

2016 Capitalization Rate Study



State-Assessed Properties Division
John K. Thompson, Chief

Lien Date 2016

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Executive Summary

“The income approach to value includes any method of converting an income stream into a present value estimate (i.e., an indicator of current fair market value). The income approach is also called the capitalization approach because capitalization is the process of converting an expected income into an indicator of value.

The methods or techniques used in the income approach may be relatively simple (e.g., income or rent multipliers and direct capitalization), or more complex (e.g., various yield capitalization techniques). All of these methods are referred to as capitalization techniques because they convert an expected future income stream into a present value estimate.

The income approach requires careful application because small variations in its key variables (capitalization rate, duration of income stream, estimated income and expenses, etc.) will be mathematically leveraged into a wide range of estimated value. This is particularly true for the capitalization rate variable. The reliability of the income approach is no greater than the validity of the assumptions used to estimate the key variables. The mathematical techniques used in the approach, while sometimes complicated, are merely tools for converting these assumptions into an estimate of current market value.”¹

I. Authority for Capitalization Rate Study

Property Tax Rule 8 (g) (2) provides the authority for the method in which the capitalization rates were developed in this study. The rule states “the capitalization rate may be developed...

By deriving a weighted average of the capitalization rates for debt and for equity capital appropriate to the California money markets (the band-of-investment method) and adding increments for expenses that are excluded from outgo because they are based on the value that is being sought or the income that is being capitalized. The appraiser shall weight the rates for debt and equity capital by the respective amounts of such capital he deems most likely to be employed by prospective purchasers.”

II. Band of Investment Approach

In its simplest form, the band of investment method assumes that a purchaser would pay cash (or equity) for a portion of the property and would borrow the balance of the purchase price. For example:

Debt	30%	x	Cost of Debt	7%	=	2.1%
Equity	70%	x	Cost of Equity	12%	=	8.4%
						<hr/>
Weighted Average Cost of Capital						10.5%
						<hr/> <hr/>

¹ Assessors’ Handbook 501, Basic Appraisal, Revised January 2002

Executive Summary

This booklet contains a study for each of the major state assessee industry groups² in California. Industry data was compiled by groups with similar Value Line financial ratings. Local exchange, wireless and interexchange industries have been combined into one telecommunications study.

Generally accepted procedures were used to estimate the cost of capital for debt and equity. The long term debt cost is the cost for a particular risk class of debt on the lien date. The equity rate reflects the rate of return or compensation that will satisfy the risk that a prospective purchaser would anticipate if a property purchase decision was made. The rates chosen are the result of analysis of economic conditions and financial data listed in the supporting schedules and are the product of the staff's informed judgment.

The rates derived in this study are basic capitalization (or discount) rates that represent the after-tax return on investment only. Any increments required to be added by Property Tax Rule 8(g)(2), such as income or ad valorem tax components, are in addition to the rates listed.

A. *Capital Structure - Prospective Purchaser vs. Company Specific*

State assesses often ask why the Board does not use the current capital structure of individual companies in the band-of-investment method. As explained in Rule 8 (g)(2), the appraiser shall weight the rates of debt and equity capital by the respective amounts of such capital deemed most likely to be employed by a prospective purchaser.

Therefore, the capital structure contemplated is a representative or typical structure of an industry group of companies with a similar bond rating, not that of the present owner. The objective of doing so is to strike an optimum capital structure from the perspective of a potential investor.

B. *Company Specific Debt Rates*

In many cases the debt component of the capital structure for a prospective purchaser and the individual company being assessed may be similar. In cases where, in the judgement of staff, the debt ratings of the individual companies being assessed and the debt ratings of prospective purchasers are similar, the company-specific bond rating has been used to develop the appropriate debt component of the recommended capitalization rate. In cases where rate-base regulated companies have embedded debt with rates higher than the market rates at the lien date, a revenue adjustment may be indicated in order to match the revenue expected by a prospective purchaser if the purchaser's revenue would be determined by those market rates.

² Gas, Electric & Water; Natural Gas Transmission; Electric Generation; Telecommunications (Local Exchange, Interexchange, Wireless); Pipeline; Railroad

Executive Summary

C. *Impact of Holding Companies on Determination of Capital Structure*

Many of the larger state assessees are subsidiaries of their holding company. Stock purchases related to a subsidiary must be made through the parent holding company. Since there is no direct market data for state assessees that are subsidiaries of a holding company, staff must rely, in great part, upon market data related to the holding company.

III. *Capital Asset Pricing Model*

The Capital Asset Pricing Model (CAPM) is a widely accepted theory used to estimate the cost of equity capital. In the application of CAPM, the most sensitive component affecting the outcome is the estimate of the beta³ coefficient. The choice of different time frames and frequencies of measurement in the calculation of the beta can produce significantly different results. Another factor in the use of beta is the choice of whether to use an unadjusted beta or a beta adjusted to reflect the fact that betas tend to revert to the mean over time. In this study, three betas were obtained from separate sources: one adjusted (Value Line) and two unadjusted. Generally the betas from the three sources are averaged to establish the beta used to estimate the cost of equity capital for a specific industry. However, the average beta for highly regulated industries, such as gas or electric transmission and distribution, tend to understate the risk inherent in those securities. Accordingly, for companies in highly regulated environments, the Value Line adjusted beta was chosen as a better estimate of the relative risk in the calculation of the required equity return.

IV. *Flotation Costs*

When new issues of both debt and equity capital are sold to investors, the issuing company incurs transaction costs such as underwriting fees, legal expenses, and prospectus preparation costs. These costs of issuing securities are known as flotation costs. Much like loan fees or points on a mortgage, flotation costs effectively reduce the net proceeds that a firm will receive from issuing securities. The cost of capital is adjusted upward to reflect the expected flotation costs incurred to issue securities. Since the flotation costs are reflected in the weighted average cost of capital, the flotation costs should not be allowed as expenses in projecting cash flows to be capitalized. Each basic capitalization rate in this study has been adjusted to reflect flotation costs.

V. *Utilization of Other Studies and Data*

Staff appraisers reviewed data and capitalization rate studies submitted by assessees and interested parties in addition to a review of recent regulatory rate case filings and decisions, and where appropriate, used this information in the development of the staff derived rates.

The capitalization rates published in this study are intended to be applied to the unitary operations of the companies subject to assessment by the California State Board of Equalization.

³ The covariance of the returns of a security regressed against the returns of the overall market - a measurement of relative volatility

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Gas, Electric and Water Companies**

SBE No.	Company Name	Ratings			Capital Structure			Rates of Return			Basic Cap Rate
		Financial	Preferred Stock	Bond	Common Equity	Preferred Stock	Debt	Common Equity	Preferred Stock	Debt	
Gas and Electric Companies											
141	San Diego Gas & Electric Company	A	A3	A1	52%	3%	45%	10.79%	6.33%	4.62%	7.88%
148	Southern California Edison Company	A	Baa1	A2	48%	9%	43%	10.94%	6.33%	4.69%	7.84%
135	Pacific Gas and Electric Company	B+	Baa2	A3	52%	1%	47%	10.89%	6.33%	5.09%	8.12%
106	PacifiCorp	Not Rated	Baa2	A3	52%	1%	47%	11.52%	6.33%	5.09%	8.44%
146	Sierra Pacific Power Company	Not Rated	Not Rated	Baa1	52%	1%	47%	11.52%	7.04%	5.48%	8.64%
125	Terra-Gen Dixie Valley, LLC	Not Rated		Not Rated	55%		45%	11.52%		5.09%	8.62%
163	Liberty Utilities (Calpeco Electric), LLC	Not Rated		Not Rated	55%		45%	11.52%		5.09%	8.62%
191	Arizona Public Service Company	Not Rated		A2	55%		45%	11.52%		5.09%	8.62%
119	Trans Bay Cable LLC	Not Rated		Not Rated	55%		45%	14.14%		5.09%	10.06%
156	DATC Path 15, LLC	Not Rated		A3	55%		45%	14.14%		5.09%	10.06%
	Electric Cooperatives	Not Rated		Not Rated	55%		45%	11.52%		5.09%	8.62%
Natural Gas Distribution and Storage Companies											
149	Southern California Gas Company	A	A3	A1	52%	2%	46%	10.58%	6.10%	4.62%	7.75%
152	Southwest Gas Corporation	B++		A3	55%		45%	10.58%		5.09%	8.11%
192	Alpine Natural Gas Operating Company No. One LLC	Not Rated		Not Rated	55%		45%	12.30%		6.02%	9.48%
194	West Coast Gas Company, Inc.	Not Rated		Not Rated	55%		45%	12.30%		6.02%	9.48%
104	Central Valley Gas Storage LLC	Not Rated		Not Rated	60%		40%	14.40%		7.02%	11.45%
121	Gill Ranch Storage, LLC	Not Rated		Not Rated	60%		40%	14.40%		7.02%	11.45%
195	Wild Goose Storage, LLC	Not Rated		Not Rated	60%		40%	14.40%		7.02%	11.45%
198	Lodi Gas Storage, LLC	Not Rated		Not Rated	60%		40%	14.40%		7.02%	11.45%
Water Company											
101	Golden State Water Company	A		A2	55%		45%	9.87%		4.81%	7.60%

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Natural Gas Transmission Companies**

SBE No.	Company Name	Ratings		Capital Structure		Rates of Return		Basic Cap Rate
		Financial	Bond	Common Equity	Debt	Common Equity	Debt	
153	Transwestern Pipeline Company	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
180	North Baja Pipeline, LLC	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
187	Mojave Pipeline Company, LLC	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
188	Kern River Gas Transmission Company	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
189	Standard Pacific Gas Line, Incorporated	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
190	Tuscarora Gas Transmission Company	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
196	Questar Southern Trails Pipeline Company	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
197	El Paso Natural Gas Company, LLC	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Electric Generation Facilities**

Facility Type	Ratings		Capital Structure		Rates of Return		Basic Cap Rate ³
	Financial	Bond	Common Equity	Debt	Common Equity	Debt	
Modern Electric Generation Technology¹	B	B2	60%	40%	13.61%	7.12%	11.02%
Older Electric Generation Technology²	B	B2	60%	40%	15.71%	8.14%	12.68%

¹ Modern Electric Generation Technology - Generally high efficiency combined-cycle or simple cycle gas turbine electric generation facilities incorporating contemporary generation technologies.

² Older Electric Generation Technology - Generally older steam turbine electric generation facilities that were sold off by vertically integrated electric utilities and for which no replacements, other than for routine maintenance, have been made.

³ Staff may adjust the rates stated above if the specific situation of a facility warrants an adjustment to its basic capitalization rate.

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Telecommunications Companies**

SBE No.	Company Name	Ratings		Capital Structure		Rates of Return		Basic Cap Rate
		Financial	Bond	Common Equity	Debt	Common Equity	Debt	
Local Exchange Companies								
279	Pacific Bell Telephone Company	A++	A2	70%	30%	11.94%	4.49%	9.70%
201	Verizon California, Inc.	A++	A3	70%	30%	11.94%	4.88%	9.82%
284	Frontier Communications	B	Not Rated	65%	35%	12.98%	5.94%	10.52%
294	SureWest Telephone	C++	Not Rated	65%	35%	15.34%	6.21%	12.14%
	Other Local Exchange Companies	Not Rated	Not Rated	65%	35%	15.34%	6.21%	12.14%
Wireless Companies								
2606	AT&T Mobility LLC	A++	A2	70%	30%	11.41%	4.49%	9.34%
2532	Los Angeles SMSA Ltd., Partnership	A++	A3	70%	30%	11.41%	4.88%	9.45%
2552	Fresno MSA Limited Partnership	A++	A3	70%	30%	11.41%	4.88%	9.45%
2559	Cellco Partnership	A++	A3	70%	30%	11.41%	4.88%	9.45%
2669	California RSA #4 Partnership	A++	A3	70%	30%	11.41%	4.88%	9.45%
2748	T-Mobile West, LLC	B	Not Rated	65%	35%	12.72%	6.21%	10.44%
2720	Sprint Telephony PCS, L.P.	C++	B3	65%	35%	14.55%	7.53%	12.10%
	Other Wireless Companies¹	Not Rated	Not Rated	55%	45%	16.65%	9.05%	13.23%
	Wireless Reseller Companies	Not Rated	Not Rated	55%	45%	18.74%	9.56%	14.61%
Interexchange Companies								
2310	AT&T Communications	A++	A2	70%	30%	12.72%	4.49%	10.25%
2274	MCI Communications Services, Inc.	A++	A3	70%	30%	12.72%	4.88%	10.37%
2372	MCI Metro Access Transmission Services, LLC	A++	A3	70%	30%	12.72%	4.88%	10.37%
2463	CenturyLink Communications, LLC	B++	Baa3	65%	35%	14.29%	5.94%	11.37%
2014	Sprint Communications Company, L.P.	C++	B3	60%	40%	16.65%	7.53%	13.00%
7761	Level 3 Communications, LLC	C++	Caa2	60%	40%	16.65%	9.05%	13.61%
	Other Interexchange Carriers	Not Rated	Not Rated	55%	45%	21.36%	9.05%	15.82%
	Other Interexchange Resellers	Not Rated	Not Rated	55%	45%	24.50%	9.56%	17.78%

¹ Includes Radio Telephone and Paging Companies

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Pipeline Companies**

SBE No.	Company Name	Ratings		Capital Structure		Rates of Return		Basic Cap Rate
		Financial	Bond	Common Equity	Debt	Equity	Debt	
402	Calnev Pipe Line LLC.	NR-1	NR-b	65%	35%	13.61%	5.60%	10.81%
461	SFPP, L.P.	NR-1	NR-b	65%	35%	13.61%	5.60%	10.81%
479	Chevron Pipe Line Company	NR-2	NR-b	65%	35%	14.14%	5.60%	11.15%
480	Phillips 66 Pipeline LLC	NR-2	NR-b	65%	35%	14.14%	5.60%	11.15%
486	Pacific Pipeline System LLC	NR-2	NR-b	65%	35%	14.14%	5.60%	11.15%
492	San Pablo Bay Pipeline Company LLC	NR-2	NR-b	65%	35%	14.14%	5.60%	11.15%
	Other Pipeline Companies	NR-3	NR-c	65%	35%	15.18%	6.61%	12.18%

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Railroad Companies**

SBE No.	Company Name	Capital Structure				Rates of Return		Basic Cap Rate
		Financial	Bond	Common Equity	Debt	Common Equity	Debt	
804	BNSF Railway Company	A++	Baa2	80%	20%	13.61%	5.60%	12.01%
843	Union Pacific Railroad Company	A++	Baa2	80%	20%	13.61%	5.60%	12.01%
802	Central Oregon & Pacific Railroad	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
810	California Northern Railroad	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
813	Pacific Harbor Lines	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
822	Pacific Sun Railroad, LLC	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
826	Sacramento Valley Railroad, LLC	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
850	Modesto & Empire Traction Company	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
865	San Diego & Imperial Valley Railroad Co. Inc.	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
878	Stockton Terminal and Eastern Railroad	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
882	Trona Railway Co.	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
897	San Joaquin Valley Railroad Company	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
899	Arizona & California Railroad	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
	Other Railroad Companies	NR-2	NR-2	60%	40%	15.97%	8.14%	12.84%

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Gas, Electric and Water Companies**

SBE No.	Company Name	Ratings			Capital Structure			Rates of Return			Basic Cap Rate
		Financial	Preferred Stock	Bond	Common Equity	Preferred Stock	Debt	Common Equity	Preferred Stock	Debt	
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148	Southern California Edison Company	A	Baa1	A2	48%	9%	43%	10.94%	6.33%	4.69%	7.84%
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195	Wild Goose Storage, LLC	Not Rated		Not Rated	60%		40%	14.40%		7.02%	11.45%
198	Lodi Gas Storage, LLC	Not Rated		Not Rated	60%		40%	14.40%		7.02%	11.45%
Water Company											
101	Golden State Water Company	A		A2	55%		45%	9.87%		4.81%	7.60%

**2016 Capitalization Rate Study
Gas, Electric and Water Companies
Industry Notes**

- In establishing the capital structures for the rate-regulated utilities, staff considered the decisions of the California Public Utilities Commission (CPUC). For the non-rate-regulated utilities, the capital structures were developed based on the financial data collected and the relative risks of the utilities sampled in the Capitalization Rate Study.

- Staff considered the following in the development of equity rates:
 1. CPUC-authorized rates of return
 2. FERC-authorized rates of return
 3. Discounted Cash Flow Model
 4. Capital Asset Pricing Model – ex post and ex ante risk premiums

- Staff considered the following in the development of debt rates:
 1. Moody’s Utility Bond Yield Spreads
 2. The debt rates that a prospective purchaser would expect at lien date

- The following utilities were removed from the 2016 Capitalization Rate Study sample:
 1. UIL Holdings Corporation merged with the Spanish company’s U.S unit Iberdrola U.S.
 2. Integrys Energy was acquired by Wisconsin Energy Corporation and forming the WEC Energy Group.

- Northeast Utilities became Eversource Energy on February 2, 2015.

