DEPARTMENT OF REVENUE

Date: April 10, 2018
From: Jon Klockziem, Acting Director – Property Tax Division
Subject: Draft Capitalization Rate Study

The Property Tax Division of the Minnesota Department of Revenue is responsible for the assessment of utility, pipeline, and railroad operating property. We complete a Capitalization Rate Study each year. We use the capitalization rates published in the study to help determine the unitary value of State Assessed Property.

We welcomed interested parties to the department's Spring Forum on March 1, 2018, to discuss current market conditions, industry trends and developments, mergers and acquisitions, new projects, and other topics that may affect the Capitalization Rate Study. They shared their input and provided feedback on factors the department used to prepare the Draft Capitalization Rate Study.

Additional comments welcome

We are collecting additional comments about this study. We welcome your thoughts about the methods and data you find most applicable in developing capitalization rates. **Please email your comments to us at** sa.property@state.mn.us **by April 24, 2018**.

What if I already submitted my comments?

We are currently reviewing studies and comments that we already received. You do not need to send them again, but feel free to provide additional comments.

What happens next?

We will compile and review your comments and studies, and use them to inform the final Capitalization Rate Study. We will use the capitalization rates determined in the final study as part of the 2018 valuations for utility, pipeline, and railroad operating property.

Who can I contact with questions?

If you have questions about this draft study, contact Jesse Larson in our State Assessed Property Section at 651-556-6112 or sa.property@state.mn.us.

Sincerely,

Jon Klockziem

Jon Klockziem, Acting Director
Property Tax Division

Draft 2018 Capitalization Rate Study

Assessment Year 2018

Property Tax Division
Minnesota Department of Revenue
April 10, 2018

Table of Contents

Introduction

Under state law, the Minnesota Department of Revenue assesses utility, pipeline, and railroad operating property. The department considers these market segments State Assessed Property. The department completes this study to determine unitary valuations of State Assessed Property in Minnesota.

The department's Property Tax Division assesses these properties, in part, with the income capitalization approach to valuation. This approach measures the present value of the anticipated future benefits of property ownership. There are two methods of income capitalization: direct and yield capitalization.[1]

- **Yield capitalization** calculates the net present value of the anticipated future income by discounting cash flows using the yield rate.
- **Direct capitalization** is used to convert an estimate of a single year's net operating income expectancy into an indication of value for the subject property. This conversion is based on the market-observed relationship between an income level and market value.

Under the income approach, yield capitalization rates are used in yield capitalization models and direct capitalization rates are used in direct capitalization models. The table below summarizes the rates derived from this study, by market segment.

Market Segments	Yield Capitalization Rate	Direct Capitalization Rate	Implied Growth Rate [2]	Short-Term Growth Rate [3]	Long-Term Growth Rate [4]	Implied Inflation Rate [5]
Electric	6.85%	4.46%	2.39%	5.87%	2.50%	2.00%
Gas Distribution	6.94%	4.02%	2.92%	6.25%	2.50%	2.00%
Gas Transmission Pipeline	8.69%	5.21%	3.48%	6.52%	2.50%	2.00%
Fluid Transportation Pipeline	9.39%	5.24%	4.15%	11.47%	2.50%	2.00%
Class I Railroads	9.22%	5.11%	4.11%	9.08%	2.50%	2.00%
Other Railroads	9.67%	5.74%	3.77%	5.50%	2.50%	2.00%

The band of investment method is used for both the yield capitalization and direct capitalization rates. This method calculates the combined rate of the debt and equity components using the capital structure indicated by the market. The table below shows an example of the band of investment method:

	Capital Structure	×	Market Rate	=	Weighted Rate
Debt	50%	×	6%	=	3%
Equity	50%	×	10%	=	5%
Combined Rate				=	**8%**

1 Appraisal Institute (2013). The Appraisal of Real Estate, 14th Edition, Page 46

2 This is the difference between the yield capitalization rate and the direct capitalization rate for each market segment.

3 See the short-term growth rate section in this narrative.

4 This is the estimated long-term growth rate of the United States Economy, explained in further detail in the Growth section of this narrative.

5 See the Inflation Section in this narrative

Yield Capitalization Rate

The yield capitalization model is based on the premise that the value of a property is equivalent to the present value of all future benefits.[6] Yield capitalization calculates the present value of the anticipated future income by discounting cash flows using the yield rate (Y_0).

The present value of future benefits as of the assessment date is what the current owner would give up by selling the property and what the new owner would receive by purchasing the property.

Discounted Cash Flows is the most sophisticated form of yield capitalization and is used when explicit forecasts of net cash flows (NCF) are available and when these forecasts show the rate of change in the cash flows is not constant. Net cash flows are equal to net operating income plus non-cash expenses minus capital expenditures minus change in working capital. Net operating income is an after-tax accounting income prior to any deductions for interest or dividends.

Key – Variables in equations

Y_0	Yield Rate for Current Assessment Period
NCF	Net Cash Flows
NCF_1	Net Cash Flows for Next Period
n	nth Period
g	Expected long-term growth rate in net cash flows
NOI	Net Operating Income

$$\text{Value} = NCF_1 / (1+Y_0)^1 + NCF_2 / (1+Y_0)^2 + NCF_3 / (1+Y_0)^3 + \ldots + NCF_n / (1+Y_0)^n$$

Because explicit forecasts of cash flows are generally not made into perpetuity, after the period of explicit forecasts the assumption is made that the growth rate will be stable and a long-term growth rate (g) is applied to the cash flows into perpetuity. This step is called the reversion.

The formula below shows three periods of explicit forecasts followed by the reversion.

$$\text{Value} = NCF_1 / (1+Y_0)^1 + NCF_2 / (1+Y_0)^2 + NCF_3 / (1+Y_0)^3 + ((NCF_3 * (1+g)/ (Y_0-g)) / (1+Y_0)^3)$$

Stable Growth Yield Capitalization is used when explicit forecasts of net cash flows are not available or when the forecasted growth in net cash flows is stable. This model is a simplified, but mathematically identical, model to the Discounted Cash Flows model when the forecasted growth rate (g) is constant.

$$\text{Value} = NCF_1 / (Y_0 - g)^1$$

A version of this model that assumes that the constant growth rate is 0%, which means that the income with remain the same over time, is called a Zero Percent Stable Growth Yield Capitalization Model.

$$\text{Value} = NCF_1 / (Y_0 - 0\%)^1$$

If the further assumption is made that the net cash flows will be equal to the net operating income (NOI) – which means that depreciation will be equal to capital expenditures over time – the formula becomes:

$$\text{Value} = NOI_1 / (Y_0 - 0\%)^1$$

[6] Western States Association of Tax Administrators, (2009). Appraisal Handbook – Unit Valuation of Centrally Assessed Properties, Page III-13

This model assumes 0% growth into perpetuity.

Guideline Companies

When selecting guideline companies, the department reviews the Standard Industrial Classification Code and market segments listed by Value Line Investment Survey. We use the Value Line survey because it is a well-respected, widely used publication. Value Line classifies companies into 100 unique industries and groupings based on their operations, products, customers, and competitors. Value Line constantly evaluates every company tracked in the survey to make sure they are located in the proper sector.[7]

The department reviewed possible guideline companies for comparability in their market segments to the companies doing business in Minnesota. We generally exclude companies that underwent a merger or acquisition in the previous calendar year, or companies that have announced an upcoming merger or acquisition during the current year.

For details on the companies reviewed for each segment, see Guideline Company Selection (page H-1).

Market Rate of Equity

The department used the Capital Asset Pricing Model (CAPM) and the Dividend Growth Model (DGM) to determine the market rate of equity for each market segment. We also considered the Build-Up Model. The market rate of equity for each market segment was selected after considering seven different CAPMs, seven different Empirical Capital Asset Pricing Models (ECAPMs), and three different DGMs. The models allowed the department to establish a range of acceptability.

Capital Asset Pricing Model (CAPM)

The CAPM is based on the theory that all investors will independently optimize their portfolios. The expected return on an asset is related to its risk. The department uses this model to determine the market rate of equity. For the risk-free rate in the CAPM, we use the U.S. Treasury 20-year coupon bond yield. We also use a market-specific beta that is calculated with data from the Value Line Investment Survey.

The CAPM is based on the following assumptions, according to Shannon Pratt and Roger Grabowski [8]:

1. Investors are risk averse.
2. Rational investors seek to hold efficient portfolios (i.e., portfolios that are fully diversified).
3. All investors have identical investment time horizons (i.e., expected holding periods).
4. All investors have identical expectations about such variables as expected rates of return and how discount rates are generated.
5. There are no transaction costs.
6. There are no investment-related taxes. However, there may be corporate income taxes.
7. The rate received from lending money is the same as the cost of borrowing money.

---

[7] Severo Nieves, (9 March 2016). Value Line Institutional Services, Institutional Sales & Marketing, Analyst, email

[8] Pratt, Shannon and Grabowski, Roger, (2010). *Cost of Capital Applications and Examples*, 4th Ed., Page 113

8. The market has perfect divisibility and liquidity (i.e., investors can readily buy or sell any desired fractional interest).

Risk Free Rate

The risk-free rate reflects the actual market conditions as of the property assessment date of January 2, 2018. The department used a risk-free rate of 2.58% for this study.[9]

“Low interest rates are not a short-term aberration, but part of a long-term trend,” Ben Bernanke noted during his term as Federal Reserve chair. The Fed, he added, is keeping the interest rates low, only in a very narrow sense: “The [Federal Reserve’s] ability to affect real rates of return, especially longer-term real rates, is transitory and limited.”[10]

While serving as vice chair of the Federal Reserve, Stanley Fischer said, “The actual federal funds rate has to be so low for the Fed to meet its objectives suggests that the equilibrium interest rate –that is, the federal funds rate that will prevail in the longer run, once cyclical and other transitory factors have played out—has fallen.” In addition, Fischer added, “…changes in factors over which the Federal Reserve has little influence—such as technological innovation and demographics—are important factors contributing to both short- and long-term interest rates being so low at present.” [11]

Corporate finance and equity valuation expert Dr. Aswath Damodaran also addressed this topic: “There is only one rate that the Federal Reserve sets, and it is the Fed Funds rate. It is the rate at which banks trade funds, that they hold at the Federal Reserve, with each other. … [I]interest rates in the U.S. (and Europe) have been low because inflation has been non-existent and real growth has been anemic.”[12]

Moreover, notes Damodaran, the author of several finance textbooks: “In the long term, the real riskless rate will converge on the real growth rate of the economy and the nominal riskless rate will approach the nominal growth rate of the economy.… A simple rule of thumb on the stable growth rate is that it should not exceed the riskless rate used in the valuation”[13].

Beta

The beta selected for each market segment indicates the market segment’s risk relative to the market. The effects of un-levering and re-levering guideline companies’ betas for the selected capital structure for each market segment were analyzed. The income tax liability data was not reliable for Gas Transmission Pipeline or Fluid Transportation Pipeline companies because the companies are limited partnerships and the income tax liability is “passed-through” to the shareholders.

---

[9] The daily observations rate for 20-year U.S. Treasury coupon bonds was 2.58% as of January 29, 2017.

[10] Bernanke, Ben. (30 March 2015). “Why are interest rates so low?” Retrieved from http://www.brookings.edu/blogs/ben-bernanke/posts/2015/03/30-why-interest-rates-so-low.

[11] Fischer, Stanley (17 October 2016). *Why Are Interest Rates So Low? Causes and Implications*. Live Speech at Economics Club of New York, New York. Retrieved from https://www.wsj.com/livecoverage/federal-reserve-september-2017

[12] Damodaran, Aswath, Dr. (4 September 2015). “The Fed, interest rates, and stock prices: fighting the fear factor.” Retrieved from http://aswathdamodaran.blogspot.com/2015/09/the-fed-interest-rates-and-stock-prices.html.

[13] Damodaran, A. Chapter 2, Intrinsic Valuation, Page 32, Retrieved from http://people.stern.nyu.edu/adamodar/pdfiles/DSV2/Ch2.pdf

See each market segment's Beta Analysis page in the appendices for more information on how the department arrived at the indicated beta.

Equity Risk Premium

The equity risk premium, as defined by Pratt and Grabowski, is the extra return over the expected yield on risk-free securities that investors expect to receive from an investment in a diversified portfolio of common stocks.[14] Bradford Cornell has a similar definition for the equity risk premium, noting it is the difference between the return on common stock and the return on government securities.[15] The equity risk premium should reflect what investors think the risk premium will be going forward.

As provided by Damodaran, "Broadly speaking, there are two ways of estimating equity risk premiums, with the first being a historical premium estimated by looking at the difference between past returns on stocks and the risk free investment and the second being a forward looking estimate, where you back out from stock prices what investors are building in as an expected return on stocks in the future."[16]

The department reviewed seven different calculations of the equity risk premium:

> **Ex Post**, long-horizon expected equity risk premium from Duff & Phelps Annual Valuation Handbook: Guide to Cost of Capital. Large company stock total returns minus long-term government bond income returns. [17]

> **Supply Side**, long-horizon expected equity risk premium forecasted by the use of supply side models from Duff & Phelps Annual Valuation Handbook: Guide to Cost of Capital.[18] Finance and capital expert Roger Ibbotson described the Supply Side Model in his Stocks, Bonds, Bills, and Inflation Yearbook: "Long-term expected equity return scan be forecasted by the use of supply side models. "The supply of stock market returns is generated by the productivity of the corporations in the real economy. Investors should not expect a much higher or lower return than that produced by the companies in the real economy. Thus, over the long run, equity returns should be close to the long-run supply estimates." [19]

> **Three Stage Ex Ante**, forward looking model using a three-stage dividend growth model of the Standard & Poor's 500. The department calculates this equity risk premium. [20] According to

---

[14] Pratt, Shannon and Grabowski, Roger, (2010). *Cost of Capital Applications and Examples,* 4th Ed., Pages 115-116

[15] Cornell, Bradford, (1999). *The Equity Risk Premium,* Page 18

[16] Damodaran, Aswath, Dr. (April 2016). The Cost of Capital: The Swiss Army Knife of Finance, Page 11. Retrieved from http://people.stern.nyu.edu/adamodar/pdfiles/papers/costofcapital.pdf

[17] Duff & Phelps. (2018). *Valuation Handbook: Guide to Cost of Capital*. Hoboken: John Wiley & Sons. Chapter 3, Page 1

[18] Ibid.

[19] *Ibbotson SBBI 2013 valuation yearbook: market results for stocks, bonds, bills, and inflation, 1926-2012*. (2013). Chicago: Morningstar. Page 64.

[20] See Appendix F for this calculation.

Ibbotson, "One of the advantages of a three-stage discounted cash flow model is that it fits with the life cycle theories in regards to company growth."[21]

Damodaran, forward looking equity risk premium as calculated by Dr. Aswath Damodaran, Professor of Finance at the Stern School of Business at New York University.[22]

Duff & Phelps, recommended equity risk premium (conditional). The Duff & Phelps recommended equity risk premium was developed in relation to (and should be used in conjunction with) a 3.50% "normalized" risk-free rate. [23]

Graham and Harvey, forward-looking equity risk premium based on surveys of U.S. Chief Financial Officers and their opinion of the equity risk premium in every quarter from June 2000 to June 2016. [24]

Fernandez, Pershin, and Acin, forward-looking equity risk premium based on surveys of finance and economics professors, analysts and managers of companies and their opinion of the required market risk premium in different countries. [25]

The equity risk premium (RP_e) is multiplied by the market segment-specific beta (β). The product is then added to the risk-free rate (R_f) to estimate the market rate of equity for the market segment.

Key – Variables in equations	
RP_e	Equity risk premium
R_f	Risk-free rate
β	Beta

Market Rate of Equity for Market Segment = $(RP_e \times \beta) + R_f$

Damodaran commented on the use of a historical risk premium versus an implied risk premium early in 2018:

> *While it is tempting to continue to dissect last year's numbers, it is healthier to turn our attention to the future. It is why I have increasingly moved away from using historical risk premiums, like the 4.77% premium that I computed by looking at the 1928-2017 return table, and towards implied equity risk premiums, where I back out what investors are demanding as a premium for investing in stocks by looking at how much they pay for stocks and what they expect to generate as cash flows. (Think of it as an IRR for stocks, analogous to the yield to maturity on a bond). At the start of*

---

[21] Ibbotson, *SBBI 2013 valuation yearbook.* Page 51

[22] Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

[23] Duff & Phelps. (2018). *Valuation Handbook: Guide to Cost of Capital*. Hoboken: John Wiley. Chapter 3, Page 1

[24] Graham, J. R., and Harvey, C. R. (04 August 2016). The Equity Risk Premium in 2016. Retrieved October 18, 2017, from http://ssrn.com/abstract=2816603

[25] Fernandez, P., Pershin, V., and Acín, I. F. (19 April 2017). Discount Rate (Risk-Free Rate and Market Risk Premium) Used for 41 Countries in 2017: A Survey. Retrieved October 18, 2017, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2954142

> *2018, putting this approach into play, I estimated an equity risk premium of 5.08% for the S&P 500.* [26]

Empirical Capital Asset Pricing Model

The Empirical Capital Asset Pricing Model (ECAPM) is a modification of the above CAPM Model. The ECAPM applies 25% weight to the equity risk premium component and 75% weight to the beta times the equity risk premium component. This reduces the sensitivity of the cost of equity estimate.

According to Steven Kihm, Andrew Satchwell, and Peter Cappers, the model "mutes the sensitivity of the cost of equity estimate to changes in the beta coefficient, consistent with the adjustment suggested by the empirical research."[27]

The equity risk premium (RP_e) is multiplied by the market segment-specific beta (β) and 75%. The product is then added to the equity risk premium (RP_e) multiplied by 25%. The two products and the risk free rate are added tighter to estimate the market rate of equity for the market segment.

$$\text{Market Rate of Equity for Market Segment} = (RP_e \text{ x } \beta \text{ x } 75\%) + (RP_e \text{ x } 25\%) + R_f$$

We completed seven ECAPM models for each market segment, using the equity risk premiums described in the Capital Asset Pricing Model section above.

Build-Up Model

The Build-Up Model is another model used to estimate the market rate of equity. Some view this as a version of the Capital Asset Pricing Model without specifically incorporating systematic risk.[28] The CAPM assumes that the risk premium portion of a security's expected return is a function of that security's systematic risk.[29]

An investor can diversify their portfolio to remove unsystematic risk (market segment-specific risk). Systematic risk (market risk) is the risk related to an investment return that cannot be eliminated through diversification.[30]

Key – Variables in equations	
RP_e	Equity risk premium
R_f	Risk-free rate
RP_U	Market segment specific risk premium (unsystematic)

In the Build-Up Model, the market rate of equity for the market segment is equal to the risk free rate plus the equity risk premium plus the risk specific to the market segment for unsystematic risk.

---

26 Damodaran, Aswath, Dr. January 2018 Data Update 2: The Buoyancy of US Equities. January 9, 2018. https://aswathdamodaran.blogspot.com/2018/01/january-2017-data-update-2-buoyancy-of.html

27 Kihm, Steven; Satchwell, Andrew; and Cappers, Peter. *The Financial Impacts of Declining Investment Opportunities on Electric Utility Shareholders*, Electricity Markets & Policy Group, Technical Brief, Page 20

28 Pratt, Shannon and Grabowski, Roger, *Cost of Capital Applications and Examples*, 4th Ed., Page 102 (2010)

29 Ibid, p. 105

30 Keown, Arthur; Martin, John; and Petty, J., *Foundations of Finance: The Logic and Practice of Financial Management*, 8th Ed., (2014). Page 195

Market rate of equity for Market Segment = $R_f + RP_e + RP_u$

The Build-Up Model can be used when the inputs are not available to complete CAPM. The department was able to complete the CAPM for each market segment and did not need to resort to the Build-Up Model.

Dividend Growth Model (DGM)

The department also uses the DGM to determine the market rate of equity. It is based on the theory that the prices paid for a share of stock reflect the investors' discounted present value of future expected earnings.[31] The DGM is a widely used method and is also called the Discounted Cash Flows Model or Gordon Growth Model.

The formula for this model is the same as the simplified Discounted Cash Flows Income Model explained above, referred to as Stable Growth Yield Capitalization, using a stable growth rate. Estimating the sustainable growth rate is explored below in this section and the Growth section.

Theoretically, the growth estimate in the DGM is the estimated growth in dividends, which are cash flows to equity shareholders after reinvestment. Dividend growth estimates may track earnings growth estimates. However, companies may change dividend payment policies drastically, resulting in large differences between earnings growth estimates and dividend growth estimates.

A consensus based on substantial academic literature indicates analysts' forecasts of earnings take account of all the information provided by more formulaic forecasting rules and incorporate other information as well. "Based on these findings, the most common solution is to assume that the dividend payout rate remains effectively constant and to use analyst forecasts of earnings growth as a proxy for the growth rate of dividends."[32]

Another issue that leads the department to question the usefulness and reliability of the dividend growth rate in this model is the trend for U.S. companies to include stock buybacks in their dividend payment policies. This is discussed in detail in the Stock Buybacks section.

The formula uses Dividend Yield (DY), which is next year's expected dividends per share divided by the current market price per share of stock, plus an estimate of growth. Both dividend and earnings growth models were reviewed.

Key – Variables in equations	
DY	Dividend Yield
DG	Dividend Growth
EG	Earnings Growth

Dividend Growth (DG), analysts' estimates of dividend growth is used in the model:

Market Rate of Equity for Market Segment = DY + DG

Earnings Growth (EG), analysts' estimates of earnings growth is used in the model:

Market Rate of Equity for Market Segment = DY + EG

---

[31] Western States Association of Tax Administrators (2009). *Appraisal Handbook – Unit Valuation of Centrally Assessed Properties*, Page III-20

[32] Cornell, Bradford, (1999). *The Equity Risk Premium*, Page 105

Another formulaic expression of the Dividend Growth Model is:

$$K_E = D_1 / P_0 + G_1$$

In this expression, the Cost of Equity is estimated by taking the Dividend Yield (Expected Dividends in the next period divided by the Recent Stock Price) plus expected growth. This model is the same model as the simplified Discounted Cash Flows Income Model that the department referred to as the Stable Growth Yield Capitalization, mentioned above. The formula is stated again here:

$$\text{Value} = NCF_1 / (Y_0 - g).$$

Instead of solving for value as the Stable Growth Yield Capitalization Model does, the DGM solves for cost of equity.

Key – Variables in equations	
K_E	Cost of Equity
D_1	Expected Dividends
P_0	Recent Stock Price
G_1	Projected 5-year Growth Rate
Y_0	Yield Rate for Current Assessment Period
g	Stable Growth
NCF_1	Net Cash Flows for Next Period

The dividend and earnings growth rates provided by Value Line Investment Survey were used for the guideline companies for the Railroad, Electric, and Gas Distribution segments. Value Line Investment Survey provides analysts' estimates of change in earnings and dividends from 2014-2016 to 2020-2022.

Guideline companies for the Gas Transmission Pipeline and Fluid Transportation Pipeline segments did not have sufficient data provided by Value Line for earnings or dividends growth rates. As a result, the growth estimate for the next five years as provided by Yahoo! Finance was used. There is less information available for earnings growth and dividend growth estimates in the Gas Transmission Pipeline and Fluid Transportation Pipeline market segments, causing concern about the reliability of these estimates.

See each market segment's Dividend Growth Model page in the appendices for more information on how the department arrived at the indicated rate.

The growth rate used in the DGM is a short-term growth rate, typically much higher than the growth rate of the U.S. economy. This model is used to calculate value of a company into perpetuity. It is not possible for a company to grow at a growth rate higher than the U.S. economy in the long-term. According to Damodaran, "the amount of cash that U.S. companies are returning to stockholders is unstainable, given the earnings and expectations of growth."[33] Pratt and Grabowski also state, "Long-term growth rates exceeding the real growth in GDP [Gross Domestic Product] plus inflation are generally not sustainable."[34]

---

[33] Damodaran, A. January 2017 Data Update 9: Dividends and Buybacks Damodaran, February 6, 2017. http://aswathdamodaran.blogspot.com/2017/02/january-2017-data-update-9-dividends.html?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+blogspot%2FpHUuM+%28Musings+on+Markets%29

[34] Pratt, Shannon and Grabowski, Roger, (2010). *Cost of Capital Applications and Examples,* 4th Ed., Page 681

Multi-Stage Dividend Growth Model (Multi-Stage DGM)

The department completed a multi-stage dividend growth model to account for the short-term growth estimates available. Unlike the DGM discussed in the previous section, the multi-stage dividend growth model assumes that growth is not constant. This allows the department to use analysts' short-term growth estimates, a transition period where the short-term growth estimates adjust to the long-term, sustainable growth estimate.

Key – Variables in equations	
K_E	Cost of Equity
D_1	Expected Dividends
P_0	Recent Stock Price
G_1	Projected 5-year Growth Rate
G	Average of G_1 and g
g	Stable Growth

David Parcell (2010) provides the following multi-stage DGM formula in The Cost of Capital – A Practitioner's Guide, published by the Society of Utility and Regulatory Financial Analysts:

$$K_E = (D_1 / P_0) + 0.67(G_1) + 0.33(g)$$

Stock Buybacks

A company's net income represents income that the company can reinvest or distribute to its owners.[35] Dividends are often considered the primary approach for publicly traded firms to return cash or assets to their shareholders. However, companies can also return cash to their stockholders through stock buybacks – buying back outstanding stock in the firm and reduce the number of shares outstanding.[36]

Because a company cannot act as its own shareholder, the company absorbs repurchased shares, and the number of outstanding shares on the market is reduced. This increases the relative ownership stake of each investor because there are fewer shares, or claims, on the earnings of the company.[37] The amount of cash that U.S. companies are returning to stockholders is unsustainable, given the earnings and expectations of growth. In 2015 and 2016, the companies in the S&P 500 returned more than 100% of earnings to investors.[38]

Given the trend of U.S. companies to include stock buybacks in their dividend payment policies, the department questions the reliability of the expected dividends and expected dividend growth rate inputs of the Dividend Growth Model (DGM).

Market Rate of Debt

All data used for the cost of debt calculation is from the Securities and Exchange Commission (SEC.gov). This differs from the 2017 study when the cost of debt was exclusively derived from

---

35 Keown, Arthur; Martin, John; and Petty, J., (2014). *Foundations of Finance: The Logic and Practice of Financial Management*, 8th Ed., Page 53

36 Damodaran, Aswath, Dr. (2015). *Applied Corporate Finance*, 4th Ed., Page 439

37 http://www.investopedia.com/articles/02/041702.asp

38 Damodaran, Aswath, Dr. (2017, February 06). January 2017 Data Update 9: Dividends and Buybacks. Retrieved February 06, 2017, from http://aswathdamodaran.blogspot.com/2017/02/january-2017-data-update-9-dividends.html?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A%2Bblogspot%2FpHUuM%2B%28Musings%2Bon%2BMarkets%29

indexes. In the 2017 study, we were researching sources of actual debt issued by the guideline companies for future assessments.[39]

For this (2018) study, the department analyzed the guideline companies' actual cost of debt and used them to estimate debt rates.[40]

We compiled our debt analysis using a majority blend of the market-observed, true cost of each guideline company's debt (through the utilization of yield to maturity calculations described below) and spread analysis when such data was unavailable. This debt analysis is referenced in the Current Actual Cost of Debt pages for each market segment (see appendices A through E).

To find each individual guideline company's cost of debt, we:

1. Accessed public information available for specific fixed and/or corporate bond mutual funds – their Quarterly Schedule Of Portfolio Holdings Of Registered Management Investment Company (Form N-Q) on the SEC website

2. Pulled out company-specific marketable debt securities data from Form N-Q, which are mandated by the SEC to include: issue name, coupon rate, maturity date, holding (face) amount, and market value amount.[41]

3. Combined the data from Form N-Q – filed December 31, 2017 – with reasonable assumptions (see below) to calculate the cost of debt.

4. Used the above data to derive the Yield to Maturity (YTM) for each company. We calculate a market price (Market Value divided by Face Value). From that point we assume:
    - A T+3 settlement date of January 4, 2018 (January 1 is a Holiday and therefore a non-settlement date.)
    - A redemption price of par ($100.00)
    - A semi-annual interest payment
    - The debt is non-callable (The "make whole" call included in most corporate debt securities favors the issuer and is therefore irrelevant to the company's cost of debt.)

We have calculated 33 of the 43 guideline company's cost of debt and YTM using the method outlined above. For the other 10 companies, we employed a spread analysis tool using long-term debt information from their most recently published Form 10-K. (The marketable long-term debt outstanding

---

[39] Minnesota Department of Revenue. *2017 Capitalization Rate Study*, Page 9-10.

[40] In previous years, the department used the following indexes to estimate the market rate of debt for guideline companies:
- Corporate Bond Yield Averages for Public Utility Bonds from Mergent Bond Record, for the Electric and Gas Distribution market segments
- Corporate Bond Yield Averages for Industrial Bonds from Mergent Bond Record, for the Gas Transmission Pipeline, Fluid Transportation Pipeline, and Railroad market segments

[41] Each company's principal executive and financial officers verify and sign off on the data on Form N-Q.

for these 10 companies was most likely placed privately to institutional or accredited investors that do not have to file Form N-Q.)

We focused on a long-term average industry YTM. [42] To arrive at this average, we built a spot U.S. Treasury zero coupon yield curve and then calculated a Z-spread to build out the data. This "boot-strapping" process is common practice in the financial sector when it comes to pricing new issue corporate debt.

For more information on how we analyzed the market rate of debt, see each market segment's Indexed Rate of Debt and Current Actual Cost of Debt pages in the appendices of this report.

Market Rate of Preferred Stock

Preferred stock makes up a minimal percentage of the capital structure for all market segments. The amount of capital structure attributable to preferred stock was not materially significant and was not included in indicated capital structure for each market segment.

Direct Capitalization Rate

Direct capitalization is used to convert an estimate of a single year's net operating income expectancy into an indication of value in one direct step.[43]

The direct rate (D_0) is an expression of the market observed relationship between price and income.

This market observed direct rate is applied to the net operating income (NOI) of the property to indicate the market value (value).

$$\text{Value} = NOI_1 / D_0$$

Key – Variables in equations	
D_0	Direct Capitalization Rate
NOI_1	Net Operating Income for the next year
Value	Market Value

Guideline Companies

When selecting guideline companies, the department reviews the Standard Industrial Classification Code and market segments listed by Value Line Investment Survey. We use the Value Line survey because it is a well-respected, widely used publication. Value Line classifies companies into 100 unique industries and groupings based on their operations, products, customers, and competitors. Value Line constantly evaluates every company tracked in the survey to make sure they are located in the proper sector.[44]

The department reviewed possible guideline companies for comparability in their market segments to the companies doing business in Minnesota. We generally exclude companies that underwent a merger or acquisition in the previous calendar year, or companies that have announced an upcoming merger or acquisition during the current year.

