

# 2017 Capitalization Rate Study

State-Assessed Properties Division  
Richard Reisinger, Chief

Lien Date 2017

**BOARD MEMBERS**

**SEN. GEORGE RUNNER (Ret.)**  
First District  
Lancaster

**FIONA MA, CPA**  
Second District  
San Francisco

**JEROME E. HORTON**  
Third District  
Los Angeles County

**DIANE L. HARKEY**  
Fourth District  
Orange County

**BETTY T. YEE**  
State Controller

**DAVID J. GAU**  
Executive Director



# 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.”<sup>1</sup>

## ***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/>

---

<sup>1</sup> Assessors’ Handbook 501, Basic Appraisal, Revised January 2002

# Executive Summary

This booklet contains a study for each of the major state assessee industry groups<sup>2</sup> 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.

---

<sup>2</sup> 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 beta<sup>3</sup> 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.

---

<sup>3</sup> 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  
2017 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	
<b>Gas and Electric Companies</b>											
141	San Diego Gas & Electric Company	A	A3	A1	52%	3%	45%	10.73%	6.31%	4.40%	<b>7.75%</b>
148	Southern California Edison Company	A	Baa1	A2	48%	9%	43%	10.89%	6.31%	4.46%	<b>7.71%</b>
135	Pacific Gas and Electric Company	B+	Baa2	A3	52%	1%	47%	10.83%	6.31%	4.63%	<b>7.87%</b>
106	PacifiCorp	Not Rated	Baa2	A3	52%	1%	47%	11.46%	6.31%	4.63%	<b>8.20%</b>
125	Terra-Gen Dixie Valley, LLC	Not Rated		Not Rated	55%		45%	11.46%		4.63%	<b>8.39%</b>
146	Sierra Pacific Power Company	Not Rated	Not Rated	Baa1	52%	1%	47%	11.46%	7.03%	4.80%	<b>8.29%</b>
119	Trans Bay Cable LLC	Not Rated		Not Rated	55%		45%	14.06%		4.63%	<b>9.82%</b>
156	DATC Path 15, LLC	Not Rated		A3	55%		45%	14.06%		4.63%	<b>9.82%</b>
163	Liberty Utilities (Calpeco Electric), LLC	Not Rated		Not Rated	55%		45%	11.46%		4.63%	<b>8.39%</b>
191	Arizona Public Service Company	Not Rated		A2	55%		45%	11.46%		4.63%	<b>8.39%</b>
	Electric Cooperatives	Not Rated		Not Rated	55%		45%	11.46%		4.63%	<b>8.39%</b>
<b>Natural Gas Companies</b>											
149	Southern California Gas Company	A	A3	A1	52%	2%	46%	10.52%	6.09%	4.40%	<b>7.62%</b>
152	Southwest Gas Corporation	B++		A3	55%		45%	10.52%		4.63%	<b>7.87%</b>
192	Alpine Natural Gas Operating Company No. One LLC	Not Rated		Not Rated	55%		45%	12.24%		5.12%	<b>9.03%</b>
194	West Coast Gas Company, Inc.	Not Rated		Not Rated	55%		45%	12.24%		5.12%	<b>9.03%</b>
104	Central Valley Gas Storage LLC	Not Rated		Not Rated	60%		40%	14.58%		6.11%	<b>11.19%</b>
121	Gill Ranch Storage, LLC	Not Rated		Not Rated	60%		40%	14.58%		6.11%	<b>11.19%</b>
195	Wild Goose Storage, LLC	Not Rated		Not Rated	60%		40%	14.58%		6.11%	<b>11.19%</b>
198	Lodi Gas Storage, LLC	Not Rated		Not Rated	60%		40%	14.58%		6.11%	<b>11.19%</b>
<b>Water Company</b>											
101	Golden State Water Company	A		A2	55%		45%	9.82%		4.37%	<b>7.37%</b>

**California State Board of Equalization  
State-Assessed Properties Division  
2017 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%	12.24%	4.77%	10.37%
180	North Baja Pipeline, LLC	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
187	Mojave Pipeline Company, LLC	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
188	Kern River Gas Transmission Company	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
189	Standard Pacific Gas Line, Incorporated	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
190	Tuscarora Gas Transmission Company	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
196	Questar Southern Trails Pipeline Company	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
197	El Paso Natural Gas Company, LLC	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%

**California State Board of Equalization  
State-Assessed Properties Division  
2017 Capitalization Rate Study  
Electric Generation Facilities**

Facility Type	Ratings		Capital Structure		Rates of Return		Basic Cap Rate <sup>3</sup>
	Financial	Bond	Common Equity	Debt	Common Equity	Debt	
<b>Modern Electric Generation Technology <sup>1</sup></b>	B	B2	60%	40%	14.06%	6.85%	<b>11.18%</b>
<b>Older Electric Generation Technology <sup>2</sup></b>	B	B2	60%	40%	16.15%	7.87%	<b>12.83%</b>

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

<sup>2</sup> 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.

<sup>3</sup> 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  
2017 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	
<b>Local Exchange Companies</b>								
279	Pacific Bell Telephone Company	A++	Baa1	70%	30%	11.35%	4.60%	9.33%
201	Frontier California	C++	B1	65%	35%	15.26%	6.09%	12.05%
284	Citizens Telecommunications Company of California, Inc.	C++	B1	65%	35%	15.26%	6.09%	12.05%
294	Consolidated Communications of California	C++	B1	65%	35%	15.26%	6.09%	12.05%
	Other Local Exchange Companies	Not Rated	Not Rated	65%	35%	15.63%	6.35%	12.38%
<b>Wireless Companies</b>								
2532	Los Angeles SMSA Ltd., Partnership	A++	Baa1	70%	30%	10.83%	4.60%	8.96%
2552	Fresno MSA Limited Partnership	A++	Baa1	70%	30%	10.83%	4.60%	8.96%
2559	Cellco Partnership	A++	Baa1	70%	30%	10.83%	4.60%	8.96%
2606	AT&T Mobility LLC	A++	Baa1	70%	30%	10.83%	4.60%	8.96%
2669	California RSA #4 Partnership	A++	Baa1	70%	30%	10.83%	4.60%	8.96%
2748	T-Mobile West, LLC	B+	Ba3	65%	35%	12.66%	5.83%	10.27%
2720	Sprint Telephony PCS, L.P.	C++	B1	65%	35%	14.48%	6.09%	11.54%
	Other Wireless Companies <sup>1</sup>	Not Rated	Not Rated	55%	45%	16.56%	8.14%	12.77%
	Wireless Reseller Companies	Not Rated	Not Rated	55%	45%	18.65%	8.65%	14.15%
<b>Interexchange Companies</b>								
2274	MCI Communications Services, Inc.	A++	Baa1	70%	30%	12.14%	4.60%	9.87%
2310	AT&T Communications	A++	Baa1	70%	30%	12.14%	4.60%	9.87%
2372	MCI Metro Access Transmission Services, LLC	A++	Baa1	70%	30%	12.14%	4.60%	9.87%
2463	CenturyLink Communications, LLC	B++	Ba2	65%	35%	14.22%	5.56%	11.19%
2014	Sprint Communications Company, L.P.	C++	B1	60%	40%	16.56%	6.09%	12.37%
7761	Level 3 Communications, LLC	C++	Ba3	60%	40%	16.56%	5.83%	12.27%
	Other Interexchange Carriers	Not Rated	Not Rated	55%	45%	21.25%	8.14%	15.35%
	Other Interexchange Resellers	Not Rated	Not Rated	55%	45%	24.38%	8.65%	17.30%

<sup>1</sup> Includes Radio Telephone and Paging Companies



**California State Board of Equalization  
State-Assessed Properties Division  
2017 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	
<b>402</b>	<b>Calnev Pipe Line LLC</b>	NR-1	NR-b	60%	40%	13.54%	4.80%	<b>10.04%</b>
<b>461</b>	<b>SFPP, L.P.</b>	NR-1	NR-b	60%	40%	13.54%	4.80%	<b>10.04%</b>
<b>479</b>	<b>Chevron Pipe Line Company</b>	NR-2	NR-b	60%	40%	14.06%	4.80%	<b>10.36%</b>
<b>480</b>	<b>Phillips 66 Pipeline LLC</b>	NR-2	NR-b	60%	40%	14.06%	4.80%	<b>10.36%</b>
<b>486</b>	<b>Pacific Pipeline System, LLC</b>	NR-2	NR-b	60%	40%	14.06%	4.80%	<b>10.36%</b>
<b>492</b>	<b>San Pablo Bay Pipeline Company LLC</b>	NR-2	NR-b	60%	40%	14.06%	4.80%	<b>10.36%</b>
	<b>Other Pipeline Companies</b>	NR-3	NR-c	60%	40%	15.10%	5.81%	<b>11.39%</b>

**California State Board of Equalization  
State-Assessed Properties Division  
2017 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	
<b>804</b>	<b>BNSF Railway Company</b>	A++	Baa2	80%	20%	12.76%	4.80%	<b>11.17%</b>
<b>843</b>	<b>Union Pacific Railroad Company</b>	A++	Baa2	80%	20%	12.76%	4.80%	<b>11.17%</b>
<b>802</b>	<b>Central Oregon &amp; Pacific Railroad</b>	NR-1	NR-1	60%	40%	14.84%	6.32%	<b>11.43%</b>
<b>810</b>	<b>California Northern Railroad</b>	NR-1	NR-1	60%	40%	14.84%	6.32%	<b>11.43%</b>
<b>813</b>	<b>Pacific Harbor Lines</b>	NR-1	NR-1	60%	40%	14.84%	6.32%	<b>11.43%</b>
<b>822</b>	<b>Pacific Sun Railroad, LLC</b>	NR-1	NR-1	60%	40%	14.84%	6.32%	<b>11.43%</b>
<b>826</b>	<b>Sacramento Valley Railroad, LLC</b>	NR-1	NR-1	60%	40%	14.84%	6.32%	<b>11.43%</b>
<b>850</b>	<b>Modesto &amp; Empire Traction Company</b>	NR-1	NR-1	60%	40%	14.84%	6.32%	<b>11.43%</b>
<b>865</b>	<b>San Diego &amp; Imperial Valley Railroad Co. Inc.</b>	NR-1	NR-1	60%	40%	14.84%	6.32%	<b>11.43%</b>
<b>878</b>	<b>Stockton Terminal and Eastern Railroad</b>	NR-1	NR-1	60%	40%	14.84%	6.32%	<b>11.43%</b>
<b>882</b>	<b>Trona Railway Co.</b>	NR-1	NR-1	60%	40%	14.84%	6.32%	<b>11.43%</b>
<b>897</b>	<b>San Joaquin Valley Railroad Company</b>	NR-1	NR-1	60%	40%	14.84%	6.32%	<b>11.43%</b>
<b>899</b>	<b>Arizona &amp; California Railroad</b>	NR-1	NR-1	60%	40%	14.84%	6.32%	<b>11.43%</b>
	<b>Other Railroad Companies</b>	NR-2	NR-2	60%	40%	15.10%	7.34%	<b>12.00%</b>

**California State Board of Equalization  
State-Assessed Properties Division  
2017 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	
<b>Gas and Electric Companies</b>											
141	San Diego Gas & Electric Company	A	A3	A1	52%	3%	45%	10.73%	6.31%	4.40%	7.75%
148	Southern California Edison Company	A	Baa1	A2	48%	9%	43%	10.89%	6.31%	4.46%	7.71%
135	Pacific Gas and Electric Company	B+	Baa2	A3	52%	1%	47%	10.83%	6.31%	4.63%	7.87%
106	PacifiCorp	Not Rated	Baa2	A3	52%	1%	47%	11.46%	6.31%	4.63%	8.20%
125	Terra-Gen Dixie Valley, LLC	Not Rated		Not Rated	55%		45%	11.46%		4.63%	8.39%
146	Sierra Pacific Power Company	Not Rated	Not Rated	Baa1	52%	1%	47%	11.46%	7.03%	4.80%	8.29%
119	Trans Bay Cable LLC	Not Rated		Not Rated	55%		45%	14.06%		4.63%	9.82%
156	DATC Path 15, LLC	Not Rated		A3	55%		45%	14.06%		4.63%	9.82%
163	Liberty Utilities (Calpeco Electric), LLC	Not Rated		Not Rated	55%		45%	11.46%		4.63%	8.39%
191	Arizona Public Service Company	Not Rated		A2	55%		45%	11.46%		4.63%	8.39%
	Electric Cooperatives	Not Rated		Not Rated	55%		45%	11.46%		4.63%	8.39%
<b>Natural Gas Companies</b>											
149	Southern California Gas Company	A	A3	A1	52%	2%	46%	10.52%	6.09%	4.40%	7.62%
152	Southwest Gas Corporation	B++		A3	55%		45%	10.52%		4.63%	7.87%
192	Alpine Natural Gas Operating Company No. One LLC	Not Rated		Not Rated	55%		45%	12.24%		5.12%	9.03%
194	West Coast Gas Company, Inc.	Not Rated		Not Rated	55%		45%	12.24%		5.12%	9.03%
104	Central Valley Gas Storage LLC	Not Rated		Not Rated	60%		40%	14.58%		6.11%	11.19%
121	Gill Ranch Storage, LLC	Not Rated		Not Rated	60%		40%	14.58%		6.11%	11.19%
195	Wild Goose Storage, LLC	Not Rated		Not Rated	60%		40%	14.58%		6.11%	11.19%
198	Lodi Gas Storage, LLC	Not Rated		Not Rated	60%		40%	14.58%		6.11%	11.19%
<b>Water Company</b>											
101	Golden State Water Company	A		A2	55%		45%	9.82%		4.37%	7.37%

**2017 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. Discounted Cash Flow Model
  3. 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 2017 Capitalization Rate Study sample:
  1. Financial data for Cleco Corporation is no longer available.
  2. Pepco Holdings, Inc. merged with another utility in the study sample.
  3. AGL Resources Inc. merged with another utility in the study sample.
  4. Piedmont Natural Gas Co. Inc. was acquired by another utility in the study sample.
- The Laclede Group, Inc. was renamed Spire Inc. on April 2, 2016.