**2016 Capitalization Rate Study
Gas and Electric Companies
Flotation Cost Adjustment**

Equity				Preferred Stock				Debt			
Value Line Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
A	10.30%	4.50%	10.79%	A3	6.22%	1.70%	6.33%	A1	4.54%	1.70%	4.62%
A	10.45%	4.50%	10.94%	Baa1	6.22%	1.70%	6.33%	A2	4.61%	1.70%	4.69%
B+	10.40%	4.50%	10.89%	Baa2	6.22%	1.70%	6.33%	A3	5.00%	1.70%	5.09%
Not Rated	11.00%	4.50%	11.52%	Not Rated	6.92%	1.70%	7.04%	Baa1	5.39%	1.70%	5.48%
Not Rated	13.50%	4.50%	14.14%					Not Rated	5.92%	1.70%	6.02%

$$\text{Cost of Capital Adjusted for Flotation Costs} = \frac{k_u}{1 - f}$$

Where: k_u = The cost of capital unadjusted for flotation costs

f = Flotation cost as a percentage of the value of securities issued

**2016 Capitalization Rate Study
Gas and Electric Companies
Summary of Rates of Return**

Common Equity		Preferred Stock		Bonds		
Value Line Rating	Rate of Return ¹	Moody's Bond Rating	Rate of Return ²	Moody's Bond Yields	Moody's Rating	Rate of Return ³
A	10.30%	A3	6.22%	Aaa=N/A	Aaa2	3.53%
					Aaa3	3.75%
A	10.45%	Baa1	6.22%	Aa=4.21	Aa1	3.98%
					Aa2	4.21%
B+	10.40%	Baa2	6.22%		Aa3	4.28%
					A1	4.34%
Not Rated	11.00%	Not Rated	6.92%	A=4.41	A2	4.41%
					A3	4.80%
Not Rated	13.50%			Baa=5.58	Baa1	5.19%
					Baa2	5.58%
					Baa3	5.72%
					Ba1	5.86%
					Ba2	6.00%
					Ba3	6.14%
					B1	6.28%
					B2	6.42%
					B3	6.56%
					Not Rated	6.70%

¹The Rate of Return on Common Equity was developed by staff based on the relative risks of the utilities in conjunction with the results of various financial models and pertinent information from different sources. Consideration was also given to the latest decisions of the California Public Utilities Commission. For 2016 the return on equity (ROE) and return on rate base (ROR) for Pacific Gas and Electric Company are 10.40% and 8.06%, respectively; for Southern California Edison Company, the ROE and ROR are 10.45% and 7.98%, respectively (D 12-12-034); for San Diego Gas & Electric Company, the ROE and ROR are 10.30% and 7.79%, respectively (D 12-12-034).

²The Rate of Return on Preferred Stocks was developed by staff based on the relative risks of the utilities. Consideration was given to the latest decisions of the California Public Utilities Commission.

³The Rates of Return on Bonds were based on the 2015 Moody's "Utility Bond Yields" reports. Because Moody's assigns yields only to groups Aaa, Aa, A and Baa, staff interpolated the difference between these groups to further refine the ratings.

**2016 Capitalization Rate Study
Gas and Electric Companies
Capital Asset Pricing Model - Ex Ante**

Component	Value Line Ratings	
	A+, A	B++, B+, B
Expected Future Return, S&P 500	10.80%	10.80%
Less: Risk Free Return - Long-Term Treasury Rates ¹	2.78%	2.78%
Risk Premium	8.02%	8.02%
Beta ²	0.77	0.80
Adjusted Risk Premium	6.18%	6.42%
Risk Free Return - Long-Term Treasury Rates ¹	2.78%	2.78%
Projected Return on Equity	8.96%	9.20%

¹ US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 31, 2015

² The estimated betas were derived from a sample of gas and electric companies with similar ratings.

**2016 Capitalization Rate Study
Gas and Electric Companies
Capital Asset Pricing Model - Ex Post**

Component	Value Line Ratings	
	A+, A	B++, B+, B
Common Stock Returns, S&P 500 (1928 - 2015) ¹	11.41%	11.41%
Less: 10 Year Treasury Bonds (1928 - 2015) ¹	5.23%	5.23%
Risk Premium	6.18%	6.18%
Beta ²	0.77	0.80
Adjusted Risk Premium	4.76%	4.94%
Risk Free Return - Long-Term Treasury Rates ³	2.78%	2.78%
Projected Return on Equity	7.54%	7.72%

¹ Damodaran Online, January 6, 2016

² The estimated betas were derived from a sample of gas and electric companies with similar ratings.

³ US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 31, 2015

2016 Capitalization Rate Study
Gas and Electric Companies
Equity Rates

a	b	c	d	e	f	g	h	i	j	k	l	m
Value Line Rating	Company Name	Stock Price 12/31/15	Est. 2016 Earnings	2015 Earnings	2015 Dividends	Est. 2016 Dividends	Dividend Yield (g/c)	Est. Dividend Growth	Est. Earnings Growth	E/P Ratio (d/c)	DvYld+ DvGrth (h+i)	DvYld+ ErngsGr (h+j)
A+	Consolidated Edison, Inc.	64.27	4.10	3.95	2.60	2.68	4.17%	2.50%	3.00%	6.38%	6.67%	7.17%
A+	Pinnacle West Capital Corporation	64.48	3.95	3.85	2.44	2.56	3.97%	3.50%	4.57%	6.13%	7.47%	8.54%
A+	WEC Energy Group Inc.	51.31	2.90	2.40	1.76	1.98	3.86%	8.50%	6.60%	5.65%	12.36%	10.46%
A	Allete, Inc.	50.83	3.20	3.50	2.02	2.08	4.09%	3.00%	5.50%	6.30%	7.09%	9.59%
A	Alliant Energy Corporation	62.45	3.85	3.65	2.20	2.36	3.78%	4.50%	5.67%	6.16%	8.28%	9.45%
A	Ameren Corporation	43.23	2.75	2.45	1.66	1.72	3.98%	3.50%	6.67%	6.36%	7.48%	10.65%
A	American Electric Power Co., Inc.	58.27	3.70	3.70	2.15	2.27	3.90%	5.00%	4.80%	6.35%	8.90%	8.70%
A	Avista Corp.	35.37	2.00	1.90	1.32	1.37	3.87%	4.00%	5.00%	5.65%	7.87%	8.87%
A	Black Hills Corporation	46.43	3.00	2.90	1.62	1.68	3.62%	4.00%	4.57%	6.46%	7.62%	8.19%
A	Cleco Corporation	52.21	2.25	2.20	1.60	1.60	3.06%	4.00%	1.75%	4.31%	7.06%	4.81%
A	Duke Energy Corporation	71.39	4.65	4.30	3.24	3.36	4.71%	3.50%	4.13%	6.51%	8.21%	8.84%
A	Edison International	59.21	4.35	4.40	1.71	1.89	3.19%	10.00%	2.87%	7.35%	13.19%	6.06%
A	Eversource Energy	51.07	3.00	2.80	1.67	1.78	3.49%	6.50%	7.30%	5.87%	9.99%	10.79%
A	Hawaiian Electric Industries Inc.	28.95	1.55	1.40	1.24	1.24	4.28%	1.00%	3.30%	5.35%	5.28%	7.58%
A	MGE Energy Inc.	46.40	2.40	2.25	1.16	1.20	2.59%	4.00%	7.00%	5.17%	6.59%	9.59%
A	NextEra Energy, Inc.	103.89	6.30	6.05	3.08	3.50	3.37%	11.00%	7.23%	6.06%	14.37%	10.60%
A	OGE Energy Corp.	26.29	1.85	1.75	1.05	1.16	4.41%	10.00%	3.27%	7.04%	14.41%	7.68%
A	Sempra Energy	94.01	4.95	4.80	2.80	2.96	3.15%	6.00%	8.70%	5.27%	9.15%	11.85%
A	Southern Company	46.79	2.95	2.85	2.15	2.22	4.74%	3.00%	4.03%	6.30%	7.74%	8.78%
A	Vectren Corporation	42.42	2.55	2.35	1.54	1.62	3.82%	4.00%	6.73%	6.01%	7.82%	10.55%
A	Xcel Energy Inc.	35.91	2.15	2.05	1.28	1.36	3.79%	6.00%	4.73%	5.99%	9.79%	8.52%
	Mean						3.80%	5.12%	5.12%	6.03%	8.92%	8.92%
	Median						3.86%	4.00%	4.80%	6.13%	7.87%	8.84%
	Weighted Average										9.72%	9.18%

Sources: Columns a, d, e, f, g and i were extracted from Value Line.

Column j represents the average estimated earnings growth extracted from Value Line, Zacks.com and ThomsonReuters.com.

Column c was acquired from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Gas and Electric Companies
Equity Rates**

a	b	c	d	e	f	g	h	i	j	k	l	m
Value Line Rating	Company Name	Stock Price 12/31/15	Est. 2016 Earnings	2015 Earnings	2015 Dividends	Est. 2016 Dividends	Dividend Yield (g/c)	Est. Dividend Growth	Est. Earnings Growth	E/P Ratio (d/c)	DvYld+ DvGrth (h+i)	DvYld+ ErngsGr (h+j)
B++	CMS Energy Corp.	36.08	2.00	1.88	1.16	1.24	3.44%	6.50%	6.13%	5.54%	9.94%	9.57%
B++	DTE Energy Company	80.19	4.90	4.60	2.84	3.00	3.74%	5.50%	5.17%	6.11%	9.24%	8.91%
B++	El Paso Electric Co.	38.50	2.20	1.95	1.17	1.23	3.19%	5.00%	5.10%	5.71%	8.19%	8.29%
B++	Empire District Electric Company	28.07	1.45	1.35	1.04	1.04	3.71%	2.00%	4.33%	5.17%	5.71%	8.04%
B++	Entergy Corporation	68.36	4.50	6.00	3.34	3.42	5.00%	2.50%	-1.73%	6.58%	7.50%	3.27%
B++	Exelon Corporation	27.77	2.65	2.60	1.24	1.24	4.47%	-2.00%	5.20%	9.54%	2.47%	9.67%
B++	Portland General Electric Company	36.37	2.40	2.15	1.18	1.26	3.46%	5.50%	4.83%	6.60%	8.96%	8.30%
B++	SCANA Corp.	60.49	3.95	3.85	2.18	2.26	3.74%	3.50%	4.43%	6.53%	7.24%	8.17%
B++	Westar Energy, Inc.	42.41	2.45	2.25	1.44	1.50	3.54%	3.00%	4.37%	5.78%	6.54%	7.90%
B+	CenterPoint Energy, Inc.	18.36	1.15	1.10	0.99	1.03	5.61%	5.00%	1.07%	6.26%	10.61%	6.68%
B+	FirstEnergy Corp.	31.73	2.65	2.00	1.44	1.48	4.66%	-1.50%	3.05%	8.35%	3.16%	7.71%
B+	Great Plains Energy Incorporated	27.31	1.75	1.35	1.00	1.06	3.88%	6.00%	5.13%	6.41%	9.88%	9.01%
B+	Otter Tail Corporation	26.63	1.75	1.60	1.23	1.25	4.69%	1.50%	9.00%	6.57%	6.19%	13.69%
B+	Pepco Holdings, Inc.	26.01	1.35	1.05	1.08	1.08	4.15%	0.00%	6.43%	5.19%	4.15%	10.59%
B+	PG&E Corporation	53.19	3.30	1.90	1.82	1.82	3.42%	3.00%	6.93%	6.20%	6.42%	10.36%
B	PNM Resources, Inc.	30.57	1.65	1.55	0.80	0.85	2.78%	10.00%	8.67%	5.40%	12.78%	11.45%
	Mean						3.97%	3.47%	4.88%	6.37%	7.44%	8.85%
	Median						3.74%	3.25%	5.12%	6.23%	7.37%	8.60%
	Weighted Average										6.34%	8.55%

Sources: Columns a, d, e, f, g and i were extracted from Value Line.

Column j represents the average estimated earnings growth extracted from Value Line, Zacks.com and ThomsonReuters.com.

Column c was acquired from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Gas and Electric Companies
Long Term Earnings Growth**

a	b	c	d	e	f
Value Line Rating	Company Name	Value Line	Zacks	Thomson	Average
A+	Consolidated Edison, Inc.	3.00%	3.10%	2.90%	3.00%
A+	Pinnacle West Capital Corporation	4.00%	4.80%	4.90%	4.57%
A+	WEC Energy Group Inc.	6.00%	6.20%	7.60%	6.60%
A	Allete, Inc.	6.50%	5.00%	5.00%	5.50%
A	Alliant Energy Corporation	6.00%	5.40%	5.60%	5.67%
A	Ameren Corporation	7.00%	6.60%	6.40%	6.67%
A	American Electric Power Co., Inc.	5.00%	4.80%	4.60%	4.80%
A	Avista Corp.	5.00%	5.00%	N/A	5.00%
A	Black Hills Corporation	6.00%	4.20%	3.50%	4.57%
A	Cleco Corporation	0.50%	3.00%	N/A	1.75%
A	Duke Energy Corporation	5.00%	4.10%	3.30%	4.13%
A	Edison International	3.50%	4.50%	0.60%	2.87%
A	Eversource Energy	8.50%	6.80%	6.60%	7.30%
A	Hawaiian Electric Industries Inc.	3.50%	3.20%	3.20%	3.30%
A	MGE Energy Inc.	7.00%	N/A	N/A	7.00%
A	NextEra Energy, Inc.	7.50%	7.10%	7.10%	7.23%
A	OGE Energy Corp.	3.00%	4.60%	2.20%	3.27%
A	Sempra Energy	8.50%	8.20%	9.40%	8.70%
A	Southern Company	4.50%	3.90%	3.70%	4.03%
A	Vectren Corporation	9.50%	5.70%	5.00%	6.73%
A	Xcel Energy Inc.	4.50%	5.00%	4.70%	4.73%

**2016 Capitalization Rate Study
Gas and Electric Companies
Long Term Earnings Growth**

a	b	c	d	e	f
Value Line Rating	Company Name	Value Line	Zacks	Thomson	Average
B++	CMS Energy Corp.	5.50%	6.20%	6.70%	6.13%
B++	DTE Energy Company	5.00%	5.50%	5.00%	5.17%
B++	El Paso Electric Co.	3.50%	6.70%	N/A	5.10%
B++	Empire District Electric Company	3.00%	5.00%	5.00%	4.33%
B++	Entergy Corporation	-1.00%	-1.70%	-2.50%	-1.73%
B++	Exelon Corporation	7.50%	4.20%	3.90%	5.20%
B++	Portland General Electric Company	6.00%	4.40%	4.10%	4.83%
B++	SCANA Corp.	4.50%	4.30%	4.50%	4.43%
B++	Westar Energy, Inc.	6.00%	3.60%	3.50%	4.37%
B+	CenterPoint Energy, Inc.	0.00%	2.80%	0.40%	1.07%
B+	FirstEnergy Corp.	7.00%	N/A	-0.90%	3.05%
B+	Great Plains Energy Incorporated	5.00%	5.60%	4.80%	5.13%
B+	Otter Tail Corporation	9.00%	N/A	N/A	9.00%
B+	Pepco Holdings, Inc.	8.00%	7.00%	4.30%	6.43%
B+	PG&E Corporation	10.50%	4.50%	5.80%	6.93%
B	PNM Resources, Inc.	9.00%	7.70%	9.30%	8.67%
	Mean	5.47%	4.91%	4.38%	5.01%
	Median	5.50%	4.90%	4.65%	5.00%
	Weighted Average				4.95%

Sources: Columns a and c were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.