For details on the companies reviewed for each segment, see Guideline Company Selection (page H-1).

---

42 Our indexed cost of debt calculations in previous capitalization rate reports similarly used a long-term basis.

43 Western States Association of Tax Administrators (2009). Appraisal Handbook – Unit Valuation of Centrally Assessed Properties, Page III-8

44 Severo Nieves, (9 March 2016). Value Line Institutional Services, Institutional Sales & Marketing, Analyst, email

Equity Component

An inverse of the Price to Earnings (P/E) Ratio is used to estimate the equity component in the direct rate.

The Price to Earnings Ratio (P/E Ratio) as calculated by Value Line Investment Survey was used. The Trailing P/E Ratio as calculated by Value Line Investment Survey was used if the P/E Ratio was not calculated. The P/E ratio most indicative of the market segment data was selected. The inverse of the selected ratio is the equity component of the direct capitalization rate.

See each market segment's Direct Equity Component page for more information on how the department arrived at the indicated equity component.

Debt Component

All data used for the cost of debt calculation is from the Securities and Exchange Commission (SEC.gov). This differs from the 2017 study when the cost of debt was exclusively derived from indexes. In the 2017 study, we were researching sources of actual debt issued by the guideline companies for future assessments.[45]

For this (2018) study, the department analyzed the guideline companies' actual cost of debt and used them to estimate debt rates.[46]

We compiled our debt analysis using a majority blend of the market-observed, true cost of each guideline company's debt (through the utilization of yield to maturity calculations described below) and spread analysis when such data was unavailable. This debt analysis is referenced in the Current Actual Cost of Debt pages for each market segment (see appendices A through E).

To find each individual guideline company's cost of debt, we:

1. Accessed public information available for specific fixed and/or corporate bond mutual funds – their Quarterly Schedule Of Portfolio Holdings Of Registered Management Investment Company (Form N-Q) on the SEC website

2. Pulled out company-specific marketable debt securities data from Form N-Q, which are mandated by the SEC to include: issue name, coupon rate, maturity date, holding (face) amount, and market value amount.[47]

3. Combined the data from Form N-Q – filed December 31, 2017 – with reasonable assumptions (see below) to calculate the cost of debt.

---

[45] Minnesota Department of Revenue. *2017 Capitalization Rate Study*, Page 9-10.

[46] In previous years, the department used the following indexes to estimate the market rate of debt for guideline companies:

- Corporate Bond Yield Averages for Public Utility Bonds from Mergent Bond Record, for the Electric and Gas Distribution market segments
- Corporate Bond Yield Averages for Industrial Bonds from Mergent Bond Record, for the Gas Transmission Pipeline, Fluid Transportation Pipeline, and Railroad market segments

[47] Each company's principal executive and financial officers verify and sign off on the data on Form N-Q.

4. Used the above data to derive the Yield to Maturity (YTM) for each company. We calculate a market price (Market Value divided by Face Value). From that point we assume:
    - A T+3 settlement date of January 4, 2018 (January 1 is a Holiday and therefore a non-settlement date.)
    - A redemption price of par ($100.00)
    - A semi-annual interest payment
    - The debt is non-callable (The "make whole" call included in most corporate debt securities favors the issuer and is therefore irrelevant to the company's cost of debt.)

We have calculated 33 of the 43 guideline company's cost of debt and YTM using the method outlined above. For the other 10 companies, we employed a spread analysis tool using long-term debt information from their most recently published Form 10-K. (The marketable long-term debt outstanding for these 10 companies was most likely placed privately to institutional or accredited investors that do not have to file Form N-Q.)

We focused on a long-term average industry YTM. [48] To arrive at this average, we built a spot U.S. Treasury zero coupon yield curve and then calculated a Z-spread to build out the data. This "boot-strapping" process is common practice in the financial sector when it comes to pricing new issue corporate debt.

For more information on how we analyzed the market rate of debt, see each market segment's Indexed Rate of Debt and Current Actual Cost of Debt pages in the appendices of this report.

Flotation Costs

Flotation costs are costs incurred when a company issues a new security, including fees to an investment banker, legal fees, accounting, and other out of pocket expenses. The market-determined opportunity cost of capital is not affected by the flotation costs of a particular firm.[49] The correct procedure for the economic analysis of flotation costs does not alter the weighted average cost of capital.[50]

The yield rates and direct rates in this study are market derived, using market data. Unlike for determining allowable rates of return in rate cases, the recovery of previously incurred costs is not added to the yield rates or direct rates used for estimating market value. The yield rate and direct rate are not recovery mechanisms for the costs of doing business. Flotation cost adjustments were not made to the yield rate or direct rate in this study.

Dr. Richard Simonds stated in his paper published in the Journal of Property Tax Assessment & Administration, "When capitalizing net operating income in the income approach, a flotation-cost adjustment cannot be applied to the cost of capital. Advocates of an adjustment may be confusing the

---

[48] Our indexed cost of debt calculations in previous capitalization rate reports similarly used a long-term basis.

[49] Western States Association of Tax Administrators, (2009). Appraisal Handbook – Unit Valuation of Centrally Assessed Properties, Page III-31

[50] Copeland, Thomas E., and Weston, Fred J. (1988). Financial Theory and Corporate Policy (3rd Ed.). Addison-Wesley Publishing Company.

concept of the allowed rate of return on invested capital in a rate-regulated environment with the concept of the market-determined opportunity cost of capital."[51]

Thomas Copeland and Fred Weston find that adjusting for flotation costs in the rate of return is incorrect because it implicitly adjusts the opportunity cost of funds supplied to the firm. The true market-determined opportunity cost is unaffected by the flotation costs of a particular firm.[52]

The department does not include an adjustment for flotation costs. We estimate the market cost of capital for each market segment, under Minnesota Rules 8100 and 8106.

Company-Specific Risk

The department does not include an adjustment for company-specific risk or a size premium adjustment for a specific company. The department estimates the market cost of capital for each market segment, per Minnesota Rules 8100 and 8106.

The department does not agree with a size premium adjustment based on the average market capitalization size of the guideline companies and does not find this to be generally accepted practice. Damodaran points out several reasons why a size adjustment to the CAPM is not appropriate, concluding that the empirical evidence is not as conclusive as it was initially thought to be.[53] He also finds that forward-looking risk premiums are yielding no premiums for small cap [market capitalization] stocks and much of the additional risk is either diversifiable or double counted.[54]

Eugene Fama and Kenneth French analyzed size premiums of companies that move to different market capitalizations and found, "the size premium is almost entirely a result of the extreme positive returns of small-cap [market capitalization] stocks that move to a big-cap [market capitalization] portfolio from one year to the next."[55]

Illiquidity

The department does not adjust capitalization rates for illiquidity. As the Appraisal Institute explains:

> *A discount rate reflects the relationship between income and the value that a market will attribute to that income. The financial and economic concepts implicitly in a discount rate are complex and have been the subject of significant analysis for more than a century. Although four key components can be identified within a discount rate – the safe rate plus considerations of*

---

[51] Simonds, Richard R., Dr. (2006). "Income Capitalization, Flotation Costs, and the Cost of Capital." Journal of Property Tax Assessment & Administration, Volume 3, Issue 4.

[52] Copeland and Weston. *Financial Theory and Corporate Policy* (3rd Ed.). Page 534

[53] Damodaran, Aswath, Dr. "Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2011 Edition." Retrieved from: http://people.stern.nyu.edu/adamodar/pdfiles/papers/ERP2011.pdf

,[54] Damodaran, Aswath, Dr. (11 April 2015). "The small cap premium: Where is the beef?" Retrieved from: http://aswathdamodaran.blogspot.com/2015/04/the-small-cap-premium-fact-fiction-and.html.

[55] Fama, Eugene F. and French, Kenneth R. (2007). "Migration." Financial Analysts Journal, Volume 63, Number 3. CFA Institute.

illiquidity, management, and various risks – a discount rate that is constructed by adding allowances for these components can be misleading and inaccurate" (p. 458).[56]

Growth

The importance of the growth rate is that it affects the yield model, explained in the Yield Capitalization Rate section. Minnesota Rules, 8100 and 8106 imply a Zero Percent Growth Yield model. If the assumption that income streams remain equal over time is incorrect, the model may not accurately reflect the market value of the company.

For a company with a changing income streams, a Discounted Cash Flows model or Stable Growth Yield model may be better at estimating the value for the company under review. The Discounted Cash Flows model uses explicit forecasts of income and expenses for each period. These inputs can be estimated if they are not made available.

The Implied Growth Rate is the difference between the yield rate and the direct rate. The direct rate is the relationship between an estimate of a single year's net operating income and the value of the property, while the yield rate converts income from future periods into present value.

The Western States Association of Tax Administrators Appraisal Handbook states, "direct capitalization is not affected by the appraiser's view of the future income."[57] In addition, Unit Valuation Insights states, "The direct capitalization rate is typically calculated as the yield capitalization rate minus an expected long-term growth rate."[58]

Short-Term Growth Rate

The department reviewed short-term growth rates from several sources to derive an estimate of a short-term growth rate for each market segment.

Business news service Reuters provides analysts' estimates of market segment earnings per share growth. The estimates for the next five years for the industry (as of January 9, 2018) are as follows:

Electric	Gas Distribution	Gas Transmission Pipeline	Fluid Transportation Pipeline	Class I Railroads	Other Railroads
25.71%	-11.31%	11.72%	11.72%	6.04%	6.04%

Value Line Investment Survey provides analysts' estimates of change in earnings and dividends from 2014-2016 to 2020-2022. Gas Transmission Pipeline and Fluid Transportation Pipeline segments did not have sufficient data provided by Value Line for earnings or dividends growth rates. The average growth rates provided by Value Line Investment Survey are as follows:

---

[56] Appraisal Institute (2013). The Appraisal of Real Estate, 14th Edition, Page 458

[57] Ibid., Page III-9

[58] Schweihs, Robert P. & Reilly, Robert F. (Spring 2014). Unit Valuation Insights, Issues Related to the Unit Valuation Principle, Page 77

	Electric	Gas Distribution	Class I Railroads	Other Railroads
Earnings Growth Rate	5.87%	6.25%	9.08%	5.50%
Dividend Growth Rate	5.33%	4.94%	7.92%	N/A [59]

Yahoo! Finance provides growth estimates for the next five years for several publicly traded companies. These estimates were used for Gas Transmission Pipeline market segment and Fluid Transportation Pipeline market segment. The median growth estimates for the guideline companies are as follows:

	Gas Transmission Pipeline	Fluid Transportation Pipeline
5-Year Growth Estimate	6.52%	11.47%

Based on the sources above, the indicated short-term growth rate for each market segment is as follows:

Electric	Gas Distribution	Gas Transmission Pipeline	Fluid Transportation Pipeline	Class I Railroads	Other Railroads
5.87%	6.25%	6.52%	11.47%	9.08%	5.50%

This evidence indicates that there is significant short-term growth in each market segment.

Long-Term Growth Rate

The department reviewed long-term growth rates from several sources to derive an estimate of long-term growth for the market as a whole.

"Since no firm can grow forever at a rate higher than the growth rate of the economy in which it operates, the constant growth rate cannot be greater than the overall growth rate of the economy."[60] Therefore, the risk-free rate can be viewed as the maximum constant growth rate for each market segment. The U.S. Treasury 20-year Coupon Bond Yield was 2.58% on December 29, 2017.[61]

The sources analyzed for this report indicate varying rates of growth in the U.S. economy over the long-term:

[59] Genesee & Wyoming is the only railroad company used for the Other Railroads market segment. Genesee & Wyoming does not pay dividends. Therefore, there is no estimated growth rate for dividends for Genesee & Wyoming.

[60] Damodaran, Aswath, Dr. (n.d.) The Stable Growth Rate, http://pages.stern.nyu.edu/~adamodar/New_Home_Page/valquestions/stablegrowthrate.htm

[61] Board of Governors of the Federal Reserve System, H.15, Selected Interest Rates, Market Yield on U.S. Treasury Securities 20-year constant maturity quoted on investment bases, daily observations, December 29, 2017. Accessed on January 8, 2018 from http://www.federalreserve.gov/

- The Federal Reserve Bank projects their "longer run" estimate of U.S. real Gross Domestic Product (GDP) growth at 1.8%[62].
- The World Bank forecasts that U.S. GDP will grow by 3.1% in 2018, 3.0% in 2019, and 2.9% in 2020.[63]
- Trading Economics projects the U.S. GDP annual growth rate to trend around 2.60% in 2020[64].
- The Economist Intelligence Unit forecasts that U.S. real GDP will grow by 1.7% from 2017 to 2050.[65]
- A 2014 publication from the Organisation for Economic Co-operation and Development (OECD) indicates that the average growth rate in potential GDP for the U.S. is 1.70% from 2031 to 2060.[66]

After considering the above sources, the department finds the indicated growth rate of the U.S. economy to be 2.50%.

The department also plans to review the Congressional Budget Office (CBO) estimated average growth rate of U.S. real GDP to help measure the indicated long-term growth rate of the U.S. economy. This estimate will be available April 9, 2018 (when the CBO's Budget and Economic Outlook is published). We intend to re-review the selected long-term growth rate at that time.

Inflation

Inflation makes future income less valuable than today's income. Inflation is the percentage change in the value of the Wholesale Price Index (WPI) on a year-to-year basis. It effectively measures the change in the prices of a basket of goods and services in a year.[67]

According to Arthur Keown, John Martin, and J. William Petty, "investors require nominal (or quoted) rate of interest that exceeds the inflation rate or else their realized real return will be negative."[68]

---

[62] Board of Governors of the Federal Reserve System, Monetary Policy Report – February 2018, Part 3. https://www.federalreserve.gov/monetarypolicy/2018-02-mpr-part3.htm

[63] World Bank Group Flagship Report, Global Economic Prospects – Broad-Based Upturn, but for How Long?, January 2018, Page 4

[64] Trading Economics, United States GDP Growth Rate Forecast, http://www.tradingeconomics.com/forecast/gdp-annual-growth-rate, accessed on January 31, 2018

[65] The Economist Intelligence Unit. Dated May 5, 2017. http://country.eiu.com/article.aspx?articleid=165451600&Country=United States&topic=Economy&subtopic=Long-term+outlook&subsubtopic=Summary#, accessed on January 12, 2018

[66] OECD (2014), "Growth Prospects and Fiscal Requirements Over the Long Term", *OECD Economic Outlook*, Volume 2017/2, Page 224

[67] http://economictimes.indiatimes.com/definition/inflation

[68] Keown, Arthur; Martin, John; and Petty, J. William, (2014). *Foundations of Finance: The Logic and Practice of Financial Management*, 8th Ed., Page 35

According to Damodaran, "An inflation-indexed Treasury security does not offer a guaranteed nominal return to buyers, but instead provides a guaranteed real return."[69]

According to Cornell, "inflation is not considered explicitly when using the equity risk premium to forecast long-run future stock returns because it is already included in the interest rates that go into the calculation."[70] Cornell continues, "When investors invest, their goal is to increase future consumption. Consequently, the success of an investment is measured not in nominal dollars but real dollars… investors are concerned with real returns, defined as the percent increase in purchasing power, not nominal returns."[71]

The U.S. Treasury issues inflation-indexed securities. Comparing the inflation-indexed securities to the non-inflation indexed securities, one can estimate the inflation rate. Using the 10-year, 20-year, and 30-year securities, the department estimated the inflation rate between 1.74% and 1.91% as shown below.[72]

	10-Year	20-Year	30-Year
Estimated Inflation	1.87%	1.91%	1.74%

The department used the expected inflation rate of 2.0% estimated by the Federal Reserve Bank in its Monetary Policy Report[73]. In this report, the Fed Board of Governors estimates the longer run personal consumption expenditures (PCE) inflation rate at 2.0%

Given the indicated long-term growth rate of 2.5% and the expected inflation rate of 2.0%, the department estimates the nominal growth rate at 4.5%.

The department plans to analyze the CBO estimate of expected inflation. This estimate will be available April 9, 2018 (when the CBO's Budget and Economic Outlook is published). We intend to re-review the selected nominal growth rate used in the multistage DGM at that time.

Market-to-Book Ratios

The department analyzes market-to-book ratios of publicly traded stock and debt securities by market segment, as data is available. This analysis indicates how the market perceives the value of these assets relative to the book value. A market-to-book ratio below one indicates that there may be obsolescence affecting that market segment; a ratio over one would indicate that there is no obsolescence.

---

[69] Damodaran, Aswath, Dr. (2015). Applied Corporate Finance, 4th Ed., Page 90

[70] Cornell, Bradford, (1999). *The Equity Risk Premium,* Page 29

[71] Ibid. Page 31

[72] Difference between inflation-indexed and non-inflation indexed securities for 10-year, 20-year, and 30-year daily rates, averaged. Accessed on January 8, 2018 from www.federalreserve.gov

[73] Board of Governors of the Federal Reserve System, Monetary Policy Report – February 2018, Part 3. https://www.federalreserve.gov/monetarypolicy/2018-02-mpr-part3.htm

For more information, see each market segment's Market-to-Book Ratio analysis in the appendices of this report.

In addition to market-to-book ratios, the department reviewed the Houlihan Lokey 2016 Purchase Price Allocation Study, published in September 2017.[74] Houlihan Lokey reviewed 455 transactions that closed in 2016 where: the acquirer was a U.S. publicly traded company; the acquirer sought 50% or greater ownership percentage; and the base equity purchase price was disclosed.

The Houlihan Lokey study reviews the amount of purchase consideration allocated to tangible assets, identifiable intangible assets, and goodwill. The 2016 study finds that:

- Purchase consideration "is equivalent to the fair value of the total assets of the target" (p. 13).
- The median percentage of purchase consideration allocated to goodwill was 36% (p. 19).
- Larger transactions generally recorded lower allocations to intangible assets and higher allocations to goodwill (p. 22).
- Sixty four percent of the transactions allocated 20% or more of purchase consideration to goodwill (p. 47).

State Assessed Property Spring Forum

The department held the 2018 State Assessed Property Spring Forum on March 1, 2018. We received feedback at the forum on market impacts to the cost of debt, cost of equity, and capital structures. We used the feedback to see how well it lined up with the data we reviewed while completing this study.

Representatives of the fluid transportation pipeline market segment noted that the industry is seeing an increase to regulatory risk and regulatory costs that may affect the capitalization rate data inputs.

Representatives of the electric market segment noted that the federal tax reform announced in 2017 will affect the cost of debt, cost of equity, and capital structure. Representatives of the electric market segment also noted that the tax benefit of holding debt is eroding.

Attendees of the forum asked how we plan to use the actual debt analysis referenced in the department's Cost of Debt presentation. As we indicated at the forum, we analyzed the reliability of the actual and indexed debt. We found the actual cost of debt to be more complete and reliable, so we decided to use actual debt in this study (see the Current Actual Cost of Debt pages for each market segment)

Industry representatives also noted an upward shift to the yield on U.S. Treasury bonds and suggested the department should consider selecting an average risk-free rate over a longer timeframe as opposed to a risk-free rate selected from a specific date.

The department's presentation at the forum included the intended list of guideline companies for each market segment. Since the forum, we have further reviewed the guideline companies and decided:

---

[74] Houlihan Lokey. (September 2017). *2016 Purchase Price Allocation Study* Downloaded from https://www.hl.com/us/insightsandideas/12884902608.aspx, accessed on October 11, 2017

- Not to include ONEOK, Inc. in the gas transmission market segment.
- To add Holly Energy Partners LP and Enbridge Energy Partners LP in the fluid transportation market segment.

For a complete list of guideline companies we reviewed, considered, and selected for this study, see Appendix H.

Public Comment

The Minnesota Department of Revenue requests comments from all parties with an interest in or information about any of the material in the 2018 Capitalization Rate Study. We posted the study on April 10, 2018 on the department website (www.revenue.state.mn.us).

Please submit any comments you have about the study in writing to **sa.property@state.mn.us**. We will accept comments through April 24, 2018. We will compile and review all written comments.

Questions?

If you have questions about the Draft 2018 Capitalization Rate Study, contact Jesse Larson at 651-556-6112 or sa.property@state.mn.us.

Yield Rate

	Capital Structure	Rate	Composite
Long-Term Debt	32.00%	3.92%	1.25%
Common Equity	68.00%	8.23%	5.60%
Yield Rate			**6.85%**

Electric Utility Yield Rate	**6.85%**

Capital Structure

Company	Value of Long-Term Debt	Value of Preferred Equity	Value of Common Equity	Total Market Value	% Long-Term Debt	% Preferred Equity	% Common Equity
Allete Inc.	1,444,600,000	None	4,014,269,102	5,458,869,102	26.46%	0.00%	73.54%
Alliant Energy Corp.	4,255,100,000	400,000,000	10,251,601,322	14,906,701,322	28.54%	2.68%	68.77%
Ameren Corp.	6,922,000,000	142,000,000	15,159,822,179	22,223,822,179	31.15%	0.64%	68.21%
American Electric Power Company Inc.	18,362,000,000	None	37,515,984,061	55,877,984,061	32.86%	0.00%	67.14%
Black Hills Corp.	3,109,900,000	None	2,867,842,107	5,977,742,107	52.02%	0.00%	47.98%
CenterPoint Energy Inc.	7,531,000,000	None	12,461,178,745	19,992,178,745	37.67%	0.00%	62.33%
CMS Energy Corp.	9,121,000,000	37,000,000	13,909,541,576	23,067,541,576	39.54%	0.16%	60.30%
DTE Energy Co.	11,795,000,000	None	20,513,279,204	32,308,279,204	36.51%	0.00%	63.49%
Entergy Corp.	14,000,000,000	203,200,000	14,984,299,464	29,187,499,464	47.97%	0.70%	51.34%
MGE Energy Inc.	389,400,000	None	2,225,709,354	2,615,109,354	14.89%	0.00%	85.11%
Northwestern Corp.	1,816,900,000	None	2,619,730,358	4,436,630,358	40.95%	0.00%	59.05%
OGE Energy Corp.	2,749,500,000	None	6,843,899,055	9,593,399,055	28.66%	0.00%	71.34%
Otter Tail Corp.	490,400,000	None	1,849,312,704	2,339,712,704	20.96%	0.00%	79.04%
Vectren Corp.	1,639,100,000	None	5,667,403,257	7,306,503,257	22.43%	0.00%	77.57%
WEC Energy Group	8,785,800,000	30,400,000	21,534,876,351	30,351,076,351	28.95%	0.10%	70.95%
Xcel Energy Inc.	14,573,000,000	None	22,996,580,880	37,569,580,880	38.79%	0.00%	61.21%
				Mean	33.02%	0.27%	66.71%
				Median	32.00%	0.00%	67.68%
				Indicated Industry Capital Structure	**32.00%**		**68.00%**

We selected the median capital structure as the indicated capital structure, rounding to 32% debt, 68% equity.

Notes:

Data downloaded from Value Line.

Indexed Rate of Debt

Company	Debt Rating	Long-Term Debt Rate
Allete Inc.	A3	4.00
Alliant Energy Corp.	Baa1	4.38
Ameren Corp.	Baa1	4.38
American Electric Power Company Inc.	Baa1	4.38
Black Hills Corp.	Baa2	4.38
CenterPoint Energy Inc.	Baa1	4.38
CMS Energy Corp.	Baa1	4.38
DTE Energy Co.	Baa1	4.38
Entergy Corp.	Baa2	4.38
MGE Energy Inc.	A1	4.00
Northwestern Corp.	Baa1	4.38
OGE Energy Corp.	(P) A3	4.00
Otter Tail Corp.	A3	4.00
Vectren Corp.	A2	4.00
WEC Energy Group	A3	4.00
Xcel Energy Inc.	A3	4.00

Mean	4.21
Median	4.38

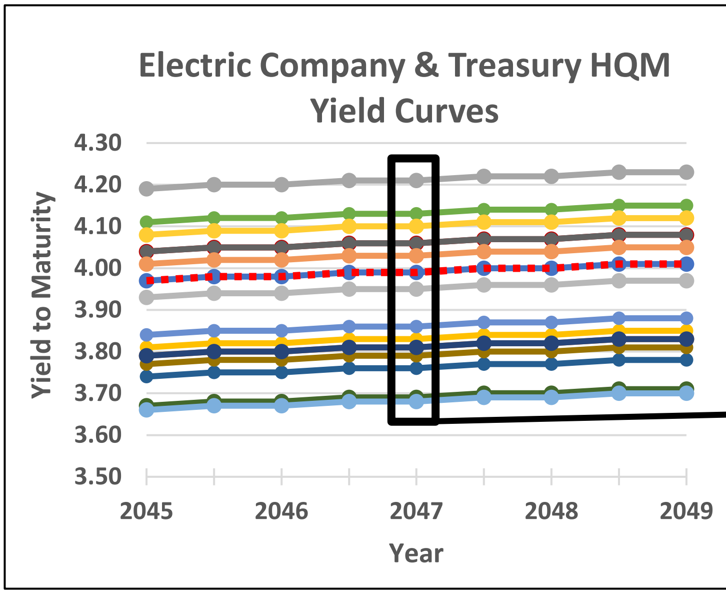
Public Utility Bond Yield Averages from Mergent Bond Record, January 2018 Edition

Public Utility Bond Averages, December 2017

Mergent	S&P	Yield Avg.
Aaa	AAA	
Aa1	AA+	
Aa2	AA	
Aa3	AA-	3.82
A1	A+	
A2	A	
A3	A-	4.00
Baa1	BBB+	
Baa2	BBB	
Baa3	BBB-	4.38

Notes:
None

Current Actual Cost of Debt

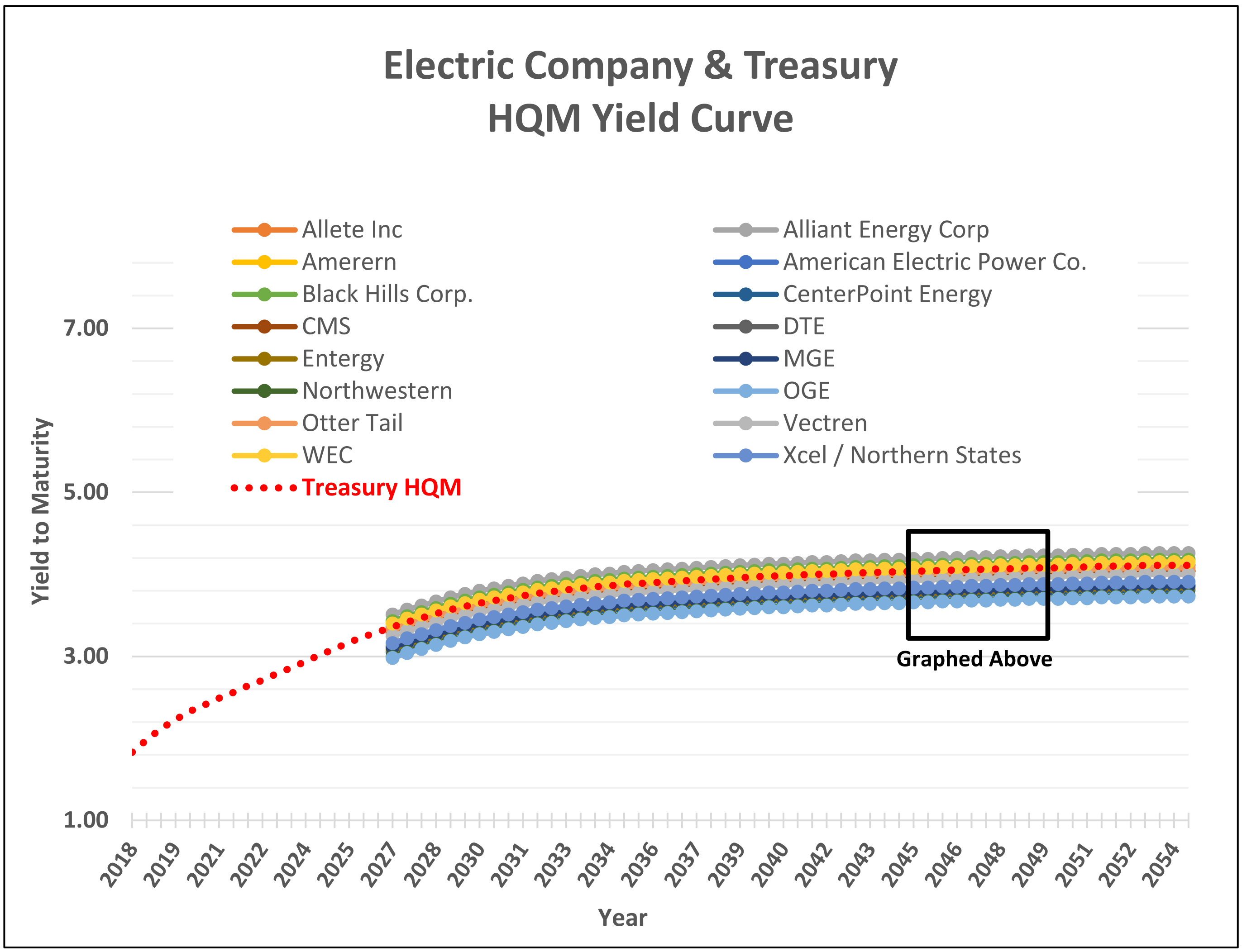


The Yield-to-Maturities (YTMs) calculated below are based off of information received via year-end filings (Form N-Q or 10-K) with the SEC. The 30-year YTMs are then calculated based off an observed spread to the Treasury High Quality Market Corporate Bond spot rate curve (equation below) and followed out to 30 years.

$$p = \sum_{i=1}^{n} d(t_i)\, c_i + \sum_{j=1}^{m} b_j\, x_j + e$$

Average of 30-Year YTMs
3.92%

Indicated Debt Rate	3.92%



* The data behind the HQM yield curve can be found in Appendix G

Issued Debt by Company

Source of Debt Issues	Company Breakdown	Number of Issues
N-Q	12	65
10-K	4	5
Total	**16**	**70**