**2017 Capitalization Rate Study  
Gas and Electric Companies  
Flotation Cost Adjustment**

<b>Equity</b>				<b>Preferred Stock</b>				<b>Debt</b>			
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%	4.00%	10.73%	A3	6.22%	1.50%	6.31%	A1	4.33%	1.50%	4.40%
A	10.45%	4.00%	10.89%	Baa1	6.22%	1.50%	6.31%	A2	4.39%	1.50%	4.46%
B+	10.40%	4.00%	10.83%	Baa2	6.22%	1.50%	6.31%	A3	4.56%	1.50%	4.63%
Not Rated	11.00%	4.00%	11.46%	Not Rated	6.92%	1.50%	7.03%	Baa1	4.73%	1.50%	4.80%
Not Rated	13.50%	4.00%	14.06%					Not Rated	5.04%	1.50%	5.12%

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

**2017 Capitalization Rate Study  
Gas and Electric Companies  
Summary of Rates of Return**

Common Equity		Preferred Stock		Bonds		
Value Line Rating	Rate of Return <sup>1</sup>	Moody's Bond Rating	Rate of Return <sup>2</sup>	Moody's Bond Yields	Moody's Rating	Rate of Return <sup>3</sup>
A	10.30%	A3	6.22%	Aa=4.02	Aa2	4.02%
					Aa3	4.08%
A	10.45%	Baa1	6.22%	A=4.19	A1	4.13%
					A2	4.19%
B+	10.40%	Baa2	6.22%		A3	4.36%
					Baa1	4.53%
Not Rated	11.00%	Not Rated	6.92%	Baa=4.70	Baa2	4.70%
					Baa3	4.84%
Not Rated	13.50%				Ba1	4.98%
					Ba2	5.12%
					Ba3	5.26%
					B1	5.40%
					B2	5.54%
					B3	5.68%
					Not Rated	5.82%

<sup>1</sup>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 2017 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 7.90%, 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).

<sup>2</sup>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.

<sup>3</sup>The Rates of Return on Bonds were based on the 2016 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.

**2017 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	11.27%	11.27%
Less: Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%	2.91%
Risk Premium	8.36%	8.36%
Beta <sup>2</sup>	0.75	0.80
Adjusted Risk Premium	6.29%	6.69%
Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%	2.91%
<b>Projected Return on Equity</b>	<b>9.20%</b>	<b>9.60%</b>

<sup>1</sup> US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 30, 2016

<sup>2</sup> The betas are based on staff's judgement in conjunction with the results from the beta analysis of the study sample.

**2017 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 - 2016) <sup>1</sup>	11.42%	11.42%
Less: 10 Year Treasury Bonds (1928 - 2016) <sup>1</sup>	5.18%	5.18%
Risk Premium	6.24%	6.24%
Beta <sup>2</sup>	0.75	0.80
Adjusted Risk Premium	4.69%	4.99%
Risk Free Return - Long-Term Treasury Rates <sup>3</sup>	2.91%	2.91%
<b>Projected Return on Equity</b>	<b>7.60%</b>	<b>7.90%</b>

<sup>1</sup> Damodaran Online, January 5, 2017

<sup>2</sup> The betas are based on staff's judgement in conjunction with the results from the beta analysis of the study sample.

<sup>3</sup> US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 30, 2016



**2017 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 12/30/16	Est. 2017 Earnings	2016 Earnings	2016 Dividends	Est. 2017 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.	73.68	4.15	3.95	2.68	2.76	3.75%	3.00%	2.57%	5.63%	6.75%	6.31%
A+	Pinnacle West Capital Corporation	78.03	4.30	3.90	2.56	2.68	3.43%	5.00%	4.53%	5.51%	8.43%	7.97%
A+	WEC Energy Group Inc.	58.65	3.10	2.95	1.98	2.08	3.55%	7.00%	6.30%	5.29%	10.55%	9.85%
A+	Xcel Energy Inc.	40.70	2.30	2.20	1.36	1.44	3.54%	6.00%	5.50%	5.65%	9.54%	9.04%
A	Allete, Inc.	64.19	3.30	2.90	2.08	2.14	3.33%	3.50%	4.83%	5.14%	6.83%	8.17%
A	Alliant Energy Corporation	37.89	2.00	1.65	1.18	1.26	3.33%	4.50%	5.83%	5.28%	7.83%	9.16%
A	Ameren Corporation	52.46	2.80	2.70	1.72	1.78	3.39%	4.00%	6.07%	5.34%	7.39%	9.46%
A	American Electric Power Co., Inc.	62.96	3.95	4.00	2.27	2.39	3.80%	5.00%	4.17%	6.27%	8.80%	7.96%
A	Avista Corp.	39.99	1.95	2.05	1.37	1.37	3.43%	3.00%	4.35%	4.88%	6.43%	7.78%
A	Black Hills Corporation	61.34	3.50	2.60	1.68	1.84	3.00%	6.00%	7.03%	5.71%	9.00%	10.03%
A	Duke Energy Corporation	77.62	4.80	4.25	3.36	3.48	4.48%	3.50%	3.57%	6.18%	7.98%	8.05%
A	Edison International	71.99	4.15	3.90	1.98	2.21	3.07%	10.00%	3.90%	5.76%	13.07%	6.97%
A	Eversource Energy	55.23	3.15	2.95	1.78	1.90	3.44%	6.00%	6.03%	5.70%	9.44%	9.47%
A	Hawaiian Electric Industries Inc.	33.07	1.65	2.30	1.24	1.24	3.75%	1.00%	3.60%	4.99%	4.75%	7.35%
A	MGE Energy Inc.	65.30	2.45	2.25	1.21	1.25	1.91%	4.00%	7.00%	3.75%	5.91%	8.91%
A	NextEra Energy, Inc.	119.46	6.05	4.70	3.48	3.92	3.28%	11.00%	6.13%	5.06%	14.28%	9.41%
A	OGE Energy Corp.	33.45	1.90	1.75	1.16	1.27	3.80%	9.50%	4.10%	5.68%	13.30%	7.90%
A	Sempra Energy	100.64	5.20	3.85	3.02	3.28	3.26%	7.00%	7.30%	5.17%	10.26%	10.56%
A	Southern Company	49.19	2.95	2.70	2.22	2.30	4.68%	3.50%	3.80%	6.00%	8.18%	8.48%
A	Vectren Corporation	52.15	2.65	2.45	1.62	1.70	3.26%	5.00%	6.30%	5.08%	8.26%	9.56%
A	Westar Energy, Inc.	56.35	2.55	2.45	1.52	1.60	2.84%	3.00%	4.23%	4.53%	5.84%	7.07%
	Mean						3.44%	5.26%	5.10%	5.36%	8.71%	8.55%
	Median						3.43%	5.00%	4.83%	5.34%	8.26%	8.48%
	Weighted Average										10.27%	9.40%

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 extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

**2017 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 12/30/16	Est. 2017 Earnings	2016 Earnings	2016 Dividends	Est. 2017 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.	41.62	2.15	2.00	1.24	1.32	3.17%	6.50%	6.43%	5.17%	9.67%	9.60%
B++	DTE Energy Company	98.51	5.35	4.85	3.07	3.36	3.41%	6.50%	5.80%	5.43%	9.91%	9.21%
B++	El Paso Electric Co.	46.50	2.45	2.30	1.23	1.30	2.80%	7.00%	5.33%	5.27%	9.80%	8.13%
B++	Empire District Electric Company	34.09	1.45	1.40	1.04	1.06	3.11%	2.50%	3.50%	4.25%	5.61%	6.61%
B++	Entergy Corporation	73.47	4.80	6.65	3.42	3.50	4.76%	2.50%	-3.03%	6.53%	7.26%	1.73%
B++	Exelon Corporation	35.49	2.80	1.85	1.26	1.29	3.63%	2.50%	4.93%	7.89%	6.13%	8.57%
B++	Otter Tail Corporation	40.80	1.65	1.58	1.25	1.27	3.11%	1.50%	6.00%	4.04%	4.61%	9.11%
B++	Portland General Electric Company	43.33	2.30	2.10	1.26	1.34	3.09%	6.00%	5.63%	5.31%	9.09%	8.73%
B++	SCANA Corp.	73.28	4.20	4.00	2.30	2.42	3.30%	5.00%	5.40%	5.73%	8.30%	8.70%
B+	CenterPoint Energy, Inc.	24.64	1.30	1.05	1.03	1.07	4.34%	4.50%	4.53%	5.28%	8.84%	8.88%
B+	FirstEnergy Corp.	30.97	2.50	1.75	1.44	1.44	4.65%	1.00%	0.20%	8.07%	5.65%	4.85%
B+	Great Plains Energy Incorporated	27.35	1.25	1.30	1.06	1.12	4.10%	5.50%	4.33%	4.57%	9.60%	8.43%
B+	PG&E Corporation	60.77	3.65	2.90	1.93	2.08	3.42%	7.00%	6.77%	6.01%	10.42%	10.19%
B	PNM Resources, Inc.	34.30	1.85	1.60	0.88	0.97	2.83%	10.00%	7.47%	5.39%	12.83%	10.29%
	Mean						3.55%	4.86%	4.52%	5.64%	8.41%	8.07%
	Median						3.36%	5.25%	5.37%	5.35%	8.97%	8.71%
	Weighted Average										8.15%	7.94%

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 extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

**2017 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.	2.50%	3.10%	2.10%	2.57%
A+	Pinnacle West Capital Corporation	4.00%	4.90%	4.70%	4.53%
A+	WEC Energy Group Inc.	6.00%	6.00%	6.90%	6.30%
A+	Xcel Energy Inc.	5.50%	5.40%	5.60%	5.50%
A	Allete, Inc.	4.00%	5.50%	5.00%	4.83%
A	Alliant Energy Corporation	6.00%	5.50%	6.00%	5.83%
A	Ameren Corporation	6.00%	6.50%	5.70%	6.07%
A	American Electric Power Co., Inc.	5.00%	5.60%	1.90%	4.17%
A	Avista Corp.	3.00%	N/A	5.70%	4.35%
A	Black Hills Corporation	7.50%	6.20%	7.40%	7.03%
A	Duke Energy Corporation	4.00%	5.00%	1.70%	3.57%
A	Edison International	3.50%	6.10%	2.10%	3.90%
A	Eversource Energy	6.00%	6.30%	5.80%	6.03%
A	Hawaiian Electric Industries Inc.	4.00%	4.00%	2.80%	3.60%
A	MGE Energy Inc.	7.00%	N/A	N/A	7.00%
A	NextEra Energy, Inc.	4.50%	6.90%	7.00%	6.13%
A	OGE Energy Corp.	3.00%	5.30%	4.00%	4.10%
A	Sempra Energy	8.00%	7.40%	6.50%	7.30%
A	Southern Company	4.00%	4.10%	3.30%	3.80%
A	Vectren Corporation	9.00%	5.30%	4.60%	6.30%
A	Westar Energy, Inc.	6.00%	3.90%	2.80%	4.23%

**2017 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.	6.00%	6.00%	7.30%	6.43%
B++	DTE Energy Company	6.00%	5.80%	5.60%	5.80%
B++	El Paso Electric Co.	4.00%	5.50%	6.50%	5.33%
B++	Empire District Electric Company	3.50%	N/A	N/A	3.50%
B++	Energy Corporation	0.50%	-1.40%	-8.20%	-3.03%
B++	Exelon Corporation	6.00%	4.30%	4.50%	4.93%
B++	Otter Tail Corporation	6.00%	N/A	N/A	6.00%
B++	Portland General Electric Company	4.00%	6.20%	6.70%	5.63%
B++	SCANA Corp.	4.50%	5.70%	6.00%	5.40%
B+	CenterPoint Energy, Inc.	2.00%	5.00%	6.60%	4.53%
B+	FirstEnergy Corp.	6.00%	-0.40%	-5.00%	0.20%
B+	Great Plains Energy Incorporated	0.00%	5.00%	8.00%	4.33%
B+	PG&E Corporation	11.00%	3.60%	5.70%	6.77%
B	PNM Resources, Inc.	9.00%	6.50%	6.90%	7.47%
	Mean	5.06%	4.99%	4.44%	4.87%
	Median	5.00%	5.50%	5.65%	5.33%
	Weighted Average				4.61%