**2016 Capitalization Rate Study
Gas and Electric Companies
Capital Structure**

a	b	c	d	e	f	g	h	i	j	k	l
Value Line Rating	Company Name	Common Stock Outstanding	Common Stock Price 12/31/15	Mkt Value Equity (\$million)	L.T. Debt (\$million)	Pfd Stock (\$million)	Common Equity (\$million)	Total Capital (\$million)	L.T. Debt %	Pfd Stock %	Common Equity %
A+	Consolidated Edison, Inc.	293,192,258	64.27	18,843.47	11,521.00	0.00	18,843.47	30,364.47	37.94%	0.00%	62.06%
A+	Pinnacle West Capital Corporation	110,813,659	64.48	7,145.26	3,565.90	0.00	7,145.26	10,711.16	33.29%	0.00%	66.71%
A+	WEC Energy Group Inc.	315,684,451	51.31	16,197.77	8,727.00	81.50	16,197.77	25,006.27	34.90%	0.33%	64.77%
A	Allele, Inc.	48,965,562	50.83	2,488.92	1,549.00	0.00	2,488.92	4,037.92	38.36%	0.00%	61.64%
A	Alliant Energy Corporation	113,360,425	62.45	7,079.36	3,855.80	200.00	7,079.36	11,135.16	34.63%	1.80%	63.58%
A	Ameren Corporation	242,634,798	43.23	10,489.10	5,981.00	142.00	10,489.10	16,612.10	36.00%	0.85%	63.14%
A	American Electric Power Co., Inc.	490,817,402	58.27	28,599.93	17,600.00	0.00	28,599.93	46,199.93	38.10%	0.00%	61.90%
A	Avista Corp.	62,296,577	35.37	2,203.43	1,546.40	0.00	2,203.43	3,749.83	41.24%	0.00%	58.76%
A	Black Hills Corporation	44,834,944	46.43	2,081.69	1,567.70	0.00	2,081.69	3,649.39	42.96%	0.00%	57.04%
A	Cleco Corporation	60,482,051	52.21	3,157.77	1,207.20	0.00	3,157.77	4,364.97	27.66%	0.00%	72.34%
A	Duke Energy Corporation	688,334,378	71.39	49,140.19	37,667.00	0.00	49,140.19	86,807.19	43.39%	0.00%	56.61%
A	Edison International	325,811,206	59.21	19,291.28	11,265.00	2,022.00	19,291.28	32,578.28	34.58%	6.21%	59.22%
A	Eversource Energy	317,173,164	51.07	16,198.03	8,689.60	155.60	16,198.03	25,043.23	34.70%	0.62%	64.68%
A	Hawaiian Electric Industries Inc.	107,456,645	28.95	3,110.87	1,506.50	34.30	3,110.87	4,651.67	32.39%	0.74%	66.88%
A	MGE Energy Inc.	34,668,370	46.40	1,608.61	392.10	0.00	1,608.61	2,000.71	19.60%	0.00%	80.40%
A	NextEra Energy, Inc.	460,535,906	103.89	47,845.08	25,604.00	0.00	47,845.08	73,449.08	34.86%	0.00%	65.14%
A	OGE Energy Corp.	199,702,572	26.29	5,250.18	2,645.50	0.00	5,250.18	7,895.68	33.51%	0.00%	66.49%
A	Sempra Energy	247,915,696	94.01	23,306.55	12,626.00	20.00	23,306.55	35,952.55	35.12%	0.06%	64.83%
A	Southern Company	908,424,808	46.79	42,505.20	22,674.00	940.00	42,505.20	66,119.20	34.29%	1.42%	64.29%
A	Vectren Corporation	82,703,774	42.42	3,508.29	1,522.70	0.00	3,508.29	5,030.99	30.27%	0.00%	69.73%
A	Xcel Energy Inc.	507,211,342	35.91	18,213.96	11,896.00	0.00	18,213.96	30,109.96	39.51%	0.00%	60.49%
	Mean								35.11%	0.57%	64.32%
	Median								34.86%	0.00%	64.29%
	Weighted Average								36.85%	0.68%	62.47%

Sources: Columns a, c, f and g were extracted from Value Line.
Column d was acquired from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Gas and Electric Companies
Capital Structure**

a	b	c	d	e	f	g	h	i	j	k	l
Value Line Rating	Company Name	Common Stock Outstanding	Common Stock Price 12/31/15	Mkt Value Equity (\$million)	L.T. Debt (\$million)	Pfd Stock (\$million)	Common Equity (\$million)	Total Capital (\$million)	L.T. Debt %	Pfd Stock %	Common Equity %
B++	CMS Energy Corp.	277,100,000	36.08	9,997.77	8,014.00	37.00	9,997.77	18,048.77	44.40%	0.21%	55.39%
B++	DTE Energy Company	179,475,625	80.19	14,392.15	8,856.00	0.00	14,392.15	23,248.15	38.09%	0.00%	61.91%
B++	El Paso Electric Co.	40,424,525	38.50	1,556.34	1,134.20	0.00	1,556.34	2,690.54	42.16%	0.00%	57.84%
B++	Empire District Electric Company	43,787,249	28.07	1,229.11	863.00	0.00	1,229.11	2,092.11	41.25%	0.00%	58.75%
B++	Entergy Corporation	178,386,800	68.36	12,194.52	13,080.00	210.80	12,194.52	25,485.32	51.32%	0.83%	47.85%
B++	Exelon Corporation	861,617,731	27.77	23,927.12	25,868.00	193.00	23,927.12	49,988.12	51.75%	0.39%	47.87%
B++	Portland General Electric Company	88,765,889	36.37	3,228.42	2,204.00	0.00	3,228.42	5,432.42	40.57%	0.00%	59.43%
B++	SCANA Corp.	142,916,917	60.49	8,645.04	6,018.00	0.00	8,645.04	14,663.04	41.04%	0.00%	58.96%
B++	Westar Energy, Inc.	141,838,178	42.41	6,015.36	2,941.90	0.00	6,015.36	8,957.26	32.84%	0.00%	67.16%
B+	CenterPoint Energy, Inc.	430,262,191	18.36	7,899.61	7,662.00	0.00	7,899.61	15,561.61	49.24%	0.00%	50.76%
B+	FirstEnergy Corp.	422,453,361	31.73	13,404.45	18,570.00	0.00	13,404.45	31,974.45	58.08%	0.00%	41.92%
B+	Great Plains Energy Incorporated	154,369,354	27.31	4,215.83	3,763.50	39.00	4,215.83	8,018.33	46.94%	0.49%	52.58%
B+	Otter Tail Corporation	37,743,953	26.63	1,005.12	498.30	0.00	1,005.12	1,503.42	33.14%	0.00%	66.86%
B+	Pepco Holdings, Inc.	253,617,191	26.01	6,596.58	5,028.00	0.00	6,596.58	11,624.58	43.25%	0.00%	56.75%
B+	PG&E Corporation	482,010,056	53.19	25,638.11	15,544.00	252.00	25,638.11	41,434.11	37.51%	0.61%	61.88%
B	PNM Resources, Inc.	79,653,624	30.57	2,435.01	1,731.20	11.50	2,435.01	4,177.71	41.44%	0.28%	58.29%
	Mean								43.31%	0.17%	56.51%
	Median								41.80%	0.00%	58.07%
	Weighted Average								45.97%	0.28%	53.75%

Sources: Columns a, c, f and g were extracted from Value Line.
Column d was acquired from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Gas and Electric Companies
Beta Analysis**

a	b	c	d	e	f	g	h	i
Value Line Rating	Company Name	Value Line Beta	Zacks Beta	Standard & Poor's Beta	Average Beta	Company's Tax Rate	Debt Equity Ratio ¹	Unlevered Beta ²
A+	Consolidated Edison, Inc.	0.60	-0.06	0.09	0.21	0.35	0.60	0.43
A+	Pinnacle West Capital Corporation	0.75	0.33	0.31	0.46	0.35	0.51	0.56
A+	WEC Energy Group Inc.	0.70	0.10	0.19	0.33	0.39	0.50	0.54
A	Allete, Inc.	0.80	0.61	0.74	0.72	0.20	0.56	0.55
A	Alliant Energy Corporation	0.80	0.43	0.42	0.55	0.15	0.53	0.55
A	Ameren Corporation	0.75	0.31	0.27	0.44	0.38	0.70	0.52
A	American Electric Power Co., Inc.	0.70	0.19	0.34	0.41	0.36	0.67	0.49
A	Avista Corp.	0.80	0.44	0.64	0.63	0.37	0.74	0.54
A	Black Hills Corporation	0.95	0.77	0.80	0.84	0.34	0.65	0.66
A	Cleco Corporation	0.75	0.40	0.54	0.56	0.36	0.47	0.58
A	Duke Energy Corporation	0.65	0.03	0.14	0.27	0.33	0.65	0.45
A	Edison International	0.70	0.25	0.39	0.45	0.21	0.81	0.43
A	Eversource Energy	0.75	0.34	0.40	0.50	0.38	0.59	0.55
A	Hawaiian Electric Industries Inc.	0.80	0.21	0.24	0.42	0.33	0.52	0.59
A	MGE Energy Inc.	0.75	0.35	0.46	0.52	0.35	0.29	0.63
A	NextEra Energy, Inc.	0.75	0.39	0.34	0.49	0.31	0.66	0.51
A	OGE Energy Corp.	0.95	0.61	0.67	0.74	0.27	0.44	0.72
A	Sempra Energy	0.80	0.44	0.39	0.54	0.29	0.57	0.57
A	Southern Company	0.60	0.00	0.08	0.23	0.33	0.55	0.44
A	Vectren Corporation	0.75	0.51	0.55	0.60	0.35	0.55	0.55
A	Xcel Energy Inc.	0.65	0.13	0.23	0.34	0.35	0.69	0.45
	Mean	0.75	0.32	0.39	0.49		0.58	0.54
	Median	0.75	0.34	0.39	0.49		0.57	0.55
	Weighted Average				0.39		0.62	0.49
	Relevered Beta based on 45% Debt Capital Structure and Mean Unlevered Beta ³							0.80
	Relevered Beta based on 45% Debt Capital Structure and Weighted Average Unlevered Beta ³							0.74

Sources: Columns a, c and g were extracted from Value Line.

Column d was extracted from Zacks.com.

Column e was extracted from Standard and Poor's Stock Reports.

¹ Average Debt to Equity Ratio over the last five years.

² Unlevered Beta = $Beta/[1+(1-tc)(D/E)]$; where D/E is the debt to equity ratio, tc is the company's most recent tax rate.

³ Relevered Beta = $[Unlevered Beta][1+(1-tp)(D/E)]$; where D/E is the debt to equity ratio, tp is a prospective purchaser's tax rate (assumed to be 40%).

**2016 Capitalization Rate Study
Gas and Electric Companies
Beta Analysis**

a	b	c	d	e	f	g	h	i
Value Line Rating	Company Name	Value Line Beta	Zacks Beta	Standard & Poor's Beta	Average Beta	Company's Tax Rate	Debt Equity Ratio ¹	Unlevered Beta ²
B++	CMS Energy Corp.	0.75	0.14	0.23	0.37	0.39	0.98	0.47
B++	DTE Energy Company	0.75	0.28	0.24	0.42	0.28	0.80	0.48
B++	El Paso Electric Co.	0.75	0.29	0.43	0.49	0.33	0.59	0.54
B++	Empire District Electric Company	0.70	0.29	0.45	0.48	0.38	0.71	0.48
B++	Entergy Corporation	0.70	0.33	0.28	0.44	0.23	0.97	0.40
B++	Exelon Corporation	0.70	0.18	0.45	0.44	0.30	0.73	0.46
B++	Portland General Electric Company	0.80	0.41	0.41	0.54	0.25	0.76	0.51
B++	SCANA Corp.	0.75	0.21	0.30	0.42	0.32	0.75	0.50
B++	Westar Energy, Inc.	0.75	0.25	0.45	0.48	0.30	0.71	0.50
B+	CenterPoint Energy, Inc.	0.85	0.31	0.38	0.51	0.35	0.91	0.53
B+	FirstEnergy Corp.	0.70	0.08	0.22	0.33	0.38	1.17	0.40
B+	Great Plains Energy Incorporated	0.85	0.43	0.50	0.59	0.35	0.90	0.54
B+	Otter Tail Corporation	0.85	0.79	1.08	0.91	0.25	0.48	0.63
B+	Pepco Holdings, Inc.	0.75	0.37	0.25	0.46	0.35	0.77	0.50
B+	PG&E Corporation	0.65	0.22	0.22	0.36	0.23	0.66	0.43
B	PNM Resources, Inc.	0.85	0.27	0.49	0.54	0.35	0.91	0.53
	Mean	0.76	0.30	0.40	0.49		0.80	0.49
	Median	0.75	0.29	0.40	0.47		0.77	0.50
	Weighted Average				0.43		0.84	0.46
	Relevered Beta based on 47% Debt Capital Structure and Mean Unlevered Beta ³							0.76
	Relevered Beta based on 47% Debt Capital Structure and Weighted Average Unlevered Beta ³							0.71

Sources: Columns a, c and g were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from Standard and Poor's Stock Reports.

¹ Average Debt to Equity Ratio over the last five years.

² Unlevered Beta = $Beta/[1+(1-tc)(D/E)]$; where D/E is the debt to equity ratio, tc is the company's most recent tax rate.

³ Relevered Beta = $[Unlevered Beta][1+(1-tp)(D/E)]$; where D/E is the debt to equity ratio, tp is the prospective purchaser's tax rate (assumed to be 40%).

**2016 Capitalization Rate Study
Natural Gas Distribution Companies
Flotation Cost Adjustment**

Equity				Preferred Stock				Debt			
Value Line Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
A, B++	10.10%	4.50%	10.58%	A3	6.00%	1.70%	6.10%	Aa2	4.41%	1.70%	4.49%
Not Rated	11.75%	4.50%	12.30%					Aa3	4.48%	1.70%	4.55%
Not Rated	13.75%	4.50%	14.40%					A1	4.54%	1.70%	4.62%
								A2	4.61%	1.70%	4.69%
								A3	5.00%	1.70%	5.09%
								Baa1	5.39%	1.70%	5.48%
								Baa2	5.78%	1.70%	5.88%
								Baa3	5.92%	1.70%	6.02%
								Ba1	6.06%	1.70%	6.16%
								Ba2	6.20%	1.70%	6.31%
								Ba3	6.34%	1.70%	6.45%
								Not Rated	6.90%	1.70%	7.02%

Cost of Capital Adjusted for Flotation Costs = $\frac{k_u}{1 - f}$

Where: k_u = The cost of capital unadjusted for flotation costs

f = Flotation cost as a percentage of the value of securities issued

**2016 Capitalization Rate Study
Natural Gas Distribution Companies
Summary of Rates of Return**

Common Equity		Preferred Stock		Bonds		
Value Line Rating	Rate of Return ¹	Moody's Bond Rating	Rate of Return ²	Moody's Bond Yields	Moody's Rating	Rate of Return ³
A, B++	10.10%	A3	6.00%	Aaa=N/A	Aaa2	3.53%
					Aaa3	3.75%
Not Rated	11.75%				Aa1	3.98%
				Aa=4.21	Aa2	4.21%
Not Rated	13.75%				Aa3	4.28%
					A1	4.34%
				A=4.41	A2	4.41%
					A3	4.80%
					Baa1	5.19%
				Baa=5.58	Baa2	5.58%
					Baa3	5.72%
					Ba1	5.86%
					Ba2	6.00%
					Ba3	6.14%
					B1	6.28%
					B2	6.42%
					B3	6.56%
					Not Rated	6.70%

¹ The Rate of Return on Common Equity was developed by staff based on the relative risks of the utilities in conjunction with the results of various financial models and pertinent information from different sources. Consideration was also given to the latest decisions of the California Public Utilities Commission. For 2016, the return on equity (ROE) and return on rate base (ROR) for Southern California Gas Company are 10.10% and 8.02%, respectively (D 12-12-034); for Southwest Gas Corporation, the ROE and ROR are 10.10% and 8.18% , respectively.

² The Rate of Return on Preferred Stocks was developed by staff based on the relative risks of the utilities. Consideration was given to the latest decisions of the California Public Utilities Commission.

³ The Rates of Return on Bonds were based on the 2015 Moody's "Utility Bond Yields" reports. Because Moody's assigns yields only to groups Aaa, Aa, A and Baa, staff interpolated the difference between these groups to further refine the ratings.

**2016 Capitalization Rate Study
Natural Gas Distribution Companies
Capital Asset Pricing Model - Ex Ante**

Component	Value Line Ratings
	A+, A, B++, B+
Expected Future Return, S&P 500	10.80%
Less: Risk Free Return - Long-Term Treasury Rates ¹	2.78%
Risk Premium	8.02%
Beta ²	0.79
Adjusted Risk Premium	6.32%
Risk Free Return - Long-Term Treasury Rates ¹	2.78%
Projected Return on Equity	9.10%

¹ US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 31, 2015

² The estimated betas were derived from a sample of natural gas distribution companies with similar ratings.

**2016 Capitalization Rate Study
Natural Gas Distribution Companies
Capital Asset Pricing Model - Ex Post**

Component	Value Line Ratings A+, A, B++, B+
Common Stock Returns, S&P 500 (1928 - 2015) ¹	11.41%
Less: 10 Year Treasury Bonds (1928 - 2015) ¹	5.23%
Risk Premium	6.18%
Beta ²	0.79
Adjusted Risk Premium	4.87%
Risk Free Return - Long-Term Treasury Rates ³	2.78%
Projected Return on Equity	7.65%

¹ Damodaran Online, January 6, 2016

² The estimated betas were derived from a sample of natural gas distribution companies with similar ratings.

³ US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 31, 2015

2016 Capitalization Rate Study
Natural Gas Distribution Companies
Equity Rates

a	b	c	d	e	f	g	h	i	j	k	l	m
Value Line Rating	Company Name	Stock Price 12/31/15	Est. 2016 Earnings	2015 Earnings	2015 Dividends	Est. 2016 Dividends	Dividend Yield (g/c)	Est. Dividend Growth	Est. Earnings Growth	E/P Ratio (d/c)	DvYld+ DvGrth (h+i)	DvYld+ ErngsGr (h+j)
A+	New Jersey Resources Corp.	32.96	1.65	1.78	0.93	0.96	2.91%	3.50%	5.33%	5.01%	6.41%	8.25%
A	AGL Resources Inc.	63.81	3.25	3.10	2.04	2.10	3.29%	4.50%	-1.23%	5.09%	7.79%	2.06%
A	Atmos Energy Corporation	63.04	3.25	3.09	1.56	1.68	2.66%	5.00%	7.00%	5.16%	7.66%	9.66%
A	Northwest Natural Gas Company	50.61	2.20	1.80	1.87	1.91	3.77%	2.50%	5.00%	4.35%	6.27%	8.77%
A	South Jersey Industries, Inc.	23.52	1.60	1.45	1.02	1.10	4.68%	7.00%	7.00%	6.80%	11.68%	11.68%
A	WGL Holdings Inc.	62.99	3.10	3.16	1.83	1.87	2.97%	3.00%	6.33%	4.92%	5.97%	9.30%
B++	Laclede Group, Inc.	59.41	3.40	3.16	1.84	1.96	3.30%	4.50%	6.43%	5.72%	7.80%	9.73%
B++	Piedmont Natural Gas Co. Inc.	57.02	2.00	1.85	1.31	1.35	2.37%	3.00%	4.33%	3.51%	5.37%	6.70%
B++	Southwest Gas Corporation	55.16	3.20	2.85	1.62	1.74	3.15%	8.00%	5.33%	5.80%	11.15%	8.49%
B++	UGI Corporation	33.76	2.15	2.01	0.90	0.92	2.73%	5.00%	6.70%	6.37%	7.73%	9.43%
B+	NiSource Inc.	19.51	1.20	1.10	0.83	0.66	3.38%	-3.50%	-5.07%	6.15%	-0.12%	-1.68%
	Mean						3.20%	3.86%	4.29%	5.35%	7.07%	7.49%
	Median						3.15%	4.50%	5.33%	5.16%	7.66%	8.77%
	Weighted Average										6.25%	6.00%

Sources: Columns a, d, e, f, g and i were extracted from Value Line.