Periodicity	Redemption Price	Settlement Date
Semi-Annual	$ 100.00	1/4/2018

	Coupon	Maturity	Face Amount	Market Value	Market Price	YTM
Allete Inc. [1]						
	3.11%	6/1/2027	$ 100,000	$ 100,000	$ 100.00	3.11%
Alliant Energy Corp.						
	3.25%	12/1/2024	$ 850,000	$ 861,931	$ 101.40	3.02%
Ameren Corp.						
	2.70%	11/15/2020	$ 300,000	$ 300,968	$ 100.32	2.58%
	2.70%	9/1/2022	$ 600,000	$ 601,752	$ 100.29	2.63%
	3.25%	3/1/2025	$ 370,000	$ 377,010	$ 101.89	2.95%
	4.15%	3/15/2046	$ 125,000	$ 137,599	$ 110.08	3.58%
	3.70%	12/1/2047	$ 500,000	$ 511,098	$ 102.22	3.58%
American Electric Power Company Inc.						
	2.15%	11/13/2020	$ 125,000	$ 124,408	$ 99.53	2.32%
	3.20%	11/13/2027	$ 200,000	$ 198,517	$ 99.26	3.29%
Black Hills Corp.						
	4.25%	11/30/2023	$ 200,000	$ 209,285	$ 104.64	3.38%
	3.95%	1/15/2026	$ 100,000	$ 103,483	$ 103.48	3.45%
	3.15%	1/15/2027	$ 100,000	$ 97,422	$ 97.42	3.49%
	4.20%	9/15/2046	$ 200,000	$ 203,962	$ 101.98	4.08%
CenterPoint Energy Inc.						
	4.50%	1/15/2021	$ 423,000	$ 442,375	$ 104.58	2.91%
	2.25%	8/1/2022	$ 400,000	$ 394,170	$ 98.54	2.59%
	2.50%	9/1/2022	$ 200,000	$ 196,964	$ 98.48	2.85%
	2.40%	9/1/2026	$ 200,000	$ 190,119	$ 95.06	3.05%
	3.00%	2/1/2027	$ 300,000	$ 298,461	$ 99.49	3.06%
	6.95%	3/15/2033	$ 100,000	$ 139,061	$ 139.06	3.59%
	3.55%	8/1/2042	$ 100,000	$ 99,618	$ 99.62	3.57%
	4.50%	4/1/2044	$ 300,000	$ 348,215	$ 116.07	3.55%
	4.10%	9/1/2047	$ 200,000	$ 209,945	$ 104.97	3.82%
CMS Energy						
	3.45%	8/15/2027	$ 790,000	$ 796,750	$ 100.85	3.35%
	4.88%	3/1/2044	$ 694,000	$ 810,127	$ 116.73	3.85%

	Coupon	Maturity	Face Amount	Market Value	Market Price	YTM
DTE Energy Co.						
	3.85%	12/1/2023	$ 342,500	$ 356,000	$ 103.94	3.11%
	3.65%	3/15/2024	$ 872,500	$ 911,400	$ 104.46	2.86%
	3.50%	6/1/2024	$ 335,000	$ 343,200	$ 102.45	3.08%
	3.38%	3/1/2025	$ 366,100	$ 374,500	$ 102.29	3.02%
	2.85%	10/1/2026	$ 102,050	$ 98,190	$ 96.22	3.35%
	3.80%	3/15/2027	$ 530,000	$ 545,900	$ 103.00	3.42%
	6.38%	4/15/2033	$ 820,000	$ 1,037,000	$ 126.46	4.04%
	4.00%	4/1/2043	$ 625,000	$ 659,000	$ 105.44	3.67%
	4.30%	7/1/2044	$ 861,000	$ 950,000	$ 110.34	3.69%
	3.70%	3/15/2045	$ 1,053,000	$ 1,055,000	$ 100.19	3.69%
	3.70%	6/1/2046	$ 388,000	$ 389,000	$ 100.26	3.69%
	3.75%	8/15/2047	$ 1,013,000	$ 1,024,000	$ 101.09	3.69%
Entergy Corp.						
	7.13%	2/1/2019	$ 225,000	$ 236,357	$ 105.05	2.34%
	5.13%	9/15/2020	$ 200,000	$ 211,282	$ 105.64	2.93%
	3.75%	2/15/2021	$ 125,000	$ 129,517	$ 103.61	2.54%
	4.00%	7/15/2022	$ 200,000	$ 208,763	$ 104.38	2.96%
	4.05%	9/1/2023	$ 200,000	$ 211,962	$ 105.98	2.90%
	3.70%	6/1/2024	$ 175,000	$ 183,706	$ 104.97	2.84%
	3.50%	4/1/2026	$ 600,000	$ 618,986	$ 103.16	3.06%
	2.95%	9/1/2026	$ 300,000	$ 291,802	$ 97.27	3.32%
	2.40%	10/1/2026	$ 200,000	$ 189,271	$ 94.64	3.11%
	3.12%	9/1/2027	$ 200,000	$ 199,429	$ 99.71	3.15%
	3.25%	4/1/2028	$ 200,000	$ 200,998	$ 100.50	3.19%
	2.85%	6/1/2028	$ 200,000	$ 193,582	$ 96.79	3.22%
MGE Energy Inc. [2]						
	3.11%	11/1/2027	$ 100,000	$ 100,000	$ 100.00	3.11%
Northwestern Corp.						
	4.18%	11/15/2044	$ 200,000	$ 215,727	$ 107.86	3.71%
OGE Energy Corp.						
	4.15%	4/1/2047	$ 525,000	$ 565,000	$ 107.62	3.72%
	3.85%	8/15/2047	$ 625,000	$ 638,000	$ 102.08	3.73%
Otter Tail Corp. [3]						
	4.07%	2/7/2048	$ 100,000	$ 100,000	$ 100.00	4.07%

Coupon	Maturity	Face Amount	Market Value	Market Price	YTM
Vectren Corp. [4]					
3.26%	8/28/2032	$ 100,000	$ 100,000	$ 100.00	3.26%
3.93%	11/29/2047	$ 100,000	$ 100,000	$ 100.00	3.93%
WEC Energy Group					
2.45%	6/15/2020	$ 200,000	$ 200,374	$ 100.19	2.37%
3.55%	6/15/2025	$ 520,000	$ 531,521	$ 102.22	3.21%
Xcel Energy Inc. / Northern States Power					
4.70%	5/15/2020	$ 100,000	$ 104,243	$ 104.24	2.83%
2.40%	3/15/2021	$ 300,000	$ 297,986	$ 99.33	2.62%
2.60%	3/15/2022	$ 300,000	$ 299,220	$ 99.74	2.67%
3.35%	12/1/2026	$ 100,000	$ 101,207	$ 101.21	3.19%
6.25%	6/1/2036	$ 260,000	$ 349,000	$ 134.23	3.67%
6.20%	7/1/2037	$ 961,000	$ 1,289,000	$ 134.13	3.72%
5.35%	11/1/2039	$ 625,000	$ 766,000	$ 122.56	3.82%
3.40%	8/15/2042	$ 880,000	$ 853,000	$ 96.93	3.59%
4.13%	5/15/2044	$ 963,000	$ 1,037,000	$ 107.68	3.67%
4.00%	8/15/2045	$ 450,000	$ 477,000	$ 106.00	3.65%
3.60%	5/15/2046	$ 770,000	$ 761,000	$ 98.83	3.67%
3.60%	9/15/2047	$ 813,000	$ 813,000	$ 100.00	3.60%

1 On June 1, 2017, ALLETE issued $80.0 million of its senior unsecured notes (the Notes) to certain institutional buyers in the private placement market. The Notes were issued in reliance on an exemption from registration under Section 4(a)(2) of the Securities Act of 1933, as amended, to institutional accredited investors. The Notes bear interest at 3.11 percent and mature on June 1, 2027. Interest on the Notes is payable semi-annually in June and December of each year, commencing on December 1, 2017. ALLETE has the option to prepay all or a portion of the Notes at its discretion, subject to a make-whole provision. The Notes are subject to additional terms and conditions which are customary for these types of transactions. Proceeds from the sale of the Notes were used to redeem debt, fund corporate growth opportunities and for general corporate purposes. https://www.sec.gov/Archives/edgar/data/66756/000006675618000029/ale12312017-10k.htm#sD85C1EE07580C7A0020D0A5661099EB1

2 In October 2017, MGE issued $30 million of long-term unsecured debt to cover capital expenditures and other corporate obligations. The debt carries an interest rate of 3.11% per annum, over its 10-year term. The covenants of these debt issuances are substantially consistent with MGE's existing unsecured long-term debt.https://www.sec.gov/Archives/edgar/data/61339/000116172818000003/f20171231.htm

3 On November 14, 2017, OTP entered into a Note Purchase Agreement (the 2018 Note Purchase Agreement) with the purchasers named therein, pursuant to which OTP agreed to issue to the purchasers, in a private placement transaction, $100 million aggregate principal amount of OTP’s 4.07% Series 2018A Senior Unsecured Notes due February 7, 2048 (the 2018 Notes). The 2018 Notes were issued on February 7, 2018. Proceeds from the 2018 Notes were used to repay $100 million in outstanding borrowings under the OTP Credit Agreement. https://www.sec.gov/Archives/edgar/data/1466593/000143774918002843/ottr20171231_10k.htm

4 On July 14, 2017, (Vectren) Utility Holdings entered into a private placement Note Purchase Agreement pursuant to which institutional investors agreed to purchase the following tranches of notes: (i) $100 million of 3.26 percent Guaranteed Senior Notes, Series A, due August 28, 2032 and (ii) $100 million of 3.93 percent Guaranteed Senior Notes, Series B, due November 29, 2047. The notes are jointly and severally guaranteed by Indiana Gas, SIGECO, and VEDO, wholly owned subsidiaries of Utility Holdings. https://www.sec.gov/Archives/edgar/data/1096385/000109638518000021/vvc10k2017doc.htm

Indicated Rate of Equity

Model	Rate
CAPM - Ex Post	7.81%
CAPM - Supply Side	7.05%
CAPM - Three Stage Ex Ante	6.85%
CAPM - Damodaran	6.34%
CAPM - Duff & Phelps	6.28%
CAPM - Graham and Harvey	5.55%
CAPM - Fernandez, Pershin, and Acin	6.80%
Empirical CAPM - Ex Post	8.27%
Empirical CAPM - Supply Side	7.44%
Empirical CAPM - Three Stage Ex Ante	7.22%
Empirical CAPM - Damodaran	6.67%
Empirical CAPM - Duff & Phelps	6.61%
Empirical CAPM - Graham and Harvey	5.82%
Empirical CAPM - Fernandez, Pershin, and Acin	7.17%
DGM - Dividend Growth	8.30%
DGM - Earnings Growth	9.10%
Multi-Stage DGM	8.57%
Indicated Rate of Equity	**8.23%**

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the most reliance on the Dividend Growth Model, Earnings Growth. The department placed secondary reliance on the Capital Asset Pricing Models using Dr. Damodaran's and the Ex Post equity risk premiums.

Direct Rate and Growth

	Capital Structure	Rate	Composite
Debt Component	32.00%	3.92%	1.25%
Equity Component	68.00%	4.72%	3.21%
Direct Rate			**4.46%**

Electric Utility Direct Rate	**4.46%**

Yield Rate	6.85%
Direct Rate	4.46%
Implied Industry Growth Rate	**2.39%**

Capital Asset Pricing Model (CAPM)

(ERP x β) + RFR = Indicated Equity Rate

Model	Equity risk premium (ERP)	x Industry Beta (β)	= Industry Risk Premium	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	0.74	5.23%	2.58%	**7.81%**
Supply Side[3]	6.04%	0.74	4.47%	2.58%	**7.05%**
Three Stage Ex Ante Model[4]	5.77%	0.74	4.27%	2.58%	**6.85%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	0.74	3.76%	2.58%	**6.34%**
Duff & Phelps[6]	5.00%	0.74	3.70%	2.58%	**6.28%**
Graham and Harvey[7]	4.02%	0.74	2.97%	2.58%	**5.55%**
Fernandez, Pershin and Acin[8]	5.70%	0.74	4.22%	2.58%	**6.80%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov

2 Long-horizon expected equity risk premium (historical), 2018 Valuation Handbook – Guide to Cost of Capital

3 Long-horizon expected equity risk premium (supply side), 2018 Valuation Handbook – Guide to Cost of Capital

4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% “normalized” risk-free rate. 2018 Valuation Handbook – Guide to Cost of Capital

7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016

8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Empirical Capital Asset Pricing Model (ECAPM)

(ERP x β x .75) + (ERP x .25) + RFR = Indicated Equity Rate

Model	Equity risk premium (ERP)	x Industry Beta (β)	x 75%	= Industry Risk Premium (weighted)	Equity risk premium (ERP)	x 25%	Equity Risk Premium (weighted)	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	0.74	75%	3.92%	7.07%	25%	1.77%	2.58%	**8.27%**
Supply Side[3]	6.04%	0.74	75%	3.35%	6.04%	25%	1.51%	2.58%	**7.44%**
Three Stage Ex Ante Model[4]	5.77%	0.74	75%	3.20%	5.77%	25%	1.44%	2.58%	**7.22%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	0.74	75%	2.82%	5.08%	25%	1.27%	2.58%	**6.67%**
Duff & Phelps[6]	5.00%	0.74	75%	2.78%	5.00%	25%	1.25%	2.58%	**6.61%**
Graham and Harvey[7]	4.02%	0.74	75%	2.23%	4.02%	25%	1.01%	2.58%	**5.82%**
Fernandez, Pershin and Acin[8]	5.70%	0.74	75%	3.16%	5.70%	25%	1.43%	2.58%	**7.17%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov

2 Long-horizon expected equity risk premium (historical), 2018 Valuation Handbook – Guide to Cost of Capital

3 Long-horizon expected equity risk premium (supply side), 2018 Valuation Handbook – Guide to Cost of Capital

4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% “normalized” risk-free rate. 2018 Valuation Handbook – Guide to Cost of Capital

7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016

8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Dividend Growth Model

Company	Current Dividend Yield (DY)	Projected EPS Growth Rate 5 Year (EG)	Projected Dividend Growth Rate 5 Year (DG)	Cost of Capital Earnings Growth DY + EG	Cost of Capital Dividend Growth DY+ DG
Allete Inc.	2.80%	5.00%	4.50%	7.80%	7.30%
Alliant Energy Corp.	3.00%	6.00%	4.50%	9.00%	7.50%
Ameren Corp.	3.00%	6.00%	4.50%	9.00%	7.50%
American Electric Power Company Inc.	3.30%	4.00%	5.00%	7.30%	8.30%
Black Hills Corp.	3.50%	7.50%	6.00%	11.00%	9.50%
CenterPoint Energy Inc.	3.80%	6.00%	3.50%	9.80%	7.30%
CMS Energy Corp.	2.90%	6.50%	6.50%	9.40%	9.40%
DTE Energy Co.	3.10%	6.00%	7.00%	9.10%	10.10%
MGE Energy Inc.	2.00%	6.50%	4.50%	8.50%	6.50%
Northwestern Corp.	4.10%	4.50%	5.00%	8.60%	9.10%
OGE Energy Corp.	4.10%	6.00%	9.00%	10.10%	13.10%
Otter Tail Corp.	2.80%	7.00%	2.00%	9.80%	4.80%
Vectren Corp.	2.70%	6.50%	5.50%	9.20%	8.20%
WEC Energy Group	3.20%	6.00%	6.50%	9.20%	9.70%
Xcel Energy Inc.	3.40%	4.50%	6.00%	7.90%	9.40%
Mean	3.18%	5.87%	5.33%	9.05%	8.51%
Median	3.10%	6.00%	5.00%	9.10%	8.30%

DGM - Dividend Growth, Indicated Rate	**8.30%**
DGM - Earnings Growth, Indicated Rate	**9.10%**

We placed more reliance on the median to arrive at the indicated rates for DGM - Earnings Growth and DGM - Dividend Growth.

Notes:

Dividend Yield and growth rates provided by Value Line

We removed Entergy Corp. as an outlier.

Entergy Corp.	4.30%	-2.50%	2.00%

Multi-Stage Dividend Growth Model

$K_E = (D_1 / P_0) + 0.67(G_1) + 0.33(g)$

Where:

K_E Cost of Equity

D1 / P_0 Dividend Yield

G_1 Growth Estimate, next five years

g Stable Growth

Company	**D1 / P_0** Dividend Yield	**G_1** Growth Estimate, next five years	**g** Stable Growth	**0.67 x G_1**	**.33 x g**	**K_E** Cost of Equity
Allete Inc.	2.80%	5.00%	4.50%	3.35%	1.49%	7.64%
Alliant Energy Corp.	3.00%	6.00%	4.50%	4.02%	1.49%	8.51%
Ameren Corp.	3.00%	6.00%	4.50%	4.02%	1.49%	8.51%
American Electric Power Company Inc.	3.30%	4.00%	4.50%	2.68%	1.49%	7.47%
Black Hills Corp.	3.50%	7.50%	4.50%	5.03%	1.49%	10.01%
CenterPoint Energy Inc.	3.80%	6.00%	4.50%	4.02%	1.49%	9.31%
CMS Energy Corp.	2.90%	6.50%	4.50%	4.36%	1.49%	8.74%
DTE Energy Co.	3.10%	6.00%	4.50%	4.02%	1.49%	8.61%
Entergy Corp.	4.30%	-2.50%	4.50%	-1.68%	1.49%	4.11%
MGE Energy Inc.	2.00%	6.50%	4.50%	4.36%	1.49%	7.84%
Northwestern Corp.	4.10%	4.50%	4.50%	3.02%	1.49%	8.60%
OGE Energy Corp.	4.10%	6.00%	4.50%	4.02%	1.49%	9.61%
Otter Tail Corp.	2.80%	7.00%	4.50%	4.69%	1.49%	8.98%
Vectren Corp.	2.70%	6.50%	4.50%	4.36%	1.49%	8.54%
WEC Energy Group	3.20%	6.00%	4.50%	4.02%	1.49%	8.71%
Xcel Energy Inc.	3.40%	4.50%	4.50%	3.02%	1.49%	7.90%

Mean	8.32%
Median	8.57%
Multi-Stage DGM, Indicated Rate	**8.57%**

We placed the most reliance on the median to arrive at the indicated rate.

Notes:

Dividend Yield provided by Value Line

Growth Estimates, Next 5 Years for Earnings provided Value Line

Stable growth rate is the nominal growth rate determined in the Capitalization Rate Study Narrative (indicated long-term growth rate of the U.S. economy of 2.5% plus the expected inflation rate of 2.0%).

Equity Component of the Direct Rate

Company	Value Line P/E Ratio
Allete Inc.	23.8
Alliant Energy Corp.	23.1
Ameren Corp.	22.4
American Electric Power Company Inc.	20.1
Black Hills Corp.	16.2
CenterPoint Energy Inc.	21.6
CMS Energy Corp.	21.3
DTE Energy Co.	20.1
Entergy Corp.	16.9
MGE Energy Inc.	28.0
Northwestern Corp.	15.9
OGE Energy Corp.	18.0
Otter Tail Corp.	25.0
Vectren Corp.	25.2
WEC Energy Group	21.1
Xcel Energy Inc.	20.6
Mean	21.21
Median	21.20
Selected Price to Earnings (P/E) Ratio	21.20
Indicated Equity Component of the Direct Rate	**4.72%**

We placed the most reliance on the median price to earnings ratio.

Notes:
The Price/Earnings Ratio was downloaded from Value Line.

Beta Analysis

Company	Beta
Allete Inc.	0.80
Alliant Energy Corp.	0.70
Ameren Corp.	0.70
American Electric Power Company Inc.	0.65
Black Hills Corp.	0.90
CenterPoint Energy Inc.	0.90
CMS Energy Corp.	0.65
DTE Energy Co.	0.65
Entergy Corp.	0.65
MGE Energy Inc.	0.75
Northwestern Corp.	0.70
OGE Energy Corp.	0.95
Otter Tail Corp.	0.90
Vectren Corp.	0.75
WEC Energy Group	0.60
Xcel Energy Inc.	0.60
Electric Beta Mean	0.74
Electric Beta Median	0.70
Unlevered and Relevered Mean*	0.73
Indicated Beta	**0.74**

We considered the mean, median, and unlevered/relevered mean. We placed more reliance on the mean when selecting the indicated beta.

Notes:
*See the Unlevering Relevering Beta page for the calculation

Unlevering/Relevering Betas

Unlevering of Betas	*Value Line* Actual Income Tax Rate	*From Capital Structure Page* Actual Debt in Capital Structure	*From Capital Structure Page* Actual Equity in Capital Structure	*Value Line* Levered Beta (Published)	*Formula* Unlevered Beta
Allete Inc.	20.00%	26.46%	73.54%	0.80	0.62
Alliant Energy Corp.	15.00%	28.54%	68.77%	0.70	0.52
Ameren Corp.	39.50%	31.15%	68.21%	0.70	0.55
American Electric Power Company Inc.	36.00%	32.86%	67.14%	0.65	0.49
Black Hills Corp.	30.00%	52.02%	47.98%	0.90	0.51
CenterPoint Energy Inc.	36.00%	37.67%	62.33%	0.90	0.65
CMS Energy Corp.	33.00%	39.54%	60.30%	0.65	0.45
DTE Energy Co.	24.50%	36.51%	63.49%	0.65	0.45
Entergy Corp.	6.00%	47.97%	51.34%	0.65	0.35
MGE Energy Inc.	35.00%	14.89%	85.11%	0.75	0.67
Northwestern Corp.	8.50%	40.95%	59.05%	0.70	0.43
OGE Energy Corp.	32.00%	28.66%	71.34%	0.95	0.75
Otter Tail Corp.	25.00%	20.96%	79.04%	0.90	0.75
Vectren Corp.	35.00%	22.43%	77.57%	0.75	0.63
WEC Energy Group	37.50%	28.95%	70.95%	0.60	0.48
Xcel Energy Inc.	35.50%	38.79%	61.21%	0.60	0.43
			Average	**0.74**	

Relevering of Betas	*Formula* Composite Income Tax Rate	*From Capital Structure Page* Industry Debt in Capital Structure	*From Capital Structure Page* Industry Equity in Capital Structure	*Formula* Levered Beta
Allete Inc.	28.03%	32.00%	68.00%	0.83
Alliant Energy Corp.	28.03%	32.00%	68.00%	0.70
Ameren Corp.	28.03%	32.00%	68.00%	0.74
American Electric Power Company Inc.	28.03%	32.00%	68.00%	0.66
Black Hills Corp.	28.03%	32.00%	68.00%	0.68
CenterPoint Energy Inc.	28.03%	32.00%	68.00%	0.87
CMS Energy Corp.	28.03%	32.00%	68.00%	0.60
DTE Energy Co.	28.03%	32.00%	68.00%	0.60
Entergy Corp.	28.03%	32.00%	68.00%	0.47
MGE Energy Inc.	28.03%	32.00%	68.00%	0.90
Northwestern Corp.	28.03%	32.00%	68.00%	0.58
OGE Energy Corp.	28.03%	32.00%	68.00%	1.00
Otter Tail Corp.	28.03%	32.00%	68.00%	1.00
Vectren Corp.	28.03%	32.00%	68.00%	0.84
WEC Energy Group	28.03%	32.00%	68.00%	0.64
Xcel Energy Inc.	28.03%	32.00%	68.00%	0.58
			Average	**0.73**

Calculation of Market to Book Ratios for the Electric Market Segment

December 31, 2017 calendar year information for the January 2, 2018 Assessment

A market to book ratio over one would be an indication of no obsolescence.

Market Value estimates for Common Equity are from Value Line. Market Value Estimates for Long-Term Debt are from the company's 10-K.

Book Value amounts are from the company's 10-K.

Market to Book Ratio for Equity

Company	Market Value of Common Equity from Value Line	Book Value of Common Equity from 10-K	Market to Book Ratio	Source
Allete Inc.	4,014,269,102	2,068,200,000	1.94	2017 10K, p. 75
Alliant Energy Corp.	10,251,601,322	4,182,200,000	2.45	2017 10K, p. 56
Ameren Corp.	15,159,822,179	7,326,000,000	2.07	2017 10K, p. 80
American Electric Power Company Inc.	37,515,984,061	18,287,000,000	2.05	2017 10K, p. S-6
Black Hills Corp.	2,867,842,107	1,820,206,000	1.58	2017 10K, p. 94
CenterPoint Energy Inc.	12,461,178,745	4,688,000,000	2.66	2017 10K, p. 76
CMS Energy Corp.	13,909,541,576	6,451,000,000	2.16	2017 10K, p. 101
DTE Energy Co.	20,513,279,204	6,265,000,000	3.27	2017 10K, p. 70
Entergy Corp.	14,984,299,464	8,081,809,000	1.85	2017 10K, p. 53
MGE Energy Inc.	2,225,709,354	724,088,000	3.07	2017 10K, p. 25
Northwestern Corp.	2,619,730,358	1,798,815,000	1.46	2017 10K, p. F-6
OGE Energy Corp.	6,843,899,055	3,851,100,000	1.78	2017 10K, p. 83
Otter Tail Corp.	1,849,312,704	696,892,000	2.65	2017 10K, p. 62
Vectren Corp.	5,667,403,257	1,849,300,000	3.06	2017 10K, p. 22
WEC Energy Group	21,534,876,351	9,461,400,000	2.28	2017 10K, p. 77
Xcel Energy Inc.	22,996,580,880	11,455,000,000	2.01	2017 10K, p. 89
		Average	**2.27**	

Market to Book Ratio for Debt

Company	Market Value of Long-Term Debt from 10-K	Book Value Long-Term Debt from 10-K	Market to Book Ratio	Source
Allete Inc.	1,627,600,000	1,513,300,000	1.08	2017 10K, p. 108
Alliant Energy Corp.	5,447,500,000	4,866,300,000	1.12	2017 10K, p. 105
Ameren Corp.	8,531,000,000	7,935,000,000	1.08	2017 10K, p. 122
American Electric Power Company Inc.	23,649,600,000	21,173,300,000	1.12	2017 10K, Interactive Data, Fair Value Table
Black Hills Corp.	3,350,544,000	3,115,143,000	1.08	2017 10K, p. 135
CenterPoint Energy Inc.	9,220,000,000	8,679,000,000	1.06	2017 10K, p. 109
CMS Energy Corp.	10,715,000,000	10,204,000,000	1.05	2017 10K, p. 126
DTE Energy Co.	13,274,000,000	12,288,000,000	1.08	2017 10K, p. 103
Entergy Corp.	15,367,453,000	14,315,259,000	1.07	2017 10K, p. 126
MGE Energy Inc.	475,282,000	426,883,000	1.11	2017 10K, p. 79
Northwestern Corp.	1,901,915,000	1,793,416,000	1.06	2017 10K, p. F-23
OGE Energy Corp.	3,242,800,000	2,854,300,000	1.14	2017 10K, p. 102
Otter Tail Corp.	543,691,000	490,566,000	1.11	2017 10K, p. 108
Vectren Corp.	1,981,200,000	1,838,700,000	1.08	2017 10K, p. 104
WEC Energy Group	10,341,900,000	9,561,700,000	1.08	2017 10K, p. 109
Xcel Energy Inc.	16,531,000,000	14,976,000,000	1.10	2017 10K, p. 131
		Average	**1.09**	

Application of Capital Structure as determined in the Capitalization Rate Study

	Capital Structure	Market to Book	Composite
Common Equity	68.00%	2.27	1.54
Long-term Debt	32.00%	1.09	0.35
	Overall Market to Book Ratio		**1.89**

Yield Rate

	Capital Structure	Rate	Composite
Long-Term Debt	28.50%	4.03%	1.15%
Common Equity	71.50%	8.10%	5.79%
Yield Rate			**6.94%**

Gas Distribution Yield Rate	**6.94%**

Capital Structure

Company	Value of Long-Term Debt	Value of Preferred Equity	Value of Common Equity	Total Market Value	% Long-Term Debt	% Preferred Equity	% Common Equity
Atmos Energy Corp.	3,066,700,000	None	9,451,505,260	12,518,205,260	24.50%	N/A	75.50%
Chesapeake Utilities Corp.	201,200,000	None	1,336,975,356	1,538,175,356	13.08%	N/A	86.92%
New Jersey Resources Corp.	897,700,000	None	3,833,662,682	4,731,362,682	18.97%	N/A	81.03%
NiSource Inc.	7,518,600,000	None	9,123,741,143	16,642,341,143	45.18%	N/A	54.82%
Northwest Natural Gas Co.	757,400,000	None	1,899,368,390	2,656,768,390	28.51%	N/A	71.49%
RGC Resources Inc.	53,100,000	None	190,840,209	243,940,209	21.77%	N/A	78.23%
South Jersey Industries	1,180,300,000	None	2,576,594,701	3,756,894,701	31.42%	N/A	68.58%
Southwest Gas Holdings Inc.	1,732,000,000	None	3,920,216,019	5,652,216,019	30.64%	N/A	69.36%
Spire Inc.	1,995,000,000	None	3,774,468,296	5,769,468,296	34.58%	N/A	65.42%

Mean	27.63%	N/A	72.37%
Median	28.51%	N/A	71.49%
Indicated Industry Capital Structure	**28.50%**	**0.00%**	**71.50%**

We selected the median capital structure as the indicated capital structure, rounding to 28.50% and 71.50%.

Notes:

Data downloaded from Value Line.

Indexed Rate of Debt

Company	Debt Rating	Long-Term Debt Rate	
Atmos Energy Corp.	A2	4.00	
Chesapeake Utilities Corp.	B3	8.53	*
New Jersey Resources Corp.	(P) Aa2	3.82	
NiSource Inc.	Baa2	4.38	
Northwest Natural Gas Co.	(P) A3	4.00	
RGC Resources Inc.	N/A	N/A	
South Jersey Industries	A2	4.00	
Southwest Gas Holdings Inc.	Baa1	4.38	
Spire Inc.	Baa2	4.38	
	Mean	4.69	
	Median	4.19	

Public Utility Bond Yield Averages from Mergent Bond Record, January 2018 Edition

Public Utility Bond Averages, December 2017

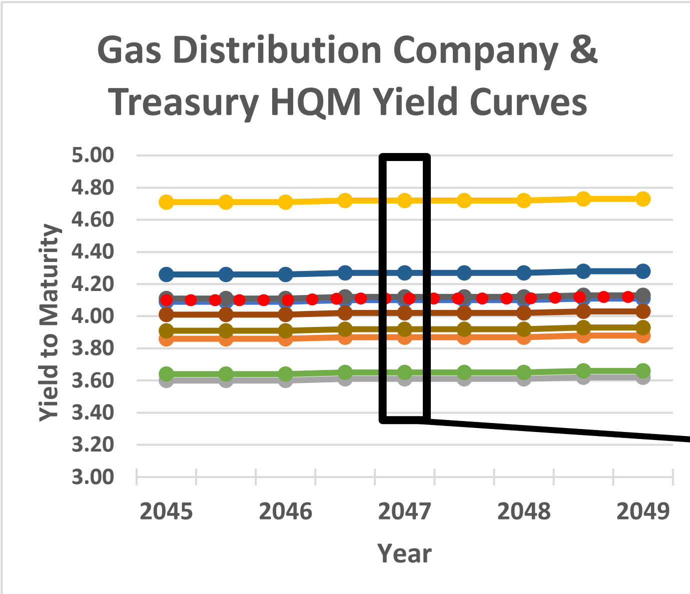
Mergent	S&P	Yield Avg.
Aaa	AAA	
Aa1	AA+	
Aa2	AA	
Aa3	AA-	3.82
A1	A+	
A2	A	
A3	A-	4.00
Baa1	BBB+	
Baa2	BBB	
Baa3	BBB-	4.38

Notes:

Not rated companies or companies who's debt rate was not available were excluded.