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

**2017 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 12/30/16	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.	304,414,974	73.68	22,429.30	13,747.00	0.00	22,429.30	36,176.30	38.00%	0.00%	62.00%
A+	Pinnacle West Capital Corporation	111,306,107	78.03	8,685.22	4,145.40	0.00	8,685.22	12,830.62	32.31%	0.00%	67.69%
A+	WEC Energy Group Inc.	315,617,299	58.65	18,510.95	9,088.10	30.40	18,510.95	27,629.45	32.89%	0.11%	67.00%
A+	Xcel Energy Inc.	507,952,795	40.70	20,673.68	13,403.00	0.00	20,673.68	34,076.68	39.33%	0.00%	60.67%
A	Allete, Inc.	49,462,700	64.19	3,175.01	1,358.90	0.00	3,175.01	4,533.91	29.97%	0.00%	70.03%
A	Alliant Energy Corporation	227,500,428	37.89	8,619.99	3,816.90	400.00	8,619.99	12,836.89	29.73%	3.12%	67.15%
A	Ameren Corporation	242,634,798	52.46	12,728.62	6,607.00	142.00	12,728.62	19,477.62	33.92%	0.73%	65.35%
A	American Electric Power Co., Inc.	491,711,533	62.96	30,958.16	17,320.00	0.00	30,958.16	48,278.16	35.88%	0.00%	64.12%
A	Avista Corp.	64,184,399	39.99	2,566.73	1,729.80	0.00	2,566.73	4,296.53	40.26%	0.00%	59.74%
A	Black Hills Corporation	53,147,805	61.34	3,260.09	3,211.80	0.00	3,260.09	6,471.89	49.63%	0.00%	50.37%
A	Duke Energy Corporation	688,933,508	77.62	53,475.02	39,931.00	0.00	53,475.02	93,406.02	42.75%	0.00%	57.25%
A	Edison International	325,811,206	71.99	23,455.15	10,407.00	2,191.00	23,455.15	36,053.15	28.87%	6.08%	65.06%
A	Eversource Energy	317,207,036	55.23	17,519.34	9,435.90	155.60	17,519.34	27,110.84	34.80%	0.57%	64.62%
A	Hawaiian Electric Industries Inc.	108,524,493	33.07	3,588.90	1,511.60	34.30	3,588.90	5,134.80	29.44%	0.67%	69.89%
A	MGE Energy Inc.	34,668,370	65.30	2,263.84	383.80	0.00	2,263.84	2,647.64	14.50%	0.00%	85.50%
A	NextEra Energy, Inc.	467,267,977	119.46	55,819.83	28,195.00	0.00	55,819.83	84,014.83	33.56%	0.00%	66.44%
A	OGE Energy Corp.	199,702,959	33.45	6,680.06	2,505.20	0.00	6,680.06	9,185.26	27.27%	0.00%	72.73%
A	Sempra Energy	250,060,973	100.64	25,166.14	13,522.00	20.00	25,166.14	38,708.14	34.93%	0.05%	65.02%
A	Southern Company	941,598,673	49.19	46,317.24	35,368.00	1,508.00	46,317.24	83,193.24	42.51%	1.81%	55.67%
A	Vectren Corporation	82,868,119	52.15	4,321.57	1,713.80	0.00	4,321.57	6,035.37	28.40%	0.00%	71.60%
A	Westar Energy, Inc.	141,353,426	56.35	7,965.27	3,388.20	0.00	7,965.27	11,353.47	29.84%	0.00%	70.16%
	Mean								33.75%	0.63%	65.62%
	Median								33.56%	0.00%	65.35%
	Weighted Average								36.59%	0.74%	62.67%

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

Column d was extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

**2017 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 12/30/16	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.	279,100,000	41.62	11,616.14	8,832.00	37.00	11,616.14	20,485.14	43.11%	0.18%	56.71%
B++	DTE Energy Company	179,434,907	98.51	17,676.13	9,478.00	0.00	17,676.13	27,154.13	34.90%	0.00%	65.10%
B++	El Paso Electric Co.	40,522,246	46.50	1,884.28	1,195.40	0.00	1,884.28	3,079.68	38.82%	0.00%	61.18%
B++	Empire District Electric Company	44,094,312	34.09	1,503.18	829.60	0.00	1,503.18	2,332.78	35.56%	0.00%	64.44%
B++	Entergy Corporation	179,127,892	73.47	13,160.53	13,887.00	233.20	13,160.53	27,280.73	50.90%	0.85%	48.24%
B++	Exelon Corporation	923,270,314	35.49	32,766.86	32,972.00	0.00	32,766.86	65,738.86	50.16%	0.00%	49.84%
B++	Otter Tail Corporation	39,268,205	40.80	1,602.14	460.80	0.00	1,602.14	2,062.94	22.34%	0.00%	77.66%
B++	Portland General Electric Company	88,926,854	43.33	3,853.20	2,325.00	0.00	3,853.20	6,178.20	37.63%	0.00%	62.37%
B++	SCANA Corp.	142,916,917	73.28	10,472.95	6,468.00	0.00	10,472.95	16,940.95	38.18%	0.00%	61.82%
B+	CenterPoint Energy, Inc.	430,682,420	24.64	10,612.01	7,736.00	0.00	10,612.01	18,348.01	42.16%	0.00%	57.84%
B+	FirstEnergy Corp.	425,198,228	30.97	13,168.39	18,348.00	0.00	13,168.39	31,516.39	58.22%	0.00%	41.78%
B+	Great Plains Energy Incorporated	215,295,002	27.35	5,888.32	3,364.60	0.00	5,888.32	9,252.92	36.36%	0.00%	63.64%
B+	PG&E Corporation	505,666,694	60.77	30,729.36	16,528.00	252.00	30,729.36	47,509.36	34.79%	0.53%	64.68%
B	PNM Resources, Inc.	79,653,624	34.30	2,732.12	2,207.00	11.50	2,732.12	4,950.62	44.58%	0.23%	55.19%
	Mean								40.55%	0.13%	59.32%
	Median								38.50%	0.00%	61.50%
	Weighted Average								44.07%	0.19%	55.75%

Sources: Columns a, c, f and g were extracted from Value Line.  
Column d was extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

**2017 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 <sup>1</sup>	Unlevered Beta <sup>2</sup>
A+	Consolidated Edison, Inc.	0.55	-0.02	0.09	0.21	0.34	0.61	0.39
A+	Pinnacle West Capital Corporation	0.70	0.27	0.31	0.43	0.35	0.49	0.53
A+	WEC Energy Group Inc.	0.60	0.04	0.19	0.28	0.38	0.48	0.46
A+	Xcel Energy Inc.	0.60	0.06	0.23	0.30	0.35	0.68	0.42
A	Allete, Inc.	0.75	0.48	0.63	0.62	0.13	0.54	0.51
A	Alliant Energy Corporation	0.70	0.36	0.42	0.49	0.15	0.51	0.49
A	Ameren Corporation	0.65	0.32	0.27	0.41	0.36	0.64	0.46
A	American Electric Power Co., Inc.	0.65	0.19	0.34	0.39	0.36	0.63	0.46
A	Avista Corp.	0.70	0.35	0.46	0.50	0.37	0.72	0.48
A	Black Hills Corporation	0.90	0.69	0.80	0.80	0.34	0.65	0.63
A	Duke Energy Corporation	0.60	0.11	0.14	0.28	0.32	0.67	0.41
A	Edison International	0.65	0.13	0.39	0.39	0.08	0.71	0.39
A	Eversource Energy	0.70	0.28	0.40	0.46	0.38	0.55	0.52
A	Hawaiian Electric Industries Inc.	0.70	0.29	0.13	0.37	0.32	0.49	0.53
A	MGE Energy Inc.	0.70	0.29	0.36	0.45	0.35	0.25	0.60
A	NextEra Energy, Inc.	0.65	0.20	0.34	0.40	0.28	0.60	0.45
A	OGE Energy Corp.	0.90	0.64	0.60	0.71	0.29	0.42	0.69
A	Sempra Energy	0.80	0.47	0.39	0.55	0.30	0.52	0.59
A	Southern Company	0.55	0.04	0.08	0.22	0.34	0.61	0.39
A	Vectren Corporation	0.75	0.63	0.44	0.61	0.35	0.50	0.57
A	Westar Energy, Inc.	0.70	0.36	0.28	0.45	0.30	0.63	0.49
	Mean	0.69	0.29	0.35	0.44		0.57	0.50
	Median	0.70	0.29	0.34	0.43		0.60	0.49
	Weighted Average				0.42		0.68	0.51
	Relevered Beta based on 45% Debt Capital Structure and Mean Unlevered Beta <sup>3</sup>							0.74
	Relevered Beta based on 45% Debt Capital Structure and Weighted Average Unlevered Beta <sup>3</sup>							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.

<sup>1</sup> Average debt to equity ratio over the last five years.

<sup>2</sup> 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.

<sup>3</sup> 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%).

**2017 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 <sup>1</sup>	Unlevered Beta <sup>2</sup>
B++	CMS Energy Corp.	0.65	0.06	0.23	0.31	0.34	0.90	0.41
B++	DTE Energy Company	0.65	0.18	0.24	0.36	0.26	0.74	0.42
B++	El Paso Electric Co.	0.70	0.42	0.30	0.47	0.36	0.60	0.51
B++	Empire District Electric Company	0.70	N/A	N/A	0.70	0.38	0.66	0.50
B++	Entergy Corporation	0.65	0.38	0.28	0.44	0.13	1.02	0.34
B++	Exelon Corporation	0.65	0.20	0.45	0.43	0.33	0.85	0.41
B++	Otter Tail Corporation	0.85	0.75	0.80	0.80	0.25	0.42	0.65
B++	Portland General Electric Company	0.70	0.28	0.41	0.46	0.22	0.69	0.45
B++	SCANA Corp.	0.70	0.21	0.30	0.40	0.32	0.72	0.47
B+	CenterPoint Energy, Inc.	0.85	0.48	0.38	0.57	0.37	0.85	0.55
B+	FirstEnergy Corp.	0.65	0.12	0.22	0.33	0.39	1.27	0.37
B+	Great Plains Energy Incorporated	0.70	0.36	0.50	0.52	0.37	0.83	0.46
B+	PG&E Corporation	0.65	0.19	0.22	0.35	0.25	0.63	0.44
B	PNM Resources, Inc.	0.75	0.27	0.49	0.50	0.35	0.84	0.49
	Mean	0.70	0.30	0.37	0.48		0.79	0.46
	Median	0.70	0.27	0.30	0.45		0.79	0.46
	Weighted Average				0.41		0.85	0.43
	Relevered Beta based on 47% Debt Capital Structure and Mean Unlevered Beta <sup>3</sup>							0.71
	Relevered Beta based on 47% Debt Capital Structure and Weighted Average Unlevered Beta <sup>3</sup>							0.65

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.

<sup>1</sup> Average debt to equity ratio over the last five years.

<sup>2</sup> 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.

<sup>3</sup> 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%).



**2017 Capitalization Rate Study  
Natural Gas Companies  
Flotation Cost Adjustment**

<b>Equity</b>				<b>Preferred Stock</b>				<b>Debt</b>			
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%	4.00%	10.52%	A3	6.00%	1.50%	6.09%	A1	4.33%	1.50%	4.40%
Not Rated	11.75%	4.00%	12.24%					A2	4.39%	1.50%	4.46%
Not Rated	14.00%	4.00%	14.58%					A3	4.56%	1.50%	4.63%
								Baa1	4.73%	1.50%	4.80%
								Baa2	4.90%	1.50%	4.97%
								Baa3	5.04%	1.50%	5.12%
								Ba1	5.18%	1.50%	5.26%
								Ba2	5.32%	1.50%	5.40%
								Ba3	5.46%	1.50%	5.54%
								Not Rated	6.02%	1.50%	6.11%

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

**2017 Capitalization Rate Study  
Natural Gas Companies  
Summary of Rates of Return**

Common Equity		Preferred Stock		Bonds		
Value Line Rating	Rate of Return <sup>1</sup>	Moody's Bond Rating	Rate of Return <sup>2</sup>	Moody's Bond Yields	Moody's Rating	Rate of Return <sup>3</sup>
A, B++	10.10%	A3	6.00%	Aa=4.02	Aa2	4.02%
					Aa3	4.08%
Not Rated	11.75%				A1	4.13%
				A=4.19	A2	4.19%
Not Rated	14.00%				A3	4.36%
					Baa1	4.53%
				Baa=4.70	Baa2	4.70%
					Baa3	4.84%
					Ba1	4.98%
					Ba2	5.12%
					Ba3	5.26%
					B1	5.40%
					B2	5.54%
					B3	5.68%
					Not Rated	5.82%

<sup>1</sup> 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 2017, 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.

<sup>2</sup> 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.

<sup>3</sup> The Rates of Return on Bonds were based on the 2016 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.

**2017 Capitalization Rate Study  
Natural Gas Companies  
Capital Asset Pricing Model - Ex Ante**

Component	Value Line Ratings	
	A+, A, B++, B+	Not Rated
Expected Future Return, S&P 500	11.27%	11.27%
Less: Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%	2.91%
Risk Premium	8.36%	8.36%
Beta <sup>2</sup>	0.78	1.25
Adjusted Risk Premium	6.51%	10.45%
Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%	2.91%
<b>Projected Return on Equity</b>	<b>9.42%</b>	<b>13.36%</b>

<sup>1</sup> US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 30, 2016

<sup>2</sup> The betas are based on staff's judgement in conjunction with the results from the beta analysis of the study sample and Damodaran Online.

**2017 Capitalization Rate Study**  
**Natural Gas Companies**  
**Capital Asset Pricing Model - Ex Post**

Component	Value Line Ratings	
	A+, A, B++, B+	Not Rated
Common Stock Returns, S&P 500 (1928 - 2016) <sup>1</sup>	11.42%	11.42%
Less: 10 Year Treasury Bonds (1928 - 2016) <sup>1</sup>	5.18%	5.18%
Risk Premium	6.24%	6.24%
Beta <sup>2</sup>	0.78	1.25
Adjusted Risk Premium	4.86%	7.80%
Risk Free Return - Long-Term Treasury Rates <sup>3</sup>	2.91%	2.91%
<b>Projected Return on Equity</b>	<b>7.77%</b>	<b>10.71%</b>

<sup>1</sup> Damodaran Online, January 5, 2017

<sup>2</sup> The betas are based on staff's judgement in conjunction with the results from the beta analysis of the study sample and Damodaran Online.