Column j represents the average estimated earnings growth extracted from Value Line, Zacks.com and ThomsonReuters.com.

Column c was acquired from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Natural Gas Distribution Companies
Long Term Earnings Growth**

a	b	c	d	e	f
Value Line Rating	Company Name	Value Line	Zacks	Thomson	Average
A+	New Jersey Resources Corp.	4.00%	6.00%	6.00%	5.33%
A	AGL Resources Inc.	6.50%	0.40%	-10.60%	-1.23%
A	Atmos Energy Corporation	7.00%	7.00%	7.00%	7.00%
A	Northwest Natural Gas Company	7.00%	4.00%	4.00%	5.00%
A	South Jersey Industries, Inc.	7.00%	N/A	N/A	7.00%
A	WGL Holdings Inc.	5.50%	6.50%	7.00%	6.33%
B++	Laclede Group, Inc.	10.00%	4.80%	4.50%	6.43%
B++	Piedmont Natural Gas Co. Inc.	3.00%	5.00%	5.00%	4.33%
B++	Southwest Gas Corporation	7.00%	5.00%	4.00%	5.33%
B++	UGI Corporation	5.00%	7.10%	8.00%	6.70%
B+	NiSource Inc.	-1.50%	-0.80%	-12.90%	-5.07%
	Mean	5.50%	4.50%	2.20%	4.29%
	Median	6.50%	5.00%	4.75%	5.33%
	Weighted Average				2.91%

Sources: Columns a and c were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.

2016 Capitalization Rate Study
Natural Gas Distribution Companies
Capital Structure

a	b	c	d	e	f	g	h	i	j	k	l
Value Line		Common	Common	Mkt Value	L.T.	Pfd	Common	Total	L.T.	Pfd	Common
Rating	Company Name	Stock	Stock Price	Equity	Debt	Stock	Equity	Capital	Debt	Stock	Equity
		Outstanding	12/31/15	(\$million)	(\$million)	(\$million)	(\$million)	(\$million)	%	%	%
A+	New Jersey Resources Corp.	85,796,206	32.96	2,827.84	843.60	0.00	2,827.84	3,671.44	22.98%	0.00%	77.02%
A	AGL Resources Inc.	120,239,934	63.81	7,672.51	3,150.00	0.00	7,672.51	10,822.51	29.11%	0.00%	70.89%
A	Atmos Energy Corporation	101,369,699	63.04	6,390.35	2,455.30	0.00	6,390.35	8,845.65	27.76%	0.00%	72.24%
A	Northwest Natural Gas Company	27,371,642	50.61	1,385.28	621.70	0.00	1,385.28	2,006.98	30.98%	0.00%	69.02%
A	South Jersey Industries, Inc.	69,294,447	23.52	1,629.81	937.40	0.00	1,629.81	2,567.21	36.51%	0.00%	63.49%
A	WGL Holdings Inc.	49,831,775	62.99	3,138.90	944.20	28.20	3,138.90	4,111.30	22.97%	0.69%	76.35%
B++	Laclede Group, Inc.	43,350,411	59.41	2,575.45	1,771.50	0.00	2,575.45	4,346.95	40.75%	0.00%	59.25%
B++	Piedmont Natural Gas Co. Inc.	79,205,112	57.02	4,516.28	1,384.50	0.00	4,516.28	5,900.78	23.46%	0.00%	76.54%
B++	Southwest Gas Corporation	47,375,398	55.16	2,613.23	1,540.40	0.00	2,613.23	4,153.63	37.09%	0.00%	62.91%
B++	UGI Corporation	172,778,018	33.76	5,832.99	3,628.30	0.00	5,832.99	9,461.29	38.35%	0.00%	61.65%
B+	NiSource Inc.	318,671,280	19.51	6,217.28	6,133.50	0.00	6,217.28	12,350.78	49.66%	0.00%	50.34%
	Mean								32.69%	0.06%	67.25%
	Median								30.98%	0.00%	69.02%
	Weighted Average								34.31%	0.04%	65.65%

Sources: Columns a, c, f and g were extracted from Value Line.
Column d was acquired from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Natural Gas Distribution Companies
Beta Analysis**

a	b	c	d	e	f	g	h	i
Value Line Rating	Company Name	Value Line Beta	Zacks Beta	Standard & Poor's Beta	Average Beta	Company's Tax Rate	Debt Equity Ratio ¹	Unlevered Beta ²
A+	New Jersey Resources Corp.	0.80	0.51	0.54	0.62	0.32	0.27	0.68
A	AGL Resources Inc.	0.60	-0.07	0.35	0.29	0.38	0.63	0.43
A	Atmos Energy Corporation	0.80	0.42	0.48	0.57	0.38	0.54	0.60
A	Northwest Natural Gas Company	0.65	0.35	0.53	0.51	0.43	0.50	0.51
A	South Jersey Industries, Inc.	0.80	0.67	0.69	0.72	0.20	0.40	0.61
A	WGL Holdings Inc.	0.75	0.58	0.54	0.62	0.39	0.28	0.64
B++	Laclede Group, Inc.	0.70	0.34	0.37	0.47	0.28	0.58	0.49
B++	Piedmont Natural Gas Co. Inc.	0.75	0.92	0.85	0.84	0.25	0.35	0.59
B++	Southwest Gas Corporation	0.80	0.59	0.65	0.68	0.35	0.54	0.59
B++	UGI Corporation	0.95	0.71	0.63	0.76	0.30	0.68	0.64
B+	NiSource Inc.	NMF	0.23	0.33	0.28	0.37	0.83	0.18
	Mean	0.76	0.48	0.54	0.58		0.51	0.54
	Median	0.78	0.51	0.54	0.62		0.54	0.59
	Weighted Average				0.53		0.57	0.50
	Relevered Beta based on 46% Debt Capital Structure and Mean Unlevered Beta ³							0.82
	Relevered Beta based on 46% Debt Capital Structure and Weighted Average Unlevered Beta ³							0.76

Sources: Columns a, c and g were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from Standard and Poor's Stock Reports.

¹ Average Debt to Equity Ratio over the last five years.
² Unlevered Beta = Beta/[1+(1-tc)(D/E)]; where D/E is the debt to equity ratio, tc is the company's most recent tax rate.
³ Relevered Beta = [Unlevered Beta][1+(1-tp)(D/E)]; where D/E is the debt to equity ratio, tp is a prospective purchaser's tax rate (assumed to be 40%).

**2016 Capitalization Rate Study
Water Utility Companies
Flotation Cost Adjustment**

Equity				Debt			
Value Line Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
A	9.43%	4.50%	9.87%	Not Rated	4.73%	1.70%	4.81%

$$\text{Cost of Capital Adjusted for Flotation Costs} = \frac{k_u}{1 - f}$$

Where: k_u = The cost of capital unadjusted for flotation costs

f = Flotation cost as a percentage of the value of securities issued

**2016 Capitalization Rate Study
Water Utility Companies
Summary of Rates of Return**

Common Equity		Bonds	
Value Line Rating	Rate of Return ¹	Moody's Rating	Rate of Return
A	9.43%	Not Rated	4.73%

¹In developing the Rate of Return on Common Equity, staff considered the latest decision of the California Public Utilities Commission and other pertinent information. For 2016, the return on equity and return on rate base for Golden State Water Company are 9.43% and 8.34%, respectively (D.12-07-009).

**2016 Capitalization Rate Study
Water Utility Companies
Capital Asset Pricing Model - Ex Ante**

Component	Value Line Ratings A, B++, B+
Expected Future Return, S&P 500	10.80%
Less: Risk Free Return - Long-Term Treasury Rates ¹	2.78%
Risk Premium	8.02%
Beta ²	0.68
Adjusted Risk Premium	5.47%
Risk Free Return - Long-Term Treasury Rates ¹	2.78%
Projected Return on Equity	8.25%

¹ US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 31, 2015

² The estimated betas were derived from a sample of water companies with similar ratings.

**2016 Capitalization Rate Study
Water Utility Companies
Capital Asset Pricing Model - Ex Post**

Component	Value Line Ratings
	A, B++, B+
Common Stock Returns, S&P 500 (1928 - 2015) ¹	11.41%
Less: 10 Year Treasury Bonds (1928 - 2015) ¹	5.23%
Risk Premium	6.18%
Beta ²	0.68
Adjusted Risk Premium	4.22%
Risk Free Return - Long-Term Treasury Rates ³	2.78%
Projected Return on Equity	<u>7.00%</u>

¹ Damodaran Online, January 6, 2016

² The estimated betas were derived from a sample of water companies with similar ratings.

³ US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 31, 2015

**2016 Capitalization Rate Study
Water Utility Companies
Equity Rates**

a	b	c	d	e	f	g	h	i	j	k	l	m
Value Line Rating	Company Name	Stock Price 12/31/15	Est. 2016 Earnings	2015 Earnings	2015 Dividends	Est. 2016 Dividends	Dividend Yield (g/c)	Est. Dividend Growth	Est. Earnings Growth	E/P Ratio (d/c)	DvYld+ DvGrth (h+i)	DvYld+ ErngsGr (h+j)
A	American States Water Co.	41.95	1.70	1.60	0.87	0.92	2.19%	7.50%	5.00%	4.05%	9.69%	7.19%
A	Aqua America, Inc.	29.80	1.35	1.25	0.69	0.76	2.55%	9.50%	6.37%	4.53%	12.05%	8.92%
B++	California Water Service Group	23.27	1.35	1.15	0.67	0.70	3.01%	7.00%	5.50%	5.80%	10.01%	8.51%
B++	Middlesex Water Company	26.54	1.25	1.20	0.77	0.78	2.94%	2.00%	5.00%	4.71%	4.94%	7.94%
B+	American Water Works Co., Inc.	59.75	2.80	2.60	1.33	1.45	2.43%	8.50%	7.40%	4.69%	10.93%	9.83%
B+	York Water Co.	24.94	1.00	0.90	0.60	0.63	2.53%	6.50%	6.50%	4.01%	9.03%	9.03%
	Mean						2.61%	6.83%	5.96%	4.63%	9.44%	8.57%
	Median						2.54%	7.25%	5.93%	4.61%	9.85%	8.71%
	Weighted Average										10.92%	9.29%

Sources: Columns a, d, e, f, g and i were extracted from Value Line.

Column j represents the average estimated earnings growth extracted from Value Line, Zacks.com and ThomsonReuters.com.

Column c was acquired from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Water Utility Companies
Long Term Earnings Growth**

a	b	c	d	e	f
Value Line Rating	Company Name	Value Line	Zacks	Thomson	Average
A	American States Water Co.	6.00%	5.00%	4.00%	5.00%
A	Aqua America, Inc.	7.50%	6.00%	5.60%	6.37%
B++	California Water Service Group	6.50%	5.00%	5.00%	5.50%
B++	Middlesex Water Company	5.00%	N/A	N/A	5.00%
B+	American Water Works Co., Inc.	7.00%	7.50%	7.70%	7.40%
B+	York Water Co.	6.50%	N/A	N/A	6.50%
	Mean	6.42%	5.88%	5.58%	5.96%
	Median	6.50%	5.50%	5.30%	5.93%
	Weighted Average				6.81%

Sources: Columns a and c were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.

**2016 Capitalization Rate Study
Water Utility Companies
Capital Structure**

a	b	c	d	e	f	g	h	i	j	k	l
Value Line Rating	Company Name	Common Stock Outstanding	Common Stock Price 12/31/15	Mkt Value Equity (\$million)	L.T. Debt (\$million)	Pfd Stock (\$million)	Common Equity (\$million)	Total Capital (\$million)	L.T. Debt %	Pfd Stock %	Common Equity %
A	American States Water Co.	37,240,678	41.95	1,562.25	325.60	0.00	1,562.25	1,887.85	17.25%	0.00%	82.75%
A	Aqua America, Inc.	176,805,350	29.80	5,268.80	1,660.50	0.00	5,268.80	6,929.30	23.96%	0.00%	76.04%
B++	California Water Service Group	47,878,659	23.27	1,114.14	416.80	0.00	1,114.14	1,530.94	27.23%	0.00%	72.77%
B++	Middlesex Water Company	16,164,099	26.54	429.00	136.10	2.40	429.00	567.50	23.98%	0.42%	75.59%
B+	American Water Works Co., Inc.	180,256,635	59.75	10,770.33	5,433.20	14.30	10,770.33	16,217.83	33.50%	0.09%	66.41%
B+	York Water Co.	12,866,946	24.94	320.90	84.80	0.00	320.90	405.70	20.90%	0.00%	79.10%
	Mean								24.47%	0.09%	75.44%
	Median								23.97%	0.00%	75.82%
	Weighted Average								29.26%	0.06%	70.68%

Sources: Columns a, c, f and g were extracted from Value Line.

Column d was acquired from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Water Utility Companies
Beta Analysis**

a	b	c	d	e	f	g	h	i
Value Line Rating	Company Name	Value Line Beta	Zacks Beta	Standard & Poor's Beta	Average Beta	Company's Tax Rate	Debt Equity Ratio ¹	Unlevered Beta ²
A	American States Water Co.	0.70	0.50	0.67	0.62	0.38	0.32	0.52
A	Aqua America, Inc.	0.75	0.44	0.44	0.54	0.08	0.37	0.40
B++	California Water Service Group	0.75	0.59	0.63	0.66	0.28	0.47	0.49
B++	Middlesex Water Company	0.75	0.61	0.71	0.69	0.35	0.40	0.55
B+	American Water Works Co., Inc.	0.70	0.22	0.29	0.40	0.40	0.70	0.28
B+	York Water Co.	0.75	0.56	0.51	0.61	0.28	0.29	0.50
	Mean	0.73	0.49	0.54	0.59		0.43	0.46
	Median	0.75	0.53	0.57	0.62		0.39	0.50
	Weighted Average				0.48		0.57	0.35
								Relevered Beta based on 45% Debt Capital Structure and Mean Unlevered Beta ³
								0.68
								Relevered Beta based on 45% Debt Capital Structure and Weighted Average Unlevered Beta ³
								0.52

Sources: Columns a, c and g were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from Standard and Poor's Stock Reports.

¹ Average Debt to Equity Ratio over the last five years.

² Unlevered Beta = Beta/[1+(1-tc)(D/E)]; where D/E is the debt to equity ratio, tc is the company's most recent tax rate.

³ Relevered Beta = [Unlevered Beta][1+(1-tp)(D/E)]; where D/E is the debt to equity ratio, tp is a prospective purchaser's tax rate (assumed to be 40%).

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Natural Gas Transmission Companies**

SBE No.	Company Name	Ratings		Capital Structure		Rates of Return		Basic Cap Rate
		Financial	Bond	Common Equity	Debt	Common Equity	Debt	
153	Transwestern Pipeline Company	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
180	North Baja Pipeline, LLC	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
187	Mojave Pipeline Company, LLC	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
188	Kern River Gas Transmission Company	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
189	Standard Pacific Gas Line, Incorporated	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
190	Tuscarora Gas Transmission Company	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
196	Questar Southern Trails Pipeline Company	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%
197	El Paso Natural Gas Company, LLC	Not Rated	Not Rated	75%	25%	12.04%	5.68%	10.45%

**2016 Capitalization Rate Study
Natural Gas Transmission Companies
Industry Notes**

- Interstate gas transmission companies are regulated by the Federal Energy Regulatory Commission (FERC).
- Staff relied upon the results of the following models in the development of equity rates:
 1. Discounted Cash Flow
 2. Capital Asset Pricing Model – (Ex Post and Ex Ante)

**2016 Capitalization Rate Study
Natural Gas Transmission Companies
Flotation Cost Adjustment**

Equity				Debt			
Value Line Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
Not Rated	11.50%	4.50%	12.04%	Not Rated	5.58%	1.70%	5.68%

Cost of Capital Adjusted for Flotation Costs = $\frac{k_u}{1 - f}$

Where: k_u = The cost of capital unadjusted for flotation costs

f = Flotation cost as a percentage of the value of securities issued

Staff applied a bond rating of Baa for the Natural Gas Transmission Companies, which represents the estimated cost of debt for the companies in the study.

2016 Capitalization Rate Study
Natural Gas Transmission Companies
Comparison of Return on Common Equity

Description	2016	2015	Change
E/P Ratio - Mean	5.33%	6.63%	-1.31%
E/P Ratio - Median	6.78%	5.34%	1.44%
Dividends Yield + Dividends Growth - Mean	9.19%	8.00%	1.20%
Dividends Yield + Dividends Growth - Median	8.86%	7.80%	1.06%
Dividends Yield + Earnings Growth - Mean	7.61%	10.29%	-2.68%
Dividends Yield + Earnings Growth - Median	7.79%	9.60%	-1.81%
Capital Asset Pricing Model (CAPM) - Ex Ante	11.64%	13.36%	-1.71%
Capital Asset Pricing Model (CAPM) - Ex Post	9.61%	10.64%	-1.03%
State-Assessed Properties Division Recommendation:	11.50%	11.50%	0.00%

The Discounted Cash Flow (DCF) model is computed using data from a sample of gas transmission companies with similar risk and operations.

The information considered by staff includes the results of DCF analysis (Dividends Yield + Dividends Growth and Dividends Yield + Earnings Growth) and the results of the Capital Asset Pricing Model (CAPM) analysis.