*This company is rated below the Mergent Bond Record Bond Yield Averages. We analyzed the Mergent Bond Record, January 2018 issue, for U.S. Corporate Bonds that were considered below investment grade. We determined the average B yield to maturity is 8.53%.

Current Actual Cost of Debt

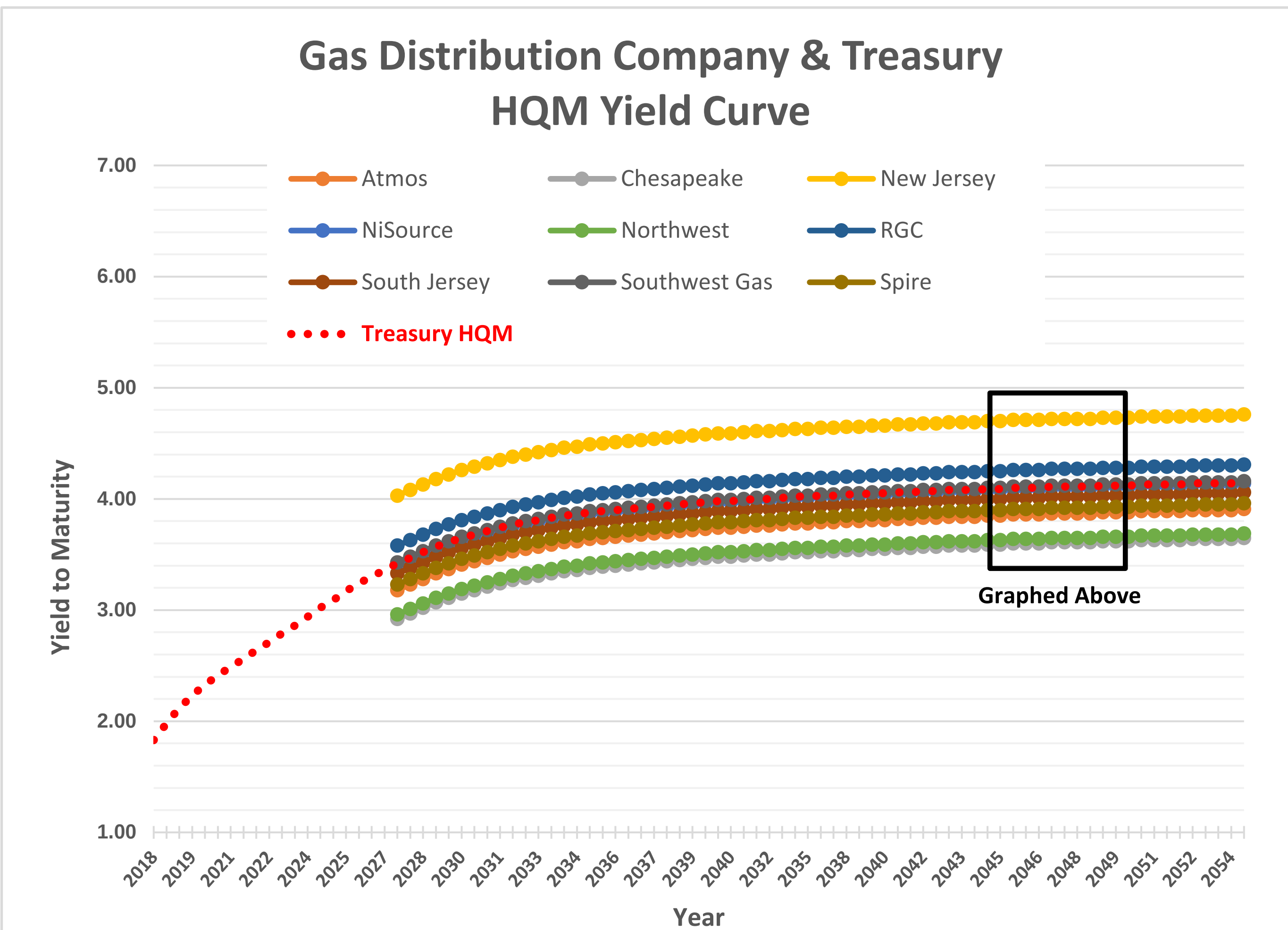


The Yield-to-Maturities (YTMs) calculated below are based off of information received via year-end filings (Form N-Q or 10-K) with the SEC. The 30-year YTMs are then calculated based off an observed spread to the Treasury High Quality Market Corporate Bond spot rate curve (equation below) and followed out to 30 years.

$$p = \sum_{i=1}^{n} d(t_i)\, c_i + \sum_{j=1}^{m} b_j\, x_j + e$$

Average of 30-Year YTMs
4.03%

Indicated Debt Rate	4.03%



* The data behind the HQM yield curve can be found in Appendix G

Issued Debt by Company

Source of Debt Issues	Company Breakdown	Number of Issues
N-Q	3	14
10-K	6	8
Total	**9**	**22**

Periodicity	Redemption Price	Settlement Date
Semi-Annual	$ 100.00	1/4/2018

	Coupon	Maturity	Face Amount	Market Value	Market Price	YTM
Atmos Energy						
	8.50%	3/15/2020	100,000	107,489	$ 107.49	4.86%
	3.00%	6/15/2027	6,758,000	6,659,000	$ 98.54	3.18%
	5.50%	6/15/2041	750,000	929,000	$ 123.87	3.93%
	4.15%	1/15/2043	822,000	871,000	$ 105.96	3.78%
	4.13%	10/15/2044	2,083,000	2,219,000	$ 106.53	3.74%
Chesapeake Energy Corp[1]						
	3.25%	4/30/2032	1,000,000	1,000,000	$ 100.00	3.25%
New Jersey Resources Corp.[2]						
	2.84%	8/16/2019	1,000,000	1,000,000	$ 100.00	2.84%
NiSource Inc.						
	2.65%	11/17/2022	150,000	148,848	$ 99.23	2.82%
	3.49%	5/15/2027	12,542	12,684	$ 101.13	3.35%
	5.95%	6/15/2041	100,000	128,125	$ 128.13	4.08%
	5.25%	2/15/2043	200,000	239,292	$ 119.65	4.00%
	4.80%	2/15/2044	150,000	169,655	$ 113.10	3.99%
	5.65%	2/1/2045	815,000	1,019,699	$ 125.12	4.10%
	3.95%	3/30/2048	200,000	204,680	$ 102.34	3.82%
Northwest Natural Gas Co.[3]						
	2.82%	9/1/2027	1,000,000	1,000,000	$ 100.00	2.82%
	3.69%	9/1/2047	1,000,000	1,000,000	$ 100.00	3.68%
RGC Resources Inc.[4]						
	3.58%	10/1/2027	1,000,000	1,000,000	$ 100.00	3.58%
South Jersey Industries[5]						
	3.00%	12/1/2025	1,000,000	1,000,000	$ 100.00	3.00%
Southwest Gas Corp.						
	4.88%	10/1/2043	300,000	337,000	$ 112.33	4.09%
	3.80%	9/29/2046	550,000	546,000	$ 99.27	3.84%

	Coupon	Maturity	Face Amount	Market Value	Market Price	YTM
Spire Inc.[6]						
	3.92%	1/15/2048	1,000,000	1,000,000	$ 100.00	3.92%
	4.02%	1/15/2058	1,000,000	1,000,000	$ 100.00	4.02%

1 In May 2016, Prudential agreed to purchase $70.0 million of 3.25 percent Prudential Shelf Notes, which were issued on April 21, 2017. The proceeds received from this issuance of Prudential Shelf Notes were used to reduce short-term borrowings under the Revolver. The balance under the Revolver had accumulated over time as capital expenditures were temporarily financed. As of December 31, 2017, $80 million remains available for issuance under the Prudential Shelf Agreement In November 2017, NYL agreed to purchase $50.0 million of 3.48% "Series A" notes and $50.0 million of 3.58% "Series B" notes. The Series A notes and Series B notes will be issued on or before May 21, 2018 and November 20, 2018, respectively. The proceeds received from these issuances will be used to reduce short-term borrowings under the Revolver, lines of credit and/or to fund capital expenditures. The NYL Shelf Agreement has been fully utilized.
https://www.sec.gov/Archives/edgar/data/19745/000162828018002594/cpk1231201710-k.htm#s8735FBA2DA6A5707B145DAB5B916D8E3

2 On January 26, 2018, NJR entered into a variable-for-fixed interest rate swap on NJR's existing $100 million variable rate term loan due August 16, 2019, which fixed the variable rate at 2.84 percent.
https://www.sec.gov/Archives/edgar/data/356309/000035630918000056/njr10qdec2017.htm

3 (Northwest Natural Gas Co) issued $100.0 million of FMBs in September 2017 consisting of $25.0 million with a coupon rate of 2.822% and maturity date in 2027 and $75 million with a coupon rate of 3.685% and maturity date in 2047. The issuance of FMBs, which includes our medium-term notes, under the Mortgage and Deed of Trust (Mortgage) is limited by eligible property, adjusted net earnings, and other provisions of the Mortgage. The Mortgage constitutes a first mortgage lien on substantially all of our utility property.https://www.sec.gov/Archives/edgar/data/73020/000007302018000008/form10-k2017.htm

4 On October 2, 2017, Roanoke Gas issued ten-year unsecured notes in the principal amount of $8,000,000 with a fixed interest rate of 3.58% per annum. The proceeds from the notes were used to convert a portion of the Company's line-of-credit balance into longer-term financing.
https://www.sec.gov/Archives/edgar/data/1069533/000106953318000007/a10q-20171231xq1.htm

5 In January 2017, SJG issued $200.0 million aggregate principal amount of MTN's, Series E, 2017, due January 2047, with principal repayments beginning in 2025. The MTN's bear interest at an annual rate of 3.0% payable semiannually. Proceeds were used to pay down the $200.0 million multiple-draw term facility referenced in (M) below, which was set to expire in June 2017.
https://www.sec.gov/Archives/edgar/data/91928/000009192818000038/sji-12311710xk.htm#sAC74E596849956569740E1884B49320D

6 On December 1, 2017, Spire Alabama entered into the First Supplement to Master Note Purchase Agreement with certain institutional investors. Pursuant to the terms of that supplement, on December 1, 2017, Spire Alabama issued and sold $30.0 million in aggregate principal amount of its 4.02% Series 2017A Senior Notes due January 15, 2058, and on January 12, 2018, issued and sold $45.0 million aggregate principal amount of its 3.92% Series 2017B Senior Notes due January 15, 2048, to those institutional investors. The notes bear interest from the date of issuance, payable semi-annually on the 15th day of July and January of each year, commencing on July 15, 2018. The notes are senior unsecured obligations of Spire Alabama, rank equal in right to payment with all its other senior unsecured indebtedness, and have make-whole call options. Spire Alabama used the proceeds from the sale of the notes to repay short-term debt and for general corporate purposes.

Indicated Rate of Equity

Model	Rate
CAPM - Ex Post	7.53%
CAPM - Supply Side	6.81%
CAPM - Three Stage Ex Ante	6.62%
CAPM - Damodaran	6.14%
CAPM - Duff & Phelps	6.08%
CAPM - Graham & Harvey	5.39%
CAPM - Fernandez, Pershin, & Acin	6.57%
Empirical CAPM - Ex Post	8.06%
Empirical CAPM - Supply Side	7.26%
Empirical CAPM - Three Stage Ex Ante	7.05%
Empirical CAPM - Damodaran	6.52%
Empirical CAPM - Duff & Phelps	6.46%
Empirical CAPM - Graham & Harvey	5.70%
Empirical CAPM - Fernandez, Pershin, & Acin	7.00%
DGM - Dividend Growth	7.61%
DGM - Earnings Growth	9.07%
Multi-Stage DGM	8.41%
Indicated Rate of Equity	**8.10%**

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the most reliance on the Dividend Growth Model, Earnings Growth. The department placed secondary reliance on the Capital Asset Pricing Models using Dr. Damodaran's and the Ex Post equity risk premiums.

Direct Rate and Growth

	Capital Structure	Rate	Composite
Debt Component	28.50%	4.03%	1.15%
Equity Component	71.50%	4.02%	2.87%
Direct Rate			**4.02%**

Gas Distribution Direct Rate	**4.02%**

Yield Rate	6.94%
Direct Rate	4.02%
Implied Industry Growth Rate	**2.92%**

Capital Asset Pricing Model (CAPM)

Model	Equity risk premium (ERP)	x Industry Beta (β)	= Industry Risk Premium	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	0.70	4.95%	2.58%	**7.53%**
Supply Side[3]	6.04%	0.70	4.23%	2.58%	**6.81%**
Three Stage Ex Ante Model[4]	5.77%	0.70	4.04%	2.58%	**6.62%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	0.70	3.56%	2.58%	**6.14%**
Duff & Phelps[6]	5.00%	0.70	3.50%	2.58%	**6.08%**
Graham and Harvey[7]	4.02%	0.70	2.81%	2.58%	**5.39%**
Fernandez, Pershin and Acin[8]	5.70%	0.70	3.99%	2.58%	**6.57%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov

2 Long-horizon expected equity risk premium (historical), 2018 Valuation Handbook – Guide to Cost of Capital

3 Long-horizon expected equity risk premium (supply side), 2018 Valuation Handbook – Guide to Cost of Capital

4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% "normalized" risk-free rate. 2018 Valuation Handbook – Guide to Cost of Capital

7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016

8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Empirical Capital Asset Pricing Model (ECAPM)

Model	Equity risk premium (ERP)	x Industry Beta (β)	x 75%	= Industry Risk Premium (weighted)	Equity risk premium (ERP)	x 25%	Equity Risk Premium (weighted)	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	0.70	75%	3.71%	7.07%	25%	1.77%	2.58%	**8.06%**
Supply Side[3]	6.04%	0.70	75%	3.17%	6.04%	25%	1.51%	2.58%	**7.26%**
Three Stage Ex Ante Model[4]	5.77%	0.70	75%	3.03%	5.77%	25%	1.44%	2.58%	**7.05%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	0.70	75%	2.67%	5.08%	25%	1.27%	2.58%	**6.52%**
Duff & Phelps[6]	5.00%	0.70	75%	2.63%	5.00%	25%	1.25%	2.58%	**6.46%**
Graham and Harvey[7]	4.02%	0.70	75%	2.11%	4.02%	25%	1.01%	2.58%	**5.70%**
Fernandez, Pershin and Acin[8]	5.70%	0.70	75%	2.99%	5.70%	25%	1.43%	2.58%	**7.00%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov

2 Long-horizon expected equity risk premium (historical), 2018 Valuation Handbook – Guide to Cost of Capital

3 Long-horizon expected equity risk premium (supply side), 2018 Valuation Handbook – Guide to Cost of Capital

4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% "normalized" risk-free rate. 2018 Valuation Handbook – Guide to Cost of Capital

7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016

8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Dividend Growth Model

Company	Current Dividend Yield (DY)	Projected Earnings Growth Rate 5 Year (EG)	Projected Dividend Growth Rate 5 Year (DG)	Cost of Capital Earnings Growth DY + EG	Cost of Capital Dividend Growth DY+ DG
Atmos Energy Corp.	2.20%	6.00%	6.50%	8.20%	8.70%
Chesapeake Utilities Corp.	1.60%	8.00%	5.50%	9.60%	7.10%
New Jersey Resources Corp.	2.50%	2.00%	3.50%	4.50%	6.00%
NiSource Inc.	2.60%	5.50%	6.50%	8.10%	9.10%
Northwest Natural Gas Co.	2.90%	7.00%	1.00%	9.90%	3.90%
RGC Resources Inc.	2.20%	N/A	N/A	N/A	N/A
South Jersey Industries	3.50%	5.50%	4.00%	9.00%	7.50%
Southwest Gas Holdings Inc.	2.50%	8.00%	7.50%	10.50%	10.00%
Spire Inc.	2.90%	8.00%	5.00%	10.90%	7.90%

Mean	2.54%	6.25%	4.94%	8.84%	7.53%
Median	2.50%	6.50%	5.25%	9.30%	7.70%

DGM - Dividend Growth, Indicated Rate	**7.61%**
DGM - Earnings Growth, Indicated Rate	**9.07%**

We placed equal reliance on the mean and median to arrive at the indicated rates for DGM - Earnings Growth and DGM - Dividend Growth.

Notes:

Dividend Yield provided by Value Line

RGC Resources, Inc. do not have analysts estimates and, therefore, the companies were not included in the mean or median. They are still shown.

Multi-Stage Dividend Growth Model

$K_E = (D_1 / P_0) + 0.67(G_1) + 0.33(g)$

Where:

K_E Cost of Equity
D1 / P_0 Dividend Yield
G_1 Growth Estimate, next five years
g Stable Growth

Company	D1 / P_0 Dividend Yield	G_1 Growth Estimate, next five years	g Stable Growth	0.67 x G_1	.33 x g	K_E Cost of Equity
Atmos Energy Corp.	2.20%	6.00%	4.50%	4.02%	1.49%	7.71%
Chesapeake Utilities Corp.	1.60%	8.00%	4.50%	5.36%	1.49%	8.45%
New Jersey Resources Corp.	2.50%	2.00%	4.50%	1.34%	1.49%	5.33%
NiSource Inc.	2.60%	5.50%	4.50%	3.69%	1.49%	7.77%
Northwest Natural Gas Co.	2.90%	7.00%	4.50%	4.69%	1.49%	9.08%
South Jersey Industries	3.50%	5.50%	4.50%	3.69%	1.49%	8.67%
Southwest Gas Holdings Inc.	2.50%	8.00%	4.50%	5.36%	1.49%	9.35%
Spire Inc.	2.90%	8.00%	4.50%	5.36%	1.49%	9.75%
					Mean	8.26%
					Median	8.56%
					Multi-Stage DGM, Indicated Rate	**8.41%**

We placed equal reliance on the mean and median to arrive at the indicated rate.

Notes:

Dividend Yield provided by Value Line

Growth Estimates, Next 5 Years for Earnings provided Value Line

Stable growth rate is the nominal growth rate determined in the Capitalization Rate Study Narrative (indicated long-term growth rate of the U.S. economy of 2.5% plus the expected inflation rate of 2.0%).

We removed the below companies because they do not have growth estimates available through Value Line

RGC Resources Inc.	2.20%	N/A

Equity Component of the Direct Rate

Company	Value Line P/E Ratio	
Atmos Energy Corp.	23.80	
Chesapeake Utilities Corp.	28.00	
New Jersey Resources Corp.	23.80	
NiSource Inc.	24.90	
Northwest Natural Gas Co.	28.80	
RGC Resources Inc.	30.70	*
South Jersey Industries	25.90	
Southwest Gas Holdings Inc.	22.50	
Spire Inc.	20.70	
Mean	25.46	
Median	24.90	
Selected Price to Earnings (P/E) Ratio	24.90	
Indicated Equity Component of the Direct Rate	**4.02%**	

We placed the most reliance on the median price to earnings ratio.

Notes:
The Price/Earnings Ratio was downloaded from Value Line.
* Trailing P/E Ratio

Beta Analysis

Company	Beta
Atmos Energy Corp.	0.70
Chesapeake Utilities Corp.	0.70
New Jersey Resources Corp.	0.80
NiSource Inc.	0.60
Northwest Natural Gas Co.	0.70
RGC Resources Inc.	0.45
South Jersey Industries	0.85
Southwest Gas Holdings Inc.	0.80
Spire Inc.	0.70
Electric Beta Mean	0.70
Electric Beta Median	0.70
Unlevered and Relevered Mean*	0.70
Indicated Beta	**0.70**

We considered the mean, median, and unlevered/relevered mean. We placed more reliance on the median when selecting the indicated beta to account for the wide range of betas.

Notes:

* See the Unlevering Relevering Beta page for the calculation

Unlevering/Relevering Betas

Unlevering of Betas	*Value Line* Actual Income Tax Rate	*From Capital Structure Page* Actual Debt in Capital Structure	*From Capital Structure Page* Actual Equity in Capital Structure	*Value Line* Levered Beta (Published)	*Formula* Unlevered Beta
Atmos Energy Corp.	36.60%	24.50%	75.50%	0.70	0.58
Chesapeake Utilities Corp.	39.50%	13.08%	86.92%	0.70	0.64
New Jersey Resources Corp.	32.00%	18.97%	81.03%	0.80	0.69
NiSource Inc.	35.50%	45.18%	54.82%	0.60	0.39
Northwest Natural Gas Co.	35.00%	28.51%	71.49%	0.70	0.56
RGC Resources Inc.	38.70%	21.77%	78.23%	0.45	0.38
South Jersey Industries	25.00%	31.42%	68.58%	0.85	0.63
Southwest Gas Holdings Inc.	35.00%	30.64%	69.36%	0.80	0.62
Spire Inc.	32.40%	34.58%	65.42%	0.70	0.52
			Average	**0.70**	

Relevering of Betas	*Formula* Composite Income Tax Rate	*From Capital Structure Page* Industry Debt in Capital Structure	*From Capital Structure Page* Industry Equity in Capital Structure	*Formula* Levered Beta
Atmos Energy Corp.	34.41%	28.50%	71.50%	0.73
Chesapeake Utilities Corp.	34.41%	28.50%	71.50%	0.81
New Jersey Resources Corp.	34.41%	28.50%	71.50%	0.87
NiSource Inc.	34.41%	28.50%	71.50%	0.49
Northwest Natural Gas Co.	34.41%	28.50%	71.50%	0.71
RGC Resources Inc.	34.41%	28.50%	71.50%	0.48
South Jersey Industries	34.41%	28.50%	71.50%	0.79
Southwest Gas Holdings Inc.	34.41%	28.50%	71.50%	0.78
Spire Inc.	34.41%	28.50%	71.50%	0.66
			Average	**0.70**

Calculation of Market to Book Ratios for the Electric Market Segment

December 31, 2017 calendar year information for the January 2, 2018 Assessment

A market to book ratio over one would be an indication of no obsolescence.

Market Value estimates are from the Capital Structure page of the Capitalization Rate Study.

Book Value amounts are from the company's balance sheet as listed in the 10-K or Annual Report.

Market to Book Ratio for Equity

Company	Market Value of Common Equity from Value Line	Book Value of Common Equity	Market to Book Ratio	Source
Atmos Energy Corp.	9,451,505,260	3,898,666,000	2.42	2017 Form 10-K, p. 40
Chesapeake Utilities Corp.	1,336,975,356	486,294,000	2.75	2017 Form 10-K, p. 59
New Jersey Resources Corp.	3,833,662,682	1,236,643,000	3.1	2017 Form 10-K, p. 77
NiSource Inc.	9,123,741,143	4,320,100,000	2.11	2017 Form 10-K, p. 79
Northwest Natural Gas Co.	1,899,368,390	742,776,000	2.56	2017 Form 10-K, p.59
RGC Resources Inc.	190,840,209	60,040,472	3.18	2017 Form 10-K, p. 34
South Jersey Industries	2,576,594,701	1,192,409,000	2.16	2017 Form 10-K, Amend p.114
Southwest Gas Holdings Inc.	3,920,216,019	1,812,403,000	2.16	2017 Form 10-K, Con Sel Fin Stats 13.01
Spire Inc.	3,774,468,296	1,991,300,000	1.9	2017 Form 10-K, p. 62
		Average	**2.48**	

Market to Book Ratio for Debt

Company	Market Value of Long-Term Debt from 10-K	Book Value Long-Term Debt	Market to Book Ratio	Source
Atmos Energy Corp.	3,382,272,000	3,085,000,000	1.10	2017 Form 10-K, p. 82
Chesapeake Utilities Corp.	215,400,000	205,200,000	1.05	2017 Form 10-K, p. 79
New Jersey Resources Corp.	1,107,676,000	1,097,045,000	1.01	2017 Form 10-K, p. 101
NiSource Inc.	8,603,400,000	7,796,500,000	1.1	2017 Form 10-K, p. 153
Northwest Natural Gas Co.	853,339,000	779,887,000	1.09	2017 Form 10-K, p. 135
RGC Resources Inc.	45,689,238	43,812,200	1.04	2017 Form 10-K, p. 62
South Jersey Industries	1,216,100,000	1,186,800,000	1.02	2017 Form 10-K, p. 163
Southwest Gas Holdings Inc.	1,957,450,000	1,798,576,000	1.09	2017 Form 10-K, Interactive Data, LTD Tables
Spire Inc.	2,210,300,000	2,095,000,000	1.06	2017 Form 10-K, p. 98
		Average	**1.06**	

Application of Capital Structure as determined in the Capitalization Rate Study

	Capital Structure	Market to Book	Composite
Common Equity	71.50%	2.48	1.77
Long-term Debt	28.50%	1.06	0.30
	Overall Market to Book Ratio		**2.08**

Yield Rate

	Capital Structure	Rate	Composite
Long-Term Debt	40.00%	4.56%	1.82%
Common Equity	60.00%	11.45%	6.87%
Yield Rate			**8.69%**

Gas Transmission Pipeline Yield Rate	**8.69%**

Capital Structure

Company	Value of Long-Term Debt	Value of Preferred Equity	Value of Common Equity	Total Market Value	% Long-Term Debt	% Preferred Equity	% Common Equity
Boardwalk Pipeline Partners, LP	3,585,700,000	N/A	3,579,243,983	7,164,943,983	50.05%	N/A	49.95%
Enterprise Products Partners, LP	21,709,900,000	N/A	52,870,376,396	74,580,276,396	29.11%	N/A	70.89%
Kinder Morgan Inc.	34,000,000,000	N/A	38,099,067,132	72,099,067,132	47.16%	N/A	52.84%
TC PipeLines, LP	2,427,000,000	None	3,617,112,000	6,044,112,000	40.15%	None	59.85%
Williams Partners, LP	16,000,000,000	N/A	33,917,762,569	49,917,762,569	32.05%	N/A	67.95%
				Mean	39.70%		60.30%
				Median	40.15%		59.85%
				Indicated Industry Capital Structure	**40.00%**		**60.00%**

We placed equal reliance on the mean and median when selecting the indicated capital structure, rounding to 40% debt, 60% equity.

Notes:

Data downloaded from Value Line.

Indexed Rate of Debt

Company	Debt Rating	Long-Term Debt Rate	
Boardwalk Pipeline Partners, LP	Baa3	4.50	
Enterprise Products Partners, LP	Ba1	6.71	*
Kinder Morgan Inc.	Baa3	4.50	
TC PipeLines, LP	Baa2	4.50	
Williams Partners, LP	Baa3	4.50	
	Mean	4.94	
	Median	4.50	

Industrial Bond Yield Averages from Mergent Bond Record, January 2018 Edition

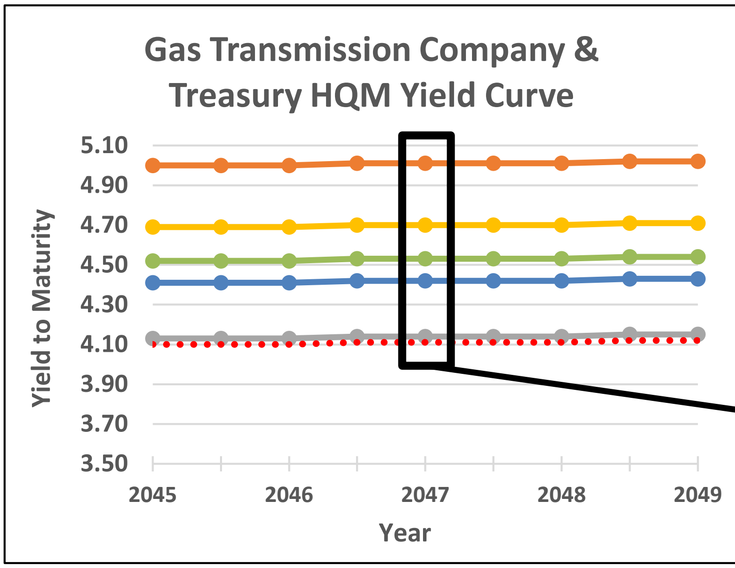
Industrial Bond Averages, December 2017

Mergent	S&P	Yield Avg.
Aaa	AAA	3.74
Aa1	AA+	
Aa2	AA	
Aa3	AA-	3.84
A1	A+	
A2	A	
A3	A-	4.00
Baa1	BBB+	
Baa2	BBB	
Baa3	BBB-	4.50

Notes:

*This company is rated below the Mergent Bond Record Bond Yield Averages. We analyzed the Mergent Bond Record, January 2018 issue, for U.S. Corporate Bonds that were considered below investment grade. We determined the average Ba yield to maturity is 6.71%.