<sup>3</sup> US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 30, 2016

**2017 Capitalization Rate Study  
Natural Gas Companies  
Equity Rates**

a	b	c	d	e	f	g	h	i	j	k	l	m
Value Line Rating	Company Name	Stock Price 12/30/16	Est. 2017 Earnings	2016 Earnings	2016 Dividends	Est. 2017 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.	35.50	1.75	1.61	0.98	1.02	2.87%	3.50%	5.17%	4.93%	6.37%	8.04%
A	Atmos Energy Corporation	74.15	3.55	3.38	1.68	1.80	2.43%	6.50%	6.93%	4.79%	8.93%	9.36%
A	Northwest Natural Gas Company	59.80	2.35	2.15	1.87	1.88	3.14%	2.00%	5.00%	3.93%	5.14%	8.14%
A	South Jersey Industries, Inc.	33.69	1.50	1.45	1.06	1.10	3.27%	6.50%	6.50%	4.45%	9.77%	9.77%
A	WGL Holdings Inc.	76.28	3.40	3.27	1.93	1.99	2.61%	2.50%	6.27%	4.46%	5.11%	8.88%
B++	Southwest Gas Corporation	76.62	3.50	3.20	1.76	1.90	2.48%	8.50%	5.17%	4.57%	10.98%	7.65%
B++	Spire Inc.	64.55	3.50	3.24	1.96	2.10	3.25%	3.50%	5.87%	5.42%	6.75%	9.12%
B++	UGI Corporation	46.08	2.35	2.05	0.94	0.95	2.06%	4.00%	6.83%	5.10%	6.06%	8.89%
B+	NiSource Inc.	22.14	1.15	1.05	0.64	0.68	3.07%	-2.50%	5.97%	5.19%	0.57%	9.04%
	Mean						2.80%	3.83%	5.97%	4.76%	6.63%	8.76%
	Median						2.87%	3.50%	5.97%	4.79%	6.37%	8.89%
	Weighted Average										5.92%	8.88%

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 extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

**2017 Capitalization Rate Study  
Natural Gas 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.	3.00%	6.50%	6.00%	5.17%
A	Atmos Energy Corporation	6.50%	7.00%	7.30%	6.93%
A	Northwest Natural Gas Company	7.00%	4.00%	4.00%	5.00%
A	South Jersey Industries, Inc.	3.00%	10.00%	N/A	6.50%
A	WGL Holdings Inc.	3.50%	7.30%	8.00%	6.27%
B++	Southwest Gas Corporation	7.00%	4.50%	4.00%	5.17%
B++	Spire Inc.	9.00%	4.40%	4.20%	5.87%
B++	UGI Corporation	4.50%	8.00%	8.00%	6.83%
B+	NiSource Inc.	1.50%	7.20%	9.20%	5.97%
	Mean	5.00%	6.54%	6.34%	5.97%
	Median	4.50%	7.00%	6.65%	5.97%
	Weighted Average				6.19%

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

**2017 Capitalization Rate Study  
Natural Gas 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 12/30/16	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+	New Jersey Resources Corp.	86,150,280	35.50	3,058.33	967.80	0.00	3,058.33	4,026.13	24.04%	0.00%	75.96%
A	Atmos Energy Corporation	103,847,858	74.15	7,700.32	2,205.60	0.00	7,700.32	9,905.92	22.27%	0.00%	77.73%
A	Northwest Natural Gas Company	27,557,756	59.80	1,647.95	530.20	0.00	1,647.95	2,178.15	24.34%	0.00%	75.66%
A	South Jersey Industries, Inc.	79,477,822	33.69	2,677.61	808.70	0.00	2,677.61	3,486.31	23.20%	0.00%	76.80%
A	WGL Holdings Inc.	51,059,773	76.28	3,894.84	1,194.30	28.20	3,894.84	5,117.34	23.34%	0.55%	76.11%
B++	Southwest Gas Corporation	47,482,068	76.62	3,638.08	1,592.90	0.00	3,638.08	5,230.98	30.45%	0.00%	69.55%
B++	Spire Inc.	45,656,218	64.55	2,947.11	1,833.70	0.00	2,947.11	4,780.81	38.36%	0.00%	61.64%
B++	UGI Corporation	173,246,168	46.08	7,983.18	3,774.70	0.00	7,983.18	11,757.88	32.10%	0.00%	67.90%
B+	NiSource Inc.	322,737,775	22.14	7,145.41	6,096.20	0.00	7,145.41	13,241.61	46.04%	0.00%	53.96%
	Mean								29.35%	0.06%	70.59%
	Median								24.34%	0.00%	75.66%
	Weighted Average								31.82%	0.05%	68.13%

Sources: Columns a, c, f and g were extracted from Value Line.  
Column d was extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

**2017 Capitalization Rate Study  
Natural Gas 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 <sup>1</sup>	Unlevered Beta <sup>2</sup>
A+	New Jersey Resources Corp.	0.80	0.39	0.54	0.58	0.32	0.29	0.67
A	Atmos Energy Corporation	0.70	0.25	0.48	0.48	0.36	0.45	0.54
A	Northwest Natural Gas Company	0.65	0.31	0.44	0.47	0.35	0.47	0.50
A	South Jersey Industries, Inc.	0.80	0.63	0.69	0.71	0.25	0.41	0.61
A	WGL Holdings Inc.	0.75	0.55	0.54	0.61	0.39	0.29	0.64
B++	Southwest Gas Corporation	0.75	0.47	0.65	0.62	0.35	0.53	0.56
B++	Spire Inc.	0.70	0.34	0.37	0.47	0.33	0.62	0.49
B++	UGI Corporation	0.90	0.53	0.63	0.69	0.30	0.65	0.62
B+	NiSource Inc.	NMF	0.24	0.33	0.29	0.34	0.81	0.19
	Mean	0.76	0.41	0.52	0.55		0.50	0.54
	Median	0.75	0.39	0.54	0.58		0.47	0.56
	Weighted Average				0.52		0.56	0.50
	Relevered Beta based on 46% Debt Capital Structure and Mean Unlevered Beta <sup>3</sup>							0.81
	Relevered Beta based on 46% Debt Capital Structure and Weighted Average Unlevered Beta <sup>3</sup>							0.75

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.

<sup>1</sup> Average debt to equity ratio over the last five years.

<sup>2</sup> 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.

<sup>3</sup> 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%).



**2017 Capitalization Rate Study  
Water Utility Companies  
Flotation Cost Adjustment**

<b>Equity</b>				<b>Debt</b>			
Value Line Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
A	9.43%	4.00%	9.82%	Not Rated	4.30%	1.50%	4.37%

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

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

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

**2017 Capitalization Rate Study  
Water Utility Companies  
Summary of Rates of Return**

Common Equity		Bonds	
Value Line Rating	Rate of Return <sup>1</sup>	Moody's Rating	Rate of Return
A	9.43%	Not Rated	4.30%

<sup>1</sup> In developing the Rate of Return on Common Equity, staff considered the latest decision of the California Public Utilities Commission and other pertinent information. For 2017, 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).

**2017 Capitalization Rate Study  
Water Utility Companies  
Capital Asset Pricing Model - Ex Ante**

<b>Component</b>	<b>Value Line Ratings</b>
	A, B++, B+
Expected Future Return, S&P 500	11.27%
Less: Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%
	<hr/>
Risk Premium	8.36%
Beta <sup>2</sup>	0.66
	<hr/>
Adjusted Risk Premium	5.54%
Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%
	<hr/>
<b>Projected Return on Equity</b>	<b><u>8.45%</u></b>

<sup>1</sup> US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 30, 2016

<sup>2</sup> The betas are based on staff's judgement in conjunction with the results from the beta analysis of the study sample.

**2017 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 - 2016) <sup>1</sup>	11.42%
Less: 10 Year Treasury Bonds (1928 - 2016) <sup>1</sup>	5.18%
Risk Premium	6.24%
Beta <sup>2</sup>	0.66
Adjusted Risk Premium	4.14%
Risk Free Return - Long-Term Treasury Rates <sup>3</sup>	2.91%
<b>Projected Return on Equity</b>	<b><u>7.05%</u></b>

<sup>1</sup> Damodaran Online, January 5, 2017

<sup>2</sup> The betas are based on staff's judgement in conjunction with the results from the beta analysis of the study sample.

<sup>3</sup> US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 30, 2016

**2017 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 12/30/16	Est. 2017 Earnings	2016 Earnings	2016 Dividends	Est. 2017 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.	45.56	1.75	1.60	0.91	0.96	2.11%	7.00%	4.80%	3.84%	9.11%	6.91%
A	Aqua America, Inc.	30.04	1.45	1.35	0.74	0.80	2.66%	9.00%	6.33%	4.83%	11.66%	9.00%
B++	California Water Service Group	33.90	1.35	0.90	0.69	0.71	2.09%	7.00%	6.77%	3.98%	9.09%	8.86%
B++	Middlesex Water Company	42.94	1.60	1.50	0.81	0.84	1.96%	3.50%	8.50%	3.73%	5.46%	10.46%
B+	American Water Works Co., Inc.	72.36	3.05	2.60	1.47	1.61	2.22%	10.50%	7.67%	4.22%	12.72%	9.89%
B+	York Water Co.	38.20	1.05	0.96	0.63	0.66	1.73%	6.50%	6.00%	2.75%	8.23%	7.73%
	Mean						2.13%	7.25%	6.68%	3.89%	9.38%	8.81%
	Median						2.10%	7.00%	6.55%	3.91%	9.10%	8.93%
	Weighted Average										11.73%	9.40%

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 extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

**2017 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%	4.00%	4.40%	4.80%
A	Aqua America, Inc.	7.00%	6.00%	6.00%	6.33%
B++	California Water Service Group	7.50%	5.00%	7.80%	6.77%
B++	Middlesex Water Company	8.50%	N/A	N/A	8.50%
B+	American Water Works Co., Inc.	8.00%	7.40%	7.60%	7.67%
B+	York Water Co.	6.00%	N/A	N/A	6.00%
	Mean	7.17%	5.60%	6.45%	6.68%
	Median	7.25%	5.50%	6.80%	6.55%
	Weighted Average				7.11%

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

**2017 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 12/30/16	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.	36,569,746	45.56	1,666.12	320.90	0.00	1,666.12	1,987.02	16.15%	0.00%	83.85%
A	Aqua America, Inc.	177,358,257	30.04	5,327.84	1,748.70	0.00	5,327.84	7,076.54	24.71%	0.00%	75.29%
B++	California Water Service Group	47,968,000	33.90	1,626.12	555.50	0.00	1,626.12	2,181.62	25.46%	0.00%	74.54%
B++	Middlesex Water Company	16,289,172	42.94	699.46	130.80	2.40	699.46	832.66	15.71%	0.29%	84.00%
B+	American Water Works Co., Inc.	178,003,367	72.36	12,880.32	5,853.00	11.00	12,880.32	18,744.32	31.23%	0.06%	68.72%
B+	York Water Co.	12,869,696	38.20	491.62	84.60	0.00	491.62	576.22	14.68%	0.00%	85.32%
	Mean								21.32%	0.06%	78.62%
	Median								20.43%	0.00%	79.57%
	Weighted Average								27.69%	0.04%	72.27%

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

Column d was extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

**2017 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 <sup>1</sup>	Unlevered Beta <sup>2</sup>
A	American States Water Co.	0.75	0.43	0.51	0.56	0.33	0.26	0.48
A	Aqua America, Inc.	0.70	0.44	0.44	0.53	0.07	0.35	0.40
B++	California Water Service Group	0.75	0.63	0.59	0.66	0.32	0.42	0.51
B++	Middlesex Water Company	0.75	0.42	0.61	0.59	0.35	0.34	0.49
B+	American Water Works Co., Inc.	0.65	0.21	0.25	0.37	0.39	0.60	0.27
B+	York Water Co.	0.75	0.55	0.56	0.62	0.29	0.26	0.52
	Mean	0.73	0.45	0.49	0.56		0.37	0.44
	Median	0.75	0.44	0.54	0.58		0.35	0.48
	Weighted Average				0.45		0.50	0.34
								Relevered Beta based on 45% Debt Capital Structure and Mean Unlevered Beta <sup>3</sup>
								0.66
								Relevered Beta based on 45% Debt Capital Structure and Weighted Average Unlevered Beta <sup>3</sup>
								0.51

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.

<sup>1</sup> Average debt to equity ratio over the last five years.

<sup>2</sup> 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.

<sup>3</sup> 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  
2017 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%	12.24%	4.77%	10.37%
180	North Baja Pipeline, LLC	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
187	Mojave Pipeline Company, LLC	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
188	Kern River Gas Transmission Company	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
189	Standard Pacific Gas Line, Incorporated	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
190	Tuscarora Gas Transmission Company	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
196	Questar Southern Trails Pipeline Company	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%
197	El Paso Natural Gas Company, LLC	Not Rated	Not Rated	75%	25%	12.24%	4.77%	10.37%

**2017 Capitalization Rate Study  
Natural Gas Transmission Companies  
Industry Notes**

- Interstate gas transmission companies are regulated by the Federal Energy Regulatory Commission (FERC).
- Devon Energy Corporation was removed from the 2017 Capitalization Rate Study sample. Operations other than natural gas transmission are significant to a degree that renders the data not representative of that industry group.
- Questar Corporation was removed from the 2017 Capitalization Rate Study sample as it was acquired by Dominion Resources in February 2016.
- Enterprise Products Partners, LP was added to the 2017 Capitalization Rate Study sample.
- ONEOK, Inc. was added to the 2017 Capitalization Rate Study sample.
- Western Gas Partners, LP was added to the 2017 Capitalization Rate Study sample.
- 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)

**2017 Capitalization Rate Study  
Natural Gas Transmission Companies  
Flotation Cost Adjustment**

<b>Equity</b>				<b>Debt</b>			
Value Line Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
Not Rated	11.75%	4.00%	12.24%	Not Rated	4.70%	1.50%	4.77%

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.

**2017 Capitalization Rate Study  
Natural Gas Transmission Companies  
Comparison of Return on Common Equity**

Description	2017	2016	Change
E/P Ratio - Mean	4.55%	5.33%	-0.78%
E/P Ratio - Median	4.86%	6.78%	-1.92%
Dividends Yield + Dividends Growth - Mean	11.66%	9.19%	2.46%
Dividends Yield + Dividends Growth - Median	12.27%	8.86%	3.41%
Dividends Yield + Earnings Growth - Mean	14.32%	7.61%	6.71%
Dividends Yield + Earnings Growth - Median	12.65%	7.79%	4.86%
Capital Asset Pricing Model (CAPM) - Ex Ante	10.49%	11.64%	-1.15%
Capital Asset Pricing Model (CAPM) - Ex Post	8.56%	9.61%	-1.05%
State-Assessed Properties Division Recommendation:	11.75%	11.50%	0.25%

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.