**2016 Capitalization Rate Study
Natural Gas Transmission Companies
Equity Rates**

a	b	c	d	e	f	g	h	i	j	k	l	m
Value Line Rating	Company Name	Stock Price 12/31/15	2016 Est. Earnings	2015 Earnings	2015 Dividends	2016 Est. Dividends	Dividend Yield (g/c)	Est. Dividend Growth	Est. Earnings Growth	E/P Ratio (d/c)	Div Yld+ Div Grwh (h+i)	Div Yld+ Engs Grwh (h+j)
A	Questar Corp.	19.48	1.32	1.25	0.84	0.92	4.72%	7.50%	3.97%	6.78%	12.22%	8.69%
B++	Devon Energy Corp.	32.00	0.70	2.52	0.96	0.96	3.00%	3.50%	3.33%	2.19%	6.50%	6.33%
B++	National Fuel Gas Co.	42.75	3.00	4.50	1.56	1.65	3.86%	5.00%	3.93%	7.02%	8.86%	7.79%
	Mean						3.86%	5.33%	3.74%	5.33%	9.19%	7.61%
	Median						3.86%	5.00%	3.93%	6.78%	8.86%	7.79%
	Weighted Average										7.62%	6.87%

Sources: Columns a, d, e, f, g and i were extracted from Value Line.

Column c was extracted from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

Column j is an average of Value Line, Zacks.com and ThomsonReuters.com.

**2016 Capitalization Rate Study
Natural Gas Transmission Companies
Long Term Earnings Growth**

a	b	c	d	e	f
Value Line Rating	Company Name	Value Line	Zacks	Thomson	Average
A	Questar Corp.	6.00%	4.00%	1.90%	3.97%
B++	Devon Energy Corp.	6.00%	6.60%	-2.60%	3.33%
B++	National Fuel Gas Co.	6.00%	2.90%	2.90%	3.93%
	Mean	6.00%	4.50%	0.73%	3.74%
	Median	6.00%	4.00%	1.90%	3.93%
	Weighted Average				3.51%

Sources: Columns a, b and c were extracted from the Value Line Investment Survey Reports.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.

**2016 Capitalization Rate Study
Natural Gas Transmission Companies
Capital Asset Pricing Model - Ex Ante**

Component	Industry Computation
Expected Future Return, S&P 500	10.80%
Less: Risk Free Return - Long-Term Treasury Rates ¹	2.78%
Risk Premium	8.02%
Relevered Beta	1.11
Adjusted Risk Premium	8.86%
Risk Free Return - Long-Term Treasury Rates ¹	2.78%
Projected Return on Equity	<u>11.64%</u>

¹ US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 31, 2015

**2016 Capitalization Rate Study
Natural Gas Transmission Companies
Capital Asset Pricing Model - Ex Post**

Component	Industry Computation
Common Stock Returns, S&P 500 (1928-2015) ¹	11.41%
Less: 10 Year Treasury Bonds (1928-2015) ¹	5.23%
Risk Premium	6.18%
Relevered Beta	1.11
Adjusted Risk Premium	6.83%
Risk Free Return - Long-Term Treasury Rates ²	2.78%
Projected Return on Equity	<u>9.61%</u>

¹ Damodaran Online, January 6, 2016

² US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 31, 2015

**2016 Capitalization Rate Study
Natural Gas Transmission Companies
Beta Analysis**

a	b	c	d	e	f	g	h	i
Value Line		Value		Standard		Company's	Debt	
Rating	Company Name	Lines	Zacks	& Poor's	Average	Tax	Equity	Unlevered
		Beta	Beta	Beta	Beta	Rate	Ratio ¹	Beta ²
A	Questar Corp.	0.85	0.58	0.00	0.48	0.35	0.33	0.39
B++	Devon Energy Corp.	1.35	1.72	1.29	1.45	0.50	1.02	0.96
B++	National Fuel Gas Co.	1.10	1.44	1.49	1.34	0.46	0.32	1.15
	Mean	1.10	1.25	0.93	1.09		0.56	0.83
	Median	1.10	1.44	1.29	1.34		0.33	0.96
	Weighted				1.31		0.81	0.92
	Relevered Beta based on 25% Debt Capital Structure						1.00 ³	
	Relevered Beta based on 25% Debt Capital Structure and a weighted average Beta						1.11 ³	

Sources: Column a, b, c and g were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from Standard and Poor's Stock Reports.

¹ Average Debt to Equity Ratio over the last five years.

² Unlevered Beta = Corrected Beta/[1+(1-tc)(D/E)]; where D/E is the debt to equity ratio, tc is the company's 2015 tax rate.

³ Relevered Beta = [Unlevered Beta][1+(1-tp)(D/E)]; where D/E is the debt to equity ratio, tp is a prospective purchaser's tax rate (assumed to be 40%).

**2016 Capitalization Rate Study
Natural Gas Transmission Companies
Capital Structure**

a	b	c	d	e	f	g	h	i	j	k	l
Value Line Rating	Moody's Bond Rating	P/S Rating	Company Name	Common Stock Outstanding	Common Stock Price 12/31/15	Market Value Equity (\$million)	L.T. Debt (\$million)	Common Equity (\$million)	Total Capital (\$million)	L.T. Debt %	Common Equity %
A	NR	NR	Questar Corp.	174,846,306	19.48	3,406.01	1,004.40	3,406.01	4,410.41	22.80%	77.20%
B++	NR	NR	Devon Energy Corp.	411,000,000	32.00	13,152.00	11,400.00	13,152.00	24,552.00	46.40%	53.60%
B++	NR	NR	National Fuel Gas Co.	84,633,992	42.75	3,618.10	2,084.00	3,618.10	5,702.10	36.50%	63.50%
			Mean							35.23%	64.77%
			Median							36.50%	63.50%
			Weighted Average							41.77%	58.23%

Recommended Capital Structure for Natural Gas Transmission Companies for lien date January 1, 2016:

Debt - 25%
Equity - 75%

The results of the above Capital Structure analysis are a reflection of a drop in oil prices and should not be reflected in the transportation of natural gas.

Sources: Columns a, e and h were extracted from Value Line.

Column f was extracted from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

NR - Not Rated

**2016 Capitalization Rate Study
Natural Gas Transmission Companies
Bonds - Rate of Return**

Utility Bond Yield	Bond Rating				
	Aaa	Aa	A	Baa	Avg Utility
As of December 31, 2015	N/A	4.21%	4.41%	5.58%	4.73%

Source: Moody's Daily Long-Term Corporate Bond Yield Averages as of December 31, 2015.

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Electric Generation Facilities**

Facility Type	Ratings		Capital Structure		Rates of Return		Basic Cap Rate ³
	Financial	Bond	Common Equity	Debt	Common Equity	Debt	
Modern Electric Generation Technology¹	B	B2	60%	40%	13.61%	7.12%	11.02%
Older Electric Generation Technology²	B	B2	60%	40%	15.71%	8.14%	12.68%

¹ Modern Electric Generation Technology - Generally high efficiency combined-cycle or simple cycle gas turbine electric generation facilities incorporating contemporary generation technologies.

² Older Electric Generation Technology - Generally older steam turbine electric generation facilities that were sold off by vertically integrated electric utilities and for which no replacements, other than for routine maintenance, have been made.

³ Staff may adjust the rates stated above if the specific situation of a facility warrants an adjustment to its basic capitalization rate.

**2016 Capitalization Rate Study
Electric Generation Facilities
Industry Notes**

- Staff relied primarily on the Capital Asset Pricing Model (CAPM) and Risk Premium Analysis in the development of equity rates. Consideration was given to both the ex post and ex ante risk premiums.
- The Discounted Cash Flow Model was not relied upon because not all of the merchant generators in the sample are currently paying dividends.
- Staff's recommended capital structure of 60% equity and 40% debt provides sufficient coverage of interest and principal payments on debt.
- Staff added a risk premium of 100 basis points to the debt rate for older technology to recognize the market's perception of additional risk present in operating these types of facilities.
- Staff considers the risk associated with older facilities to be greater than that of newer facilities, and has adjusted the beta used in the CAPM calculation upward to reflect this additional risk.
- The following company was removed from the 2016 Capitalization Rate Study sample for electric generation companies:
 1. Atlantic Power is no longer rated by Value Line.
- The following company was added to the 2016 Capitalization Rate Study sample for electric generation companies:
 1. Dynegy, Inc. as a result of it emerging from bankruptcy.

**2016 Capitalization Rate Study
Electric Generation Facilities
Flotation Cost Adjustment**

Facility Type	Equity			Debt		
	Recommended Rate	Flotation Cost in %	Adjusted Rate	Recommended Rate	Flotation Cost in %	Adjusted Rate
Modern Electric Generation Technology ¹	13.00%	4.50%	13.61%	7.00%	1.70%	7.12%
Older Electric Generation Technology ²	15.00%	4.50%	15.71%	8.00%	1.70%	8.14%

$$\text{Cost of Capital Adjusted for Flotation Costs} = \frac{k_u}{1 - f}$$

Where: k_u = The cost of capital unadjusted for flotation costs

f = Flotation cost as a percentage of the value of securities issued

¹ The Modern Electric Generation Technology Recommended Debt Rate was developed by staff based on the relative rates of the utilities and other pertinent information from various sources.

² The Older Electric Generation Technology Recommended Debt Rate is equal to the Modern Electric Generation Technology Recommended Debt Rate with an additional risk premium of 100 basis points.

**2016 Capitalization Rate Study
Electric Generation Facilities
Summary of Rates of Return**

Common Equity		Bonds		
Facility Type	Rate of Return ¹	Moody's Bond Yields	Moody's Rating	Rate of Return ²
Modern Electric Generation Technology	13.00%	Aaa=NA	Aaa2	3.53%
			Aaa3	3.75%
			Aa1	3.98%
Older Electric Generation Technology	15.00%	Aa=4.21%	Aa2	4.21%
			Aa3	4.28%
			A1	4.34%
			A2	4.41%
			A3	4.80%
			Baa1	5.19%
			Baa2	5.58%
			Baa3	5.72%
			Ba1	5.86%
			Ba2	6.00%
		A=4.41%	Ba3	6.14%
			B1	6.28%
			B2	6.42%
			B3	6.56%
			Caa1	6.70%

¹ The Rate of Return on Common Equity was developed by staff based on the relative risk of the utilities in conjunction with the results of the various financial models and pertinent information from various sources.

² Rates of Return on Bonds are based on Moody's "Utility Bond Yields" as of December 31, 2015. However, because Moody's assigns a yield to the groups Aa, A and Baa for bonds, the staff interpolates the difference between these groups in order to achieve a further refinement of the ratings.

2016 Capitalization Rate Study
Electric Generation Facilities
Comparison of Rates of Return on Common Equity

	All Facilities in Study		
	2016	2015	Change
E/P Ratio-Mean	6.31%	2.26%	4.05%
E/P Ratio-Median	5.99%	5.57%	0.42%
Div Yld + Div Growth-Mean	10.82%	8.07%	2.75%
Div Yld + Div Growth-Median	9.79%	8.51%	1.28%
Div Yld + Div Growth-Weighted Avg.	11.34%	9.66%	1.68%
Div Yld + Earn.Growth-Mean	9.60%	14.26%	-4.66%
Div Yld + Earn.Growth-Median	8.52%	8.71%	-0.19%
Div Yld + Earn.Growth-Weighted Avg.	9.66%	11.32%	-1.66%
<hr/>			
Merrill Lynch Industry Factor - Required Return IPPs	11.60%	9.60%	2.00%
ROE% - Yahoo Finance - Utilities	11.80%	7.93%	3.87%
ROE% - Yahoo Finance - Electric Utilities	9.50%	5.30%	4.20%
ROE% - Yahoo Finance - Diversified Utilities	11.80%	8.20%	3.60%
<hr/>			
	Modern Technology	Older Technology	
2015 Recommended Rate	12.50%	14.50%	
CAPM - Ex Ante	11.20%	13.21%	
CAPM - Ex Post	9.27%	10.81%	
Risk Premium Analysis ¹	13.30%	14.32%	
2016 Recommended Rate	13.00%	15.00%	

¹ Risk Premium Analysis estimates the market indicated cost of equity by adding the appropriate "risk premium" to the corresponding cost of debt. "Risk Premium" of 6.18% is determined by comparing the Damodaran Online total return on large company stocks to the total return on long-term corporate bonds.

**2016 Capitalization Rate Study
Electric Generation Facilities
Capital Asset Pricing Model - Ex Ante**

Component	Types of Facilities	
	Modern Technology	Older Technology
Expected Future Return, S&P 500	10.80%	10.80%
Less: Risk Free Return - Long-Term Treasury Rates ¹	2.78%	2.78%
Risk Premium	8.02%	8.02%
Beta ²	1.05	1.30
Adjusted Risk Premium	8.42%	10.43%
Risk Free Return - Long-Term Treasury Rates ¹	2.78%	2.78%
Projected Return on Equity	11.20%	13.21%

¹ US Department of the Treasury - Composite Long-Term Rates >10 yrs, December 31, 2015

² The betas are based on staff's judgment in conjunction with the results of the Beta Analysis. See explanation contained in the Industry Notes.

**2016 Capitalization Rate Study
Electric Generation Facilities
Capital Asset Pricing Model - Ex Post**

Component	Types of Facilities	
	Modern Technology	Older Technology
Common Stock Returns, S&P 500 (1928 - 2015) ¹	11.41%	11.41%
Less: 10 Year Treasury Bonds (1928 - 2015) ¹	5.23%	5.23%
Risk Premium	6.18%	6.18%
Beta ²	1.05	1.30
Adjusted Risk Premium	6.49%	8.03%
Risk Free Return - Long-Term Treasury Rates ³	2.78%	2.78%
Projected Return on Equity	9.27%	10.81%

¹ Damodaran Online, January 6, 2016

² The betas are based on staff's judgment in conjunction with the results of the Beta Analysis. See explanation contained in the Industry Notes.

³ US Department of the Treasury - Composite Long-Term Rates >10 yrs, December 31, 2015

2016 Capitalization Rate Study
Electric Generation Facilities
Equity Rates

a	b	c	d	e	f	g	h	i	j	k	l	m
Value Line		Stock	Est.			Est.	Dividend	Est.	Est.	E/P	DvYld+	DvYld+
Rating	Company Name	Price	2016	2015	2015	2016	Yield	Dividend	Earnings	Ratio	DvGrth	ErngsGrth
		12/31/15	Earnings	Earnings	Dividends	Dividends	(g/c)	Growth	Growth	(d/c)	(h+i)	(h+j)
<u>Merchant Generators</u>												
B+	Calpine Corp.	14.47	0.80	0.65	0.00	0.00	0.00%	0.00%	7.63%	5.53%	0.00%	7.63%
B+	NRG Energy, Inc.	11.77	0.60	-0.25	0.58	0.62	5.27%	13.50%	18.85%	5.10%	18.77%	24.12%
B	AES Corp.	9.57	1.05	0.95	0.40	0.44	4.60%	20.00%	2.90%	10.97%	24.60%	7.50%
C++	Dynegy, Inc	13.40	0.54	0.69	0.00	0.00	0.00%	0.00%	0.00%	4.03%	0.00%	0.00%
<u>Diversified Electric Utilities</u>												
A	Duke Energy Corp.	71.39	4.65	4.30	3.24	3.36	4.71%	3.50%	4.13%	6.51%	8.21%	8.84%
A	NextEra Energy, Inc.	103.89	6.30	6.05	3.08	3.50	3.37%	11.00%	7.23%	6.06%	14.37%	10.60%
A	Xcel Energy Inc.	35.91	2.15	2.05	1.28	1.36	3.79%	6.00%	4.73%	5.99%	9.79%	8.52%
	Mean						3.10%	7.71%	6.50%	6.31%	10.82%	9.60%
	Median						3.79%	6.00%	4.73%	5.99%	9.79%	8.52%
	Weighted Average										11.34%	9.66%
	Merrill Lynch Required Return - Independent Power Producers & Energy Traders											11.60%

Sources: Columns a, b, d, e, f, g and i were extracted from Value Line.

Column c was extracted from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

Column j represents the average estimated earnings growth extracted from Value Line, Zacks.com and ThomsonReuters.com.

**2016 Capitalization Rate Study
Electric Generation Facilities
Long Term Earnings Growth**

a	b	c	d	e	f
Value Line Rating	Company Name	Value Line	Zacks	Thomson	Average
	<u>Merchant Generators</u>				
B+	Calpine Corp.	4.50%	16.70%	1.70%	7.63%
B+	NRG Energy, Inc.	23.50%	NMF	14.20%	18.85%
B	AES Corp.	8.00%	1.90%	-1.20%	2.90%
C++	Dynegy, Inc	NMF	NMF	-66.30%	0.00%
	<u>Diversified Electric Utilities</u>				
A	Duke Energy Corp.	5.00%	4.10%	3.30%	4.13%
A	NextEra Energy, Inc.	7.50%	7.10%	7.10%	7.23%
A	Xcel Energy Inc.	4.50%	5.00%	4.70%	4.73%
	Mean	8.83%	6.96%	-5.21%	6.50%
	Median	6.25%	5.00%	3.30%	4.73%
	Weighted Average				6.34%
	Merrill Lynch 5 Year Growth Estimate - Independent Power Producers & Energy Traders				36.80%

Sources: Columns a, b and c were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.