Current Actual Cost of Debt

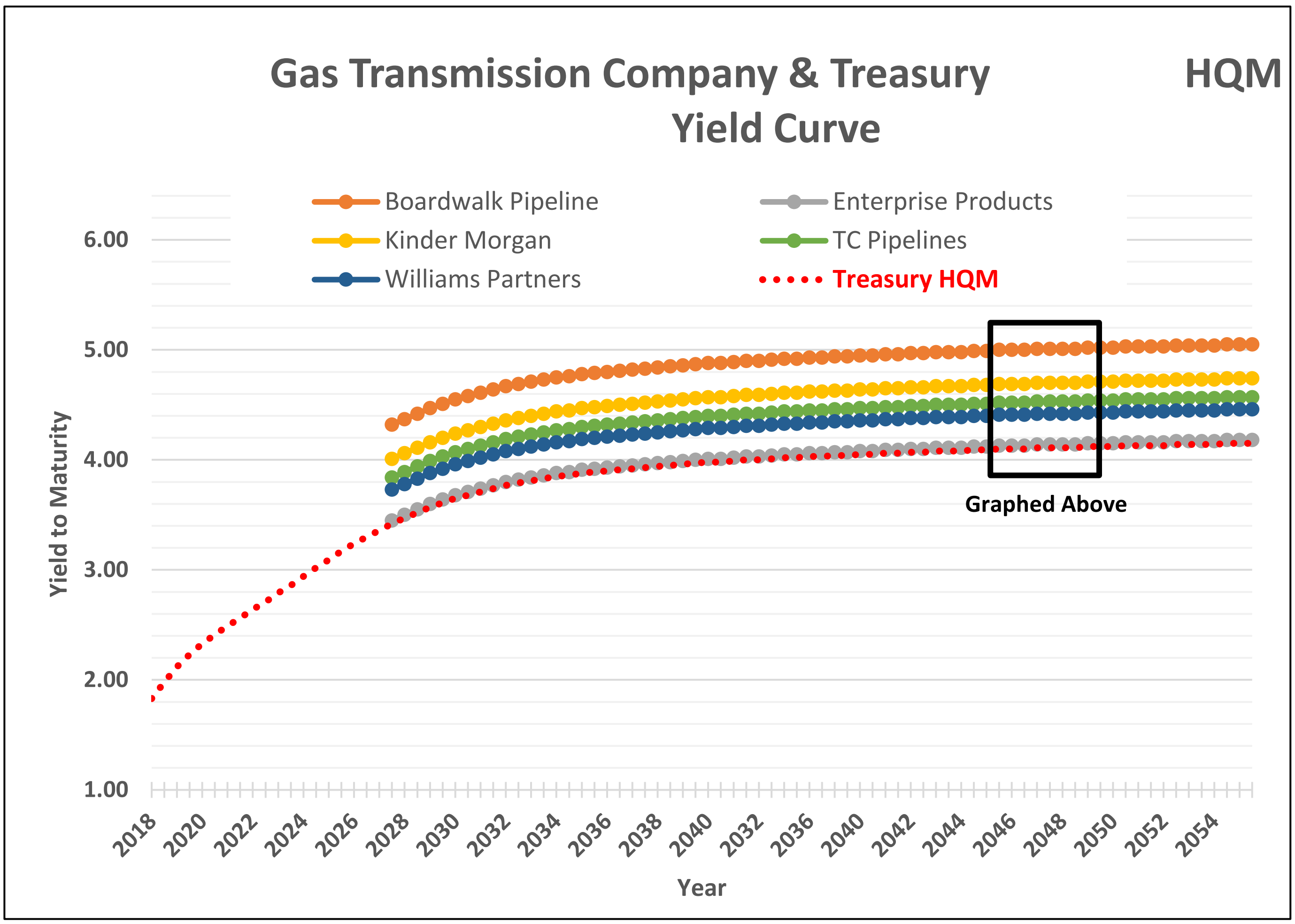


The Yield-to-Maturities (YTMs) calculated below are based off of information received via year-end filings (Form N-Q or 10-K) with the SEC. The 30-year YTMs are then calculated based off an observed spread to the Treasury High Quality Market Corporate Bond spot rate curve (equation below) and followed out to 30 years.

$$p = \sum_{i=1}^{n} d(t_i)\, c_i + \sum_{j=1}^{m} b_j\, x_j + e$$

Average of 30-Year YTMs
4.56%

Indicated Debt Rate	4.56%



* The data behind the HQM yield curve can be found in Appendix G

Issued Debt by Company

Source of Debt Issues	Company Breakdown	Number of Issues
N-Q	5	59
10-K	0	0
Total	**5**	**59**

Periodicity	Redemption Price	Settlement Date
Semi-Annual	$ 100.00	1/4/2018

	Coupon	Maturity	Face Amount	Market Value	Market Price	YTM
Boardwalk Pipelines, LP						
	5.75%	9/15/2019	$ 200,000	$ 209,615	$ 104.81	2.83%
	3.38%	2/1/2023	$ 200,000	$ 199,084	$ 99.54	3.47%
	5.95%	6/1/2026	$ 200,000	$ 223,035	$ 111.52	4.30%
	4.45%	7/15/2027	$ 6,362,000	$ 6,427,000	$ 101.02	4.32%
Enterprise Products Operating, LLC						
	5.20%	9/1/2020	$ 600,000	$ 641,014	$ 106.84	2.52%
	2.85%	4/15/2021	$ 100,000	$ 100,825	$ 100.83	2.59%
	4.05%	2/15/2022	$ 400,000	$ 418,515	$ 104.63	2.85%
	3.90%	2/15/2024	$ 800,000	$ 833,440	$ 104.18	3.14%
	3.70%	2/15/2026	$ 300,000	$ 307,106	$ 102.37	3.36%
	3.95%	2/15/2027	$ 3,065,000	$ 3,184,786	$ 103.91	3.45%
	6.13%	10/15/2039	$ 480,000	$ 603,389	$ 125.71	4.30%
	4.85%	8/15/2042	$ 300,000	$ 329,169	$ 109.72	4.21%
	4.45%	2/15/2043	$ 100,000	$ 103,433	$ 103.43	4.23%
	4.85%	3/15/2044	$ 1,500,000	$ 1,642,771	$ 109.52	4.24%
	5.10%	2/15/2045	$ 500,000	$ 570,048	$ 114.01	4.23%
	4.90%	5/15/2046	$ 300,000	$ 330,249	$ 110.08	4.28%
	4.95%	10/15/2054	$ 200,000	$ 218,601	$ 109.30	4.43%
	4.88%	8/16/2077	$ 200,000	$ 200,500	$ 100.25	4.86%
	5.25%	8/16/2077	$ 700,000	$ 693,000	$ 99.00	5.31%
Kinder Morgan, Inc.						
	3.05%	12/1/2019	$ 2,400,000	$ 2,420,748	$ 100.86	2.58%
	3.95%	9/1/2022	$ 1,200,000	$ 1,238,276	$ 103.19	3.21%
	3.15%	1/15/2023	$ 1,000,000	$ 993,769	$ 99.38	3.29%
	3.45%	2/15/2023	$ 350,000	$ 351,731	$ 100.49	3.34%
	3.50%	9/1/2023	$ 200,000	$ 200,098	$ 100.05	3.49%
	4.15%	2/1/2024	$ 300,000	$ 311,076	$ 103.69	3.47%
	4.25%	9/1/2024	$ 500,000	$ 517,734	$ 103.55	3.64%
	4.30%	6/1/2025	$ 1,950,000	$ 2,030,720	$ 104.14	3.66%
	5.30%	12/1/2034	$ 1,900,000	$ 2,025,601	$ 106.61	4.73%

Kinder Morgan, Inc.

6.50%	9/1/2039	$	535,000	$	630,971	$	117.94	5.12%
5.63%	9/1/2041	$	300,000	$	318,518	$	106.17	5.17%
5.00%	8/15/2042	$	200,000	$	202,996	$	101.50	4.89%
5.00%	3/1/2043	$	500,000	$	507,130	$	101.43	4.90%
5.50%	3/1/2044	$	400,000	$	425,744	$	106.44	5.05%
5.40%	9/1/2044	$	200,000	$	211,284	$	105.64	5.01%
5.55%	6/1/2045	$	800,000	$	874,810	$	109.35	4.92%

TransCanadian Pipelines Ltd. / TC Pipelines, LP

3.13%	1/15/2019	$	500,000	$	504,538	$	100.91	2.23%
2.13%	11/15/2019	$	500,000	$	498,223	$	99.64	2.32%
3.80%	10/1/2020	$	600,000	$	622,069	$	103.68	2.40%
4.38%	3/13/2025	$	300,000	$	312,020	$	104.01	3.73%
4.88%	1/15/2026	$	1,000,000	$	1,119,377	$	111.94	3.18%
3.90%	5/25/2027	$	200,000	$	200,943	$	100.47	3.84%
4.63%	3/1/2034	$	1,700,000	$	1,896,965	$	111.59	3.67%
5.85%	3/15/2036	$	340,000	$	426,129	$	125.33	3.89%
7.63%	1/15/2039	$	469,000	$	706,128	$	150.56	4.04%
6.10%	6/1/2040	$	200,000	$	262,148	$	131.07	3.99%
5.00%	10/16/2043	$	200,000	$	236,690	$	118.35	3.87%

Williams Partners, LP

5.25%	3/15/2020	$	830,000	$	876,699	$	105.63	2.60%
4.00%	11/15/2021	$	600,000	$	620,433	$	103.41	3.06%
3.60%	3/15/2022	$	750,000	$	767,095	$	102.28	3.02%
3.35%	8/15/2022	$	200,000	$	202,020	$	101.01	3.11%
4.50%	11/15/2023	$	300,000	$	317,225	$	105.74	3.41%
4.30%	3/4/2024	$	300,000	$	314,146	$	104.72	3.44%
3.90%	1/15/2025	$	500,000	$	509,478	$	101.90	3.59%
4.00%	9/15/2025	$	750,000	$	767,229	$	102.30	3.65%
3.75%	6/15/2027	$	500,000	$	500,897	$	100.18	3.73%
5.80%	11/15/2043	$	300,000	$	353,086	$	117.70	4.62%
5.40%	3/4/2044	$	300,000	$	336,440	$	112.15	4.60%
4.90%	1/15/2045	$	1,000,000	$	1,059,979	$	106.00	4.51%

Indicated Rate of Equity

Model	Rate
CAPM - Ex Post	11.77%
CAPM - Supply Side	10.43%
CAPM - Three Stage Ex Ante	10.08%
CAPM - Damodaran	9.18%
CAPM - Duff & Phelps	9.08%
CAPM - Graham and Harvey	7.81%
CAPM - Fernandez, Pershin, and Acin	9.99%
Empirical CAPM - Ex Post	11.24%
Empirical CAPM - Supply Side	9.98%
Empirical CAPM - Three Stage Ex Ante	9.65%
Empirical CAPM - Damodaran	8.80%
Empirical CAPM - Duff & Phelps	8.71%
Empirical CAPM - Graham and Harvey	7.51%
Empirical CAPM - Fernandez, Pershin, and Acin	9.57%
Dividend Growth Model	12.50%
Multi-Stage DGM	14.65%
Indicated Rate of Equity	**11.45%**

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the most reliance on the Capital Asset Pricing Models using Dr. Damodaran's and the Ex Post equity risk premiums. The department placed secondary reliance on the Dividend Growth Model.

Direct Rate and Growth

	Capital Structure	Rate	Composite
Debt Component	40.00%	4.56%	1.82%
Equity Component	60.00%	5.65%	3.39%
Direct Rate			**5.21%**

Gas Transmission Direct Rate	**5.21%**
Yield Rate	8.69%
Direct Rate	5.21%
Implied Industry Growth Rate	**3.48%**

Capital Asset Pricing Model (CAPM)

(ERP x β) + RFR = Indicated Equity Rate

Model	Equity risk premium (ERP)	x Industry Beta (β)	= Industry Risk Premium	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	1.30	9.19%	2.58%	**11.77%**
Supply Side[3]	6.04%	1.30	7.85%	2.58%	**10.43%**
Three Stage Ex Ante Model[4]	5.77%	1.30	7.50%	2.58%	**10.08%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	1.30	6.60%	2.58%	**9.18%**
Duff & Phelps[6]	5.00%	1.30	6.50%	2.58%	**9.08%**
Graham and Harvey[7]	4.02%	1.30	5.23%	2.58%	**7.81%**
Fernandez, Pershin and Acin[8]	5.70%	1.30	7.41%	2.58%	**9.99%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov

2 Long-horizon expected equity risk premium (historical), 2018 Valuation Handbook – Guide to Cost of Capital

3 Long-horizon expected equity risk premium (supply side), 2018 Valuation Handbook – Guide to Cost of Capital

4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% “normalized” risk-free rate. 2018 Valuation Handbook – Guide to Cost of Capital

7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016

8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Empirical Capital Asset Pricing Model (ECAPM)

Model	Equity risk premium (ERP)	x Industry Beta (β)	x 75%	= Industry Risk Premium (weighted)	Equity risk premium (ERP)	x 25%	Equity Risk Premium (weighted)	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	1.30	75%	6.89%	7.07%	25%	1.77%	2.58%	**11.24%**
Supply Side[3]	6.04%	1.30	75%	5.89%	6.04%	25%	1.51%	2.58%	**9.98%**
Three Stage Ex Ante Model[4]	5.77%	1.30	75%	5.63%	5.77%	25%	1.44%	2.58%	**9.65%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	1.30	75%	4.95%	5.08%	25%	1.27%	2.58%	**8.80%**
Duff & Phelps[6]	5.00%	1.30	75%	4.88%	5.00%	25%	1.25%	2.58%	**8.71%**
Graham and Harvey[7]	4.02%	1.30	75%	3.92%	4.02%	25%	1.01%	2.58%	**7.51%**
Fernandez, Pershin and Acin[8]	5.70%	1.30	75%	5.56%	5.70%	25%	1.43%	2.58%	**9.57%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov

2 Long-horizon expected equity risk premium (historical), 2018 Valuation Handbook – Guide to Cost of Capital

3 Long-horizon expected equity risk premium (supply side), 2018 Valuation Handbook – Guide to Cost of Capital

4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% "normalized" risk-free rate. 2018 Valuation Handbook – Guide to Cost of Capital

7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016

8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Dividend Growth Model

Company	Current Dividend Yield (DY)	Growth Estimate, Next 5 Years	Indicated Cost of Equity
Boardwalk Pipeline Partners, LP	2.80%	7.40%	10.20%
Enterprise Products Partners, LP	7.00%	6.52%	13.52%
Kinder Morgan Inc.	2.90%	51.67%	54.57%
TC PipeLines, LP	7.70%	4.80%	12.50%
Williams Partners, LP	6.80%	4.00%	10.80%
Mean	5.44%	14.88%	20.32%
Median	6.80%	6.52%	12.50%
Dividend Growth Model, Indicated Rate			**12.50%**

Given the wide range of growth estimates, we selected the median as the indicated rate.

Notes:

Dividend Yield provided by Value Line

Growth Estimates, Next 5 Years for Earnings provided Yahoo Finance

Multi-Stage Dividend Growth Model

$K_E = (D_1 / P_0) + 0.67(G_1) + 0.33(g)$

Where:

K_E Cost of Equity

$D1 / P_0$ Dividend Yield

G_1 Growth Estimate, next five years

g Stable Growth

Company	**$D1 / P_0$** Dividend Yield	**G_1** Growth Estimate, next five years	**g** Stable Growth	**$0.67 \times G_1$**	**.33 x g**	**K_E** Cost of Equity
Boardwalk Pipeline Partners, LP	2.80%	7.40%	4.50%	4.96%	1.49%	9.24%
Enterprise Products Partners, LP	7.00%	6.52%	4.50%	4.37%	1.49%	12.85%
Kinder Morgan Inc.	2.90%	51.67%	4.50%	34.62%	1.49%	39.00%
TC PipeLines, LP	7.70%	4.80%	4.50%	3.22%	1.49%	12.40%
Williams Partners, LP	6.80%	4.00%	4.50%	2.68%	1.49%	10.97%
					Mean	16.89%
					Median	12.40%
					Multi-Stage DGM, Indicated Rate	**14.65%**

We placed equal reliance on the mean and median to arrive at the indicated rate.

Notes:

Dividend Yield provided by Value Line

Growth Estimates, Next 5 Years for Earnings provided Yahoo Finance

Stable growth rate is the nominal growth rate determined in the Capitalization Rate Study Narrative (indicated long-term growth rate of the U.S. economy of 2.5% plus the expected inflation rate of 2.0%).

Equity Component of the Direct Rate

Company	Value Line P/E Ratio	
Boardwalk Pipeline Partners, LP	10.50	
Enterprise Products Partners, LP	17.70	
Kinder Morgan Inc.	23.70	
TC PipeLines, LP	16.80	*
Williams Partners, LP	20.60	
Mean	17.86	
Median	17.70	
Selected Price to Earnings (P/E) Ratio	17.70	
Indicated Equity Component of the Direct Rate	**5.65%**	

We placed most reliance on the median when selecting the price to earnings ratio given the wide range of values.

Notes:
The Price to Earnings Ratio was downloaded from Value Line.
*Trailing P/E Ratio

Beta Analysis

Company	Beta
Boardwalk Pipeline Partners, LP	1.00
Enterprise Products Partners, LP	1.30
Kinder Morgan Inc.	1.45
TC PipeLines, LP	1.15
Williams Partners, LP	1.55
Beta Mean	1.29
Beta Median	1.30
Unlevered and Relevered Mean*	1.35
Indicated Beta	**1.30**

We considered the mean and median, placing more reliance on the median when selecting the indicated beta. We unlevered and relevered the betas (see the Unelevering Relevering Beta page). However, the income tax data is not reliable for this market segment and we did not give weight to the unlevered relevered mean.

Notes:
* See the Unlevering Relevering Beta page for the calculation

Unlevering/Relevering Betas

Unlevering of Betas	*Value Line* Actual Income Tax Rate	*From Capital Structure Page* Actual Debt in Capital Structure	*From Capital Structure Page* Actual Equity in Capital Structure	*Value Line* Levered Beta (Published)	*Formula* Unlevered Beta
Boardwalk Pipeline Partners, LP	0.20%	50.05%	49.95%	1.00	0.50
Enterprise Products Partners, LP	1.00%	29.11%	70.89%	1.30	0.92
Kinder Morgan Inc.	15.50%	47.16%	52.84%	1.45	0.83
TC PipeLines, LP	---	40.15%	59.85%	1.15	N/A
Williams Partners, LP	2.00%	32.05%	67.95%	1.55	1.06
			Average	**1.29**	

Relevering of Betas	*Formula* Composite Income Tax Rate	*From Capital Structure Page* Debt in Capital Structure	*From Capital Structure Page* Equity in Capital Structure	*Formula* Levered Beta
Boardwalk Pipeline Partners, LP	4.68%	40.00%	60.00%	0.82
Enterprise Products Partners, LP	4.68%	40.00%	60.00%	1.50
Kinder Morgan Inc.	4.68%	40.00%	60.00%	1.36
TC PipeLines, LP	4.68%	40.00%	60.00%	N/A
Williams Partners, LP	4.68%	40.00%	60.00%	1.73
			Average	**1.35**

Calculation of Market to Book Ratios for the Gas Transmission Market Segment

December 31, 2017 calendar year information for the January 2, 2018 Assessment

A market to book ratio over one would be an indication of no obsolescence.

Market Value estimates for Common Equity are from Value Line. Market Value Estimates for Long-Term Debt are from the company's Annual Report or 10-K.

Book Value amounts are from the company's balance sheet as listed in the 10-K or Annual Report.

Market to Book Ratio for Equity

Company	Market Value of Common Equity	Book Value of Common Equity	Market to Book Ratio	Source
Boardwalk Pipeline Partners, LP	3,579,243,983	4,724,800,000	0.76	2017 10-K, p. 45
Enterprise Products Partners, LP	52,870,376,396	22,772,400,000	2.32	2017 10-K, p. 179
Kinder Morgan Inc.	38,099,067,132	35,124,000,000	1.08	2017 10-K, p. 118
TC PipeLines, LP	3,617,112,000	1,068,000,000	3.39	2017 10-K, p. 103
Williams Partners, LP	33,917,762,569	23,689,000,000	1.43	2017 10-K, p. 143
		Average	**1.80**	

Market to Book Ratio for Debt

Company	Market Value of Long-Term Debt from 10-K	Book Value Long-Term Debt	Market to Book Ratio	Source
Boardwalk Pipeline Partners, LP	3,889,400,000	3,687,500,000	1.05	2017 10-K, p. 103
Enterprise Products Partners, LP	23,470,000,000	21,480,000,000	1.09	2017 10-K, p. 265
Kinder Morgan Inc.	35,015,000,000	34,088,000,000	1.03	2017 10-K, p. 81 & 106
TC PipeLines, LP	294,154,000,000	265,500,000,000	1.11	2017 10-K, p. 148
Williams Partners, LP	18,112,000,000	16,497,000,000	1.10	2017 10-K, p. 214
		Average	**1.08**	

Application of Capital Structure as determined in the Capitalization Rate Study

	Capital Structure	Market to Book	Composite
Common Equity	60.00%	1.80	1.08
Long-term Debt	40.00%	1.08	0.43
	Overall Market to Book Ratio		**1.51**

Yield Rate

	Capital Structure	Rate	Composite
Long-Term Debt	41.00%	4.81%	1.97%
Common Equity	59.00%	12.57%	7.42%
Yield Rate			**9.39%**

Fluid Transportation Pipeline Yield Rate	**9.39%**

Capital Structure

Company	Value of Long-Term Debt	Value of Preferred Equity	Value of Common Equity	Total Market Value	% Long-Term Debt	% Preferred Equity	% Common Equity
Buckeye Partners, LP	4,593,600,000	N/A	6,952,389,907	11,545,989,907	39.79%	N/A	60.21%
Enbridge Energy Partners, LP	6,835,000,000	N/A	4,332,882,050	11,167,882,050	61.20%	N/A	38.80%
Holly Energy Partners, LP	1,245,100,000	None	2,045,985,959	3,291,085,959	37.83%	N/A	62.17%
Magellan Midstream Partners, LP	4,051,400,000	N/A	14,817,035,649	18,868,435,649	21.47%	N/A	78.53%
NuStar Energy, LP	3,232,600,000	None	2,630,944,960	5,863,544,960	55.13%	N/A	44.87%
Plains All American Pipeline	10,489,000,000	N/A	14,569,049,782	25,058,049,782	41.86%	N/A	58.14%
				Mean	42.88%		57.12%
				Median	40.82%		59.18%
				Indicated Industry Capital Structure	**41.00%**		**59.00%**

Given the wide range in capital structures, we selected the median capital structure as the indicated capital structure, rounding to 41% debt, 59% equity.

Notes:

Data downloaded from Value Line

Indexed Rate of Debt

Company	Debt Rating	Long-Term Debt Rate	
Buckeye Partners, LP	Baa3	4.50	
Enbridge Energy Partners, LP	Baa3	4.50	
Holly Energy Partners, LP	Ba3	6.71	*
Magellan Midstream Partners, LP	Baa1	4.50	
NuStar Energy, LP	Ba1	6.71	*
Plains All American Pipeline	Ba1	6.71	*
	Mean	5.61	
	Median	5.61	

Industrial Bond Yield Averages from Mergent Bond Record, January 2018 Edition

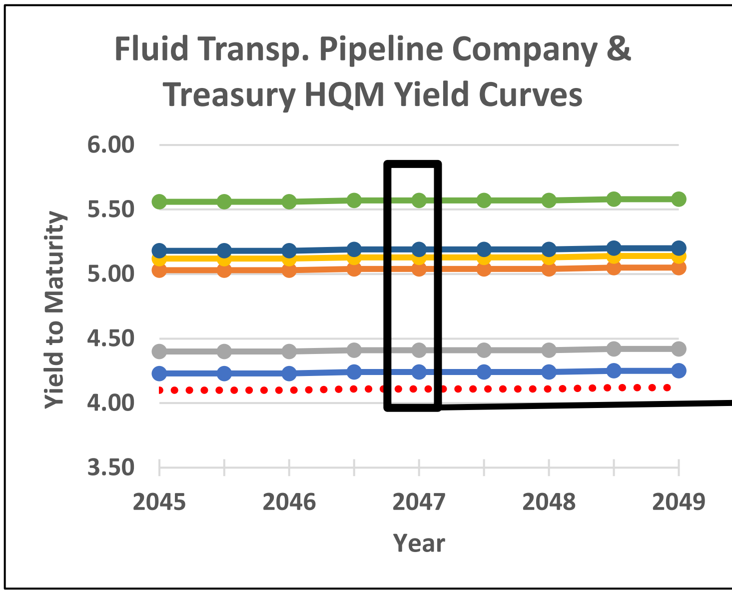
Industrial Bond Averages, December 2017

Mergent	S&P	Yield Avg.
Aaa	AAA	3.74
Aa1	AA+	
Aa2	AA	
Aa3	AA-	3.84
A1	A+	
A2	A	
A3	A-	4.00
Baa1	BBB+	
Baa2	BBB	
Baa3	BBB-	4.50

Notes:

* These companies are rated below the Mergent Bond Record Bond Yield Averages. We analyzed the Mergent Bond Record, January 2018 issue, for U.S. Corporate Bonds that were considered below investment grade. We determined the average Ba yield to maturity is 6.71%.

Current Actual Cost of Debt

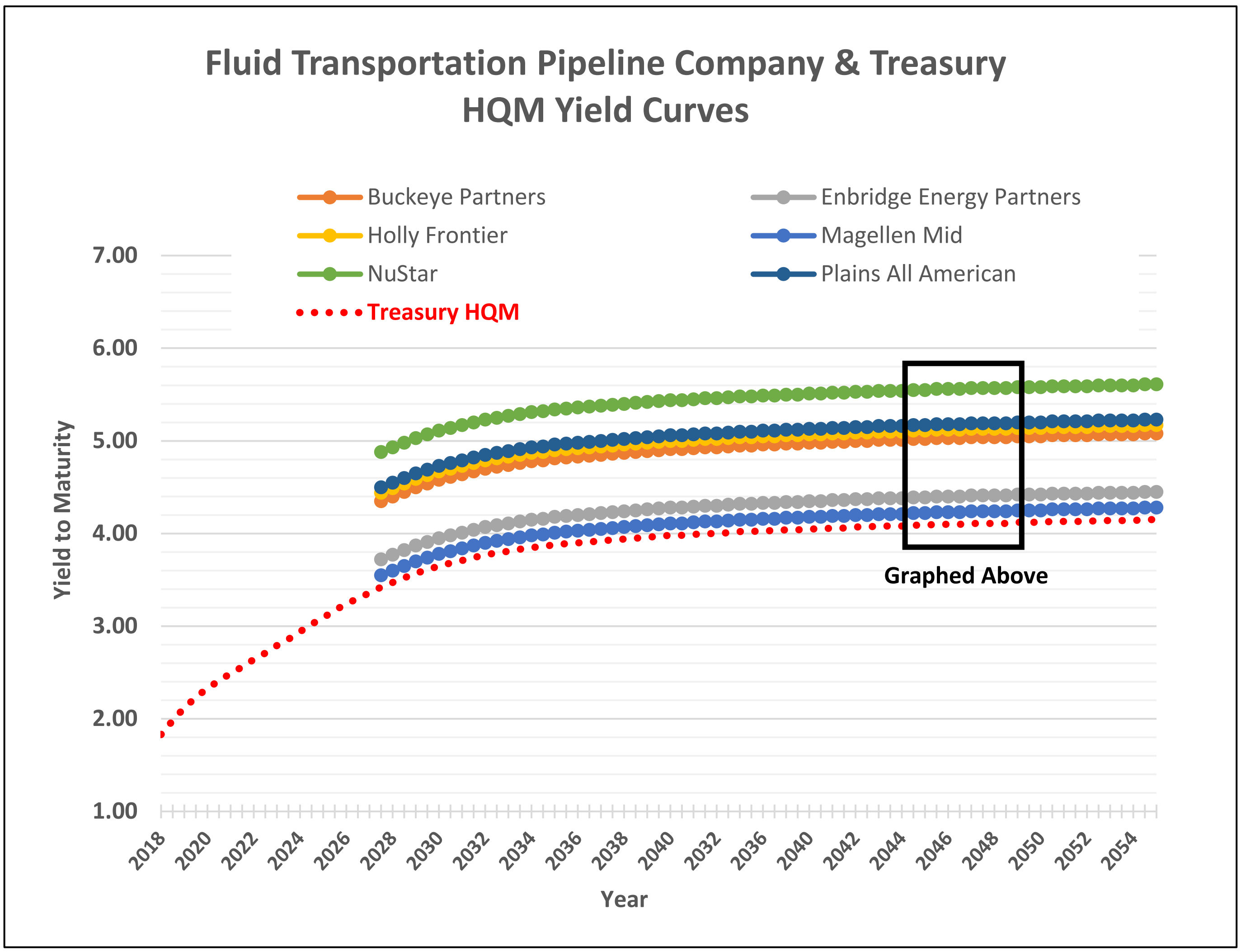


The Yield-to-Maturities (YTMs) calculated below are based off of information received via year-end filings (Form N-Q or 10-K) with the SEC. The 30-year YTMs are then calculated based off an observed spread to the Treasury High Quality Market Corporate Bond spot rate curve (equation below) and followed out to 30 years.

$$p = \sum_{i=1}^{n} d(t_i)\, c_i + \sum_{j=1}^{m} b_j\, x_j + e$$

Average of 30-Year YTMs
4.81%

Indicated Debt Rate	4.81%



* The data behind the HQM yield curve can be found in Appendix G

Issued Debt by Company

Source of Debt Issues	Company Breakdown	Number of Issues
N-Q	6	41
10-K	0	0
Total	**6**	**41**

Periodicity	Redemption Price	Settlement Date
Semi-Annual	$ 100.00	1/4/2018

Coupon	Maturity	Face Amount	Market Value	Market Price	YTM
Buckeye Partners, LP					
2.65%	11/15/2018	$ 200,000	$ 200,577	$ 100.29	2.31%
4.88%	2/1/2021	$ 200,000	$ 210,343	$ 105.17	3.10%
4.35%	10/15/2024	$ 200,000	$ 204,046	$ 102.02	4.01%
3.95%	12/1/2026	$ 300,000	$ 294,793	$ 98.26	4.19%
4.13%	12/1/2027	$ 500,000	$ 491,000	$ 98.20	4.35%
5.85%	11/15/2043	$ 200,000	$ 215,254	$ 107.63	5.30%
5.60%	10/15/2044	$ 100,000	$ 104,992	$ 104.99	5.25%
Enbridge Inc. / Enbridge Energy Partners, LP					
9.88%	3/1/2019	$ 4,325,000	$ 4,702,000	$ 108.72	2.21%
5.20%	3/15/2020	$ 7,942,000	$ 8,355,000	$ 105.20	2.74%
4.38%	10/15/2020	$ 7,870,000	$ 8,229,000	$ 104.56	2.66%
4.20%	9/15/2021	$ 7,869,000	$ 8,205,000	$ 104.27	2.97%
2.90%	7/15/2022	$ 8,450,000	$ 8,422,000	$ 99.67	2.98%
4.00%	10/1/2023	$ 4,505,000	$ 4,675,000	$ 103.77	3.27%
3.50%	6/10/2024	$ 6,834,000	$ 6,890,000	$ 100.82	3.36%
5.88%	10/15/2025	$ 6,825,000	$ 7,736,000	$ 113.35	3.87%
4.25%	12/1/2026	$ 14,625,000	$ 15,294,000	$ 104.57	3.64%
3.70%	7/15/2027	$ 13,007,000	$ 13,008,000	$ 100.01	3.70%
7.50%	4/15/2038	$ 1,373,000	$ 1,747,000	$ 127.24	5.29%
5.50%	9/15/2040	$ 733,000	$ 782,000	$ 106.68	5.00%
4.50%	6/10/2044	$ 700,000	$ 708,000	$ 101.14	4.43%
7.38%	10/15/2045	$ 625,000	$ 817,000	$ 130.72	5.26%
5.50%	12/1/2046	$ 1,700,000	$ 1,963,000	$ 115.47	4.53%
Holly Frontier / Holly Energy Partners, LP					
5.88%	4/1/2026	$ 11,809,000	$ 13,073,000	$ 110.70	4.32%
Magellan Midstream Partners, LP					
6.55%	7/15/2019	$ 200,000	$ 211,828	$ 105.91	2.58%
4.25%	2/1/2021	$ 125,000	$ 130,422	$ 104.34	2.77%
5.00%	3/1/2026	$ 900,000	$ 999,479	$ 111.05	3.43%
4.25%	9/15/2046	$ 100,000	$ 101,119	$ 101.12	4.18%
4.20%	10/3/2047	$ 300,000	$ 302,210	$ 100.74	4.16%

NuStar Logistics, LP[1]									
	6.75%	2/1/2021	$	250,000	$	270,625	$	108.25	3.88%
	5.63%	4/28/2027	$	550,000	$	580,250	$	105.50	4.88%
Plains All American Pipeline									
	2.60%	12/15/2019	$	550,000	$	546,807	$	99.42	2.91%
	5.00%	2/1/2021	$	700,000	$	733,480	$	104.78	3.35%
	2.85%	1/31/2023	$	200,000	$	191,348	$	95.67	3.80%
	3.85%	10/15/2023	$	400,000	$	398,038	$	99.51	3.94%
	3.60%	11/1/2024	$	200,000	$	194,729	$	97.36	4.05%
	4.65%	10/15/2025	$	300,000	$	309,076	$	103.03	4.19%
	4.50%	12/15/2026	$	1,000,000	$	1,013,433	$	101.34	4.32%
	6.65%	1/15/2037	$	100,000	$	114,112	$	114.11	5.45%
	5.15%	6/1/2042	$	250,000	$	243,241	$	97.30	5.35%
	4.70%	6/15/2044	$	300,000	$	280,227	$	93.41	5.16%
	4.90%	2/15/2045	$	300,000	$	287,849	$	95.95	5.18%

Indicated Rate of Equity

Model	Rate
CAPM - Ex Post	11.42%
CAPM - Supply Side	10.13%
CAPM - Three Stage Ex Ante	9.79%
CAPM - Damodaran	8.93%
CAPM - Duff & Phelps	8.83%
CAPM - Graham and Harvey	7.61%
CAPM - Fernandez, Pershin, and Acin	9.71%
Empirical CAPM - Ex Post	10.98%
Empirical CAPM - Supply Side	9.75%
Empirical CAPM - Three Stage Ex Ante	9.43%
Empirical CAPM - Damodaran	8.61%
Empirical CAPM - Duff & Phelps	8.52%
Empirical CAPM - Graham and Harvey	7.36%
Empirical CAPM - Fernandez, Pershin, and Acin	9.35%
Dividend Growth Model	19.69%
Multi-Stage DGM	17.67%
Indicated Rate of Equity	**12.57%**

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the most reliance on the Capital Asset Pricing Models using Dr. Damodaran's and the Ex Post equity risk premiums. The department placed secondary reliance on the Dividend Growth Model, Earnings Growth.