**2017 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 12/30/16	2017 Est. Earnings	2016 Earnings	2016 Dividends	2017 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)
B+	Enterprise Products Partners, LP	27.04	1.40	1.25	1.59	1.67	6.18%	8.00%	7.10%	5.18%	14.18%	13.28%
B+	National Fuel Gas Company	56.64	2.85	-3.43	1.60	1.65	2.91%	5.00%	8.55%	5.03%	7.91%	11.46%
B+	ONEOK, Inc.	57.41	1.90	1.70	2.48	2.60	4.53%	7.00%	7.50%	3.31%	11.53%	12.03%
B+	Western Gas Partners, LP	58.76	2.75	1.90	3.29	3.53	6.01%	7.00%	14.50%	4.68%	13.01%	20.51%
	Mean						4.91%	6.75%	9.41%	4.55%	11.66%	14.32%
	Median						5.27%	7.00%	8.03%	4.86%	12.27%	12.65%
	Weighted Average										13.23%	13.65%

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 30, 2016 closing stock prices.

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

**2017 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
B+	Enterprise Products Partners, LP	10.50%	5.10%	5.70%	7.10%
B+	National Fuel Gas Company	NMF	8.60%	8.50%	8.55%
B+	ONEOK, Inc.	12.50%	5.00%	5.00%	7.50%
B+	Western Gas Partners, LP	14.50%	NMF	NMF	14.50%
	Mean	12.50%	6.23%	6.40%	9.41%
	Median	12.50%	5.10%	5.70%	8.03%
	Weighted Average				7.97%

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.

**2017 Capitalization Rate Study  
Natural Gas Transmission Companies  
Capital Asset Pricing Model - Ex Ante**

Component	Industry Computation
Expected Future Return, S&P 500	11.27%
Less: Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%
Risk Premium	8.36%
Relevered Beta	0.91
Adjusted Risk Premium	7.58%
Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%
<b>Projected Return on Equity</b>	<b><u>10.49%</u></b>

<sup>1</sup> US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 30, 2016

**2017 Capitalization Rate Study  
Natural Gas Transmission Companies  
Capital Asset Pricing Model - Ex Post**

Component	Industry Computation
Common Stock Returns, S&P 500 (1928-2016) <sup>1</sup>	11.42%
Less: 10 Year Treasury Bonds (1928-2016) <sup>1</sup>	5.18%
Risk Premium	6.24%
Relevered Beta	0.91
Adjusted Risk Premium	5.65%
Risk Free Return - Long-Term Treasury Rates <sup>2</sup>	2.91%
<b>Projected Return on Equity</b>	<b><u>8.56%</u></b>

<sup>1</sup> Damodaran Online, January 5, 2017

<sup>2</sup> US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 30, 2016



**2017 Capitalization Rate Study  
Natural Gas Transmission Companies  
Beta Analysis**

a	b	c	d	e	f	g	h	i
Value Line		Value Lines	Zacks	Standard & Poor's	Average	Company's Tax Rate	Debt Equity Ratio <sup>1</sup>	Unlevered Beta <sup>2</sup>
Rating	Company Name	Beta	Beta	Beta	Beta			
B+	Enterprise Products Partners, LP	1.15	0.91	0.65	0.90	0.40	0.37	0.74
B+	National Fuel Gas Company	1.05	0.88	1.49	1.14	0.56	0.37	0.98
B+	ONEOK, Inc.	1.35	1.14	0.94	1.14	0.25	0.69	0.75
B+	Western Gas Partners, LP	1.20	1.14	0.31	0.88	0.40	0.34	0.73
	Mean	1.19	1.02	0.85	1.02		0.44	0.80
	Median	1.18	1.03	0.80	1.02		0.37	0.75
	Weighted				0.96		0.42	0.76
	Relevered Beta based on 25% Debt Capital Structure						0.96 <sup>3</sup>	
	Relevered Beta based on 25% Debt Capital Structure and a weighted average Beta						0.91 <sup>3</sup>	

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.

<sup>1</sup> Average debt to equity ratio over the last five years.

<sup>2</sup> Unlevered Beta = Corrected Beta/[1+(1- $t_c$ )(D/E)]; where D/E is the debt to equity ratio,  $t_c$  is the company's 2016 tax rate.

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

**2017 Capitalization Rate Study  
Natural Gas Transmission Companies  
Capital Structure**

a	b	c	d	e	f	g	h	i	j	k	l
Value Line	Moody's Bond	P/S Rating	Company Name	Common Stock Outstanding	Common Stock Price 12/30/16	Market Value Equity (\$million)	L.T. Debt (\$million)	Common Equity (\$million)	Total Capital (\$million)	L.T. Debt %	Common Equity %
B+	NR	NR	Enterprise Products Partners, LP	2,104,197,364	27.04	56,897.50	21,121.20	56,897.50	78,018.70	27.10%	72.90%
B+	NR	NR	National Fuel Gas Company	85,161,752	56.64	4,823.56	2,086.30	4,823.56	6,909.86	30.20%	69.80%
B+	NR	NR	ONEOK, Inc.	210,521,971	57.41	12,086.07	8,320.10	12,086.07	20,406.17	40.80%	59.20%
B+	NR	NR	Western Gas Partners, LP	142,832,394	58.76	8,392.83	2,907.40	8,392.83	11,300.23	25.70%	74.30%
			Mean							30.95%	69.05%
			Median							28.65%	71.35%
			Weighted Average							29.54%	70.46%

Recommended Capital Structure for Natural Gas Transmission Companies for lien date January 1, 2017:

Debt - 25%  
Equity - 75%

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

Column f was extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

NR - Not Rated

**2017 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 30, 2016	N/A	4.02%	4.19%	4.70%	4.30%

Source: Moody's Daily Long-Term Corporate Bond Yield Averages as of December 30, 2016.

**California State Board of Equalization  
State-Assessed Properties Division  
2017 Capitalization Rate Study  
Electric Generation Facilities**

Facility Type	Ratings		Capital Structure		Rates of Return		Basic Cap Rate <sup>3</sup>
	Financial	Bond	Common Equity	Debt	Common Equity	Debt	
<b>Modern Electric Generation Technology<sup>1</sup></b>	B	B2	60%	40%	14.06%	6.85%	<b>11.18%</b>
<b>Older Electric Generation Technology<sup>2</sup></b>	B	B2	60%	40%	16.15%	7.87%	<b>12.83%</b>

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

<sup>2</sup> 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.

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

**2017 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.

**2017 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 <sup>1</sup>	13.50%	4.00%	14.06%	6.75%	1.50%	6.85%
Older Electric Generation Technology <sup>2</sup>	15.50%	4.00%	16.15%	7.75%	1.50%	7.87%

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

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

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

<sup>1</sup> 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.

<sup>2</sup> 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.

**2017 Capitalization Rate Study  
Electric Generation Facilities  
Summary of Rates of Return**

Common Equity		Bonds		
Facility Type	Rate of Return <sup>1</sup>	Moody's Bond Yields	Moody's Rating	Rate of Return <sup>2</sup>
Modern Electric Generation Technology	13.50%	Aa=4.02%	Aa2	4.02%
			Aa3	4.08%
			A1	4.13%
Older Electric Generation Technology	15.50%	A=4.19%	A2	4.19%
			A3	4.36%
			Baa1	4.53%
			Baa2	4.70%
			Baa3	4.84%
			Ba1	4.98%
			Ba2	5.12%
			Ba3	5.26%
			B1	5.40%
			B2	5.54%
		Baa=4.70%	B3	5.68%
			Caa1	5.82%

<sup>1</sup> 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.

<sup>2</sup> Rates of Return on Bonds are based on Moody's "Utility Bond Yields" as of December 30, 2016. 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.

**2017 Capitalization Rate Study**  
**Electric Generation Facilities**  
**Comparison of Rates of Return on Common Equity**

	All Facilities in Study		
	2017	2016	Change
E/P Ratio-Mean	4.32%	6.31%	-1.99%
E/P Ratio-Median	5.65%	5.99%	-0.34%
Div Yld + Div Growth-Mean	4.06%	10.82%	-6.76%
Div Yld + Div Growth-Median	7.98%	9.79%	-1.81%
Div Yld + Div Growth-Weighted Avg.	10.78%	11.34%	-0.56%
Div Yld + Earn.Growth-Mean	7.07%	9.60%	-2.53%
Div Yld + Earn.Growth-Median	8.54%	8.52%	0.02%
Div Yld + Earn.Growth-Weighted Avg.	8.70%	9.66%	-0.96%
<hr/>			
Merrill Lynch Industry Factor - Required Return IPPs	11.80%	11.60%	0.20%
ROE% - Yahoo Finance - Utilities	11.34%	11.80%	-0.46%
ROE% - Yahoo Finance - Electric Utilities	9.50%	9.50%	0.00%
ROE% - Yahoo Finance - Diversified Utilities	11.80%	11.80%	0.00%
<hr/>			
	Modern Technology	Older Technology	
2016 Recommended Rate	13.00%	15.00%	
CAPM - Ex Ante	11.94%	14.03%	
CAPM - Ex Post	9.65%	11.21%	
Risk Premium Analysis <sup>1</sup>	13.59%	14.11%	
2017 Recommended Rate	13.50%	15.50%	

<sup>1</sup> Risk Premium Analysis estimates the market indicated cost of equity by adding the appropriate "adjusted risk premium" to the corresponding cost of debt.



**2017 Capitalization Rate Study  
Electric Generation Facilities  
Capital Asset Pricing Model - Ex Ante**

<b>Component</b>	<b>Types of Facilities</b>	
	<b>Modern Technology</b>	<b>Older Technology</b>
Expected Future Return, S&P 500	11.27%	11.27%
Less: Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%	2.91%
Risk Premium	8.36%	8.36%
Beta <sup>2</sup>	1.08	1.33
Adjusted Risk Premium	9.03%	11.12%
Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%	2.91%
<b>Projected Return on Equity</b>	<b>11.94%</b>	<b>14.03%</b>

<sup>1</sup> US Department of the Treasury - Composite Long-Term Rates >10 yrs, December 30, 2016

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

**2017 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 - 2016) <sup>1</sup>	11.42%	11.42%
Less: 10 Year Treasury Bonds (1928 - 2016) <sup>1</sup>	5.18%	5.18%
Risk Premium	6.24%	6.24%
Beta <sup>2</sup>	1.08	1.33
Adjusted Risk Premium	6.74%	8.30%
Risk Free Return - Long-Term Treasury Rates <sup>3</sup>	2.91%	2.91%
<b>Projected Return on Equity</b>	<b>9.65%</b>	<b>11.21%</b>

<sup>1</sup> Damodaran Online, January 5, 2017

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

<sup>3</sup> US Department of the Treasury - Composite Long-Term Rates >10 yrs, December 30, 2016

**2017 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	2017	2016	2016	2017	Yield	Dividend	Earnings	Ratio	DvGrth	ErngsGrth
		12/30/16	Earnings	Earnings	Dividends	Dividends	(g/c)	Growth	Growth	(d/c)	(h+i)	(h+j)
<u>Merchant Generators</u>												
B+	Calpine Corp.	11.43	0.65	0.05	0.00	0.00	0.00%	0.00%	6.37%	5.69%	0.00%	6.37%
B+	NRG Energy, Inc.	12.26	0.35	0.80	0.12	0.12	0.98%	-19.50%	NMF	2.85%	-18.52%	NMF
B	AES Corp.	11.62	1.15	0.05	0.44	0.48	4.13%	11.00%	5.43%	9.90%	15.13%	9.56%
C+	Dynegy, Inc	8.46	-0.43	-0.65	0.00	0.00	0.00%	0.00%	0.00%	-5.08%	0.00%	0.00%
<u>Diversified Electric Utilities</u>												
A+	Xcel Energy Inc.	40.70	2.30	2.20	1.36	1.44	3.54%	6.00%	5.50%	5.65%	9.54%	9.04%
A	Duke Energy Corp.	77.62	4.80	4.25	3.36	3.48	4.48%	3.50%	3.57%	6.18%	7.98%	8.05%
A	NextEra Energy, Inc.	119.46	6.05	4.70	3.48	3.92	3.28%	11.00%	6.13%	5.06%	14.28%	9.41%
	Mean						2.34%	1.71%	4.50%	4.32%	4.06%	7.07%
	Median						3.28%	3.50%	5.47%	5.65%	7.98%	8.54%
	Weighted Average										10.78%	8.70%
	Merrill Lynch Required Return - Independent Power Producers & Energy Traders											11.80%

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 30, 2016 closing stock prices.

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

**2017 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.	0.00%	17.40%	1.70%	6.37%
B+	NRG Energy, Inc.	NMF	NMF	NMF	NMF
B	AES Corp.	8.50%	5.00%	2.80%	5.43%
C+	Dynegy, Inc	0.00%	NMF	NMF	0.00%
	<u>Diversified Electric Utilities</u>				
A+	Xcel Energy Inc.	5.50%	5.40%	5.60%	5.50%
A	Duke Energy Corp.	4.00%	5.00%	1.70%	3.57%
A	NextEra Energy, Inc.	4.50%	6.90%	7.00%	6.13%
	Mean	3.75%	7.94%	3.76%	4.50%
	Median	4.25%	5.40%	2.80%	5.47%
	Weighted Average				4.85%
	Merrill Lynch 5 Year Growth Estimate - Independent Power Producers & Energy Traders				12.80%

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.