2016 Capitalization Rate Study
Electric Generation Facilities
Capital Structure

a	b	c	d	e	f	g	h	i	j	k	l	m
Value Line Rating	Company Name	Common Stock Outstanding	Common Stock Price 12/31/2015	Mkt Value Equity (\$million)	L.T. Debt (\$million)	Pfd Stock (\$million)	Common Equity (\$million)	Total Capital (\$million)	L.T. Debt %	Pfd Stock %	Common Equity %	Debt Equity Ratio
<u>Merchant Generators</u>												
B+	Calpine Corp.	366,837,359	14.47	5,308.14	11,465.00	0.00	5,308.14	16,773.14	68.35%	0.00%	31.65%	2.16
B+	NRG Energy, Inc.	334,589,672	11.77	3,938.12	19,598.00	249.00	3,938.12	23,785.12	82.40%	1.05%	16.56%	4.68
B	AES Corp.	682,721,956	9.57	6,533.65	18,398.00	0.00	6,533.65	24,931.65	73.79%	0.00%	26.21%	2.82
C++	Dynegy, Inc	123,182,927	13.40	1,650.65	7,208.00	400.00	1,650.65	9,258.65	77.85%	4.32%	17.83%	3.51
Mean									75.60%	1.34%	23.06%	3.29
Median									75.82%	0.52%	22.02%	3.17
Weighted Average									75.81%	0.87%	23.32%	3.35
<u>Diversified Electric Utilities</u>												
A	Duke Energy Corp.	688,334,378	71.39	49,140.19	37,667.00	0.00	49,140.19	86,807.19	43.39%	0.00%	56.61%	0.77
A	NextEra Energy, Inc.	460,535,906	103.89	47,845.08	25,604.00	0.00	47,845.08	73,449.08	34.86%	0.00%	65.14%	0.54
A	Xcel Energy Inc.	507,211,342	35.91	18,213.96	11,896.00	0.00	18,213.96	30,109.96	39.51%	0.00%	60.49%	0.65
Mean									39.25%	0.00%	60.75%	0.65
Median									39.51%	0.00%	60.49%	0.65
Weighted Average									39.49%	0.00%	60.51%	0.66
Damodaran Online - Power Industry									45.5%	0.0%	54.5%	0.83
Damodaran Online - Utility (General) Industry									41.4%	0.0%	58.7%	0.71
Fidelity.com Research Independent Power Producers & Energy Traders												2.83
Fidelity.com Research Electric Utilities												1.31

Sources: Columns a, b, c, f and g were extracted from Value Line.

Column d was extracted from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

2016 Capitalization Rate Study
Electric Generation Facilities
Beta Analysis

a	b	c	d	e	f	g	h	i
Value		Value		Standard		Company	Debt	
Line		Line	Zacks	& Poor's	Average	Tax	Equity	Unlevered
Rating	Company Name	Beta	Beta	Beta	Beta	Rate	Ratio ¹	Beta ²
<u>Merchant Generators</u>								
B+	Calpine Corp.	1.00	0.92	0.72	0.88	0.16	1.48	0.41
B+	NRG Energy, Inc.	1.00	0.75	0.72	0.82	0.00	2.53	0.26
B	AES Corp.	1.15	1.23	1.23	1.20	0.25	2.18	0.50
C++	Dynegy, Inc	1.15	1.60	NMF	1.38	0.00	3.51	0.34
Mean					1.07	0.10	2.43	0.38
Median					1.04	0.08		0.37
Weighted					1.03	0.12		0.38
<u>Diversified Electric Utility</u>								
A	Duke Energy Corp.	0.65	0.03	0.14	0.27	0.33	0.64	0.19
A	NextEra Energy, Inc.	0.75	0.39	0.34	0.49	0.31	0.63	0.34
A	Xcel Energy Inc.	0.65	0.13	0.23	0.34	0.35	0.69	0.23
Mean		0.68	0.18	0.24	0.37	0.33	0.65	0.26
Median		0.65	0.13	0.23	0.34	0.33		0.23
Weighted					0.37	0.32		0.26
Merchant Generators Relevered Beta based on 40% Debt Capital Structure							0.54	³
Diversified Electric Utilities Relevered Beta based on 40% Debt Capital Structure							0.36	³
Merrill Lynch Adjusted Beta Independent Power Producers & Energy Traders							1.05	
Damodaran Online - Cost of Capital by Sector - Power Industry Beta							0.80	

Sources: Columns a, b, c and g were extracted from Value Line.

Column d was extracted from Zacks.com.

Column e was extracted from Standard and Poor's Stock Reports.

¹ Average Debt to Equity Ratio over the last five years.

² Unlevered Beta = Corrected Beta/[1+(1-tc)(D/E)]; where D/E is the debt to equity ratio, tc is the company's 2015 tax rate.

³ Relevered Beta = [Unlevered Beta][1+(1-tp)(D/E)]; where D/E is the debt to equity ratio, tp is a prospective purchaser's tax rate (assumed to be 40%).

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Telecommunications Companies**

SBE No.	Company Name	Ratings		Capital Structure		Rates of Return		Basic Cap Rate
		Financial	Bond	Common Equity	Debt	Common Equity	Debt	
Local Exchange Companies								
279	Pacific Bell Telephone Company	A++	A2	70%	30%	11.94%	4.49%	9.70%
201	Verizon California, Inc.	A++	A3	70%	30%	11.94%	4.88%	9.82%
284	Frontier Communications	B	Not Rated	65%	35%	12.98%	5.94%	10.52%
294	SureWest Telephone	C++	Not Rated	65%	35%	15.34%	6.21%	12.14%
	Other Local Exchange Companies	Not Rated	Not Rated	65%	35%	15.34%	6.21%	12.14%
Wireless Companies								
2606	AT&T Mobility LLC	A++	A2	70%	30%	11.41%	4.49%	9.34%
2532	Los Angeles SMSA Ltd., Partnership	A++	A3	70%	30%	11.41%	4.88%	9.45%
2552	Fresno MSA Limited Partnership	A++	A3	70%	30%	11.41%	4.88%	9.45%
2559	Cellco Partnership	A++	A3	70%	30%	11.41%	4.88%	9.45%
2669	California RSA #4 Partnership	A++	A3	70%	30%	11.41%	4.88%	9.45%
2748	T-Mobile West, LLC	B	Not Rated	65%	35%	12.72%	6.21%	10.44%
2720	Sprint Telephony PCS, L.P.	C++	B3	65%	35%	14.55%	7.53%	12.10%
	Other Wireless Companies¹	Not Rated	Not Rated	55%	45%	16.65%	9.05%	13.23%
	Wireless Reseller Companies	Not Rated	Not Rated	55%	45%	18.74%	9.56%	14.61%
Interexchange Companies								
2310	AT&T Communications	A++	A2	70%	30%	12.72%	4.49%	10.25%
2274	MCI Communications Services, Inc.	A++	A3	70%	30%	12.72%	4.88%	10.37%
2372	MCI Metro Access Transmission Services, LLC	A++	A3	70%	30%	12.72%	4.88%	10.37%
2463	CenturyLink Communications, LLC	B++	Baa3	65%	35%	14.29%	5.94%	11.37%
2014	Sprint Communications Company, L.P.	C++	B3	60%	40%	16.65%	7.53%	13.00%
7761	Level 3 Communications, LLC	C++	Caa2	60%	40%	16.65%	9.05%	13.61%
	Other Interexchange Carriers	Not Rated	Not Rated	55%	45%	21.36%	9.05%	15.82%
	Other Interexchange Resellers	Not Rated	Not Rated	55%	45%	24.50%	9.56%	17.78%

¹ Includes Radio Telephone and Paging Companies

**2016 Capitalization Rate Study
Telecommunications Companies
Industry Notes**

- Staff conducted a consolidated capitalization rate study for the local exchange, wireless, and interexchange industries due to the increasing convergence of these three industries. Separate capitalization rates were estimated for the companies in each of the three industries based on the relative risk experienced by each group of companies within their respective industries.
- Staff relied on the Discounted Cash Flow Model (DCF) and Capital Asset Pricing Model (CAPM Ex Post and Ex Ante) in the development of equity rates.
- NTELOS was removed from the Capitalization Rate Study sample in 2016 as it was removed by Value Line in 2015.
- Windstream Holdings, Inc. was removed from the Capitalization Rate Study sample in 2016 due to lack of data from various sources used for the study.

**2016 Capitalization Rate Study
Telecommunications Companies - Local Exchange
Flotation Cost Adjustment**

Value Line Rating	Equity			Debt			
	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
A++	11.40%	4.50%	11.94%	Aa2	4.21%	1.70%	4.28%
B	12.40%	4.50%	12.98%	Aa3	4.28%	1.70%	4.35%
C++	14.65%	4.50%	15.34%	A1	4.34%	1.70%	4.42%
Other Local Exchange Companies	14.65%	4.50%	15.34%	A2	4.41%	1.70%	4.49%
				A3	4.80%	1.70%	4.88%
				Baa1	5.19%	1.70%	5.28%
				Baa2	5.58%	1.70%	5.68%
				Baa3	5.84%	1.70%	5.94%
				Not Rated	6.10%	1.70%	6.21%

$$\text{Cost of Capital Adjusted for Flotation Costs} = \frac{k_u}{1 - f}$$

Where: k_u = The cost of capital unadjusted for flotation costs

f = Flotation cost as a percentage of the value of securities issued

**2016 Capitalization Rate Study
Telecommunications Companies - Wireless
Flotation Cost Adjustment**

Value Line Rating	Equity			Debt			
	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
A++	10.90%	4.50%	11.41%	Aa2	4.21%	1.70%	4.28%
B	12.15%	4.50%	12.72%	Aa3	4.28%	1.70%	4.35%
C++	13.90%	4.50%	14.55%	A1	4.34%	1.70%	4.42%
Other Wireless Companies ¹	15.90%	4.50%	16.65%	A2	4.41%	1.70%	4.49%
Wireless Reseller Companies	17.90%	4.50%	18.74%	A3	4.80%	1.70%	4.88%
				Baa1	5.19%	1.70%	5.28%
				Baa2	5.58%	1.70%	5.68%
				Baa3	5.84%	1.70%	5.94%
				Ba1	6.10%	1.70%	6.21%
				Ba2	6.36%	1.70%	6.47%
				Ba3	6.62%	1.70%	6.73%
				B1	6.88%	1.70%	7.00%
				B2	7.14%	1.70%	7.26%
				B3	7.40%	1.70%	7.53%
				Not Rated	8.90%	1.70%	9.05%
				Not Rated	9.40%	1.70%	9.56%

$$\text{Cost of Capital Adjusted for Flotation Costs} = \frac{k_u}{1 - f}$$

Where: k_u = The cost of capital unadjusted for flotation costs

f = Flotation cost as a percentage of the value of securities issued

¹ Includes Radio Telephone and Paging Companies

**2016 Capitalization Rate Study
Telecommunications Companies - Interexchange
Flotation Cost Adjustment**

Value Line Rating	Equity			Debt			
	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
A++	12.15%	4.50%	12.72%	Aa2	4.21%	1.70%	4.28%
B++, B	13.65%	4.50%	14.29%	Aa3	4.28%	1.70%	4.35%
C++	15.90%	4.50%	16.65%	A1	4.34%	1.70%	4.42%
Other Interexchange Carriers	20.40%	4.50%	21.36%	A2	4.41%	1.70%	4.49%
Other Interexchange Resellers	23.40%	4.50%	24.50%	A3	4.80%	1.70%	4.88%
				Baa1	5.19%	1.70%	5.28%
				Baa2	5.58%	1.70%	5.68%
				Baa3	5.84%	1.70%	5.94%
				Ba1	6.10%	1.70%	6.21%
				Ba2	6.36%	1.70%	6.47%
				Ba3	6.62%	1.70%	6.73%
				B1	6.88%	1.70%	7.00%
				B2	7.14%	1.70%	7.26%
				B3	7.40%	1.70%	7.53%
				Not Rated	8.90%	1.70%	9.05%
				Not Rated	9.40%	1.70%	9.56%

$$\text{Cost of Capital Adjusted for Flotation Costs} = \frac{k_u}{1 - f}$$

Where: k_u = The cost of capital unadjusted for flotation costs

f = Flotation cost as a percentage of the value of securities issued

2016 Capitalization Rate Study
Telecommunications Companies
Comparison of Return on Common Equity

Description	A++			B++, B+, B			C++, C+		
	2016	2015	Change	2016	2015	Change	2016	2015	Change
Discounted Cash Flow Analysis									
E/P Ratio - Mean	8.45%	8.16%	0.29%	3.20%	1.76%	1.44%	-12.43%	0.29%	-12.72%
E/P Ratio - Median	8.45%	8.16%	0.29%	2.14%	2.43%	-0.29%	2.78%	3.09%	-0.31%
Dividend Yield + Dividend Growth - Mean	7.55%	8.19%	-0.64%	6.37%	4.35%	2.02%	1.85%	1.39%	0.46%
Dividend Yield + Dividend Growth - Median	7.55%	8.19%	-0.64%	8.16%	5.13%	3.03%	0.00%	0.00%	0.00%
Weighted Average (Div. Yield + Div. Growth)	7.58%	8.05%	-0.46%	4.76%	3.63%	1.13%	0.22%	5.57%	-5.35%
Dividend Yield + Earnings Growth - Mean	11.68%	12.21%	-0.53%	11.63%	10.07%	1.56%	16.15%	11.36%	4.79%
Dividend Yield + Earnings Growth - Median	11.68%	12.21%	-0.53%	9.50%	11.49%	-1.99%	16.80%	10.93%	5.87%
Weighted Average (Div. Yield + Earn. Growth)	11.63%	12.33%	-0.69%	12.51%	10.05%	2.45%	17.20%	23.57%	-6.37%
CAPM Analysis									
Ex Ante	7.59%	7.79%	-0.20%	9.20%	9.05%	0.15%	10.80%	11.07%	-0.27%
Ex Post	6.49%	6.50%	-0.01%	7.72%	7.44%	0.29%	8.96%	8.94%	0.02%
Recommended Rates									
Local Exchange	11.40%	11.55%	-0.15%	12.40%	12.55%	-0.15%	14.65%	14.80%	-0.15%
Wireless	10.90%	11.05%	-0.15%	12.15%	12.30%	-0.15%	13.90%	14.05%	-0.15%
Interexchange	12.15%	12.30%	-0.15%	13.65%	13.80%	-0.15%	15.90%	16.05%	-0.15%

**2016 Capitalization Rate Study
Telecommunications Companies
Equity Rates**

a	b	c	d	e	f	g	h	i	j	k	l	m
Value Line Rating	Company Name	Stock Price 12/31/15	Est. 2016 Earnings	2015 Earnings	2015 Dividends	Est. 2016 Dividends	Dividend Yield (g/c)	Est. Dividend Growth	Est. Earnings Growth	E/P Ratio (d/c)	DivYld+ DivGrw (h+i)	DivYld+ ErngsGrw (h+j)
A++	AT&T Inc.	34.41	2.80	2.70	1.88	1.92	5.58%	2.50%	5.30%	8.14%	8.08%	10.88%
A++	Verizon Communications	46.22	4.05	3.96	2.23	2.32	5.02%	2.00%	7.47%	8.76%	7.02%	12.49%
	Mean						5.30%	2.25%	6.38%	8.45%	7.55%	11.68%
	Median						5.30%	2.25%	6.38%	8.45%	7.55%	11.68%
	Weighted Average										7.58%	11.63%
B++	Atlantic Tele-Network, Inc.	78.23	2.90	2.10	1.19	1.30	1.66%	6.50%	7.00%	3.71%	8.16%	8.66%
B++	CenturyLink, Inc.	25.16	2.40	2.55	2.16	2.16	8.59%	0.00%	2.10%	9.54%	8.59%	10.69%
B+	U.S. Cellular	40.81	0.10	2.45	0.00	0.00	0.00%	0.00%	3.75%	0.25%	0.00%	3.75%
B	Frontier Communications	4.67	0.10	0.05	0.42	0.42	8.99%	2.50%	17.45%	2.14%	11.49%	26.44%
B	Shenandoah Telecom	43.05	0.90	0.78	0.24	0.26	0.60%	9.50%	15.50%	2.09%	10.10%	16.10%
B	T-Mobile US, Inc.	39.12	1.60	0.80	0.00	0.00	0.00%	0.00%	9.50%	4.09%	0.00%	9.50%
B	Telephone & Data Systems	25.89	0.15	1.70	0.56	0.58	2.24%	4.00%	4.00%	0.58%	6.24%	6.24%
	Mean						3.15%	3.21%	8.47%	3.20%	6.37%	11.63%
	Median						1.66%	2.50%	7.00%	2.14%	8.16%	9.50%
	Weighted Average										4.76%	12.51%

Sources: Columns a, d, e, f, g and i were extracted from Value Line.

Column c was extracted from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

Column j is an average of Value Line, Zacks.com, and ThomsonReuters.com.