Direct Rate and Growth

	Capital Structure	Rate	Composite
Debt Component	41.00%	4.81%	1.97%
Equity Component	59.00%	5.54%	3.27%
Direct Rate			**5.24%**

Fluid Transportation Pipeline Direct Rate	**5.24%**

Yield Cap Rate	9.39%
Direct Cap Rate	5.24%
Implied Industry Growth Rate	**4.15%**

Capital Asset Pricing Model (CAPM)

(ERP x β) + RFR = Indicated Equity Rate

Model	Equity risk premium (ERP)	x Industry Beta (β)	= Industry Risk Premium	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	1.25	8.84%	2.58%	**11.42%**
Supply Side[3]	6.04%	1.25	7.55%	2.58%	**10.13%**
Three Stage Ex Ante Model[4]	5.77%	1.25	7.21%	2.58%	**9.79%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	1.25	6.35%	2.58%	**8.93%**
Duff & Phelps[6]	5.00%	1.25	6.25%	2.58%	**8.83%**
Graham and Harvey[7]	4.02%	1.25	5.03%	2.58%	**7.61%**
Fernandez, Pershin and Acin[8]	5.70%	1.25	7.13%	2.58%	**9.71%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov

2 Long-horizon expected equity risk premium (historical), <u>2018 Valuation Handbook – Guide to Cost of Capital</u>

3 Long-horizon expected equity risk premium (supply side), <u>2018 Valuation Handbook – Guide to Cost of Capital</u>

4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% “normalized” risk-free rate. <u>2018 Valuation Handbook – Guide to Cost of Capital</u>

7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016

8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Empirical Capital Asset Pricing Model (ECAPM)

(ERP x β x .75) + (ERP x .25) + RFR = Indicated Equity Rate

Model	Equity risk premium (ERP)	x Industry Beta (β)	x 75%	= Industry Risk Premium (weighted)	Equity risk premium (ERP)	x 25%	Equity Risk Premium (weighted)	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	1.25	75%	6.63%	7.07%	25%	1.77%	2.58%	**10.98%**
Supply Side[3]	6.04%	1.25	75%	5.66%	6.04%	25%	1.51%	2.58%	**9.75%**
Three Stage Ex Ante Model[4]	5.77%	1.25	75%	5.41%	5.77%	25%	1.44%	2.58%	**9.43%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	1.25	75%	4.76%	5.08%	25%	1.27%	2.58%	**8.61%**
Duff & Phelps[6]	5.00%	1.25	75%	4.69%	5.00%	25%	1.25%	2.58%	**8.52%**
Graham and Harvey[7]	4.02%	1.25	75%	3.77%	4.02%	25%	1.01%	2.58%	**7.36%**
Fernandez, Pershin and Acin[8]	5.70%	1.25	75%	5.34%	5.70%	25%	1.43%	2.58%	**9.35%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov
2 Long-horizon expected equity risk premium (historical), 2018 Valuation Handbook – Guide to Cost of Capital
3 Long-horizon expected equity risk premium (supply side), 2018 Valuation Handbook – Guide to Cost of Capital
4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation
5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/
6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% "normalized" risk-free rate. 2018 Valuation Handbook – Guide to Cost of Capital
7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016
8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Dividend Growth Model

Company	Current Dividend Yield	Growth Estimate, Next 5 Years	Indicated Cost of Equity
Buckeye Partners, LP	10.70%	0.60%	11.30%
Enbridge Energy Partners, LP	10.60%	14.20%	24.80%
Holly Energy Partners, LP	8.10%	6.20%	14.30%
Magellan Midstream Partners, LP	5.80%	8.77%	14.57%
NuStar Energy, LP	15.50%	14.16%	29.66%
Plains All American Pipeline	6.00%	51.52%	57.52%
Mean	9.45%	15.91%	25.36%
Median	9.35%	11.47%	19.69%

Dividend Growth Model, Indicated Rate	**19.69%**

Given the wide range of growth rates, we selected the median as the indicated rate.

Notes:

Dividend Yield provided by Value Line

Growth Estimates, Next 5 Years for Earnings provided Yahoo Finance

Multi-Stage Dividend Growth Model

$K_E = [(D_1 / P_0) + 0.67(G_1) + 0.33(g)]$

Where:

K_E Cost of Equity
D1 / P_0 Dividend Yield
G_1 Growth Estimate, next five years
g Stable Growth

Company	D1 / P_0 Dividend Yield	G_1 Growth Estimate, next five years	g Stable Growth	0.67 x G_1	.33 x g	K_E Cost of Equity
Buckeye Partners, LP	10.70%	0.60%	4.50%	0.40%	1.49%	12.59%
Enbridge Energy Partners, LP	10.60%	14.20%	4.50%	9.51%	1.49%	21.60%
Holly Energy Partners, LP	8.10%	6.20%	4.50%	4.15%	1.49%	13.74%
Magellan Midstream Partners, LP	5.80%	8.77%	4.50%	5.88%	1.49%	13.16%
NuStar Energy, LP	15.50%	14.16%	4.50%	9.49%	1.49%	26.47%
Plains All American Pipeline	6.00%	51.52%	4.50%	34.52%	1.49%	42.00%
					Mean	21.59%
					Median	17.67%

Multi-Stage DGM, Indicated Rate	**17.67%**

We placed the most reliance on the median to arrive at the indicated rate.

Notes:

Dividend Yield provided by Value Line

Growth Estimates, Next 5 Years for Earnings provided Yahoo Finance

Stable growth rate is the nominal growth rate determined in the Capitalization Rate Study Narrative (indicated long-term growth rate of the U.S. economy of 2.5% plus the expected inflation rate of 2.0%).

Equity Component of the Direct Rate

Company	Value Line P/E Ratio	
Buckeye Partners, LP	12.90	
Enbridge Energy Partners, LP	19.50	
Holly Energy Partners, LP	20.50	*
Magellan Midstream Partners, LP	16.20	
NuStar Energy, LP	32.50	*
Plains All American Pipeline	16.60	
Mean	19.70	
Median	18.05	
Selected Price to Earnings (P/E) Ratio	18.05	
Indicated Equity Component of the Direct Rate	**5.54%**	

We selected the median as the price to earnings ratio given the wide range of values.

Notes:

The Price/Earnings Ratio was downloaded from Value Line.

*Trailing P/E Ratio

Beta Analysis

Company	Beta
Buckeye Partners, LP	1.20
Enbridge Energy Partners, LP	1.30
Holly Energy Partners, LP	1.00
Magellan Midstream Partners, LP	1.20
NuStar Energy, LP	1.30
Plains All American Pipeline	1.50
Beta Mean	1.25
Beta Median	1.25
Unlevered and Relevered Mean*	1.20
Indicated Beta	**1.25**

We considered the mean and median, placing more reliance on the median when selecting the indicated beta given the wide range of betas. We unlevered and relevered the betas (see the Unlevering Relevering Beta page). However, the income tax data is not reliable for this market segment and we did not give significant reliance to the unlevered relevered mean.

Notes:
* See the Unlevering Relevering Beta page for the calculation

Unlevering/Relevering Betas

Unlevering of Betas	*Value Line* **Actual Income Tax Rate**	*From Capital Structure Page* **Actual Debt in Capital Structure**	*From Capital Structure Page* **Actual Equity in Capital Structure**	*Value Line* **Levered Beta (Published)**	*Formula* **Unlevered Beta**
Buckeye Partners, LP	0.50%	39.79%	60.21%	1.20	0.72
Enbridge Energy Partners, LP	5.00%	61.20%	38.80%	1.30	0.52
Holly Energy Partners, LP	0.20%	37.83%	62.17%	1.00	0.62
Magellan Midstream Partners, LP	0.50%	21.47%	78.53%	1.20	0.94
NuStar Energy, LP	14.70%	55.13%	44.87%	1.30	0.63
Plains All American Pipeline	3.50%	41.86%	58.14%	1.50	0.89
			Average	**1.25**	

Relevering of Betas	*Formula* **Composite Income Tax Rate**	*From Capital Structure Page* **Debt in Capital Structure**	*From Capital Structure Page* **Equity in Capital Structure**	*Formula* **Levered Beta**
Buckeye Partners, LP	4.07%	41.00%	59.00%	1.20
Enbridge Energy Partners, LP	4.07%	41.00%	59.00%	0.87
Holly Energy Partners, LP	4.07%	41.00%	59.00%	1.03
Magellan Midstream Partners, LP	4.07%	41.00%	59.00%	1.57
NuStar Energy, LP	4.07%	41.00%	59.00%	1.05
Plains All American Pipeline	4.07%	41.00%	59.00%	1.48
			Average	**1.20**

Calculation of Market to Book Ratios for the Fluid Transportation Market Segment

December 31, 2017 calendar year information for the January 2, 2018 Assessment

A market to book ratio over one would be an indication of no obsolescence.

Market Value estimates for Common Equity are from Value Line. Market Value Estimates for Long-Term Debt are from the company's 10-K.

Book Value amounts are from the company's 10-K.

Market to Book Ratio for Equity

Company	Market Value of Common Equity	Book Value of Common Equity	Market to Book Ratio	Source
Buckeye Partners, LP	6,952,389,907	4,868,322,000	1.43	2017 10-K, p. 67
Enbridge Energy Partners, LP	4,332,882,050	1,770,000,000	2.45	2017 10-K, p. 75
Holly Energy Partners, LP	2,045,985,959	485,065,000	4.22	2017 10-K, p. 66
Magellan Midstream Partners, LP	14,817,035,649	2,129,653,000	6.96	2017 10-K, p. 110
NuStar Energy, LP	2,630,944,960	2,480,089,000	1.06	2017 10-K, p. 122
Plains All American Pipeline	14,569,049,782	10,958,000,000	1.33	2017 10-K, p. 140
		Average	**3.22**	

Market to Book Ratio for Debt

Company	Long-term Debt Market Value from 10-K	Book Value Long-Term Debt	Market to Book Ratio	Source
Buckeye Partners, LP	5,053,240,000	4,910,525,000	1.03	2017 10-K, p. 99
Enbridge Energy Partners, LP	4,420,000,000	4,200,000,000	1.05	2017 10-K, p. 93
Holly Energy Partners, LP	525,120,000	495,308,000	1.06	2017 10-K, p. 78
Magellan Midstream Partners, LP	4,826,480,000	4,524,492,000	1.07	2017 10-K, p. 110
NuStar Energy, LP	3,677,622,000	3,613,059,000	1.02	2017 10-K, p. 162
Plains All American Pipeline	9,100,000,000	9,183,000,000	0.99	2017 10-K, p. 77 & 169
		Average	**1.05**	

Application of Capital Structure as determined in the Capitalization Rate Study

	Capital Structure	Market to Book	Composite
Common Equity	59.00%	3.22	1.90
Long-term Debt	41.00%	1.05	0.43
		Overall Market to Book Ratio	**2.33**

Yield Rate

Class I Railroads

	Capital Structure	Rate	Composite
Long-Term Debt	18.00%	4.49%	0.81%
Common Equity	82.00%	10.26%	8.41%
Yield Rate			**9.22%**

Class I Railroads Yield Rate	**9.22%**

Other Railroads

	Capital Structure	Rate	Composite
Long-Term Debt	35.00%	7.19%	2.52%
Common Equity	65.00%	11.00%	7.15%
Yield Rate			**9.67%**

Other Railroads Yield Rate	**9.67%**

Capital Structure

Company	Value of Long-Term Debt	Value of Preferred Equity	Value of Common Equity	Total Market Value	% Long-Term Debt	% Preferred Equity	% Common Equity
Canadian National Railway Co.	6,883,000,000	None	60,535,900,000	67,418,900,000	10.21%	N/A	89.79%
Canadian Pacific Railway Ltd.	5,745,000,000	None	24,915,350,000	30,660,350,000	18.74%	N/A	81.26%
CSX Corp.	11,788,000,000	None	44,149,920,300	55,937,920,300	21.07%	N/A	78.93%
Genesee & Wyoming	2,398,100,000	N/A	4,496,988,727	6,895,088,727	34.78%	N/A	65.22%
Kansas City Southern	2,238,400,000	6,100,000	10,794,370,364	13,038,870,364	17.17%	0.05%	82.79%
Norfolk Southern Corp.	9,280,000,000	None	36,335,170,307	45,615,170,307	20.34%	N/A	79.66%
Union Pacific Corp.	15,930,000,000	None	91,492,631,367	107,422,631,367	14.83%	N/A	85.17%

	% Long-Term Debt	% Preferred Equity	% Common Equity
Mean All	19.59%	0.05%	80.40%
Median All	18.74%	0.05%	81.26%
Mean Class I*	17.06%	0.05%	82.93%
Median Class I*	17.95%	0.05%	82.02%
Mean Other Railroads^	34.78%	N/A	65.22%
Median Other Railroads^	34.78%	N/A	65.22%
Indicated Industry Capital Structure, Class I Railroads	**18.00%**	**N/A**	**82.00%**
Indicated Industry Capital Structure, Other Railroads	**35.00%**	**N/A**	**65.00%**

We placed more reliance on the median capital structure when selecting the indicated capital structure for Class I Railroads, rounding to 18% debt, 82% equity.
We selected the median and mean capital structure as the indicated capital structure for Other Railroads, rounding to 35% debt, 65% equity.

Notes:
Data downloaded from Value Line.
* Does not include Genesee & Wyoming.
^ Genesee & Wyoming only.

Indexed Rate of Debt

Company	Debt Rating	Long-Term Debt Rate	
Canadian National Railway Co.	A2	4.00	
Canadian Pacific Railway Ltd.	Baa1	4.50	
CSX Corp.	Baa1	4.50	
Genesee & Wyoming	Ba2	6.71	**
Kansas City Southern	Baa3	4.50	
Norfolk Southern Corp.	Baa1	4.50	
Union Pacific Corp.	A3	4.00	

Mean Class I* 4.33
Median Class I* 4.50

Industrial Bond Yield Averages from Mergent Bond Record, January 2018 Edition

Industrial Bond Averages, December 2017

Mergent	S&P	Yield Avg.
Aaa	AAA	3.74
Aa1	AA+	
Aa2	AA	
Aa3	AA-	3.84
A1	A+	
A2	A	
A3	A-	4.00
Baa1	BBB+	
Baa2	BBB	
Baa3	BBB-	4.50

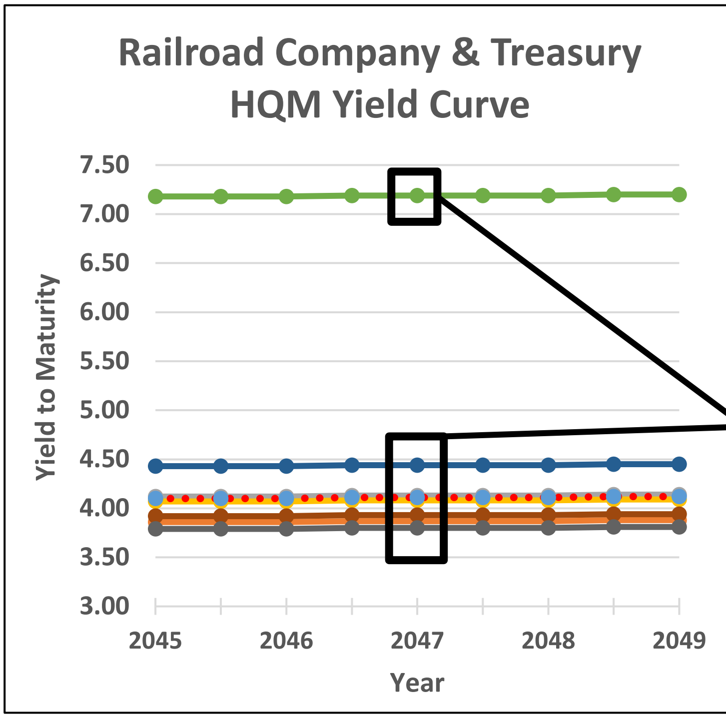
Notes:

*Does not include Genesee & Wyoming.

^Genesee & Wyoming Only.

**Genesee & Wyoming is rated below the Mergent Bond Record Bond Yield Averages. We analyzed the Mergent Bond Record, January 2018 issue, for U.S. Corporate Bonds that were considered below investment grade. We determined the average Ba yield to maturity is 6.71%.

Current Actual Cost of Debt



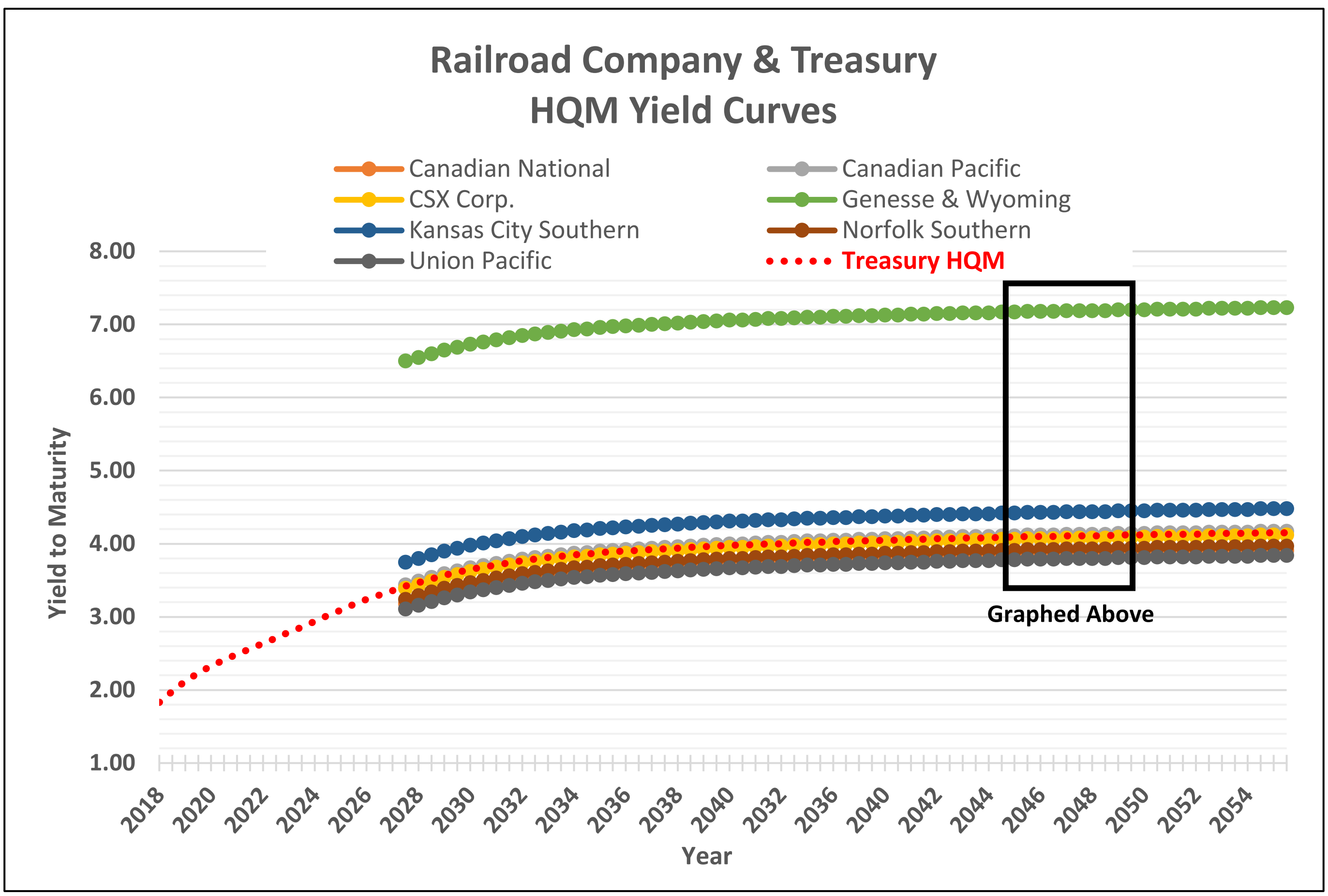
The Yield-to-Maturities (YTMs) calculated below are based off of information received via year-end filings (Form N-Q or 10-K) with the SEC. The 30-year YTMs are then calculated based off an observed spread to the Treasury High Quality Market Corporate Bond spot rate curve (equation below) and followed out to 30 years.

$$p = \sum_{i=1}^{n} d(t_i)\, c_i + \sum_{j=1}^{m} b_j\, x_j + e$$

Class I Railroads
Average of 30-Year YTMs
4.49%

Other Railroads
Average of 30-Year YTMs
7.19%

Indicated Debt Rate (Class I)	4.49%
Indicated Debt Rate (Other)	7.19%



* The data behind the HQM yield curve can be found in Appendix G

Issued Debt by Company

Source of Debt Issues	Company Breakdown	Number of Issues
N-Q	6	66
10-K	1	1
Total	**7**	**67**

Periodicity	Redemption Price	Settlement Date
Semi-Annual	$ 100.00	1/4/2018

	Coupon	Maturity	Face Amount	Market Value	Market Price	YTM
Canadian National Railway Co.						
	5.55%	3/1/2019	$ 200,000	$ 207,601	$ 103.80	2.21%
	2.85%	12/15/2021	$ 100,000	$ 101,127	$ 101.13	2.55%
	2.25%	11/15/2022	$ 300,000	$ 293,748	$ 97.92	2.71%
	2.95%	11/21/2024	$ 200,000	$ 202,283	$ 101.14	2.77%
	2.75%	3/1/2026	$ 3,818,000	$ 3,768,000	$ 98.69	2.93%
	6.25%	8/1/2034	$ 200,000	$ 270,267	$ 135.13	3.45%
	3.50%	11/15/2042	$ 250,000	$ 244,105	$ 97.64	3.64%
	4.50%	11/7/2043	$ 100,000	$ 113,270	$ 113.27	3.70%
	3.20%	8/2/2046	$ 400,000	$ 387,264	$ 96.82	3.37%
Canadian Pacific Railway Co.						
	2.90%	2/1/2025	$ 13,708,000	$ 13,525,000	$ 98.67	3.11%
	7.13%	10/15/2031	$ 200,000	$ 273,557	$ 136.78	3.69%
	5.95%	5/15/2037	$ 250,000	$ 325,185	$ 130.07	3.75%
	6.13%	9/15/2115	$ 200,000	$ 266,715	$ 133.36	4.58%
CSX Corp.						
	3.70%	11/1/2023	$ 125,000	$ 129,662	$ 103.73	3.00%
	3.40%	8/1/2024	$ 300,000	$ 308,262	$ 102.75	2.94%
	3.35%	11/1/2025	$ 200,000	$ 203,292	$ 101.65	3.11%
	2.60%	11/1/2026	$ 1,200,000	$ 1,144,795	$ 95.40	3.20%
	3.25%	6/1/2027	$ 10,150,000	$ 10,086,000	$ 99.37	3.33%
	6.00%	10/1/2036	$ 100,000	$ 128,132	$ 128.13	3.87%
	6.15%	5/1/2037	$ 200,000	$ 262,241	$ 131.12	3.85%
	5.50%	4/15/2041	$ 400,000	$ 493,940	$ 123.49	3.95%
	4.40%	3/1/2043	$ 350,000	$ 378,652	$ 108.19	3.89%
	4.10%	3/15/2044	$ 100,000	$ 104,082	$ 104.08	3.85%
	3.80%	11/1/2046	$ 675,000	$ 670,494	$ 99.33	3.84%
	3.95%	5/1/2050	$ 200,000	$ 198,803	$ 99.40	3.98%
	4.50%	8/1/2054	$ 300,000	$ 315,525	$ 105.18	4.22%
	4.25%	11/1/2066	$ 150,000	$ 149,707	$ 99.80	4.26%

Coupon	Maturity	Face Amount	Market Value	Market Price	YTM
Genesse & Wyoming[1]					
6.50%	1/15/2026	$ 100,000	$ 100,000	$ 100.00	6.50%
Kansas City Southern					
3.00%	5/15/2023	$ 100,000	$ 99,119	$ 99.12	3.18%
3.13%	6/1/2026	$ 100,000	$ 96,825	$ 96.83	3.57%
4.30%	5/15/2043	$ 100,000	$ 105,030	$ 105.03	3.98%
4.95%	8/15/2045	$ 175,000	$ 199,321	$ 113.90	4.10%
Norfolk Southern Corp.					
3.25%	12/1/2021	$ 100,000	$ 102,457	$ 102.46	2.58%
3.00%	4/1/2022	$ 250,000	$ 253,111	$ 101.24	2.69%
2.90%	2/15/2023	$ 1,291,000	$ 1,297,041	$ 100.47	2.80%
3.85%	1/15/2024	$ 200,000	$ 210,981	$ 105.49	2.85%
5.59%	5/17/2025	$ 81,000	$ 92,877	$ 114.66	3.33%
2.90%	6/15/2026	$ 200,000	$ 196,679	$ 98.34	3.13%
3.15%	6/1/2027	$ 300,000	$ 299,147	$ 99.72	3.18%
4.84%	10/1/2041	$ 16,000	$ 18,633	$ 116.46	3.78%
3.95%	10/1/2042	$ 750,000	$ 767,742	$ 102.37	3.80%
4.80%	8/15/2043	$ 75,000	$ 85,634	$ 114.18	3.92%
4.45%	6/15/2045	$ 300,000	$ 334,160	$ 111.39	3.78%
4.65%	1/15/2046	$ 200,000	$ 228,204	$ 114.10	3.83%
3.94%	11/1/2047	$ 128,000	$ 131,244	$ 102.53	3.80%

	Coupon	Maturity	Face Amount	Market Value	Market Price	YTM
Unioun Pacific Corp						
	2.25%	2/15/2019	$ 100,000	$ 100,120	$ 100.12	2.14%
	2.25%	6/20/2020	$ 450,000	$ 450,534	$ 100.12	2.20%
	4.16%	7/15/2022	$ 331,000	$ 354,762	$ 107.18	2.48%
	2.95%	1/15/2023	$ 500,000	$ 508,393	$ 101.68	2.59%
	3.65%	2/15/2024	$ 277,000	$ 291,105	$ 105.09	2.74%
	3.75%	3/15/2024	$ 200,000	$ 211,341	$ 105.67	2.75%
	3.25%	1/15/2025	$ 200,000	$ 204,720	$ 102.36	2.88%
	3.25%	8/15/2025	$ 200,000	$ 205,298	$ 102.65	2.86%
	2.75%	3/1/2026	$ 300,000	$ 296,454	$ 98.82	2.91%
	3.00%	4/15/2027	$ 1,000,000	$ 1,004,682	$ 100.47	2.94%
	2.70%	5/12/2027	$ 186,266	$ 180,957	$ 97.15	3.05%
	3.38%	2/1/2035	$ 100,000	$ 101,215	$ 101.22	3.28%
	3.60%	9/15/2037	$ 100,000	$ 103,526	$ 103.53	3.35%
	4.30%	6/15/2042	$ 100,000	$ 109,778	$ 109.78	3.69%
	4.25%	4/15/2043	$ 150,000	$ 164,349	$ 109.57	3.67%
	4.05%	11/15/2045	$ 200,000	$ 215,967	$ 107.98	3.59%
	3.35%	8/15/2046	$ 200,000	$ 192,930	$ 96.47	3.55%
	4.00%	4/15/2047	$ 300,000	$ 324,244	$ 108.08	3.55%
	3.80%	10/1/2051	$ 770,000	$ 784,255	$ 101.85	3.70%
	3.88%	2/1/2055	$ 200,000	$ 202,976	$ 101.49	3.80%
	4.38%	11/15/2065	$ 300,000	$ 327,233	$ 109.08	3.95%
	4.10%	9/15/2067	$ 200,000	$ 208,409	$ 104.20	3.91%

1 Partner Loan Agreement (6.50% and 6.51% interest rate at December 31, 2017 and 2016, respectively) due 2026.
https://www.sec.gov/Archives/edgar/data/1012620/000101262018000008/gwr10k20171231secimport.htm

Indicated Rate of Equity

Class I Railroads

Model	Rate
CAPM - Ex Post	10.71%
CAPM - Supply Side	9.53%
CAPM - Three Stage Ex Ante	9.22%
CAPM - Damodaran	8.42%
CAPM - Duff & Phelps	8.33%
CAPM - Graham and Harvey	7.20%
CAPM - Fernandez, Pershin, and Acin	9.14%
Empirical CAPM - Ex Post	10.45%
Empirical CAPM - Supply Side	9.30%
Empirical CAPM - Three Stage Ex Ante	9.00%
Empirical CAPM - Damodaran	8.23%
Empirical CAPM - Duff & Phelps	8.14%
Empirical CAPM - Graham and Harvey	7.06%
Empirical CAPM - Fernandez, Pershin, and Acin	8.93%
DGM - Dividend Growth	9.60%
DGM - Earnings Growth	10.30%
Multi-Stage DGM	8.95%
Indicated Rate of Equity	**10.26%**

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the most reliance on the Dividend Growth Model, Earnings Growth. The department placed secondary reliance on the Capital Asset Pricing Models using Dr. Damodaran's and the Ex Post equity risk premiums.