**2017 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 12/30/2016	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.	353,109,025	11.43	4,036.04	11,623.00	0.00	4,036.04	15,659.04	74.23%	0.00%	25.77%	2.88
B+	NRG Energy, Inc.	312,902,011	12.26	3,836.18	18,018.00	304.00	3,836.18	22,158.18	81.32%	1.37%	17.31%	4.35
B	AES Corp.	660,312,894	11.62	7,672.84	19,740.00	0.00	7,672.84	27,412.84	72.01%	0.00%	27.99%	2.57
C+	Dynegy, Inc	117,293,000	8.46	992.30	9,356.00	0.00	992.30	10,348.30	90.41%	0.00%	9.59%	9.43
Mean									79.49%	0.34%	20.17%	4.81
Median									77.77%	0.00%	21.54%	3.62
Weighted Average									77.72%	0.40%	21.88%	4.10
<u>Diversified Electric Utilities</u>												
A+	Xcel Energy Inc.	507,952,795	40.70	20,673.68	13,105.00	0.00	20,673.68	33,778.68	38.80%	0.00%	61.20%	0.63
A	Duke Energy Corp.	688,933,508	77.62	53,475.02	39,931.00	0.00	53,475.02	93,406.02	42.75%	0.00%	57.25%	0.75
A	NextEra Energy, Inc.	467,267,977	119.46	55,819.83	28,195.00	0.00	55,819.83	84,014.83	33.56%	0.00%	66.44%	0.51
Mean									38.37%	0.00%	61.63%	0.63
Median									38.80%	0.00%	61.20%	0.63
Weighted Average									38.46%	0.00%	61.54%	0.63
Damodaran Online - Power Industry									46.35%	0.00%	53.65%	0.86
Damodaran Online - Utility (General) Industry									40.54%	0.00%	59.46%	0.68
Fidelity.com Research Independent Power Producers & Energy Traders												3.67
Fidelity.com Research Electric Utilities												1.32

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

Column d was extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

**2017 Capitalization Rate Study**  
**Electric Generation Facilities**  
**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 Tax Rate	Debt Equity Ratio <sup>1</sup>	Unlevered Beta <sup>2</sup>
<u>Merchant Generators</u>								
B+	Calpine Corp.	1.00	0.96	0.37	0.78	0.20	1.76	0.33
B+	NRG Energy, Inc.	1.15	1.09	0.72	0.99	0.19	2.98	0.33
B	AES Corp.	1.10	1.18	1.23	1.17	0.17	2.29	0.44
C+	Dynegy, Inc	1.45	1.95	NMF	1.70	0.00	6.47	0.26
Mean					1.16	0.14	3.37	0.34
Median					1.08	0.18		0.33
Weighted					1.11	0.16		0.36
<u>Diversified Electric Utility</u>								
A+	Xcel Energy Inc.	0.60	0.06	0.23	0.30	0.35	0.68	0.21
A	Duke Energy Corp.	0.60	0.11	0.14	0.28	0.32	0.67	0.19
A	NextEra Energy, Inc.	0.65	0.20	0.34	0.40	0.28	0.60	0.28
Mean		0.62	0.12	0.24	0.33	0.32	0.65	0.23
Median		0.60	0.11	0.23	0.30	0.32		0.21
Weighted					0.33	0.31		0.23
Merchant Generators Relevered Beta based on 40% Debt Capital Structure							0.51	<sup>3</sup>
Diversified Electric Utilities Relevered Beta based on 40% Debt Capital Structure							0.32	<sup>3</sup>
Merrill Lynch Adjusted Beta Independent Power Producers & Energy Traders							1.08	
Damodaran Online - Cost of Capital by Sector - Power Industry Beta							0.54	

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.

<sup>1</sup> Average Debt to Equity Ratio over the last five years.

<sup>2</sup> Unlevered Beta = Corrected Beta/[1+(1-tc)(D/E)]; where D/E is the debt to equity ratio, tc is the company's 2016 tax rate.

<sup>3</sup> 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  
2017 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	
<b>Local Exchange Companies</b>								
279	Pacific Bell Telephone Company	A++	Baa1	70%	30%	11.35%	4.60%	<b>9.33%</b>
201	Frontier California	C++	B1	65%	35%	15.26%	6.09%	<b>12.05%</b>
284	Citizens Telecommunications Company of California, Inc.	C++	B1	65%	35%	15.26%	6.09%	<b>12.05%</b>
294	Consolidated Communications of California	C++	B1	65%	35%	15.26%	6.09%	<b>12.05%</b>
	<b>Other Local Exchange Companies</b>	Not Rated	Not Rated	65%	35%	15.63%	6.35%	<b>12.38%</b>
<b>Wireless Companies</b>								
2532	Los Angeles SMSA Ltd., Partnership	A++	Baa1	70%	30%	10.83%	4.60%	<b>8.96%</b>
2552	Fresno MSA Limited Partnership	A++	Baa1	70%	30%	10.83%	4.60%	<b>8.96%</b>
2559	Cellco Partnership	A++	Baa1	70%	30%	10.83%	4.60%	<b>8.96%</b>
2606	AT&T Mobility LLC	A++	Baa1	70%	30%	10.83%	4.60%	<b>8.96%</b>
2669	California RSA #4 Partnership	A++	Baa1	70%	30%	10.83%	4.60%	<b>8.96%</b>
2748	T-Mobile West, LLC	B+	Ba3	65%	35%	12.66%	5.83%	<b>10.27%</b>
2720	Sprint Telephony PCS, L.P.	C++	B1	65%	35%	14.48%	6.09%	<b>11.54%</b>
	<b>Other Wireless Companies<sup>1</sup></b>	Not Rated	Not Rated	55%	45%	16.56%	8.14%	<b>12.77%</b>
	<b>Wireless Reseller Companies</b>	Not Rated	Not Rated	55%	45%	18.65%	8.65%	<b>14.15%</b>
<b>Interexchange Companies</b>								
2274	MCI Communications Services, Inc.	A++	Baa1	70%	30%	12.14%	4.60%	<b>9.87%</b>
2310	AT&T Communications	A++	Baa1	70%	30%	12.14%	4.60%	<b>9.87%</b>
2372	MCI Metro Access Transmission Services, LLC	A++	Baa1	70%	30%	12.14%	4.60%	<b>9.87%</b>
2463	CenturyLink Communications, LLC	B++	Ba2	65%	35%	14.22%	5.56%	<b>11.19%</b>
2014	Sprint Communications Company, L.P.	C++	B1	60%	40%	16.56%	6.09%	<b>12.37%</b>
7761	Level 3 Communications, LLC	C++	Ba3	60%	40%	16.56%	5.83%	<b>12.27%</b>
	<b>Other Interexchange Carriers</b>	Not Rated	Not Rated	55%	45%	21.25%	8.14%	<b>15.35%</b>
	<b>Other Interexchange Resellers</b>	Not Rated	Not Rated	55%	45%	24.38%	8.65%	<b>17.30%</b>

<sup>1</sup> Includes Radio Telephone and Paging Companies

**2017 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.
- Verizon California, Inc. was acquired by Frontier Communications in 2016 and changed its name to Frontier California.
- Viasat, Inc. was added to the 2017 Capitalization Rate Study sample.
- SureWest Telephone changed its name to Consolidated Communications of California.



**2017 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++	10.90%	4.00%	11.35%	Aa2	4.02%	1.50%	4.08%
B	12.40%	4.00%	12.92%	Aa3	4.08%	1.50%	4.14%
C++	14.65%	4.00%	15.26%	A1	4.13%	1.50%	4.20%
Other Local Exchange Companies	15.00%	4.00%	15.63%	A2	4.19%	1.50%	4.25%
				A3	4.36%	1.50%	4.43%
				Baa1	4.53%	1.50%	4.60%
				Baa2	4.70%	1.50%	4.77%
				B1	6.00%	1.50%	6.09%
				Not Rated	6.25%	1.50%	6.35%

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

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

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

**2017 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++	10.40%	4.00%	10.83%	Aa2	4.02%	1.50%	4.08%
B+	12.15%	4.00%	12.66%	Aa3	4.08%	1.50%	4.14%
C++	13.90%	4.00%	14.48%	A1	4.13%	1.50%	4.20%
Other Wireless Companies <sup>1</sup>	15.90%	4.00%	16.56%	A2	4.19%	1.50%	4.25%
Wireless Reseller Companies	17.90%	4.00%	18.65%	A3	4.36%	1.50%	4.43%
				Baa1	4.53%	1.50%	4.60%
				Baa2	4.70%	1.50%	4.77%
				Baa3	4.96%	1.50%	5.04%
				Ba1	5.22%	1.50%	5.30%
				Ba2	5.48%	1.50%	5.56%
				Ba3	5.74%	1.50%	5.83%
				B1	6.00%	1.50%	6.09%
				B2	6.26%	1.50%	6.36%
				B3	6.52%	1.50%	6.62%
				Not Rated	8.02%	1.50%	8.14%
				Not Rated	8.52%	1.50%	8.65%

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

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

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

<sup>1</sup> Includes Radio Telephone and Paging Companies

**2017 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++	11.65%	4.00%	12.14%	Aa2	4.02%	1.50%	4.08%
B++	13.65%	4.00%	14.22%	Aa3	4.08%	1.50%	4.14%
C++	15.90%	4.00%	16.56%	A1	4.13%	1.50%	4.20%
Other Interexchange Carriers	20.40%	4.00%	21.25%	A2	4.19%	1.50%	4.25%
Other Interexchange Resellers	23.40%	4.00%	24.38%	A3	4.36%	1.50%	4.43%
				Baa1	4.53%	1.50%	4.60%
				Baa2	4.70%	1.50%	4.77%
				Baa3	4.96%	1.50%	5.04%
				Ba1	5.22%	1.50%	5.30%
				Ba2	5.48%	1.50%	5.56%
				Ba3	5.74%	1.50%	5.83%
				B1	6.00%	1.50%	6.09%
				B2	6.26%	1.50%	6.36%
				B3	6.52%	1.50%	6.62%
				Not Rated	8.02%	1.50%	8.14%
				Not Rated	8.52%	1.50%	8.65%

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

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

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

**2017 Capitalization Rate Study**  
**Telecommunications Companies**  
**Comparison of Return on Common Equity**

Description	A++			B++, B+, B			C++, C+		
	2017	2016	Change	2017	2016	Change	2017	2016	Change
<b>Discounted Cash Flow Analysis</b>									
E/P Ratio - Mean	7.32%	8.45%	-1.13%	3.31%	3.20%	0.11%	-2.38%	-12.43%	10.05%
E/P Ratio - Median	7.32%	8.45%	-1.13%	2.96%	2.14%	0.82%	1.79%	2.78%	-0.99%
Dividend Yield + Dividend Growth - Mean	7.76%	7.55%	0.21%	4.56%	6.37%	-1.81%	3.74%	1.85%	1.89%
Dividend Yield + Dividend Growth - Median	7.76%	7.55%	0.21%	5.65%	8.16%	-2.51%	0.00%	0.00%	0.00%
Weighted Average (Div. Yield + Div. Growth)	7.87%	7.58%	0.29%	2.71%	4.76%	-2.05%	2.30%	0.22%	2.08%
Dividend Yield + Earnings Growth - Mean	9.29%	11.68%	-2.39%	16.38%	11.63%	4.75%	17.37%	16.15%	1.22%
Dividend Yield + Earnings Growth - Median	9.29%	11.68%	-2.39%	14.25%	9.50%	4.75%	10.70%	16.80%	-6.10%
Weighted Average (Div. Yield + Earn. Growth)	9.44%	11.63%	-2.19%	23.95%	12.51%	11.44%	12.31%	17.20%	-4.89%
<b>CAPM Analysis</b>									
Ex Ante	7.51%	7.59%	-0.08%	9.60%	9.20%	0.40%	11.27%	10.80%	0.47%
Ex Post	6.34%	6.49%	-0.15%	7.90%	7.72%	0.18%	9.15%	8.96%	0.19%
<b>Recommended Rates</b>									
Local Exchange	10.90%	11.40%	-0.50%	12.40%	12.40%	0.00%	14.65%	14.65%	0.00%
Wireless	10.40%	10.90%	-0.50%	12.15%	12.15%	0.00%	13.90%	13.90%	0.00%
Interexchange	11.65%	12.15%	-0.50%	13.65%	13.65%	0.00%	15.90%	15.90%	0.00%

**2017 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 12/30/16	Est. 2017 Earnings	2016 Earnings	2016 Dividends	Est. 2017 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.	42.53	3.00	2.85	1.92	1.96	4.61%	4.50%	6.53%	7.05%	9.11%	11.14%
A++	Verizon Communications	53.38	4.05	3.95	2.29	2.35	4.40%	2.00%	3.03%	7.59%	6.40%	7.44%
	Mean						4.51%	3.25%	4.78%	7.32%	7.76%	9.29%
	Median						4.51%	3.25%	4.78%	7.32%	7.76%	9.29%
	Weighted Average										7.87%	9.44%
B++	ATN International, Inc.	80.13	2.55	2.20	1.30	1.40	1.75%	6.50%	12.50%	3.18%	8.25%	14.25%
B++	CenturyLink, Inc.	23.78	2.30	2.45	2.16	2.16	9.08%	0.00%	2.05%	9.67%	9.08%	11.13%
B+	T-Mobile US, Inc.	57.51	1.70	1.00	0.00	0.00	0.00%	0.00%	31.89%	2.96%	0.00%	31.89%
B+	U.S. Cellular	43.72	0.70	0.45	0.00	0.00	0.00%	0.00%	8.10%	1.60%	0.00%	8.10%
B+	Viasat, Inc.	66.22	0.70	0.70	0.00	0.00	0.00%	0.00%	28.47%	1.06%	0.00%	28.47%
B	Shenandoah Telecom	27.30	0.90	0.85	0.25	0.26	0.95%	8.00%	18.70%	3.30%	8.95%	19.65%
B	Telephone & Data Systems, Inc.	28.87	0.40	0.37	0.59	0.62	2.15%	3.50%	-1.00%	1.39%	5.65%	1.15%
	Mean						1.99%	2.57%	14.39%	3.31%	4.56%	16.38%
	Median						0.95%	0.00%	12.50%	2.96%	5.65%	14.25%
	Weighted Average										2.71%	23.95%

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 30, 2016 closing stock prices.  
Column j is an average of Value Line, Zacks.com, and ThomsonReuters.com.