**2016 Capitalization Rate Study
Telecommunications Companies
Equity Rates**

a	b	c	d	e	f	g	h	i	j	k	l	m
Value Line Rating	Company Name	Stock Price 12/31/15	Est. 2016 Earnings	2015 Earnings	2015 Dividends	Est. 2016 Dividends	Dividend Yield (g/c)	Est. Dividend Growth	Est. Earnings Growth	E/P Ratio (d/c)	DivYld+ DivGrw (h+i)	DivYld+ ErngsGrw (h+j)
C++	Consolidated Communications	20.95	0.75	0.05	1.55	1.55	7.40%	0.00%	15.65%	3.58%	7.40%	23.05%
C++	Level 3 Communications, Inc.	54.36	2.35	1.75	0.00	0.00	0.00%	0.00%	28.00%	4.32%	0.00%	28.00%
C++	Sprint Corporation	3.62	-0.45	-0.40	0.00	0.00	0.00%	0.00%	10.55%	-12.43%	0.00%	10.55%
C+	Cincinnati Bell	3.60	0.10	0.05	0.00	0.00	0.00%	0.00%	3.00%	2.78%	0.00%	3.00%
	Mean						1.85%	0.00%	14.30%	-0.44%	1.85%	16.15%
	Median						0.00%	0.00%	13.10%	3.18%	0.00%	16.80%
	Weighted Average										0.22%	17.20%

Sources: Columns a, d, e, f, g and i were extracted from Value Line.
Column c was extracted from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.
Column j is an average of Value Line, Zacks.com, and ThomsonReuters.com.

**2016 Capitalization Rate Study
Telecommunications Companies
Long Term Earnings Growth**

a	b	c	d	e	f
Value Line Rating	Company Name	Value Line	Zacks	Thomson	Average
A++	AT&T Inc.	5.50%	4.50%	5.90%	5.30%
A++	Verizon Communications	8.00%	6.80%	7.60%	7.47%
	Mean	6.75%	5.65%	6.75%	6.38%
	Median	6.75%	5.65%	6.75%	6.38%
	Weighted Average				6.32%
B++	Atlantic Tele-Network, Inc.	7.00%	NMF	NMF	7.00%
B++	CenturyLink, Inc.	9.50%	-1.70%	-1.50%	2.10%
B+	U.S. Cellular	4.50%	3.00%	NMF	3.75%
B	Frontier Communications	26.00%	8.90%	NMF	17.45%
B	Shenandoah Telecom	15.50%	NMF	NMF	15.50%
B	T-Mobile US, Inc.	NMF	9.50%	NMF	9.50%
B	Telephone & Data Systems	4.00%	NMF	NMF	4.00%
	Mean	11.08%	4.93%	-1.50%	8.47%
	Median	8.25%	5.95%	-1.50%	7.00%
	Weighted Average				8.58%

Sources: Columns a and c were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.

**2016 Capitalization Rate Study
Telecommunications Companies
Long Term Earnings Growth**

a	b	c	d	e	f
Value Line Rating	Company Name	Value Line	Zacks	Thomson	Average
C++	Consolidated Communications	25.50%	5.80%	NMF	15.65%
C++	Level 3 Communications, Inc.	NMF	8.00%	48.00%	28.00%
C++	Sprint Corporation	NMF	16.10%	5.00%	10.55%
C+	Cincinnati Bell	NMF	3.00%	3.00%	3.00%
	Mean	25.50%	8.23%	18.67%	14.30%
	Median	25.50%	6.90%	5.00%	13.10%
	Weighted Average				16.98%

Sources: Columns a and c were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.

**2016 Capitalization Rate Study
Telecommunications Companies
Capital Structure**

a	b	c	d	e	f	g	h	i	j	k	l
Value Line Rating	Company Name	Common Stock Outstanding	Common Stock Price 12/31/15	Market Value Equity (\$million)	Long Term Debt (\$million)	Preferred Stock (\$million)	Common Stock (\$million)	Total Capital (\$million)	L.T Debt %	Preferred Stock %	Common Stock %
A++	AT&T Inc.	6,152,000,000	34.41	211,690.32	119,395.00	0.00	211,690.32	331,085.32	36.06%	0.00%	63.94%
A++	Verizon Communications	4,068,873,137	46.22	188,063.32	105,060.00	0.00	188,063.32	293,123.32	35.84%	0.00%	64.16%
	Mean								35.95%	0.00%	64.05%
	Median								35.95%	0.00%	64.05%
	Weighted Average								35.96%	0.00%	64.04%
B++	Atlantic Tele-Network, Inc.	16,062,167	78.23	1,256.54	28.10	0.00	1,256.54	1,284.64	2.19%	0.00%	97.81%
B++	CenturyLink, Inc.	549,004,205	25.16	13,812.95	18,504.00	0.00	13,812.95	32,316.95	57.26%	0.00%	42.74%
B+	U.S. Cellular	84,287,521	40.81	3,439.77	1,368.70	0.00	3,439.77	4,808.47	28.46%	0.00%	71.54%
B	Frontier Communications	1,168,212,000	4.67	5,455.55	16,016.00	0.02	5,455.55	21,471.57	74.59%	0.00%	25.41%
B	Shenandoah Telecom	48,444,866	43.05	2,085.55	184.00	0.00	2,085.55	2,269.55	8.11%	0.00%	91.89%
B	T-Mobile US, Inc.	816,037,384	39.12	31,923.38	24,570.00	20.00	31,923.38	56,513.38	43.48%	0.04%	56.49%
B	Telephone & Data Systems	108,760,881	25.89	2,815.82	2,210.00	0.80	2,815.82	5,026.62	43.97%	0.02%	56.02%
	Mean								36.86%	0.01%	63.13%
	Median								43.48%	0.00%	56.49%
	Weighted Average								50.84%	0.02%	49.15%

Sources: Columns a, c, f, and g were extracted from Value Line.
Column d was extracted from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Telecommunications Companies
Capital Structure**

a	b	c	d	e	f	g	h	i	j	k	l
Value Line Rating	Company Name	Common Stock Outstanding	Common Stock Price 12/31/15	Market Value Equity (\$million)	Long Term Debt (\$million)	Preferred Stock (\$million)	Common Stock (\$million)	Total Capital (\$million)	L.T Debt %	Preferred Stock %	Common Stock %
C++	Consolidated Communications	50,509,148	20.95	1,058.17	1,406.30	0.00	1,058.17	2,464.47	57.06%	0.00%	42.94%
C++	Level 3 Communications, Inc.	356,267,100	54.36	19,366.68	10,997.00	0.00	19,366.68	30,363.68	36.22%	0.00%	63.78%
C++	Sprint Corporation	3,969,872,033	3.62	14,370.94	32,570.00	0.00	14,370.94	46,940.94	69.39%	0.00%	30.61%
C+	Cincinnati Bell	209,863,805	3.60	755.51	1,236.30	129.40	755.51	2,121.21	58.28%	6.10%	35.62%
	Mean								55.24%	1.53%	43.24%
	Median								57.67%	0.00%	53.36%
	Weighted Average								56.43%	0.16%	43.41%

Sources: Columns a, c, f, and g were extracted from Value Line.

Column d was extracted from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Telecommunications Companies
Capital Asset Pricing Model - Ex Ante**

Component	Value Line Rating		
	A++	B++, B+, B	C++, C+
Expected Future Return, S&P 500	10.80%	10.80%	10.80%
Less: Risk Free Return - 10 Year Treasury Bonds ¹	2.78%	2.78%	2.78%
Risk Premium	8.02%	8.02%	8.02%
Beta ²	0.60	0.80	1.00
Adjusted Risk Premium	4.81%	6.42%	8.02%
Risk Free Return - 10 Year Treasury Bonds ¹	2.78%	2.78%	2.78%
Projected Return on Equity	7.59%	9.20%	10.80%

¹ US Department of Treasury - Composite Long-Term Rates > 10 yrs, December 31, 2015

² The estimated betas were derived from a representative sample of telecommunications companies with similar ratings.

**2016 Capitalization Rate Study
Telecommunications Companies
Capital Asset Pricing Model - Ex Post**

Component	Value Line Rating		
	A++	B++, B+, B	C++, C+
Common Stock Return, S&P 500 (1928-2015) ¹	11.41%	11.41%	11.41%
Less: 10 Year Treasury Bonds (1928-2015) ¹	5.23%	5.23%	5.23%
Risk Premium	6.18%	6.18%	6.18%
Beta ²	0.60	0.80	1.00
Adjusted Risk Premium	3.71%	4.94%	6.18%
Risk Free Return - 10 Year Treasury Bonds ³	2.78%	2.78%	2.78%
Projected Return on Equity	6.49%	7.72%	8.96%

¹ Damodaran Online, January 6, 2016

² The estimated betas were derived from a representative sample of telecommunications companies with similar ratings.

³ US Department of Treasury - Composite Long Term Rates > 10 yrs, December 31, 2015

**2016 Capitalization Rate Study
Telecommunications Companies
Beta Analysis**

a	b	c	d	e	f	g	h	i
Value Line Rating	Company Name	Value Line Beta	Zacks Beta	Thomson Beta	Average Beta	Company's Tax Rate	Debt Equity Ratio	Unlevered Beta ¹
A++	AT&T Inc.	0.75	0.35	0.72	0.61	0.34	0.40	0.48
A++	Verizon Communications	0.75	0.31	0.74	0.60	0.35	0.51	0.45
	Mean	0.75	0.33	0.73	0.60		0.45	0.47
	Median	0.75	0.33	0.73	0.60		0.45	0.47
	Weighted Average				0.60		0.45	0.47
B++	Atlantic Tele-Network, Inc.	0.95	0.88	0.68	0.84	0.43	0.19	0.76
B++	CenturyLink, Inc.	0.90	0.80	0.97	0.89	0.32	1.01	0.53
B+	U.S. Cellular	1.05	0.59	0.91	0.85	0.33	0.29	0.71
B	Frontier Communications	1.05	0.72	1.04	0.94	0.35	1.91	0.42
B	Shenandoah Telecom.	1.10	1.46	1.03	1.20	0.41	0.40	0.97
B	T-Mobile US, Inc.	1.00	1.09	0.72	0.94	0.25	1.57	0.43
B	Telephone & Data Systems	1.20	1.14	1.06	1.13	0.33	0.65	0.79
	Mean	1.04	0.95	0.92	0.97		0.86	0.66
	Median	1.05	0.88	0.97	0.94		0.65	0.71
	Weighted Average				0.93		1.36	0.49

Sources: Columns a, c, and g were extracted from Value Line.

Column d was extracted from Zacks.com.

Column e was extracted from ThomsonReuters.com.

Column h is a 5-year average Debt to Equity Ratio, where historical information is available.

¹ Unlevered Beta = Average Beta/[1+(1-tc)(D/E)]; where D/E is the debt to equity ratio, tc is the company's most recent tax rate.

**2016 Capitalization Rate Study
Telecommunications Companies
Beta Analysis**

a	b	c	d	e	f	g	h	i
Value Line Rating	Company Name	Value Line Beta	Zacks Beta	Thomson Beta	Average Beta	Company's Tax Rate	Debt Equity Ratio	Unlevered Beta ¹
C++	Consolidated Communications	0.75	0.93	0.86	0.85	0.37	1.46	0.44
C++	Level 3 Communications	1.15	1.80	1.11	1.35	0.40	1.52	0.71
C++	Sprint Nextel	1.30	0.36	1.08	0.91	0.40	1.70	0.45
C+	Cincinnati Bell	1.15	1.32	1.29	1.25	0.35	2.95	0.43
	Mean	1.09	1.10	1.09	1.09		1.91	0.51
	Median	1.15	1.13	1.10	1.08		1.61	0.45
	Weighted Average				1.08		1.66	0.55

		A++	B++, B+, B	C++, C+, C
A++:	Relevered beta based on 30% debt capital structure	0.58 ²	----	----
	Relevered beta based on 30% debt capital structure and a weighted average beta	0.59 ²	----	----
B++, B+, B:	Relevered beta based on 35% debt capital structure	----	0.87 ²	----
	Relevered beta based on 35% debt capital structure and a weighted average beta	----	0.65 ²	----
C++, C+, C:	Relevered beta based on 40% debt capital structure	----	----	0.71 ²
	Relevered beta based on 40% debt capital structure and a weighted average beta	----	----	0.76 ²

Sources: Columns a, c, and g were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.
Column h is a 5-year average Debt to Equity Ratio, where historical information is available.

¹ Unlevered Beta = Average Beta/[1+(1- t_c)(D/E)]; where D/E is the debt to equity ratio, t_c is the company's most recent tax rate.

² Relevered Beta = [Unlevered Beta][1+(1- t_p)(D/E)]; where D/E is the debt to equity ratio, t_p is the prospective purchaser's tax rate (assumed to be 40%).

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Pipeline Companies**

SBE No.	Company Name	Ratings		Capital Structure		Rates of Return		Basic Cap Rate
		Financial	Bond	Common Equity	Debt	Equity	Debt	
402	Calnev Pipe Line LLC.	NR-1	NR-b	65%	35%	13.61%	5.60%	10.81%
461	SFPP, L.P.	NR-1	NR-b	65%	35%	13.61%	5.60%	10.81%
479	Chevron Pipe Line Company	NR-2	NR-b	65%	35%	14.14%	5.60%	11.15%
480	Phillips 66 Pipeline LLC	NR-2	NR-b	65%	35%	14.14%	5.60%	11.15%
486	Pacific Pipeline System LLC	NR-2	NR-b	65%	35%	14.14%	5.60%	11.15%
492	San Pablo Bay Pipeline Company LLC	NR-2	NR-b	65%	35%	14.14%	5.60%	11.15%
	Other Pipeline Companies	NR-3	NR-c	65%	35%	15.18%	6.61%	12.18%

**2016 Capitalization Rate Study
Pipeline Companies
Industry Notes**

- Staff considered both the Capital Asset Pricing Model (CAPM Ex Post and Ex Ante) and the Discounted Cash Flow Model (DCF) in the development of equity rates. Staff relied primarily on the Discounted Cash Flow model in the development of equity rates.
- Magellan Midstream Partners, L. P. was added to the Capitalization Rate Study as staff determined that its capital structure was representative of a typical oil pipeline company.

**2016 Capitalization Rate Study
Pipeline Companies
Flotation Cost Adjustment**

Equity				Debt			
Value Line Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
NR-1	13.00%	4.50%	13.61%	NR-b	5.50%	1.70%	5.60%
NR-2	13.50%	4.50%	14.14%	NR-c	6.50%	1.70%	6.61%
NR-3	14.50%	4.50%	15.18%				

Cost of Capital Adjusted for Flotation Costs = $\frac{k_u}{1 - f}$

Where: k_u = The cost of capital unadjusted for flotation costs

f = Flotation cost as a percentage of the value of securities issued

NR-1: Not-Rated-1 pipelines are not directly traded because they are subsidiaries of larger companies. These are larger common carrier pipelines transmitting refined petroleum products.

NR-2: Not-Rated-2 pipelines are not directly traded because they are subsidiaries of larger companies. These are larger common carrier pipelines transmitting crude oil.

NR-3: Not-Rated-3 pipelines are smaller companies transporting petroleum products or crude oil.

NR-b: Although these companies do not have rated debt securities, the rating class "Baa" was chosen to represent these subsidiaries of larger corporations.

NR-c: Issues of this size are not normally rated. An additional increment of 100 basis points (before flotation costs) has been added to the "Baa" rate.

**2016 Capitalization Rate Study
Pipeline Companies
Comparison of Return on Common Equity**

Description	2016	2015	Change
E/P Ratio - Mean	4.61%	3.49%	1.12%
E/P Ratio - Median	5.00%	3.55%	1.45%
Dividend Yield + Dividend Growth - Mean	13.09%	12.03%	1.06%
Dividend Yield + Dividend Growth - Median	12.82%	10.50%	2.32%
Dividend Yield + Earnings Growth - Mean	13.30%	17.39%	-4.09%
Dividend Yield + Earnings Growth - Median	13.22%	17.73%	-4.51%
Capital Asset Pricing Model (CAPM) - Ex Ante	8.90%	8.68%	0.22%
Capital Asset Pricing Model (CAPM) - Ex Post	7.49%	7.16%	0.33%
State-Assessed Properties Division Recommendation:	13.00%	12.00%	1.00%

**2016 Capitalization Rate Study
Pipeline Companies
Equity Rates**

a	b	c	d	e	f	g	h	i	j	k	l
Value Line		Stock	2015	2015	2016	2016	2016	2016	E/P	Div Yld+	Div Yld+
Rating	Company Name	Price	Earnings	Dividends	Est Div ¹	Dividend	Hist. Div	Avg. Erns	Ratio	Div Gwth	Erns Gwth
		12/31/15				Yield	Growth	Growth	(d/c)	(g+h)	(g+i)
B++	Enbridge Energy Partners, L.P.	23.07	0.95	2.20	1.21	5.24%	2.50%	12.40%	4.12%	7.74%	17.64%
B++	Kinder Morgan, Inc.	14.92	0.55	1.90	0.50	3.35%	9.00%	5.13%	3.69%	12.35%	8.48%
B++	Magellan Midstream Partners, L.P.	67.92	3.50	2.90	3.25	4.79%	13.00%	8.43%	5.15%	17.79%	13.22%
B+	Buckeye Partners, L.P.	65.96	3.30	4.63	4.83	7.32%	5.50%	8.10%	5.00%	12.82%	15.42%
B+	Enterprise Products Partners, L.P.	25.58	1.30	1.51	1.60	6.25%	8.50%	5.47%	5.08%	14.75%	11.72%
	Mean						7.70%	7.91%	4.61%	13.09%	13.30%
	Median						8.50%	8.10%	5.00%	12.82%	13.22%
	Weighted Average										11.37%

Sources: Columns a, b, d, e, f and h were extracted from the Value Line (with the exception of column f for Kinder Morgan, Inc., as explained in note 1).

Column c was extracted from the Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

Column i is an average of Value Line, Zacks.com, and ThomsonReuters.com.

¹ Kinder Morgan, Inc's, 2016 estimated dividend is extracted from Zacks.com, due to Kinder Morgan announcing a change in dividend payout after the Value Line analysis but prior to the end of 2015.