Indicated Rate of Equity

Other Railroads

Model	Rate
CAPM - Ex Post	13.19%
CAPM - Supply Side	11.64%
CAPM - Three Stage Ex Ante	11.24%
CAPM - Damodaran	10.20%
CAPM - Duff & Phelps	10.08%
CAPM - Graham and Harvey	8.61%
CAPM - Fernandez, Pershin, and Acin	11.13%
Empirical CAPM - Ex Post	12.30%
Empirical CAPM - Supply Side	10.89%
Empirical CAPM - Three Stage Ex Ante	10.51%
Empirical CAPM - Damodaran	9.57%
Empirical CAPM - Duff & Phelps	9.46%
Empirical CAPM - Graham and Harvey	8.11%
Empirical CAPM - Fernandez, Pershin, and Acin	10.42%
DGM - Dividend Growth	9.60%
DGM - Earnings Growth	10.30%
Multi-Stage DGM	8.95%
Indicated Rate of Equity	**11.00%**

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the most reliance on the Dividend Growth Model, Earnings Growth. The department placed secondary reliance on the Capital Asset Pricing Models using Dr. Damodaran's and the Ex Post equity risk premiums.

Direct Rate and Growth

Class I Railroads

	Capital Structure	Rate	Composite
Debt Component	18.00%	4.49%	0.81%
Equity Component	82.00%	5.24%	4.30%
Direct Rate			**5.11%**

Class I Railroads Direct Rate	**5.11%**

Yield Rate	9.22%
Direct Rate	5.11%
Estimated Industry Growth Rate	**4.11%**

Other Railroads

	Capital Structure	Rate	Composite
Debt Component	35.00%	7.19%	2.52%
Equity Component	65.00%	5.21%	3.39%
Direct Rate			**5.90%**

Other Railroads Direct Rate	**5.90%**

Yield Rate	9.67%
Direct Rate	5.90%
Estimated Industry Growth Rate	**3.77%**

Capital Asset Pricing Model (CAPM)

(ERP x β) + RFR = Indicated Equity Rate

Class I Railroads

Model	Equity risk premium (ERP)	x Industry Beta (β)	= Industry Risk Premium	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	1.15	8.13%	2.58%	**10.71%**
Supply Side[3]	6.04%	1.15	6.95%	2.58%	**9.53%**
Three Stage Ex Ante Model[4]	5.77%	1.15	6.64%	2.58%	**9.22%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	1.15	5.84%	2.58%	**8.42%**
Duff & Phelps[6]	5.00%	1.15	5.75%	2.58%	**8.33%**
Graham and Harvey[7]	4.02%	1.15	4.62%	2.58%	**7.20%**
Fernandez, Pershin and Acin[8]	5.70%	1.15	6.56%	2.58%	**9.14%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov

2 Long-horizon expected equity risk premium (historical), 2018 Valuation Handbook – Guide to Cost of Capital

3 Long-horizon expected equity risk premium (supply side), 2018 Valuation Handbook – Guide to Cost of Capital

4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% “normalized” risk-free rate. 2018 Valuation Handbook – Guide to Cost of Capital

7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016

8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Capital Asset Pricing Model (CAPM)

(ERP x β) + RFR = Indicated Equity Rate

Other Railroads

Model	Equity risk premium (ERP)	x Industry Beta (β)	= Industry Risk Premium	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	1.50	10.61%	2.58%	**13.19%**
Supply Side[3]	6.04%	1.50	9.06%	2.58%	**11.64%**
Three Stage Ex Ante Model[4]	5.77%	1.50	8.66%	2.58%	**11.24%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	1.50	7.62%	2.58%	**10.20%**
Duff & Phelps[6]	5.00%	1.50	7.50%	2.58%	**10.08%**
Graham and Harvey[7]	4.02%	1.50	6.03%	2.58%	**8.61%**
Fernandez, Pershin and Acin[8]	5.70%	1.50	8.55%	2.58%	**11.13%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov

2 Long-horizon expected equity risk premium (historical), 2018 Valuation Handbook – Guide to Cost of Capital

3 Long-horizon expected equity risk premium (supply side), 2018 Valuation Handbook – Guide to Cost of Capital

4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% “normalized” risk-free rate. 2018 Valuation Handbook – Guide to Cost of Capital

7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016

8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Empirical Capital Asset Pricing Model (ECAPM)

(ERP x β x .75) + (ERP x .25) + RFR = Indicated Equity Rate

Class I Railroads

Model	Equity risk premium (ERP)	x Industry Beta (β)	x 75%	= Industry Risk Premium (weighted)	Equity risk premium (ERP)	x 25%	Equity Risk Premium (weighted)	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	1.15	75%	6.10%	7.07%	25%	1.77%	2.58%	**10.45%**
Supply Side[3]	6.04%	1.15	75%	5.21%	6.04%	25%	1.51%	2.58%	**9.30%**
Three Stage Ex Ante Model[4]	5.77%	1.15	75%	4.98%	5.77%	25%	1.44%	2.58%	**9.00%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	1.15	75%	4.38%	5.08%	25%	1.27%	2.58%	**8.23%**
Duff & Phelps[6]	5.00%	1.15	75%	4.31%	5.00%	25%	1.25%	2.58%	**8.14%**
Graham and Harvey[7]	4.02%	1.15	75%	3.47%	4.02%	25%	1.01%	2.58%	**7.06%**
Fernandez, Pershin and Acin[8]	5.70%	1.15	75%	4.92%	5.70%	25%	1.43%	2.58%	**8.93%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov

2 Long-horizon expected equity risk premium (historical), 2018 Valuation Handbook – Guide to Cost of Capital

3 Long-horizon expected equity risk premium (supply side), 2018 Valuation Handbook – Guide to Cost of Capital

4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% "normalized" risk-free rate. 2018 Valuation Handbook – Guide to Cost of Capital

7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016

8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Empirical Capital Asset Pricing Model (ECAPM)

(ERP x β x .75) + (ERP x .25) + RFR = Indicated Equity Rate

Other Railroads

Model	Equity risk premium (ERP)	x Industry Beta (β)	x 75%	= Industry Risk Premium (weighted)	Equity risk premium (ERP)	x 25%	Equity Risk Premium (weighted)	+ Risk-Free Rate[1] (RFR)	Indicated Equity Rate
Ex Post[2]	7.07%	1.50	75%	7.95%	7.07%	25%	1.77%	2.58%	**12.30%**
Supply Side[3]	6.04%	1.50	75%	6.80%	6.04%	25%	1.51%	2.58%	**10.89%**
Three Stage Ex Ante Model[4]	5.77%	1.50	75%	6.49%	5.77%	25%	1.44%	2.58%	**10.51%**
Dr. Damodaran Equity Risk Premium[5]	5.08%	1.50	75%	5.72%	5.08%	25%	1.27%	2.58%	**9.57%**
Duff & Phelps[6]	5.00%	1.50	75%	5.63%	5.00%	25%	1.25%	2.58%	**9.46%**
Graham and Harvey[7]	4.02%	1.50	75%	4.52%	4.02%	25%	1.01%	2.58%	**8.11%**
Fernandez, Pershin and Acin[8]	5.70%	1.50	75%	6.41%	5.70%	25%	1.43%	2.58%	**10.42%**

Notes:

1 U.S. Treasury 20 year Coupon Bond Yield, Daily observations, December 29, 2017, www.federalreserve.gov

2 Long-horizon expected equity risk premium (historical), 2018 Valuation Handbook – Guide to Cost of Capital

3 Long-horizon expected equity risk premium (supply side), 2018 Valuation Handbook – Guide to Cost of Capital

4 3 Stage Dividend Growth Model, S&P 500, See Exhibit, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2018 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) : The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% "normalized" risk-free rate. 2018 Valuation Handbook – Guide to Cost of Capital

7 Graham and Harvey Survey of U.S. Chief Financial Officers, The Equity Risk Premium in 2016

8 Fernandez, Pershin, and Acin Survey of Finance and Economic Professors, Analysts, and Managers, 2017

Class I Railroads

Company	Current Dividend Yield (DY)	Projected EPS Growth Rate 5 Year (EG)	Projected Dividend Growth Rate 5 Year (DG)	Cost of Capital Earnings Growth DY + EG	Cost of Capital Dividend Growth DY + DG
Canadian National Railway Co.	2.10%	8.00%	11.00%	10.10%	13.10%
Canadian Pacific Railway Ltd.	1.00%	9.50%	12.00%	10.50%	13.00%
CSX Corp.	1.60%	11.50%	8.50%	13.10%	10.10%
Genesee & Wyoming	Nil	5.50%	Nil	---	---
Kansas City Southern	1.40%	9.50%	6.00%	10.90%	7.40%
Norfolk Southern Corp.	1.90%	8.00%	3.00%	9.90%	4.90%
Union Pacific Corp.	2.10%	8.00%	7.00%	10.10%	9.10%
Mean	1.68%	9.08%	7.92%	10.77%	9.60%
Median	1.75%	8.75%	7.75%	10.30%	9.60%

DGM - Dividend Growth, Indicated Rate	**9.60%**
DGM - Earnings Growth, Indicated Rate	**10.30%**

We placed most reliance on the median when selecting the indicated rate given the wide range in values.

Notes:

Dividend Yield provided by Value Line.
Genesee & Wyoming is shown in the above calculation, but is not included in the mean or median because they do not pay dividends.

Multi-Stage Dividend Growth Model

$K_E = (D_1 / P_0) + 0.67(G_1) + 0.33(g)$

Where:

K_E Cost of Equity

$D1 / P_0$ Dividend Yield

G_1 Growth Estimate, next five years

g Stable Growth

Company	**$D1 / P_0$** Dividend Yield	**G_1** Growth Estimate, next five years	**g** Stable Growth	**0.67 x G_1**	**.33 x g**	**K_E** Cost of Equity
Canadian National Railway Co.	2.10%	8.00%	4.50%	5.36%	1.49%	8.95%
Canadian Pacific Railway Ltd.	1.00%	9.50%	4.50%	6.37%	1.49%	8.85%
CSX Corp.	1.60%	11.50%	4.50%	7.71%	1.49%	10.79%
Kansas City Southern	1.40%	9.50%	4.50%	6.37%	1.49%	9.25%
Norfolk Southern Corp.	1.90%	8.00%	4.50%	5.36%	1.49%	8.75%
Union Pacific Corp.	2.10%	8.00%	4.50%	5.36%	1.49%	8.95%

Mean	9.25%
Median	8.95%
Multi-Stage DGM, Indicated Rate	**8.95%**

We placed the most reliance on the median to arrive at the indicated rate.

Notes:

Dividend Yield provided by Value Line.

Growth Estimates, Next 5 Years for Earnings provided Value Line.

Stable growth rate is the nominal growth rate determined in the Capitalization Rate Study Narrative (indicated long-term growth rate of the U.S. economy of 2.5% plus the expected inflation rate of 2.0%).

We removed Genesee & Wyoming because they do not pay dividends.

Genesee & Wyoming	Nil	5.50%	4.50%	3.69%	1.49%	N/A

Equity Component of the Direct Rate, Class I Railroads

Company	Value Line P/E Ratio
Canadian National Railway Co.	20.00
Canadian Pacific Railway Ltd.	18.90
CSX Corp.	20.30
Kansas City Southern	18.60
Norfolk Southern Corp.	19.00
Union Pacific Corp.	19.20
Mean	19.33
Median	19.10
Selected Price to Earnings (P/E) Ratio	19.10
Indicated Equity Component of the Direct Rate	**5.24%**

Equity Component of the Direct Rate, Other Railroads

Company	Value Line P/E Ratio
Canadian National Railway Co.	20.00
Canadian Pacific Railway Ltd.	18.90
CSX Corp.	20.30
Genesee & Wyoming	22.40
Kansas City Southern	18.60
Norfolk Southern Corp.	19.00
Union Pacific Corp.	19.20
Mean	19.77
Median	19.20
Selected Price to Earnings (P/E) Ratio	19.20
Indicated Equity Component of the Direct Rate	**5.21%**

We placed the most reliance on the median price to earnings ratio for both the Class I and Other Railroads.

Notes:
The Price/Earnings Ratio was downloaded from Value Line.

Beta Analysis

Company	Beta
Canadian National Railway Co.	1.05
Canadian Pacific Railway Ltd.	1.20
CSX Corp.	1.20
Genesee & Wyoming	1.50
Kansas City Southern	1.15
Norfolk Southern Corp.	1.15
Union Pacific Corp.	1.05

Class I Railroads*	
Beta Mean	1.13
Beta Median	1.15
Unlevered and Relevered Mean^	1.14
Indicated Beta	**1.15**

Other Railroads^^	
Beta Mean	1.50
Beta Median	1.50
Indicated Beta	**1.50**

We placed equal reliance on the median when selecting the indicated beta for both Class I and Other Railroads.

Notes:

^ See the Unlevering Relevering Beta page for the calculation.

* Does not include Genesee & Wyoming.

^^ Genesee & Wyoming only
We did not unlever and relever the beta for Other Railroads as it is only Genesee & Wyoming.

Unlevering/Relevering Betas

Guideline Companies for Class I Railroads

Unlevering of Betas	*Value Line* Actual Income Tax Rate	*From Capital Structure Page* Actual Debt in Capital Structure	*From Capital Structure Page* Actual Equity in Capital Structure	*Value Line* Levered Beta (Published)	*Formula* Unlevered Beta
Canadian National Railway Co.	26.00%	10.21%	89.79%	1.05	0.97
Canadian Pacific Railway Ltd.	26.50%	18.74%	81.26%	1.20	1.03
CSX Corp.	37.50%	21.07%	78.93%	1.20	1.03
Kansas City Southern	33.00%	17.17%	82.79%	1.15	1.01
Norfolk Southern Corp.	37.00%	20.34%	79.66%	1.15	0.99
Union Pacific Corp.	38.00%	14.83%	85.17%	1.05	0.95
			Average Beta	**1.13**	

Relevering of Betas	*Formula* Composite Income Tax Rate	*From Capital Structure Page* Debt in Capital Structure	*From Capital Structure Page* Equity in Capital Structure	*Formula* Levered Beta
Canadian National Railway Co.	33.00%	18.00%	82.00%	1.11
Canadian Pacific Railway Ltd.	33.00%	18.00%	82.00%	1.18
CSX Corp.	33.00%	18.00%	82.00%	1.18
Kansas City Southern	33.00%	18.00%	82.00%	1.16
Norfolk Southern Corp.	33.00%	18.00%	82.00%	1.14
Union Pacific Corp.	33.00%	18.00%	82.00%	1.09
			Average Beta	**1.14**

Calculation of Market to Book Ratios for Railroad Market Segment

December 31, 2017 calendar year information for the January 2, 2018 Assessment

A market to book ratio over one would be an indication of no obsolescence.

Market Value estimates for Common Equity are from Value Line. Market Value Estimates for Long-Term Debt are from the company's Annual Report or 10-K.
Book Value amounts are from the company's balance sheet as listed in the 10-K or Annual Report.

Market to Book Ratio for Equity

Company	Market Value of Common Equity from Value Line	Book Value of Common Equity	Market to Book Ratio	Source
Canadian National Railway Co.	60,535,900,000	13,244,351,520 ^	4.57	2017 Full Year Financials Report, p. 58
Canadian Pacific Railway Ltd.	24,915,350,000	5,118,509,200 ^	4.87	2017 Form 10-K, p. 67
CSX Corp.	44,149,920,300	14,721,000,000	3.00	2017 Form 10-K, p. 58
Genesee & Wyoming	4,496,988,727	3,896,092,000	1.15	2017 Form 10-K, p. F-4
Kansas City Southern	10,794,370,364	4,548,900,000	2.37	2017 Form 10-K, p. 52
Norfolk Southern Corp.	36,335,170,307	16,359,000,000	2.22	2017 Form 10-K, p. 38
Union Pacific Corp.	91,492,631,367	24,856,000,000	3.68	2017 Form 10-K, p. 47
		Class I Average	**3.45**	
		Other Railroads Average	**1.15**	

Market to Book Ratio for Debt

Company	Market Value of Long-Term Debt from 10-K	Book Value Long-Term Debt	Market to Book Ratio	Source
Canadian National Railway Co.	9,672,447,880 ^	8,610,100,760 ^	1.12	2017 Full Year Financials Report, p. 58 & 95
Canadian Pacific Railway Ltd.	7,698,040,700 ^	6,487,792,000 ^	1.19	2018 Form 10-K, p. 87
CSX Corp.	13,220,000,000	11,809,000,000	1.12	2017 Form 10-K, p. 106
Genesee & Wyoming	2,279,901,000	2,256,312,000	1.01	2017 Form 10-K, p. F-43
Kansas City Southern	2,377,800,000	2,274,300,000	1.05	2017 Form 10-K, p. 63
Norfolk Southern Corp.	11,771,000,000	9,736,000,000	1.21	2017 Form 10-K, p. 47
Union Pacific Corp.	18,200,000,000	16,900,000,000	1.08	2017 Form 10-K, p. 71
		Class I Average	**1.13**	
		Other Railroads Average	**1.01**	

Class I Railroads

Application of Capital Structure as determined in the Capitalization Rate Study

	Capital Structure		Market to Book		Composite
Common Equity	82.00%		3.45		2.83
Long-term Debt	18.00%		1.13		0.20
	Overall Market to Book Ratio				**3.03**

Other Railroads

Application of Capital Structure as determined in the Capitalization Rate Study

	Capital Structure		Market to Book		Composite
Common Equity	65.00%		1.15		0.75
Long-term Debt	35.00%		1.01		0.35
	Overall Market to Book Ratio				**1.10**

Notes:

^ Canadian Dollars converted to U.S. Dollars using 12/29/2017 exchange rate of 0.79517 from exchange-rates.org

Appendix F - Three Stage Ex Ante Calculation

Three Stage Ex Ante Equity Risk Premium Calculation

Implied Market Rate Range =	**6.97%**	**to**	**8.35%**
Mean	7.66%		
Median	7.66%		
Market Rate Used	**8.35%**		
(Less) Risk-Free Rate	2.58%		
Equals Equity Risk Premium	**5.77%**		

Assumptions:

Stages	**Years**		**Growth**	**Model 1**				**Model 2**		
1st Stage	1-5 years		Constant @:	12.57%			*	10.20%		
2nd Stage	6-15 years		Linear from:	11.87%	to	4.91%	OR	11.87%	to	3.37%
				Real Growth**				Inflation^		
3rd Stage	15 years -perpetuity	GDP Growth:	Real and Inflatio	1.50%		3.00%	+	1.87%	to	1.91%
		GDP Growth^^:	Real + Inflation	4.91%			TO	3.37%		

** Linear from 1st Stage to 3rd Stage*

	Model 1	Model 2
Implied Market Return	8.35%	6.97%

Year	Model 1				Model 2			
	Starting Industry			S & P 500	Starting Industry			S & P 500
2017	Start Price†		$	(2,600.87)	Start Price†		$	(2,600.87)
2018	Expected Dividends††		$	53.00	Expected Dividends††		$	53.00
2019	1st Stage Growth Rates	12.570%	$	59.66	1st Stage Growth Rates	10.200%	$	58.41
2020		12.570%	$	67.16		10.200%	$	64.36
2021		12.570%	$	75.60		10.200%	$	70.93
2022		12.570%	$	85.11		10.200%	$	78.16
2023	2nd Stage Growth Rates	11.87%	$	95.21	2nd Stage Growth Rates	11.87%	$	87.44
2024		11.177%	$	105.85		11.023%	$	97.08
2025		10.481%	$	116.95		10.173%	$	106.96
2026		9.785%	$	128.39		9.323%	$	116.93
2027		9.088%	$	140.06		8.472%	$	126.84
2028		8.392%	$	151.81		7.622%	$	136.50
2029		7.695%	$	163.50		6.771%	$	145.75
2030		6.999%	$	174.94		5.921%	$	154.38
2031		6.303%	$	185.97		5.071%	$	162.21
2032		5.606%	$	196.39		4.220%	$	169.05
2033		4.910%	$	206.04		3.370%	$	174.75
2034		4.910%	$	216.15		3.370%	$	180.64
2035		4.910%	$	226.76		3.370%	$	186.73
2036		4.910%	$	237.90		3.370%	$	193.02
2037		4.910%	$	249.58		3.370%	$	199.52
2038		4.910%	$	261.83		3.370%	$	206.25
2039		4.910%	$	274.69		3.370%	$	213.20
2040		4.910%	$	288.18		3.370%	$	220.38
2041		4.910%	$	302.33		3.370%	$	227.81
2042		4.910%	$	317.17		3.370%	$	235.49
2043		4.910%	$	332.74		3.370%	$	243.42
2044		4.910%	$	349.08		3.370%	$	251.62
2045		4.910%	$	366.22		3.370%	$	260.10
2046		4.910%	$	384.20		3.370%	$	268.87
2047		4.910%	$	403.07		3.370%	$	277.93
2048		4.910%	$	422.86		3.370%	$	287.30
2049		4.910%	$	443.62		3.370%	$	296.98
2050		4.910%	$	465.40		3.370%	$	306.99
2051		4.910%	$	488.25		3.370%	$	317.33
2052		4.910%	$	512.23		3.370%	$	328.03
2053		4.910%	$	537.38		3.370%	$	339.08
2054		4.910%	$	563.76		3.370%	$	350.51
2055		4.910%	$	591.44		3.370%	$	362.32
2056		4.910%	$	620.48		3.370%	$	374.53
2057		4.910%	$	650.95		3.370%	$	387.15
2058		4.910%	$	682.91		3.370%	$	400.20
2059		4.910%	$	716.44		3.370%	$	413.69
2060		4.910%	$	751.62		3.370%	$	427.63
2061		4.910%	$	788.52		3.370%	$	442.04
2062		4.910%	$	827.24		3.370%	$	456.94
2063		4.910%	$	867.86		3.370%	$	472.33
2064		4.910%	$	910.47		3.370%	$	488.25
2065		4.910%	$	955.17		3.370%	$	504.71
2066		4.910%	$	1,002.07		3.370%	$	521.71
2067		4.910%	$	1,051.27		3.370%	$	539.30
2068		4.910%	$	1,102.89		3.370%	$	557.47

2069		4.910%	$ 1,157.04		3.370%	$ 576.26
2070		4.910%	$ 1,213.85		3.370%	$ 595.68
2071		4.910%	$ 1,273.45		3.370%	$ 615.75
2072		4.910%	$ 1,335.98		3.370%	$ 636.50
2073		4.910%	$ 1,401.58		3.370%	$ 657.95
2074		4.910%	$ 1,470.40		3.370%	$ 680.13
2075		4.910%	$ 1,542.59		3.370%	$ 703.05
2076		4.910%	$ 1,618.33		3.370%	$ 726.74
2077		4.910%	$ 1,697.79		3.370%	$ 751.23
2078		4.910%	$ 1,781.16		3.370%	$ 776.55
2079		4.910%	$ 1,868.61		3.370%	$ 802.72
2080		4.910%	$ 1,960.36		3.370%	$ 829.77
2081		4.910%	$ 2,056.61		3.370%	$ 857.73
2082	3rd Stage Growth Rates	4.910%	$ 2,157.59	3rd Stage Growth Rates	3.370%	$ 886.64
2083		4.910%	$ 2,263.53		3.370%	$ 916.51
2084		4.910%	$ 2,374.67		3.370%	$ 947.40
2085		4.910%	$ 2,491.26		3.370%	$ 979.33
2086		4.910%	$ 2,613.59		3.370%	$ 1,012.33
2087		4.910%	$ 2,741.91		3.370%	$ 1,046.45
2088		4.910%	$ 2,876.54		3.370%	$ 1,081.71
2089		4.910%	$ 3,017.78		3.370%	$ 1,118.17
2090		4.910%	$ 3,165.95		3.370%	$ 1,155.85
2091		4.910%	$ 3,321.40		3.370%	$ 1,194.80
2092		4.910%	$ 3,484.48		3.370%	$ 1,235.07
2093		4.910%	$ 3,655.57		3.370%	$ 1,276.69
2094		4.910%	$ 3,835.06		3.370%	$ 1,319.71
2095		4.910%	$ 4,023.36		3.370%	$ 1,364.19
2096		4.910%	$ 4,220.91		3.370%	$ 1,410.16
2097		4.910%	$ 4,428.15		3.370%	$ 1,457.68
2098		4.910%	$ 4,645.57		3.370%	$ 1,506.81
2099		4.910%	$ 4,873.67		3.370%	$ 1,557.59
2100		4.910%	$ 5,112.97		3.370%	$ 1,610.08
2101		4.910%	$ 5,364.02		3.370%	$ 1,664.34
2102		4.910%	$ 5,627.39		3.370%	$ 1,720.42
2103		4.910%	$ 5,903.69		3.370%	$ 1,778.40
2104		4.910%	$ 6,193.57		3.370%	$ 1,838.33
2105		4.910%	$ 6,497.67		3.370%	$ 1,900.29
2106		4.910%	$ 6,816.71		3.370%	$ 1,964.33
2107		4.910%	$ 7,151.41		3.370%	$ 2,030.52
2108		4.910%	$ 7,502.54		3.370%	$ 2,098.95
2109		4.910%	$ 7,870.91		3.370%	$ 2,169.69
2110		4.910%	$ 8,257.38		3.370%	$ 2,242.80
2111		4.910%	$ 8,662.81		3.370%	$ 2,318.39
2112		4.910%	$ 9,088.16		3.370%	$ 2,396.52
2113		4.910%	$ 9,534.39		3.370%	$ 2,477.28
2114		4.910%	$ 10,002.53		3.370%	$ 2,560.76
2115		4.910%	$ 10,493.65		3.370%	$ 2,647.06
2116		4.910%	$ 11,008.89		3.370%	$ 2,736.27
2117		4.910%	$ 11,549.42		3.370%	$ 2,828.48
2118		4.910%	$ 12,116.50		3.370%	$ 2,923.80
2119		4.910%	$ 12,711.42		3.370%	$ 3,022.33
2120		4.910%	$ 13,335.55		3.370%	$ 3,124.18
2121		4.910%	$ 13,990.33		3.370%	$ 3,229.47
2122		4.910%	$ 14,677.25		3.370%	$ 3,338.30
2123		4.910%	$ 15,397.90		3.370%	$ 3,450.80
2124		4.910%	$ 16,153.94		3.370%	$ 3,567.10
2125		4.910%	$ 16,947.10		3.370%	$ 3,687.31
2126		4.910%	$ 17,779.20		3.370%	$ 3,811.57
2127		4.910%	$ 18,652.16		3.370%	$ 3,940.02
2128		4.910%	$ 19,567.98		3.370%	$ 4,072.80
2129		4.910%	$ 20,528.77		3.370%	$ 4,210.05
2130		4.910%	$ 21,536.73		3.370%	$ 4,351.93
2131		4.910%	$ 22,594.19		3.370%	$ 4,498.59
2132		4.910%	$ 23,703.56		3.370%	$ 4,650.19
2133		Reversion``	$ 33.29		Reversion``	$ 38.58
		Implied Market Return	**8.354341%**		**Implied Market Return**	**6.97026%**

*S&P 500 Earnings and Estimate Report dated 1/3/2018, http://us.spindices.com/indices/equity/sp-500
***First Quarter 2018 Survey of Professional Forecasters - Philadelphia Federal Reserve Release Date 2/9/2018*
^Inflation Range = Federal Reserve, Treasuries Inflation - Indexed
^^GDP Growth = Real growth + Inflation
† Start Price is the S&P 500 Index -2017 4th quarter hi-low average downloaded from Yahoo! Finance
††Expected Dividends downloaded from http://www.cmegroup.com/trading/equity-index/us-index/sp-500-quarterly-dividend-index.html, Published 12/29/2017

``Reversion Calculation:

A.	Last period's expected dividends, growth applied	24,867.41	4,806.90
B.	Implied Market Risk Premium Less Long-Term Growth	5.77%	4.39%
C.	A / B	430,653.59	109,490.16
D.	C / ((1 + Implied Market Risk Premium) ^ Last Period +1)	33.29	38.58