**2017 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 12/30/16	Est. 2017 Earnings	2016 Earnings	2016 Dividends	Est. 2017 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	26.85	0.60	0.40	1.55	1.55	5.77%	0.00%	29.00%	2.23%	5.77%	34.77%
C++	Frontier Communications	3.38	0.15	-0.10	0.42	0.42	12.43%	0.50%	18.70%	4.44%	12.93%	31.13%
C++	Level 3 Communications, Inc.	56.36	1.85	1.60	0.00	0.00	0.00%	0.00%	2.13%	3.28%	0.00%	2.13%
C++	Sprint Corporation	8.42	-0.20	-0.35	0.00	0.00	0.00%	0.00%	10.70%	-2.38%	0.00%	10.70%
C+	Cincinnati Bell	22.35	0.40	0.27	0.00	0.00	0.00%	0.00%	8.10%	1.79%	0.00%	8.10%
	Mean						3.64%	0.10%	13.73%	1.87%	3.74%	17.37%
	Median						0.00%	0.00%	10.70%	2.23%	0.00%	10.70%
	Weighted Average										2.30%	12.31%

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 30, 2016 closing stock prices.  
Column j is an average of Value Line, Zacks.com, and ThomsonReuters.com.

**2017 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.	6.50%	4.80%	8.30%	6.53%
A++	Verizon Communications	3.00%	4.50%	1.60%	3.03%
	Mean	4.75%	4.65%	4.95%	4.78%
	Median	4.75%	4.65%	4.95%	4.78%
	Weighted Average				4.93%
B++	ATN International, Inc.	12.50%	NMF	NMF	12.50%
B++	CenturyLink, Inc.	9.50%	-2.65%	-0.70%	2.05%
B+	T-Mobile US, Inc.	NMF	15.77%	48.00%	31.89%
B+	U.S. Cellular	2.00%	1.50%	20.80%	8.10%
B+	Viasat, Inc.	38.50%	25.00%	21.90%	28.47%
B	Shenandoah Telecom	13.00%	NMF	24.40%	18.70%
B	Telephone & Data Systems	7.00%	NMF	-9.00%	-1.00%
	Mean	13.75%	9.91%	17.57%	14.39%
	Median	11.00%	8.64%	21.35%	12.50%
	Weighted Average				21.60%

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

**2017 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	29.00%	NMF	NMF	29.00%
C++	Frontier Communications	16.00%	1.00%	7.30%	8.10%
C++	Level 3 Communications, Inc.	36.00%	7.50%	-37.10%	2.13%
C++	Sprint Corporation	NMF	16.40%	5.00%	10.70%
C+	Cincinnati Bell	NMF	3.00%	13.20%	8.10%
	Mean	27.00%	6.98%	-2.90%	11.61%
	Median	29.00%	5.25%	6.15%	8.10%
	Weighted Average				8.39%

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



**2017 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 12/30/16	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.	6,141,000,000	42.53	261,176.73	117,239.00	0.00	261,176.73	378,415.73	30.98%	0.00%	69.02%
A++	Verizon Communications	4,076,633,952	53.38	217,610.72	102,739.00	0.00	217,610.72	320,349.72	32.07%	0.00%	67.93%
	Mean								31.53%	0.00%	68.47%
	Median								31.53%	0.00%	68.47%
	Weighted Average								31.48%	0.00%	68.52%
B++	ATN International, Inc.	16,139,477	80.13	1,293.26	106.90	0.00	1,293.26	1,400.16	7.63%	0.00%	92.37%
B++	CenturyLink, Inc.	543,800,000	23.78	12,931.56	18,184.00	0.00	12,931.56	31,115.56	58.44%	0.00%	41.56%
B+	T-Mobile US, Inc.	824,015,429	57.51	47,389.13	30,054.00	20.00	47,389.13	77,463.13	38.80%	0.03%	61.18%
B+	U.S. Cellular	84,818,102	43.72	3,708.25	1,621.00	0.00	3,708.25	5,329.25	30.42%	0.00%	69.58%
B+	Viasat, Inc.	49,486,623	66.22	3,277.00	1,060.50	0.00	3,277.00	4,337.50	24.45%	0.00%	75.55%
B	Shenandoah Telecom	48,915,405	27.30	1,335.39	783.60	0.00	1,335.39	2,118.99	36.98%	0.00%	63.02%
B	Telephone & Data Systems	109,942,778	28.87	3,174.05	2,436.00	0.80	3,174.05	5,610.85	43.42%	0.01%	56.57%
	Mean								34.31%	0.01%	65.69%
	Median								36.98%	0.00%	63.02%
	Weighted Average								42.59%	0.02%	57.40%

Sources: Columns a, c, f, and g were extracted from Value Line.  
Column d was extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

**2017 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 12/30/16	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	50,654,989	26.85	1,360.09	1,377.50	0.00	1,360.09	2,737.59	50.32%	0.00%	49.68%
C++	Frontier Communications	1,173,027,000	3.38	3,964.83	17,434.00	0.02	3,964.83	21,398.85	81.47%	0.00%	18.53%
C++	Level 3 Communications, Inc.	359,925,515	56.36	20,285.40	10,875.00	0.00	20,285.40	31,160.40	34.90%	0.00%	65.10%
C++	Sprint Corporation	3,981,273,493	8.42	33,522.32	29,541.00	0.00	33,522.32	63,063.32	46.84%	0.00%	53.16%
C+	Cincinnati Bell	42,026,791	22.35	939.30	1,125.50	129.40	939.30	2,194.20	51.29%	5.90%	42.81%
	Mean								52.97%	1.18%	45.86%
	Median								50.32%	0.00%	49.68%
	Weighted Average								50.06%	0.11%	49.83%

Sources: Columns a, c, f, and g were extracted from Value Line.  
Column d was extracted from Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

**2017 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	11.27%	11.27%	11.27%
Less: Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%	2.91%	2.91%
Risk Premium	8.36%	8.36%	8.36%
Beta <sup>2</sup>	0.55	0.80	1.00
Adjusted Risk Premium	4.60%	6.69%	8.36%
Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%	2.91%	2.91%
<b>Projected Return on Equity</b>	<b>7.51%</b>	<b>9.60%</b>	<b>11.27%</b>

<sup>1</sup> US Department of Treasury - Composite Long-Term Rates > 10 yrs, December 30, 2016

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

**2017 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 (1928-2016) <sup>1</sup>	11.42%	11.42%	11.42%
Less: 10 Year Treasury Bonds (1928-2016) <sup>1</sup>	5.18%	5.18%	5.18%
Risk Premium	6.24%	6.24%	6.24%
Beta <sup>2</sup>	0.55	0.80	1.00
Adjusted Risk Premium	3.43%	4.99%	6.24%
Risk Free Return - Long-Term Treasury Rates <sup>3</sup>	2.91%	2.91%	2.91%
<b>Projected Return on Equity</b>	<b>6.34%</b>	<b>7.90%</b>	<b>9.15%</b>

<sup>1</sup> Damodaran Online, January 5, 2017

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

<sup>3</sup> US Department of Treasury - Composite Long Term Rates > 10 yrs, December 30, 2016

**2017 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 <sup>1</sup>
A++	AT&T Inc.	0.75	0.39	0.46	0.53	0.33	0.42	0.42
A++	Verizon Communications	0.75	0.40	0.56	0.57	0.35	0.52	0.43
	Mean	0.75	0.40	0.51	0.55		0.47	0.42
	Median	0.75	0.40	0.51	0.55		0.47	0.42
	Weighted Average				0.55		0.47	0.42
B++	ATN International, Inc.	0.90	0.77	0.61	0.76	0.40	0.11	0.71
B++	CenturyLink, Inc.	0.95	0.80	1.07	0.94	0.33	1.10	0.54
B+	T-Mobile US, Inc.	1.00	0.68	1.33	1.00	0.38	1.34	0.55
B+	U.S. Cellular	1.05	0.85	0.88	0.93	0.38	0.33	0.77
B+	Viasat, Inc.	1.00	0.67	1.13	0.93	0.25	0.32	0.75
B	Shenandoah Telecom	1.10	0.94	0.86	0.97	0.35	0.39	0.77
B	Telephone & Data Systems	1.20	1.22	1.21	1.21	0.38	0.69	0.85
	Mean	1.03	0.85	1.01	0.96		0.61	0.71
	Median	1.00	0.80	1.07	0.94		0.39	0.75
	Weighted Average				0.99		1.14	0.58

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.

<sup>1</sup> 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.

**2017 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 <sup>1</sup>
C++	Consolidated Communications	0.90	1.25	0.88	1.01	0.45	1.35	0.58
C++	Frontier Communications	1.15	0.66	1.44	1.08	0.40	2.47	0.44
C++	Level 3 Communications, Inc.	1.20	1.49	1.52	1.40	0.40	0.90	0.91
C++	Sprint Corporation	1.35	1.01	1.59	1.32	0.40	1.41	0.71
C+	Cincinnati Bell	1.25	1.82	1.46	1.51	0.39	2.33	0.62
	Mean	1.17	1.25	1.38	1.26		1.69	0.65
	Median	1.20	1.25	1.46	1.32		1.41	0.62
	Weighted Average				1.29		1.48	0.71

		A++	B++, B+, B	C++, C+, C
A++:	Relevered beta based on 30% debt capital structure	0.53 <sup>2</sup>	----	----
	Relevered beta based on 30% debt capital structure and a weighted average beta	0.53 <sup>2</sup>	----	----
B++, B+, B:	Relevered beta based on 35% debt capital structure	----	0.93 <sup>2</sup>	----
	Relevered beta based on 35% debt capital structure and a weighted average beta	----	0.77 <sup>2</sup>	----
C++, C+, C:	Relevered beta based on 40% debt capital structure	----	----	0.91 <sup>2</sup>
	Relevered beta based on 40% debt capital structure and a weighted average beta	----	----	0.99 <sup>2</sup>

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.

<sup>1</sup> 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.

<sup>2</sup> 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  
2017 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	
<b>402</b>	<b>Calnev Pipe Line LLC</b>	NR-1	NR-b	60%	40%	13.54%	4.80%	<b>10.04%</b>
<b>461</b>	<b>SFPP, L.P.</b>	NR-1	NR-b	60%	40%	13.54%	4.80%	<b>10.04%</b>
<b>479</b>	<b>Chevron Pipe Line Company</b>	NR-2	NR-b	60%	40%	14.06%	4.80%	<b>10.36%</b>
<b>480</b>	<b>Phillips 66 Pipeline LLC</b>	NR-2	NR-b	60%	40%	14.06%	4.80%	<b>10.36%</b>
<b>486</b>	<b>Pacific Pipeline System, LLC</b>	NR-2	NR-b	60%	40%	14.06%	4.80%	<b>10.36%</b>
<b>492</b>	<b>San Pablo Bay Pipeline Company LLC</b>	NR-2	NR-b	60%	40%	14.06%	4.80%	<b>10.36%</b>
	<b>Other Pipeline Companies</b>	NR-3	NR-c	60%	40%	15.10%	5.81%	<b>11.39%</b>

**2017 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.
- Plains All American, L.P. was added to the 2017 Capitalization Rate Study sample.
- Enterprise Products Partners, L.P. was removed from the 2017 Capitalization Rate Study sample.



**2017 Capitalization Rate Study  
Pipeline Companies  
Flotation Cost Adjustment**

<b>Equity</b>				<b>Debt</b>			
Value Line Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
NR-1	13.00%	4.00%	13.54%	NR-b	4.73%	1.50%	4.80%
NR-2	13.50%	4.00%	14.06%	NR-c	5.73%	1.50%	5.81%
NR-3	14.50%	4.00%	15.10%				

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.

**2017 Capitalization Rate Study  
Pipeline Companies  
Comparison of Return on Common Equity**

Description	2017	2016	Change
E/P Ratio - Mean	3.37%	4.61%	-1.24%
E/P Ratio - Median	2.16%	5.00%	-2.84%
Dividend Yield + Dividend Growth - Mean	12.60%	13.09%	-0.50%
Dividend Yield + Dividend Growth - Median	11.97%	12.82%	-0.86%
Dividend Yield + Earnings Growth - Mean	15.30%	13.30%	2.00%
Dividend Yield + Earnings Growth - Median	15.92%	13.22%	2.70%
Capital Asset Pricing Model (CAPM) - Ex Ante	10.19%	8.90%	1.29%
Capital Asset Pricing Model (CAPM) - Ex Post	8.34%	7.49%	0.85%
State-Assessed Properties Division Recommendation:	13.00%	13.00%	0.00%

**2017 Capitalization Rate Study  
Pipeline Companies  
Equity Rates**

a	b	c	d	e	f	g	h	i	j	k	l
Value Line Rating	Company Name	Stock Price 12/30/16	2016 Earnings	2016 Dividends	Est. 2017 Dividends	2017 Dividend Yield	2017 Hist. Div Growth	2017 Avg. Erns Growth	E/P Ratio (d/c)	Div Yld+ Div Gwth (g+h)	Div Yld+ Erns Gwth (g+i)
B++	Magellan Midstream Partners, L.P.	75.63	3.50	3.25	3.52	4.65%	12.00%	7.77%	4.63%	16.65%	12.42%
B+	Buckeye Partners, L.P.	66.16	4.20	4.85	5.05	7.63%	5.00%	8.55%	6.35%	12.63%	16.18%
B+	Plains All American Pipeline, L.P.	32.39	0.70	2.65	2.20	6.79%	3.00%	10.15%	2.16%	9.79%	16.94%
B	Enbridge Energy Partners, L.P.	25.48	0.45	2.33	2.37	9.30%	2.00%	NMF	1.77%	11.30%	NMF
B	Kinder Morgan, Inc.	20.71	0.40	0.50	0.55	2.66%	NMF	13.00%	1.93%	NMF	15.66%
	Mean						5.50%	9.87%	3.37%	12.60%	15.30%
	Median						4.00%	9.35%	2.16%	11.97%	15.92%
	Weighted Average										13.75%

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

Column c was extracted from the Finance.Yahoo.com and represents December 30, 2016 closing stock prices.