**2016 Capitalization Rate Study
Pipeline Companies
Long Term Earnings Growth**

a	b	c	d	e	f
Value Line Rating	Company Name	Value Line	Zacks	Thomson	Average
B++	Enbridge Energy Partners, L.P.	-18.00%	26.90%	28.30%	12.40%
B++	Kinder Morgan, Inc.	13.00%	-1.50%	3.90%	5.13%
B++	Magellan Midstream Partners, L.P.	10.50%	7.70%	7.10%	8.43%
B+	Buckeye Partners, L.P.	9.50%	10.80%	4.00%	8.10%
B+	Enterprise Products Partners, L.P.	9.00%	3.70%	3.70%	5.47%
	Mean	4.80%	9.52%	9.40%	7.91%
	Median	9.50%	7.70%	24.20%	8.10%
	Weighted Average				6.39%

Sources: Columns a, b, and c were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.

**2016 Capitalization Rate Study
Pipeline Companies
Capital Asset Pricing Model - Ex Ante**

Component	Industry Computation
Expected Future Return, S&P 500	10.80%
Less: Risk Free Return - Long-Term Treasury Rates ¹	2.78%
Risk Premium	8.02%
Relevered Beta ²	0.76
Adjusted Risk Premium	6.12%
Risk Free Return - Long-Term Treasury Rates ¹	2.78%
Projected Return on Equity	8.90%

¹ US Department of the Treasury - Composite Long - Term Rates > 10yrs, December 31, 2015

² Weighted average using betas from Value Line, Zacks.com, and Standard & Poor's for a representative sample of pipeline companies.

2016 Capitalization Rate Study
Pipeline Companies
Capital Asset Pricing Model - Ex Post

Component	Industry Computation
Common Stock Return, S&P 500 (1928 - 2015) ¹	11.41%
Less: Risk Free Return - Long-Term Treasury Rates (1928 - 2015) ¹	5.23%
Risk Premium	6.18%
Relevered Beta ²	0.76
Adjusted Risk Premium	4.71%
Risk Free Return - Long-Term Treasury Rates ³	2.78%
Projected Return on Equity	7.49%

¹ Damodaran Online, January 5, 2016

² Weighted average using betas from Value Line, Zacks.com, and Standard & Poor's for a representative sample of pipeline companies.

³ US Department of the Treasury - Composite Long-Term Rates > 10yrs, December 31, 2015

**2016 Capitalization Rate Study
Pipeline Companies
Beta Analysis**

a	b	c	d	e	f	g	h	i
Value Line Rating	Company Name	Value Line Beta	Zacks Beta	Standard & Poor's Beta	Average Beta	Tax Rate	Debt Equity Ratio	Unlevered Beta ¹
B++	Enbridge Energy Partners, L.P.	0.90	0.91	0.55	0.79	0.40	0.73	0.55
B++	Kinder Morgan, Inc.	1.00	0.84	0.63	0.82	0.20	1.25	0.47
B++	Magellan Midstream Partners, L.P.	0.90	0.68	0.55	0.71	0.40	0.22	0.63
B+	Buckeye Partners, L.P.	0.85	0.89	0.60	0.78	0.40	0.43	0.62
B+	Enterprise Products Partners, L.P.	1.00	0.86	0.65	0.84	0.40	0.41	0.67
	Mean	0.93	0.84	0.60	0.79	0.36	0.61	0.59
	Median	0.90	0.86	0.60	0.79	0.40	0.43	0.62
	Weighted Average				0.81		0.74	0.58
	Relevered beta based on 35% Debt Capital Structure				0.78 ²			
	Relevered beta based on 35% Debt Capital Structure and a weighted average beta				0.76 ²			

Sources: Columns a, b, and c were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.

¹ Unlevered Beta = Beta/[1+(1-t)(D/E)]; where D/E is the debt to equity ratio, t is the tax rate (assumed to be 40%)

² Relevered Beta = [Unlevered Beta][1+(1-t)(D/E)]; where D/E is the debt to equity ratio, t is the tax rate (assumed to be 40%)

**2016 Capitalization Rate Study
Pipeline Companies
Capital Structure**

a	b	c	d	e	f	g	h	i	j
Value Line Rating	Moody Bond Rating	Company Name	Partnership Units Outstanding (\$million)	Unit Price 12/31/15	Market Value Equity (\$million)	Long Term Debt (\$million)	Total Capital (\$million)	Long Term Debt %	Equity %
B++	NR	Enbridge Energy Partners, L.P.	425,992.00	23.07	9,827.64	7,169.80	16997.44	42.18%	57.82%
B++	NR	Kinder Morgan, Inc.	2,231,514.70	14.92	33,294.20	41,600.00	74894.20	55.55%	44.45%
B++	NR	Magellan Midstream Partners, L.P.	227,427.20	67.92	15,446.86	3,407.10	18853.96	18.07%	81.93%
B+	NR	Buckeye Partners, L.P.	128,836.30	65.96	8,498.04	3,632.80	12130.84	29.95%	70.05%
B+	NR	Enterprise Products Partners, L.P.	2,005,753.80	25.58	51,307.18	20,840.70	72147.88	28.89%	71.11%
		Total			118,373.91	76,650.40	195024.31		
		Mean						34.93%	65.07%
		Median						29.95%	70.05%
		Weighted Average						39.30%	60.70%

Recommended Capital Structure for Common Carrier Pipelines for lien date January 1, 2016:

Debt - 35%
Equity - 65%

Sources: Columns a, d, and g were extracted from the Value Line Investment Survey Reports.

Column e was extracted from the Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Pipeline Companies
Debt Yield Rate**

Average of Industrial and Public Utility Bond Yield:

	Aa Industrial/Utility Average	4.22%	
	A Industrial/Utility Average	4.44%	
		4.22%	Aa
		4.44%	A
	Baa Industrial/Utility Average	5.50%	
	Recommended	5.50%	Baa/Ba

	Bond Rating	Industrial	Public Utility	Average
	Aaa	4.04%	N/A	4.04%
	Aa	4.23%	4.21%	4.22%
	A	4.46%	4.41%	4.44%
	Baa	5.42%	5.58%	5.50%

Source: Moody's Daily Long-Term Corporate Bond Yield Averages as of December 31, 2015.

**California State Board of Equalization
State-Assessed Properties Division
2016 Capitalization Rate Study
Railroad Companies**

SBE No.	Company Name	Capital Structure				Rates of Return		Basic Cap Rate
		Financial	Bond	Common Equity	Debt	Common Equity	Debt	
804	BNSF Railway Company	A++	Baa2	80%	20%	13.61%	5.60%	12.01%
843	Union Pacific Railroad Company	A++	Baa2	80%	20%	13.61%	5.60%	12.01%
802	Central Oregon & Pacific Railroad	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
810	California Northern Railroad	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
813	Pacific Harbor Lines	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
822	Pacific Sun Railroad, LLC	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
826	Sacramento Valley Railroad, LLC	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
850	Modesto & Empire Traction Company	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
865	San Diego & Imperial Valley Railroad Co. Inc.	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
878	Stockton Terminal and Eastern Railroad	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
882	Trona Railway Co.	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
897	San Joaquin Valley Railroad Company	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
899	Arizona & California Railroad	NR-1	NR-1	60%	40%	15.71%	7.12%	12.27%
	Other Railroad Companies	NR-2	NR-2	60%	40%	15.97%	8.14%	12.84%

**2016 Capitalization Rate Study
Railroad Companies
Industry Notes**

- Staff relied upon the results of the following models in the development of equity rates:
 1. Discounted Cash Flow Model
 2. Capital Asset Pricing Model – ex post and ex ante

**2016 Capitalization Rate Study
Railroad Companies
Flotation Cost Adjustment**

Equity				Debt			
Value Line Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
A++	13.00%	4.50%	13.61%	Baa2	5.50%	1.70%	5.60%
NR-1	15.00%	4.50%	15.71%	NR-1 ¹	7.00%	1.70%	7.12%
NR-2	15.25%	4.50%	15.97%	NR-2 ²	8.00%	1.70%	8.14%

Cost of Capital Adjusted for Flotation Costs = $\frac{k_u}{1 - f}$

Where: k_u = The cost of capital unadjusted for flotation costs

f = Flotation cost as a percentage of the value of securities issued

¹ NR-1: Represents short line railroad companies with stable historical income. An additional 150 basis points were added to the Baa2 bond rate to represent the additional risk premium.

² NR-2: Represents short line railroad companies without stable historical income patterns. An additional 250 basis points were added to the Baa2 bond rate to represent the additional risk premium.

**2016 Capitalization Rate Study
Railroad Companies
Comparison of Return on Common Equity**

Description	2016	2015	Change
E/P Ratio - Mean	7.83%	5.93%	1.90%
E/P Ratio - Median	8.06%	5.93%	2.13%
Dividend Yield + Dividend Growth - Mean	13.46%	12.46%	1.00%
Dividend Yield + Dividend Growth - Median	14.93%	13.26%	1.67%
Dividend Yield + Earnings Growth - Mean	10.03%	13.34%	-3.31%
Dividend Yield + Earnings Growth - Median	10.23%	12.99%	-2.76%
Capital Asset Pricing Model - Ex Post	9.55%	9.73%	-0.18%
Capital Asset Pricing Model - Ex Ante	11.56%	12.14%	-0.58%
State-Assessed Properties Division Recommendation:	13.00%	12.25%	0.75%

**2016 Capitalization Rate Study
Railroad Companies
Equity Rates**

a	b	c	d	e	f	g	h	i	j	k	l	m
Value Line Rating	Company Name	Stock Price 12/31/15	Est. Earnings 2016	Earnings 2015	Dividends 2015	Est. Dividends 2016	Div Yield 2016 (g/c)	Value Line Dividend Est Gwth	Average Est Erns Gwth	E/P Ratio (d/c)	Div Yld + Dv Gwth (h+i)	Div Yld + Erns Gwth (h+j)

Class 1 Railroads:

A++	Union Pacific Corp.	78.20	6.30	5.65	2.15	2.40	3.07%	13.00%	8.50%	8.06%	16.07%	11.57%
A	Norfolk Southern Corp.	84.59	6.05	5.40	2.36	2.44	2.88%	6.50%	5.40%	7.15%	9.38%	8.28%
B++	CSX Corp.	25.95	2.15	2.00	0.70	0.76	2.93%	12.00%	7.30%	8.29%	14.93%	10.23%
	Mean						2.96%	10.50%	7.07%	7.83%	13.46%	10.03%
	Median						2.93%	12.00%	7.30%	8.06%	14.93%	10.23%
	Weighted Average										14.27%	10.50%

Sources: Columns a, d, e, f, g and i were extracted from Value Line.

Column c was extracted from Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

Column j is an average of Value Line, Zacks.com and ThomsonReuters.com.

**2016 Capitalization Rate Study
Railroad Companies
Long Term Earnings Growth**

a	b	c	d	e	f
Value Line Rating	Company Name	Value Line	Zacks	Thomson	Average
Class 1 Railroads:					
A++	Union Pacific Corp.	10.00%	8.50%	7.00%	8.50%
A	Norfolk Southern Corp.	8.00%	7.40%	0.80%	5.40%
B++	CSX Corp.	11.00%	5.40%	5.50%	7.30%
	Mean	9.67%	7.10%	4.43%	7.07%
	Median	10.00%	7.40%	5.50%	7.30%
	Weighted Average				7.51%

Sources: Columns a and c were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.

**2016 Capitalization Rate Study
Railroad Companies
Capital Asset Pricing Model - Ex Ante**

Component	Industry Computation
Expected Future Return, S&P 500	10.80%
Less: Risk Free Return - Long-Term Treasury Rates ¹	2.78%
Risk Premium	8.02%
Relevered Beta	1.10
Adjusted Risk Premium	8.78%
Risk Free Return - Long-Term Treasury Rates ¹	2.78%
Projected Return on Equity	11.56%

¹ US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 31, 2015

**2016 Capitalization Rate Study
Railroad Companies
Capital Asset Pricing Model - Ex Post**

Component	Industry Computation
Common Stock Returns, S&P 500 (1928 - 2015) ¹	11.41%
Less: 10 Year Treasury Bonds (1928 - 2015) ¹	5.23%
Risk Premium	6.18%
Relevered Beta	1.10
Adjusted Risk Premium	6.77%
Risk Free Return - Long-Term Treasury Rates ²	2.78%
Projected Return on Equity	9.55%

¹ Damodaran Online, January 6, 2016

² US Department of Treasury - Composite Long -Term Rates > 10 yrs, December 31, 2015

**2016 Capitalization Rate Study
Railroad Companies
Beta Analysis**

a	b	c	d	e	f	g	h	i
Value Line Rating	Company Name	Value Line Beta	Zacks Beta	Thomson Beta	Average Beta	Company's Tax Rate	Debt Equity Ratio ¹	Unlevered Beta ²
Class 1 Railroads:								
A++	Union Pacific Corp.	1.05	0.99	1.11	1.05	0.38	0.15	0.96
A	Norfolk Southern Corp.	1.05	1.17	0.96	1.06	0.38	0.32	0.88
B++	CSX Corp.	1.15	1.32	1.17	1.21	0.38	0.35	1.00
	Mean	1.08	1.16	1.08	1.11		0.27	0.95
	Median	1.05	1.17	1.11	1.06		0.32	0.96
	Weighted Average				1.09		0.23	0.95
	Relevered Beta based on 20% Debt Capital Structure						1.09 ³	
	Relevered Beta based on 20% Debt Capital Structure and a weighted average Beta						1.10 ³	
Non-Class 1 Railroads:								
B+	Genesee & Wyoming	1.30	1.64	1.34	1.43	0.38	0.35	1.17
	Mean	1.30	1.64	1.34	1.43		0.35	1.17
	Median	1.30	1.64	1.34	1.43		0.35	1.17
	Weighted Average				1.43		0.35	1.17
	Relevered Beta based on 40% Debt Capital Structure						1.64 ³	
	Relevered Beta based on 40% Debt Capital Structure and a weighted average Beta						1.64 ³	

Sources: Columns a, c, and g were extracted from Value Line.
Column d was extracted from Zacks.com.
Column e was extracted from ThomsonReuters.com.

¹ Average debt-to-equity ratio over the last five years.

² Unlevered Beta = Corrected Beta/[1+(1-tc)(D/E)]; where D/E is the debt-to-equity ratio, tc is the company's 2015 tax rate.

³ Relevered Beta = [Unlevered Beta][1+(1-tp)(D/E)]; where D/E is the debt-to-equity ratio, tp is a prospective purchaser's tax rate (assumed to be 40%).

**2016 Capitalization Rate Study
Railroad Companies
Capital Structure**

a	b	c	d	e	f	g	h	i	j
Value Line Rating	Moody's Bond Rating	Company Name	Common Stock Outstanding (\$million)	Common Stock Price 12/31/15	Market Value Equity (\$million)	Long Term Debt (\$million)	Total Capital (\$million)	Long Term Debt %	Common Equity %
Class 1 Railroads:									
A++	NR	Union Pacific Corp.	854	78.20	66,783	12,798	79,581	16.08%	83.92%
A	NR	Norfolk Southern Corp.	298	84.59	25,208	8,896	34,104	26.09%	73.91%
B++	NR	CSX Corp.	975	25.95	25,301	10,088	35,389	28.51%	71.49%
		Total					<u>149,074</u>		
		Mean						23.56%	76.44%
		Median						26.09%	73.91%
		Weighted Average						21.32%	78.68%
Non-Class 1 Railroads:									
B+	NR	Genesee & Wyoming	57	53.69	3,060	2,251	5,311	42.38%	57.62%
		Total					<u>5,311</u>		
		Mean						42.38%	57.62%
		Median						42.38%	57.62%
		Weighted Average						42.38%	57.62%

Recommended Capital Structures for lien date January 1, 2016		Equity	Debt
Class 1 Railroads:		80%	20%
Non-Class 1 Railroads:		60%	40%

Sources: Columns a, d, and g were extracted from Value Line.
Column e was extracted from the Finance.Yahoo.com and represents December 31, 2015 closing stock prices.

**2016 Capitalization Rate Study
Railroad Companies
Interpolation of Railroad Bond Yield**

Yield Increment from Moody's Average Bond Ratings			
a	b	c	d
Moody's Average Rating	Moody's Average Bond Yield	Number of Increments	Incremental Increase (b/c)
Aa = Aa2	4.22%		
A = A2	<u>4.44%</u>		
Difference	<u><u>0.22%</u></u>	3	0.07%
A = A2	4.44%		
Baa = Baa2	<u>5.50%</u>		
Difference	<u><u>1.06%</u></u>	3	0.35%

Interpolated Railroad Bond Yield			
a	b	c	d
Moody's Average Rating	Moody's Average Bond Yield	Incremental Increase	Interpolated Bond Yield
Aa2	4.220%		4.22%
Aa3		0.07%	4.29%
A1		0.07%	4.36%
A2	4.435%		4.44%
A3		0.35%	4.79%
Baa1		0.35%	5.14%
Baa2	5.500%		5.50%
Baa3		0.35%	5.85%

**2016 Capitalization Rate Study
Railroad Companies
Debt Yield Rates**

Bond Rating	Industrial	Public Utility	Average
Aaa	4.04%	N/A	4.04%
Aa	4.23%	4.21%	4.22%
A	4.46%	4.41%	4.44%
Baa	5.42%	5.58%	5.50%

Source: Moody's Daily Long-Term Corporate Bond Yield Averages as of December 31, 2015.