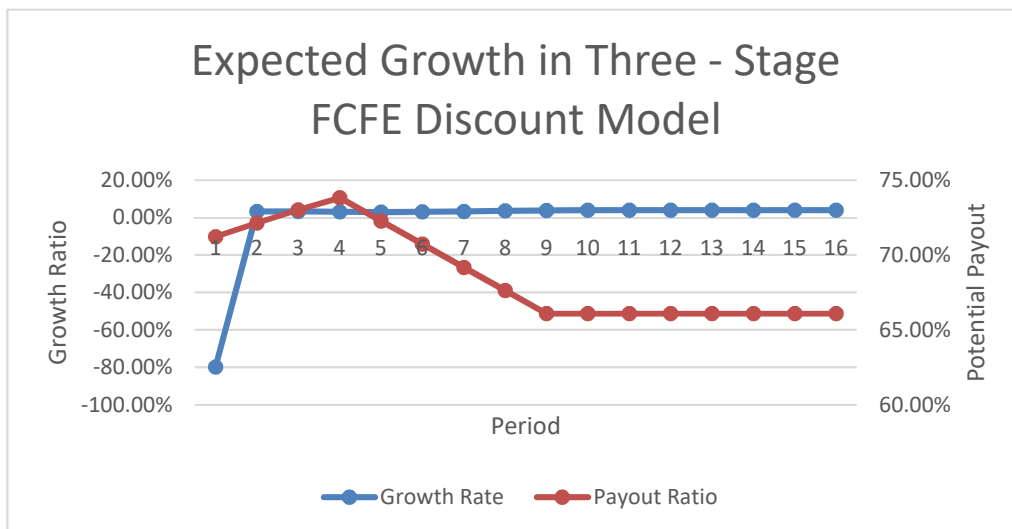


Three Stage Free Cash Flow to Equity Discount Model

Company **NRG Energy Inc** **3.90%** GDP
 Ticker **nrg** **17.0** Industry P/E
46.0% Target Dividend Payout Ratio
11.5% Target ROE

	Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
Historic	0		-693.69%	793.69%	16.81			(39.75)
Stage 1	1	-79.77%	28.77%	71.23%	3.40	2.42		2.42
	2	3.31%	27.85%	72.15%	3.51	2.53		2.53
	3	3.20%	26.99%	73.01%	3.63	2.65		2.65
	4	3.10%	26.17%	73.83%	3.74	2.76		2.76
	5	3.01%	27.72%	72.28%	3.85	2.78		2.78
Stage 2	6	3.19%	29.27%	70.73%	3.97	2.81		2.81
	7	3.37%	30.82%	69.18%	4.11	2.84		2.84
	8	3.54%	32.37%	67.63%	4.25	2.88		2.88
	9	3.72%	33.91%	66.09%	4.41	2.91		2.91
	10	3.90%	33.91%	66.09%	4.58	3.03	80.94	83.96
Stage 3	11+	3.90%	33.91%	66.09%	4.76	3.15		

K_e = 12.55%

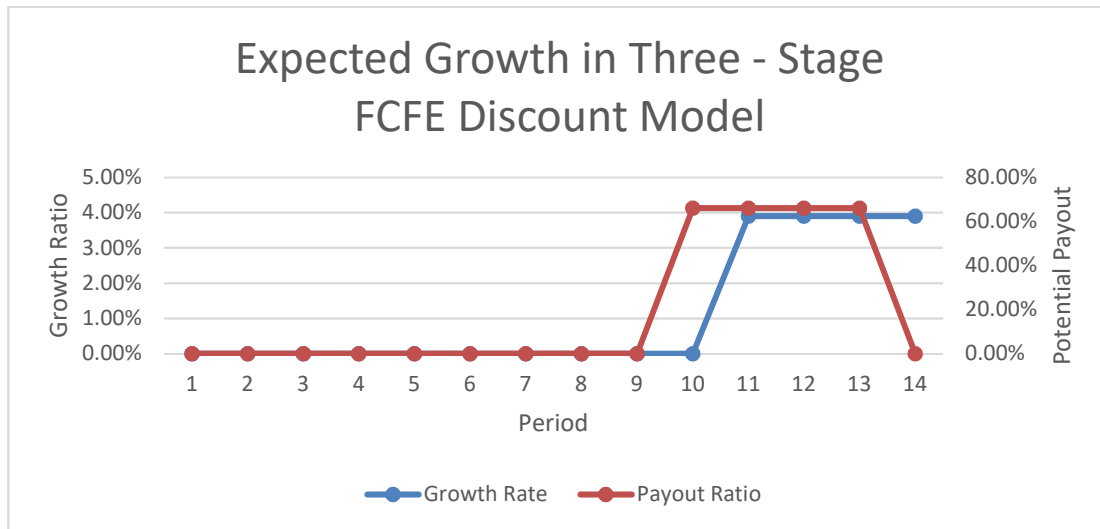


Three Stage Free Cash Flow to Equity Discount Model

Company **#REF!** 3.90% GDP
 Ticker **#REF!** 17.0 Industry P/E
 46.0% Target Dividend Payout Ratio
 11.5% Target ROE

	Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
Historic	0		#REF!	#REF!	#REF!			#REF!
Stage 1	1	#REF!	#REF!	#REF!	#REF!	#REF!		#REF!
	2	#REF!	#REF!	#REF!	#REF!	#REF!		#REF!
	3	#REF!	#REF!	#REF!	#REF!	#REF!		#REF!
	4	#REF!	#REF!	#REF!	#REF!	#REF!		#REF!
	5	#REF!	#REF!	#REF!	1.00	#REF!		#REF!
Stage 2	6	#REF!	#REF!	#REF!	#REF!	#REF!		#REF!
	7	#REF!	#REF!	#REF!	#REF!	#REF!		#REF!
	8	#REF!	#REF!	#REF!	#REF!	#REF!		#REF!
	9	#REF!	#REF!	#REF!	#REF!	#REF!		#REF!
	10	#REF!	33.91%	66.09%	#REF!	#REF!	#REF!	#REF!
Stage 3	11+	3.90%	33.91%	66.09%	#REF!	#REF!		#REF!

$K_e = \text{\#VALUE!}$

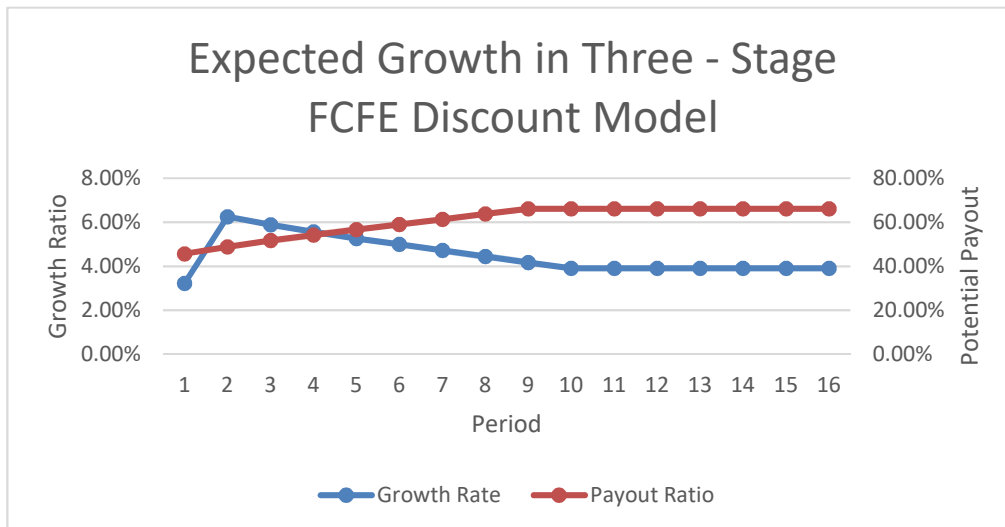


Three Stage Free Cash Flow to Equity Discount Model

Company **Southern Co** **3.90%** GDP
 Ticker **so** **17.0** Industry P/E use median
46.0% Target Dividend Payout Ratio
11.5% Target ROE

	Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
Historic	0		28.05%	71.95%	3.10			(63.70)
	1	3.23%	54.35%	45.65%	3.20	1.46		1.46
	2	6.25%	51.15%	48.85%	3.40	1.66		1.66
Stage 1	3	5.88%	48.31%	51.69%	3.60	1.86		1.86
	4	5.56%	45.77%	54.23%	3.80	2.06		2.06
	5	5.26%	43.40%	56.60%	4.00	2.26		2.26
	6	4.99%	41.03%	58.97%	4.20	2.48		2.48
	7	4.72%	38.65%	61.35%	4.40	2.70		2.70
Stage 2	8	4.45%	36.28%	63.72%	4.59	2.93		2.93
	9	4.17%	33.91%	66.09%	4.78	3.16		3.16
	10	3.90%	33.91%	66.09%	4.97	3.29	87.81	91.10
Stage 3	11+	3.90%	33.91%	66.09%	5.17	3.41		