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

**2017 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++	Magellan Midstream Partners, L.P.	7.50%	9.00%	6.80%	7.77%
B+	Buckeye Partners, L.P.	9.00%	NMF	8.10%	8.55%
B+	Plains All American Pipeline, L.P.	7.00%	NMF	13.30%	10.15%
B	Enbridge Energy Partners, L.P.	NMF	NMF	NMF	NMF
B	Kinder Morgan, Inc.	13.00%	NMF	NMF	13.00%
	Mean	9.13%	9.00%	9.40%	9.87%
	Median	8.25%	9.00%	8.10%	9.35%
	Weighted Average				10.09%

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.

**2017 Capitalization Rate Study  
Pipeline Companies  
Capital Asset Pricing Model - Ex Ante**

Component	Industry Computation
Expected Future Return, S&P 500	11.27%
Less: Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%
Risk Premium	8.36%
Relevered Beta <sup>2</sup>	0.87
Adjusted Risk Premium	7.28%
Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%
<b>Projected Return on Equity</b>	<b>10.19%</b>

<sup>1</sup> US Department of the Treasury - Composite Long - Term Rates > 10yrs, December 30, 2016

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

**2017 Capitalization Rate Study**  
**Pipeline Companies**  
**Capital Asset Pricing Model - Ex Post**

Component	Industry Computation
Common Stock Return, S&P 500 (1928 - 2016) <sup>1</sup>	11.42%
Less: 10 Year Treasury Bonds (1928 - 2016) <sup>1</sup>	5.18%
Risk Premium	6.24%
Relevered Beta <sup>2</sup>	0.87
Adjusted Risk Premium	5.43%
Risk Free Return - Long-Term Treasury Rates <sup>3</sup>	2.91%
<b>Projected Return on Equity</b>	<b>8.34%</b>

<sup>1</sup> Damodaran Online, January 5, 2017

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

<sup>3</sup> US Department of the Treasury - Composite Long-Term Rates > 10yrs, December 30, 2016

**2017 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 <sup>1</sup>
B++	Magellan Midstream Partners, L.P.	1.05	0.77	0.55	0.79	0.40	0.24	0.69
B+	Buckeye Partners, L.P.	1.05	1.19	0.60	0.95	0.40	0.41	0.76
B+	Plains All American Pipeline, L.P.	1.25	0.90	0.57	0.91	0.40	0.72	0.63
B	Enbridge Energy Partners, L.P.	1.10	1.12	0.55	0.92	0.40	0.92	0.59
B	Kinder Morgan, Inc.	1.25	0.71	0.63	0.86	0.16	0.79	0.58
	Mean	1.14	0.94	0.58	0.89	0.35	0.62	0.65
	Median	1.10	0.90	0.57	0.91	0.40	0.72	0.63
	Weighted Average				0.87		0.69	0.62
	Relevered beta based on 40% Debt Capital Structure				0.91 <sup>2</sup>			
	Relevered beta based on 40% Debt Capital Structure and a weighted average beta				0.87 <sup>2</sup>			

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.

<sup>1</sup> 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%)

<sup>2</sup> 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%)

**2017 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 12/30/16	Market Value Equity (\$million)	Long Term Debt (\$million)	Total Capital (\$million)	Long Term Debt %	Equity %
B++	NR	Magellan Midstream Partners, L.P.	227,783.90	75.63	17,227.30	4,073.50	21,300.80	19.12%	80.88%
B+	NR	Buckeye Partners, L.P.	140,222.30	66.16	9,277.11	3,826.90	13,104.01	29.20%	70.80%
B+	NR	Plains All American Pipeline, L.P.	412,962.80	32.39	13,375.87	9,634.00	23,009.87	41.87%	58.13%
B	NR	Enbridge Energy Partners, L.P.	349,100.00	25.48	8,895.07	8,208.00	17,103.07	47.99%	52.01%
B	NR	Kinder Morgan, Inc.	2,232,364.30	20.71	46,232.26	36,700.00	82,932.26	44.25%	55.75%
		Total			95,007.60	62,442.40	157,450.00		
		Mean						36.49%	63.51%
		Median						41.87%	58.13%
		Weighted Average						39.66%	60.34%

Recommended Capital Structure for Common Carrier Pipelines for lien date January 1, 2017:

Debt - 40%  
Equity - 60%

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 30, 2016 closing stock prices.



**2017 Capitalization Rate Study  
Pipeline Companies  
Debt Yield Rate**

---

Average of Industrial and Public Utility Bond Yield:

---

	Aa Industrial/Utility Average	4.03%	
	A Industrial/Utility Average	4.20%	
		4.03%	Aa
		4.20%	A
	Baa Industrial/Utility Average	4.73%	
	Recommended	4.73%	Baa/Ba

---

	Bond Rating	Industrial	Public Utility	Average
	Aaa	3.98%	N/A	3.98%
	Aa	4.03%	4.02%	4.03%
	A	4.21%	4.19%	4.20%
	Baa	4.75%	4.70%	4.73%

Source: Moody's Daily Long-Term Corporate Bond Yield Averages as of December 30, 2016.

**California State Board of Equalization  
State-Assessed Properties Division  
2017 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%	12.76%	4.80%	11.17%
843	Union Pacific Railroad Company	A++	Baa2	80%	20%	12.76%	4.80%	11.17%
802	Central Oregon & Pacific Railroad	NR-1	NR-1	60%	40%	14.84%	6.32%	11.43%
810	California Northern Railroad	NR-1	NR-1	60%	40%	14.84%	6.32%	11.43%
813	Pacific Harbor Lines	NR-1	NR-1	60%	40%	14.84%	6.32%	11.43%
822	Pacific Sun Railroad, LLC	NR-1	NR-1	60%	40%	14.84%	6.32%	11.43%
826	Sacramento Valley Railroad, LLC	NR-1	NR-1	60%	40%	14.84%	6.32%	11.43%
850	Modesto & Empire Traction Company	NR-1	NR-1	60%	40%	14.84%	6.32%	11.43%
865	San Diego & Imperial Valley Railroad Co. Inc.	NR-1	NR-1	60%	40%	14.84%	6.32%	11.43%
878	Stockton Terminal and Eastern Railroad	NR-1	NR-1	60%	40%	14.84%	6.32%	11.43%
882	Trona Railway Co.	NR-1	NR-1	60%	40%	14.84%	6.32%	11.43%
897	San Joaquin Valley Railroad Company	NR-1	NR-1	60%	40%	14.84%	6.32%	11.43%
899	Arizona & California Railroad	NR-1	NR-1	60%	40%	14.84%	6.32%	11.43%
	<b>Other Railroad Companies</b>	NR-2	NR-2	60%	40%	15.10%	7.34%	12.00%

**2017 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

**2017 Capitalization Rate Study  
Railroad Companies  
Flotation Cost Adjustment**

<b>Equity</b>				<b>Debt</b>			
Value Line Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate	Moody's Rating	Recommended Rate	Flotation Cost in %	Adjusted Rate
A++	12.25%	4.00%	12.76%	Baa2	4.73%	1.50%	4.80%
NR-1	14.25%	4.00%	14.84%	NR-1 <sup>1</sup>	6.23%	1.50%	6.32%
NR-2	14.50%	4.00%	15.10%	NR-2 <sup>2</sup>	7.23%	1.50%	7.34%

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

<sup>1</sup> 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.

<sup>2</sup> 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.

**2017 Capitalization Rate Study  
Railroad Companies  
Comparison of Return on Common Equity**

Description	2017	2016	Change
E/P Ratio - Mean	5.55%	7.83%	-2.28%
E/P Ratio - Median	5.57%	8.06%	-2.49%
Dividend Yield + Dividend Growth - Mean	9.90%	13.46%	-3.56%
Dividend Yield + Dividend Growth - Median	11.62%	14.93%	-3.31%
Dividend Yield + Earnings Growth - Mean	10.47%	10.03%	0.44%
Dividend Yield + Earnings Growth - Median	10.25%	10.23%	0.02%
Capital Asset Pricing Model - Ex Post	9.51%	9.55%	-0.04%
Capital Asset Pricing Model - Ex Ante	11.76%	11.56%	0.19%
State-Assessed Properties Division Recommendation:	12.25%	13.00%	-0.75%

**2017 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 12/30/16	Est. Earnings 2017	Earnings 2016	Dividends 2016	Est. Dividends 2017	Div Yield 2017 (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.	103.68	5.55	4.90	2.20	2.40	2.31%	9.50%	7.93%	5.35%	11.81%	10.25%
A	Norfolk Southern Corp.	108.07	6.20	5.55	2.36	2.44	2.26%	4.00%	9.58%	5.74%	6.26%	11.83%
B++	CSX Corp.	35.93	2.00	1.79	0.72	0.76	2.12%	9.50%	7.20%	5.57%	11.62%	9.32%
	Mean						2.23%	7.67%	8.24%	5.55%	9.90%	10.47%
	Median						2.26%	9.50%	7.93%	5.57%	11.62%	10.25%
	Weighted Average										10.53%	10.38%

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 30, 2016 closing stock prices.

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

**2017 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
<b>Class 1 Railroads:</b>					
A++	Union Pacific Corp.	7.00%	10.00%	6.80%	7.93%
A	Norfolk Southern Corp.	6.50%	11.33%	10.90%	9.58%
B++	CSX Corp.	8.00%	7.40%	6.20%	7.20%
	Mean	7.17%	9.58%	7.97%	8.24%
	Median	7.00%	10.00%	6.80%	7.93%
	Weighted Average				8.13%

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

**2017 Capitalization Rate Study  
Railroad Companies  
Capital Asset Pricing Model - Ex Ante**

Component	Industry Computation
Expected Future Return, S&P 500	11.27%
Less: Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%
Risk Premium	8.36%
Relevered Beta	1.06
Adjusted Risk Premium	8.85%
Risk Free Return - Long-Term Treasury Rates <sup>1</sup>	2.91%
Projected Return on Equity	<b>11.76%</b>

<sup>1</sup> US Department of the Treasury - Composite Long-Term Rates > 10 yrs, December 30, 2016



**2017 Capitalization Rate Study  
Railroad Companies  
Capital Asset Pricing Model - Ex Post**

Component	Industry Computation
Common Stock Returns, S&P 500 (1928 - 2016) <sup>1</sup>	11.42%
Less: 10 Year Treasury Bonds (1928 - 2016) <sup>1</sup>	5.18%
Risk Premium	6.24%
Relevered Beta	1.06
Adjusted Risk Premium	6.60%
Risk Free Return - Long-Term Treasury Rates <sup>2</sup>	2.91%
Projected Return on Equity	<b>9.51%</b>

<sup>1</sup> Damodaran Online, January 5, 2017

<sup>2</sup> US Department of Treasury - Composite Long -Term Rates > 10 yrs, December 30, 2016

**2017 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 <sup>1</sup>	Unlevered Beta <sup>2</sup>
<b>Class 1 Railroads:</b>								
A++	Union Pacific Corp.	1.05	0.73	1.05	0.94	0.38	0.15	0.86
A	Norfolk Southern Corp.	1.10	1.19	1.18	1.16	0.38	0.33	0.96
B++	CSX Corp.	1.20	1.17	1.30	1.22	0.37	0.33	1.01
	Mean	1.12	1.03	1.18	1.11		0.27	0.95
	Median	1.10	1.17	1.18	1.16		0.33	0.96
	Weighted Average				1.06		0.23	0.92
	Relevered Beta based on 20% Debt Capital Structure						1.09 <sup>3</sup>	
	Relevered Beta based on 20% Debt Capital Structure and a weighted average Beta						1.06 <sup>3</sup>	
<b>Non-Class 1 Railroads:</b>								
B+	Genesee & Wyoming	1.40	1.54	1.97	1.64	0.29	0.41	1.27
	Mean	1.40	1.54	1.97	1.64		0.41	1.27
	Median	1.40	1.54	1.97	1.64		0.41	1.27
	Weighted Average				1.64		0.41	1.27
	Relevered Beta based on 40% Debt Capital Structure						1.78 <sup>3</sup>	
	Relevered Beta based on 40% Debt Capital Structure and a weighted average Beta						1.78 <sup>3</sup>	

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.

<sup>1</sup> Average debt-to-equity ratio over the last five years.

<sup>2</sup> Unlevered Beta = Corrected Beta/[1+(1-tc)(D/E)]; where D/E is the debt-to-equity ratio, tc is the company's 2016 tax rate.

<sup>3</sup> 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%).

**2017 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 12/30/16	Market Value Equity (\$million)	Long Term Debt (\$million)	Total Capital (\$million)	Long Term Debt %	Common Equity %
<b>Class 1 Railroads:</b>									
A++	NR	Union Pacific Corp.	824	103.68	85,432	15,205	100,637	15.11%	84.89%
A	NR	Norfolk Southern Corp.	292	108.07	31,556	9,555	41,111	23.24%	76.76%
B++	NR	CSX Corp.	936	35.93	33,630	9,888	43,518	22.72%	77.28%
		Total					<u>185,267</u>		
		Mean						20.36%	79.64%
		Median						22.72%	77.28%
		Weighted Average						18.70%	81.30%
<b>Non-Class 1 Railroads:</b>									
B+	NR	Genesee & Wyoming	58	69.41	4,026	1,977	6,003	32.93%	67.07%
		Total					<u>6,003</u>		
		Mean						32.93%	67.07%
		Median						32.93%	67.07%
		Weighted Average						32.93%	67.07%
Recommended Capital Structures for lien date January 1, 2017			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 30, 2016 closing stock prices.

**2017 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	4.03%		
A = A2	<u>4.20%</u>		
Difference	<u><u>0.17%</u></u>	3	0.06%
A = A2	4.20%		
Baa = Baa2	<u>4.73%</u>		
Difference	<u><u>0.53%</u></u>	3	0.18%

Interpolated Railroad Bond Yield			
a	b	c	d
Moody's Average Rating	Moody's Average Bond Yield	Incremental Increase	Interpolated Bond Yield
Aa2	4.025%		4.03%
Aa3		0.06%	4.08%
A1		0.06%	4.14%
A2	4.200%		4.20%
A3		0.18%	4.38%
Baa1		0.18%	4.55%
Baa2	4.725%		4.73%
Baa3		0.18%	4.90%