$K_e = 6.40%$

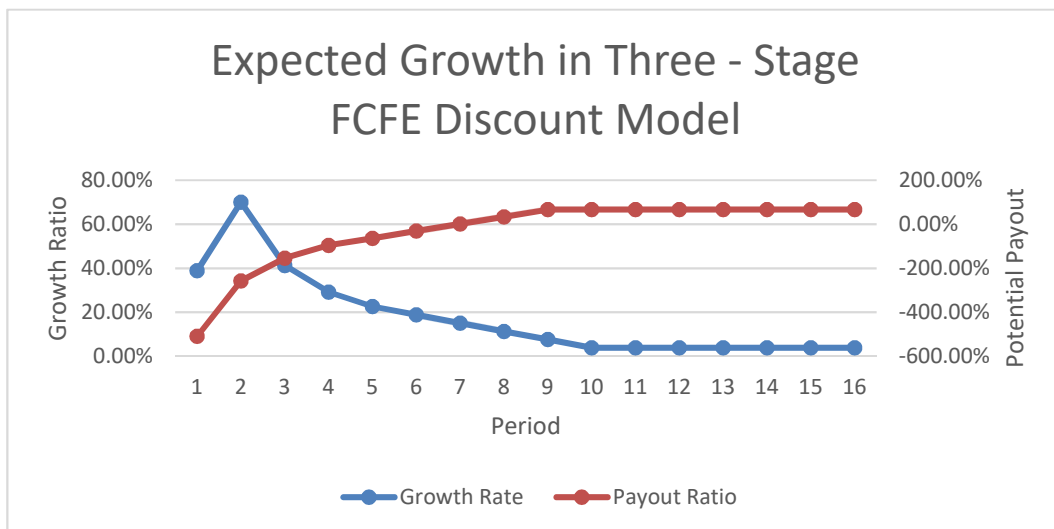


Three Stage Free Cash Flow to Equity Discount Model

Company **TransAlta Corp** **3.90%** GDP
 Ticker **ta.to** **17.0** Industry P/E
46.0% Target Dividend Payout Ratio
11.5% Target ROE

	Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
Historic	0		338.16%	-238.16%	0.18			(7.16)
Stage 1	1	38.89%	608.70%	-508.70%	0.25	(1.27)		-1.27
	2	70.00%	358.06%	-258.06%	0.43	(1.10)		-1.10
	3	41.18%	253.62%	-153.62%	0.60	(0.92)		-0.92
	4	29.17%	196.35%	-96.35%	0.78	(0.75)		-0.75
	5	22.58%	163.87%	-63.87%	0.95	(0.61)		-0.61
Stage 2	6	18.84%	131.38%	-31.38%	1.13	(0.35)		-0.35
	7	15.11%	98.89%	1.11%	1.30	0.01		0.01
	8	11.37%	66.40%	33.60%	1.45	0.49		0.49
	9	7.64%	33.91%	66.09%	1.56	1.03		1.03
	10	3.90%	33.91%	66.09%	1.62	1.07	28.59	29.66
Stage 3	11+	3.90%	33.91%	66.09%	1.68	1.11		

$K_e = 11.17%$



Three Stage Free Cash Flow to Equity Discount Model

Company **Vistra Energy Corp** **3.90%** GDP
 Ticker **vst** **17.0** Industry P/E
46.0% Target Dividend Payout Ratio
11.5% Target ROE

	Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
Historic	0		65.45%	34.55%	1.86			(22.99)
	1	7.53%	86.96%	13.04%	2.00	0.26		0.26
	2	10.00%	79.05%	20.95%	2.20	0.46		0.46
Stage 1	3	9.09%	72.46%	27.54%	2.40	0.66		0.66
	4	8.33%	66.89%	33.11%	2.60	0.86		0.86
	5	7.69%	60.29%	39.71%	2.80	1.11		1.11
	6	6.93%	53.70%	46.30%	2.99	1.39		1.39
	7	6.18%	47.10%	52.90%	3.18	1.68		1.68
Stage 2	8	5.42%	40.51%	59.49%	3.35	1.99		1.99
	9	4.66%	33.91%	66.09%	3.51	2.32		2.32
	10	3.90%	33.91%	66.09%	3.64	2.41	64.37	66.78
Stage 3	11+	3.90%	33.91%	66.09%	3.79	2.50		

K_e = 13.92%