Electric - HQM Yield Curve Data

	Treasury HQM	Allete Inc.	Alliant Energy Corp.	Ameren Corp	American Electric Power Co.	Black Hills Corp.	CenterPoint Energy	CMS Energy Corp.	DTE Energy	Entergy Corp.	MGE Energy Inc.	Northwestern Corp.	OGE Energy Corp.	Otter Tail Corp.	Vectren Corp.	WEC Energy Group	Xcel Energy / Northern States
2018	1.83																
2018	1.98																
2019	2.12																
2019	2.23																
2020	2.33																
2020	2.41																
2021	2.49																
2021	2.56																
2022	2.64																
2022	2.71																
2023	2.79																
2023	2.86																
2024	2.94																
2024	3.02																
2025	3.09																
2025	3.17																
2026	3.24																
2026	3.30																
2027	3.36	3.11	3.51	3.13	3.29	3.43	3.06	3.29	3.36	3.09	3.11	2.99	2.98	3.33	3.25	3.40	3.16
2027	3.42	3.17	3.57	3.19	3.35	3.49	3.12	3.35	3.42	3.15	3.17	3.05	3.04	3.39	3.31	3.46	3.22
2028	3.47	3.22	3.62	3.24	3.40	3.54	3.17	3.40	3.47	3.20	3.22	3.10	3.09	3.44	3.36	3.51	3.27
2028	3.52	3.27	3.67	3.29	3.45	3.59	3.22	3.45	3.52	3.25	3.27	3.15	3.14	3.49	3.41	3.56	3.32
2029	3.57	3.32	3.72	3.34	3.50	3.64	3.27	3.50	3.57	3.30	3.32	3.20	3.19	3.54	3.46	3.61	3.37
2029	3.61	3.36	3.76	3.38	3.54	3.68	3.31	3.54	3.61	3.34	3.36	3.24	3.23	3.58	3.50	3.65	3.41
2030	3.65	3.40	3.80	3.42	3.58	3.72	3.35	3.58	3.65	3.38	3.40	3.28	3.27	3.62	3.54	3.69	3.45
2030	3.68	3.43	3.83	3.45	3.61	3.75	3.38	3.61	3.68	3.41	3.43	3.31	3.30	3.65	3.57	3.72	3.48
2031	3.71	3.46	3.86	3.48	3.64	3.78	3.41	3.64	3.71	3.44	3.46	3.34	3.33	3.68	3.60	3.75	3.51
2031	3.74	3.49	3.89	3.51	3.67	3.81	3.44	3.67	3.74	3.47	3.49	3.37	3.36	3.71	3.63	3.78	3.54
2032	3.77	3.52	3.92	3.54	3.70	3.84	3.47	3.70	3.77	3.50	3.52	3.40	3.39	3.74	3.66	3.81	3.57
2032	3.79	3.54	3.94	3.56	3.72	3.86	3.49	3.72	3.79	3.52	3.54	3.42	3.41	3.76	3.68	3.83	3.59
2033	3.81	3.56	3.96	3.58	3.74	3.88	3.51	3.74	3.81	3.54	3.56	3.44	3.43	3.78	3.70	3.85	3.61
2033	3.83	3.58	3.98	3.60	3.76	3.90	3.53	3.76	3.83	3.56	3.58	3.46	3.45	3.80	3.72	3.87	3.63
2034	3.85	3.60	4.00	3.62	3.78	3.92	3.55	3.78	3.85	3.58	3.60	3.48	3.47	3.82	3.74	3.89	3.65
2034	3.86	3.61	4.01	3.63	3.79	3.93	3.56	3.79	3.86	3.59	3.61	3.49	3.48	3.83	3.75	3.90	3.66
2035	3.88	3.63	4.03	3.65	3.81	3.95	3.58	3.81	3.88	3.61	3.63	3.51	3.50	3.85	3.77	3.92	3.68
2035	3.89	3.64	4.04	3.66	3.82	3.96	3.59	3.82	3.89	3.62	3.64	3.52	3.51	3.86	3.78	3.93	3.69
2036	3.90	3.65	4.05	3.67	3.83	3.97	3.60	3.83	3.90	3.63	3.65	3.53	3.52	3.87	3.79	3.94	3.70
2036	3.91	3.66	4.06	3.68	3.84	3.98	3.61	3.84	3.91	3.64	3.66	3.54	3.53	3.88	3.80	3.95	3.71
2037	3.92	3.67	4.07	3.69	3.85	3.99	3.62	3.85	3.92	3.65	3.67	3.55	3.54	3.89	3.81	3.96	3.72
2037	3.93	3.68	4.08	3.70	3.86	4.00	3.63	3.86	3.93	3.66	3.68	3.56	3.55	3.90	3.82	3.97	3.73
2038	3.94	3.69	4.09	3.71	3.87	4.01	3.64	3.87	3.94	3.67	3.69	3.57	3.56	3.91	3.83	3.98	3.74
2038	3.95	3.70	4.10	3.72	3.88	4.02	3.65	3.88	3.95	3.68	3.70	3.58	3.57	3.92	3.84	3.99	3.75
2039	3.96	3.71	4.11	3.73	3.89	4.03	3.66	3.89	3.96	3.69	3.71	3.59	3.58	3.93	3.85	4.00	3.76
2039	3.97	3.72	4.12	3.74	3.90	4.04	3.67	3.90	3.97	3.70	3.72	3.60	3.59	3.94	3.86	4.01	3.77
2040	3.98	3.73	4.13	3.75	3.91	4.05	3.68	3.91	3.98	3.71	3.73	3.61	3.60	3.95	3.87	4.02	3.78
2040	3.98	3.73	4.13	3.75	3.91	4.05	3.68	3.91	3.98	3.71	3.73	3.61	3.60	3.95	3.87	4.02	3.78
2041	3.99	3.74	4.14	3.76	3.92	4.06	3.69	3.92	3.99	3.72	3.74	3.62	3.61	3.96	3.88	4.03	3.79
2041	4.00	3.75	4.15	3.77	3.93	4.07	3.70	3.93	4.00	3.73	3.75	3.63	3.62	3.97	3.89	4.04	3.80
2042	4.00	3.75	4.15	3.77	3.93	4.07	3.70	3.93	4.00	3.73	3.75	3.63	3.62	3.97	3.89	4.04	3.80
2042	4.01	3.76	4.16	3.78	3.94	4.08	3.71	3.94	4.01	3.74	3.76	3.64	3.63	3.98	3.90	4.05	3.81
2043	4.02	3.77	4.17	3.79	3.95	4.09	3.72	3.95	4.02	3.75	3.77	3.65	3.64	3.99	3.91	4.06	3.82
2043	4.02	3.77	4.17	3.79	3.95	4.09	3.72	3.95	4.02	3.75	3.77	3.65	3.64	3.99	3.91	4.06	3.82
2044	4.03	3.78	4.18	3.80	3.96	4.10	3.73	3.96	4.03	3.76	3.78	3.66	3.65	4.00	3.92	4.07	3.83
2044	4.03	3.78	4.18	3.80	3.96	4.10	3.73	3.96	4.03	3.76	3.78	3.66	3.65	4.00	3.92	4.07	3.83
2045	4.04	3.79	4.19	3.81	3.97	4.11	3.74	3.97	4.04	3.77	3.79	3.67	3.66	4.01	3.93	4.08	3.84
2045	4.04	3.79	4.19	3.81	3.97	4.11	3.74	3.97	4.04	3.77	3.79	3.67	3.66	4.01	3.93	4.08	3.84
2046	4.05	3.80	4.20	3.82	3.98	4.12	3.75	3.98	4.05	3.78	3.80	3.68	3.67	4.02	3.94	4.09	3.85
2046	4.05	3.80	4.20	3.82	3.98	4.12	3.75	3.98	4.05	3.78	3.80	3.68	3.67	4.02	3.94	4.09	3.85
2047	4.06	3.81	4.21	3.83	3.99	4.13	3.76	3.99	4.06	3.79	3.81	3.69	3.68	4.03	3.95	4.10	3.86
2047	4.06	3.81	4.21	3.83	3.99	4.13	3.76	3.99	4.06	3.79	3.81	3.69	3.68	4.03	3.95	4.10	3.86
2048	4.07	3.82	4.22	3.84	4.00	4.14	3.77	4.00	4.07	3.80	3.82	3.70	3.69	4.04	3.96	4.11	3.87
2048	4.07	3.82	4.22	3.84	4.00	4.14	3.77	4.00	4.07	3.80	3.82	3.70	3.69	4.04	3.96	4.11	3.87
2049	4.08	3.83	4.23	3.85	4.01	4.15	3.78	4.01	4.08	3.81	3.83	3.71	3.70	4.05	3.97	4.12	3.88
2049	4.08	3.83	4.23	3.85	4.01	4.15	3.78	4.01	4.08	3.81	3.83	3.71	3.70	4.05	3.97	4.12	3.88
2050	4.08	3.83	4.23	3.85	4.01	4.15	3.78	4.01	4.08	3.81	3.83	3.71	3.70	4.05	3.97	4.12	3.88
2050	4.09	3.84	4.24	3.86	4.02	4.16	3.79	4.02	4.09	3.82	3.84	3.72	3.71	4.06	3.98	4.13	3.89
2051	4.09	3.84	4.24	3.86	4.02	4.16	3.79	4.02	4.09	3.82	3.84	3.72	3.71	4.06	3.98	4.13	3.89
2051	4.10	3.85	4.25	3.87	4.03	4.17	3.80	4.03	4.10	3.83	3.85	3.73	3.72	4.07	3.99	4.14	3.90

Appendix G - Debt Rate Analysis Data

	Treasury HQM	Allete Inc.	Alliant Energy Corp.	Ameren Corp	American Electric Power Co.	Black Hills Corp.	CenterPoint Energy	CMS Energy Corp.	DTE Energy	Entergy Corp.	MGE Energy Inc.	Northwestern Corp.	OGE Energy Corp.	Otter Tail Corp.	Vectren Corp.	WEC Energy Group	Xcel Energy / Northern States
2052	4.10	3.85	4.25	3.87	4.03	4.17	3.80	4.03	4.10	3.83	3.85	3.73	3.72	4.07	3.99	4.14	3.90
2052	4.10	3.85	4.25	3.87	4.03	4.17	3.80	4.03	4.10	3.83	3.85	3.73	3.72	4.07	3.99	4.14	3.90
2053	4.11	3.86	4.26	3.88	4.04	4.18	3.81	4.04	4.11	3.84	3.86	3.74	3.73	4.08	4.00	4.15	3.91
2053	4.11	3.86	4.26	3.88	4.04	4.18	3.81	4.04	4.11	3.84	3.86	3.74	3.73	4.08	4.00	4.15	3.91
2054	4.11	3.86	4.26	3.88	4.04	4.18	3.81	4.04	4.11	3.84	3.86	3.74	3.73	4.08	4.00	4.15	3.91
2054	4.11	3.86	4.26	3.88	4.04	4.18	3.81	4.04	4.11	3.84	3.86	3.74	3.73	4.08	4.00	4.15	3.91
2055	4.12	3.87	4.27	3.89	4.05	4.19	3.82	4.05	4.12	3.85	3.87	3.75	3.74	4.09	4.01	4.16	3.92
2055	4.12	3.87	4.27	3.89	4.05	4.19	3.82	4.05	4.12	3.85	3.87	3.75	3.74	4.09	4.01	4.16	3.92
2056	4.12	3.87	4.27	3.89	4.05	4.19	3.82	4.05	4.12	3.85	3.87	3.75	3.74	4.09	4.01	4.16	3.92
2056	4.13	3.88	4.28	3.90	4.06	4.20	3.83	4.06	4.13	3.86	3.88	3.76	3.75	4.10	4.02	4.17	3.93
2057	4.13	3.88	4.28	3.90	4.06	4.20	3.83	4.06	4.13	3.86	3.88	3.76	3.75	4.10	4.02	4.17	3.93
2057	4.13	3.88	4.28	3.90	4.06	4.20	3.83	4.06	4.13	3.86	3.88	3.76	3.75	4.10	4.02	4.17	3.93
2058	4.13	3.88	4.28	3.90	4.06	4.20	3.83	4.06	4.13	3.86	3.88	3.76	3.75	4.10	4.02	4.17	3.93
2058	4.14	3.89	4.29	3.91	4.07	4.21	3.84	4.07	4.14	3.87	3.89	3.77	3.76	4.11	4.03	4.18	3.94
2059	4.14	3.89	4.29	3.91	4.07	4.21	3.84	4.07	4.14	3.87	3.89	3.77	3.76	4.11	4.03	4.18	3.94
2059	4.14	3.89	4.29	3.91	4.07	4.21	3.84	4.07	4.14	3.87	3.89	3.77	3.76	4.11	4.03	4.18	3.94
2060	4.14	3.89	4.29	3.91	4.07	4.21	3.84	4.07	4.14	3.87	3.89	3.77	3.76	4.11	4.03	4.18	3.94
2060	4.15	3.90	4.30	3.92	4.08	4.22	3.85	4.08	4.15	3.88	3.90	3.78	3.77	4.12	4.04	4.19	3.95
2061	4.15	3.90	4.30	3.92	4.08	4.22	3.85	4.08	4.15	3.88	3.90	3.78	3.77	4.12	4.04	4.19	3.95
2061	4.15	3.90	4.30	3.92	4.08	4.22	3.85	4.08	4.15	3.88	3.90	3.78	3.77	4.12	4.04	4.19	3.95
2062	4.15	3.90	4.30	3.92	4.08	4.22	3.85	4.08	4.15	3.88	3.90	3.78	3.77	4.12	4.04	4.19	3.95
2062	4.15	3.90	4.30	3.92	4.08	4.22	3.85	4.08	4.15	3.88	3.90	3.78	3.77	4.12	4.04	4.19	3.95
2063	4.16	3.91	4.31	3.93	4.09	4.23	3.86	4.09	4.16	3.89	3.91	3.79	3.78	4.13	4.05	4.20	3.96
2063	4.16	3.91	4.31	3.93	4.09	4.23	3.86	4.09	4.16	3.89	3.91	3.79	3.78	4.13	4.05	4.20	3.96
2064	4.16	3.91	4.31	3.93	4.09	4.23	3.86	4.09	4.16	3.89	3.91	3.79	3.78	4.13	4.05	4.20	3.96
2064	4.16	3.91	4.31	3.93	4.09	4.23	3.86	4.09	4.16	3.89	3.91	3.79	3.78	4.13	4.05	4.20	3.96
2065	4.16	3.91	4.31	3.93	4.09	4.23	3.86	4.09	4.16	3.89	3.91	3.79	3.78	4.13	4.05	4.20	3.96
2065	4.17	3.92	4.32	3.94	4.10	4.24	3.87	4.10	4.17	3.90	3.92	3.80	3.79	4.14	4.06	4.21	3.97
2066	4.17	3.92	4.32	3.94	4.10	4.24	3.87	4.10	4.17	3.90	3.92	3.80	3.79	4.14	4.06	4.21	3.97
2066	4.17	3.92	4.32	3.94	4.10	4.24	3.87	4.10	4.17	3.90	3.92	3.80	3.79	4.14	4.06	4.21	3.97
2067	4.17	3.92	4.32	3.94	4.10	4.24	3.87	4.10	4.17	3.90	3.92	3.80	3.79	4.14	4.06	4.21	3.97
2067	4.17	3.92	4.32	3.94	4.10	4.24	3.87	4.10	4.17	3.90	3.92	3.80	3.79	4.14	4.06	4.21	3.97

Gas Distribution - HQM Yield Curve Data

	Treasury HQM	Atmos Energy Corp.	Chesapeake Utilities Corp.	New Jersey Resources	NiSource Inc.	Northwest Natural Gas	RGC Resources Inc.	South Jersey Industries	Southwest Gas Holdings	Spire Inc.
2018	1.83									
2018	1.98									
2019	2.12									
2019	2.23									
2020	2.33									
2020	2.41									
2021	2.49									
2021	2.56									
2022	2.64									
2022	2.71									
2023	2.79									
2023	2.86									
2024	2.94									
2024	3.02									
2025	3.09									
2025	3.17									
2026	3.24									
2026	3.30									
2027	3.36									
2027	3.42	3.18	2.92	4.03	3.41	2.96	3.58	3.33	3.43	3.23
2028	3.47	3.23	2.97	4.08	3.46	3.01	3.63	3.38	3.48	3.28
2028	3.52	3.28	3.02	4.13	3.51	3.06	3.68	3.43	3.53	3.33
2029	3.57	3.33	3.07	4.18	3.56	3.11	3.73	3.48	3.58	3.38
2029	3.61	3.37	3.11	4.22	3.60	3.15	3.77	3.52	3.62	3.42
2030	3.65	3.41	3.15	4.26	3.64	3.19	3.81	3.56	3.66	3.46
2030	3.68	3.44	3.18	4.29	3.67	3.22	3.84	3.59	3.69	3.49
2031	3.71	3.47	3.21	4.32	3.70	3.25	3.87	3.62	3.72	3.52
2031	3.74	3.50	3.24	4.35	3.73	3.28	3.90	3.65	3.75	3.55
2032	3.77	3.53	3.27	4.38	3.76	3.31	3.93	3.68	3.78	3.58
2032	3.79	3.55	3.29	4.40	3.78	3.33	3.95	3.70	3.80	3.60
2033	3.81	3.57	3.31	4.42	3.80	3.35	3.97	3.72	3.82	3.62
2033	3.83	3.59	3.33	4.44	3.82	3.37	3.99	3.74	3.84	3.64
2034	3.85	3.61	3.35	4.46	3.84	3.39	4.01	3.76	3.86	3.66
2034	3.86	3.62	3.36	4.47	3.85	3.40	4.02	3.77	3.87	3.67
2035	3.88	3.64	3.38	4.49	3.87	3.42	4.04	3.79	3.89	3.69
2035	3.89	3.65	3.39	4.50	3.88	3.43	4.05	3.80	3.90	3.70
2036	3.90	3.66	3.40	4.51	3.89	3.44	4.06	3.81	3.91	3.71
2036	3.91	3.67	3.41	4.52	3.90	3.45	4.07	3.82	3.92	3.72
2037	3.92	3.68	3.42	4.53	3.91	3.46	4.08	3.83	3.93	3.73
2037	3.93	3.69	3.43	4.54	3.92	3.47	4.09	3.84	3.94	3.74
2038	3.94	3.70	3.44	4.55	3.93	3.48	4.10	3.85	3.95	3.75
2038	3.95	3.71	3.45	4.56	3.94	3.49	4.11	3.86	3.96	3.76
2039	3.96	3.72	3.46	4.57	3.95	3.50	4.12	3.87	3.97	3.77
2039	3.97	3.73	3.47	4.58	3.96	3.51	4.13	3.88	3.98	3.78
2040	3.98	3.74	3.48	4.59	3.97	3.52	4.14	3.89	3.99	3.79
2040	3.98	3.74	3.48	4.59	3.97	3.52	4.14	3.89	3.99	3.79
2030	3.99	3.75	3.49	4.60	3.98	3.53	4.15	3.90	4.00	3.80
2031	4.00	3.76	3.50	4.61	3.99	3.54	4.16	3.91	4.01	3.81
2032	4.00	3.76	3.50	4.61	3.99	3.54	4.16	3.91	4.01	3.81
2033	4.01	3.77	3.51	4.62	4.00	3.55	4.17	3.92	4.02	3.82
2034	4.02	3.78	3.52	4.63	4.01	3.56	4.18	3.93	4.03	3.83
2035	4.02	3.78	3.52	4.63	4.01	3.56	4.18	3.93	4.03	3.83
2036	4.03	3.79	3.53	4.64	4.02	3.57	4.19	3.94	4.04	3.84
2037	4.03	3.79	3.53	4.64	4.02	3.57	4.19	3.94	4.04	3.84
2038	4.04	3.80	3.54	4.65	4.03	3.58	4.20	3.95	4.05	3.85
2039	4.04	3.80	3.54	4.65	4.03	3.58	4.20	3.95	4.05	3.85
2040	4.05	3.81	3.55	4.66	4.04	3.59	4.21	3.96	4.06	3.86
2040	4.05	3.81	3.55	4.66	4.04	3.59	4.21	3.96	4.06	3.86
2041	4.06	3.82	3.56	4.67	4.05	3.60	4.22	3.97	4.07	3.87
2041	4.06	3.82	3.56	4.67	4.05	3.60	4.22	3.97	4.07	3.87
2042	4.07	3.83	3.57	4.68	4.06	3.61	4.23	3.98	4.08	3.88
2042	4.07	3.83	3.57	4.68	4.06	3.61	4.23	3.98	4.08	3.88
2043	4.08	3.84	3.58	4.69	4.07	3.62	4.24	3.99	4.09	3.89
2043	4.08	3.84	3.58	4.69	4.07	3.62	4.24	3.99	4.09	3.89
2044	4.08	3.84	3.58	4.69	4.07	3.62	4.24	3.99	4.09	3.89
2044	4.09	3.85	3.59	4.70	4.08	3.63	4.25	4.00	4.10	3.90
2045	4.09	3.85	3.59	4.70	4.08	3.63	4.25	4.00	4.10	3.90
2045	4.10	3.86	3.60	4.71	4.09	3.64	4.26	4.01	4.11	3.91
2046	4.10	3.86	3.60	4.71	4.09	3.64	4.26	4.01	4.11	3.91
2046	4.10	3.86	3.60	4.71	4.09	3.64	4.26	4.01	4.11	3.91

Appendix G - Debt Rate Analysis Data

	Treasury HQM	Atmos Energy Corp.	Chesapeake Utilities Corp.	New Jersey Resources	NiSource Inc.	Northwest Natural Gas	RGC Resources Inc.	South Jersey Industries	Southwest Gas Holdings	Spire Inc.
2047	4.11	3.87	3.61	4.72	4.10	3.65	4.27	4.02	4.12	3.92
2047	4.11	3.87	3.61	4.72	4.10	3.65	4.27	4.02	4.12	3.92
2048	4.11	3.87	3.61	4.72	4.10	3.65	4.27	4.02	4.12	3.92
2048	4.11	3.87	3.61	4.72	4.10	3.65	4.27	4.02	4.12	3.92
2049	4.12	3.88	3.62	4.73	4.11	3.66	4.28	4.03	4.13	3.93
2049	4.12	3.88	3.62	4.73	4.11	3.66	4.28	4.03	4.13	3.93
2050	4.12	3.88	3.62	4.73	4.11	3.66	4.28	4.03	4.13	3.93
2050	4.13	3.89	3.63	4.74	4.12	3.67	4.29	4.04	4.14	3.94
2051	4.13	3.89	3.63	4.74	4.12	3.67	4.29	4.04	4.14	3.94
2051	4.13	3.89	3.63	4.74	4.12	3.67	4.29	4.04	4.14	3.94
2052	4.13	3.89	3.63	4.74	4.12	3.67	4.29	4.04	4.14	3.94
2052	4.14	3.90	3.64	4.75	4.13	3.68	4.30	4.05	4.15	3.95
2053	4.14	3.90	3.64	4.75	4.13	3.68	4.30	4.05	4.15	3.95
2053	4.14	3.90	3.64	4.75	4.13	3.68	4.30	4.05	4.15	3.95
2054	4.14	3.90	3.64	4.75	4.13	3.68	4.30	4.05	4.15	3.95
2054	4.15	3.91	3.65	4.76	4.14	3.69	4.31	4.06	4.16	3.96
2055	4.15	3.91	3.65	4.76	4.14	3.69	4.31	4.06	4.16	3.96
2055	4.15	3.91	3.65	4.76	4.14	3.69	4.31	4.06	4.16	3.96
2056	4.15	3.91	3.65	4.76	4.14	3.69	4.31	4.06	4.16	3.96
2056	4.15	3.91	3.65	4.76	4.14	3.69	4.31	4.06	4.16	3.96
2057	4.16	3.92	3.66	4.77	4.15	3.70	4.32	4.07	4.17	3.97
2057	4.16	3.92	3.66	4.77	4.15	3.70	4.32	4.07	4.17	3.97
2058	4.16	3.92	3.66	4.77	4.15	3.70	4.32	4.07	4.17	3.97
2058	4.16	3.92	3.66	4.77	4.15	3.70	4.32	4.07	4.17	3.97
2059	4.16	3.92	3.66	4.77	4.15	3.70	4.32	4.07	4.17	3.97
2059	4.17	3.93	3.67	4.78	4.16	3.71	4.33	4.08	4.18	3.98
2060	4.17	3.93	3.67	4.78	4.16	3.71	4.33	4.08	4.18	3.98
2060	4.17	3.93	3.67	4.78	4.16	3.71	4.33	4.08	4.18	3.98
2061	4.17	3.93	3.67	4.78	4.16	3.71	4.33	4.08	4.18	3.98
2061	4.17	3.93	3.67	4.78	4.16	3.71	4.33	4.08	4.18	3.98
2062	4.17	3.93	3.67	4.78	4.16	3.71	4.33	4.08	4.18	3.98
2062	4.18	3.94	3.68	4.79	4.17	3.72	4.34	4.09	4.19	3.99
2063	4.18	3.94	3.68	4.79	4.17	3.72	4.34	4.09	4.19	3.99
2063	4.18	3.94	3.68	4.79	4.17	3.72	4.34	4.09	4.19	3.99
2064	4.18	3.94	3.68	4.79	4.17	3.72	4.34	4.09	4.19	3.99
2064	4.18	3.94	3.68	4.79	4.17	3.72	4.34	4.09	4.19	3.99
2065	4.18	3.94	3.68	4.79	4.17	3.72	4.34	4.09	4.19	3.99
2065	4.18	3.94	3.68	4.79	4.17	3.72	4.34	4.09	4.19	3.99
2066	4.19	3.95	3.69	4.80	4.18	3.73	4.35	4.10	4.20	4.00
2066	4.19	3.95	3.69	4.80	4.18	3.73	4.35	4.10	4.20	4.00
2067	4.19	3.95	3.69	4.80	4.18	3.73	4.35	4.10	4.20	4.00
2067	4.19	3.95	3.69	4.80	4.18	3.73	4.35	4.10	4.20	4.00

Appendix G - Debt Rate Analysis Data

Gas Transmission - HQM Yield Curve Data

	Treasury HQM	Boardwalk Pipeline	Enterprise Products Partners	Kinder Morgan	TC Pipelines / TransCanadian Pipelines	Williams Parteners
2018	1.83					
2018	1.98					
2019	2.12					
2019	2.23					
2020	2.33					
2020	2.41					
2012	2.49					
2021	2.56					
2022	2.64					
2022	2.71					
2023	2.79					
2023	2.86					
2024	2.94					
2024	3.02					
2025	3.09					
2025	3.17					
2026	3.24					
2026	3.30					
2027	3.36					
2027	3.42	4.32	3.45	4.01	3.84	3.73
2028	3.47	4.37	3.50	4.06	3.89	3.78
2028	3.52	4.42	3.55	4.11	3.94	3.83
2029	3.57	4.47	3.60	4.16	3.99	3.88
2029	3.61	4.51	3.64	4.20	4.03	3.92
2030	3.65	4.55	3.68	4.24	4.07	3.96
2030	3.68	4.58	3.71	4.27	4.10	3.99
2031	3.71	4.61	3.74	4.30	4.13	4.02
2031	3.74	4.64	3.77	4.33	4.16	4.05
2032	3.77	4.67	3.80	4.36	4.19	4.08
2032	3.79	4.69	3.82	4.38	4.21	4.10
2033	3.81	4.71	3.84	4.40	4.23	4.12
2033	3.83	4.73	3.86	4.42	4.25	4.14
2034	3.85	4.75	3.88	4.44	4.27	4.16
2034	3.86	4.76	3.89	4.45	4.28	4.17
2035	3.88	4.78	3.91	4.47	4.30	4.19
2035	3.89	4.79	3.92	4.48	4.31	4.20
2036	3.90	4.80	3.93	4.49	4.32	4.21
2036	3.91	4.81	3.94	4.50	4.33	4.22
2037	3.92	4.82	3.95	4.51	4.34	4.23
2037	3.93	4.83	3.96	4.52	4.35	4.24
2038	3.94	4.84	3.97	4.53	4.36	4.25
2038	3.95	4.85	3.98	4.54	4.37	4.26
2039	3.96	4.86	3.99	4.55	4.38	4.27
2039	3.97	4.87	4.00	4.56	4.39	4.28
2040	3.98	4.88	4.01	4.57	4.40	4.29
2040	3.98	4.88	4.01	4.57	4.40	4.29
2030	3.99	4.89	4.02	4.58	4.41	4.30
2031	4.00	4.90	4.03	4.59	4.42	4.31
2032	4.00	4.90	4.03	4.59	4.42	4.31
2033	4.01	4.91	4.04	4.60	4.43	4.32
2034	4.02	4.92	4.05	4.61	4.44	4.33
2035	4.02	4.92	4.05	4.61	4.44	4.33
2036	4.03	4.93	4.06	4.62	4.45	4.34
2037	4.03	4.93	4.06	4.62	4.45	4.34
2038	4.04	4.94	4.07	4.63	4.46	4.35
2039	4.04	4.94	4.07	4.63	4.46	4.35
2040	4.05	4.95	4.08	4.64	4.47	4.36
2040	4.05	4.95	4.08	4.64	4.47	4.36
2041	4.06	4.96	4.09	4.65	4.48	4.37
2041	4.06	4.96	4.09	4.65	4.48	4.37
2042	4.07	4.97	4.10	4.66	4.49	4.38
2042	4.07	4.97	4.10	4.66	4.49	4.38
2043	4.08	4.98	4.11	4.67	4.50	4.39
2043	4.08	4.98	4.11	4.67	4.50	4.39
2044	4.08	4.98	4.11	4.67	4.50	4.39
2044	4.09	4.99	4.12	4.68	4.51	4.40
2045	4.09	4.99	4.12	4.68	4.51	4.40

Appendix G - Debt Rate Analysis Data

	Treasury HQM	Boardwalk Pipeline	Enterprise Products Partners	Kinder Morgan	TC Pipelines / TransCanadian Pipelines	Williams Parteners
2045	4.10	5.00	4.13	4.69	4.52	4.41
2046	4.10	5.00	4.13	4.69	4.52	4.41
2046	4.10	5.00	4.13	4.69	4.52	4.41
2047	4.11	5.01	4.14	4.70	4.53	4.42
2047	4.11	5.01	4.14	4.70	4.53	4.42
2048	4.11	5.01	4.14	4.70	4.53	4.42
2048	4.11	5.01	4.14	4.70	4.53	4.42
2049	4.12	5.02	4.15	4.71	4.54	4.43
2049	4.12	5.02	4.15	4.71	4.54	4.43
2050	4.12	5.02	4.15	4.71	4.54	4.43
2050	4.13	5.03	4.16	4.72	4.55	4.44
2051	4.13	5.03	4.16	4.72	4.55	4.44
2051	4.13	5.03	4.16	4.72	4.55	4.44
2052	4.13	5.03	4.16	4.72	4.55	4.44
2052	4.14	5.04	4.17	4.73	4.56	4.45
2053	4.14	5.04	4.17	4.73	4.56	4.45
2053	4.14	5.04	4.17	4.73	4.56	4.45
2054	4.14	5.04	4.17	4.73	4.56	4.45
2054	4.15	5.05	4.18	4.74	4.57	4.46
2055	4.15	5.05	4.18	4.74	4.57	4.46
2055	4.15	5.05	4.18	4.74	4.57	4.46
2056	4.15	5.05	4.18	4.74	4.57	4.46
2056	4.15	5.05	4.18	4.74	4.57	4.46
2057	4.16	5.06	4.19	4.75	4.58	4.47
2057	4.16	5.06	4.19	4.75	4.58	4.47
2058	4.16	5.06	4.19	4.75	4.58	4.47
2058	4.16	5.06	4.19	4.75	4.58	4.47
2059	4.16	5.06	4.19	4.75	4.58	4.47
2059	4.17	5.07	4.20	4.76	4.59	4.48
2060	4.17	5.07	4.20	4.76	4.59	4.48
2060	4.17	5.07	4.20	4.76	4.59	4.48
2061	4.17	5.07	4.20	4.76	4.59	4.48
2061	4.17	5.07	4.20	4.76	4.59	4.48
2062	4.17	5.07	4.20	4.76	4.59	4.48
2062	4.18	5.08	4.21	4.77	4.60	4.49
2063	4.18	5.08	4.21	4.77	4.60	4.49
2063	4.18	5.08	4.21	4.77	4.60	4.49
2064	4.18	5.08	4.21	4.77	4.60	4.49
2064	4.18	5.08	4.21	4.77	4.60	4.49
2065	4.18	5.08	4.21	4.77	4.60	4.49
2065	4.18	5.08	4.21	4.77	4.60	4.49
2066	4.19	5.09	4.22	4.78	4.61	4.50
2066	4.19	5.09	4.22	4.78	4.61	4.50
2067	4.19	5.09	4.22	4.78	4.61	4.50
2067	4.19	5.09	4.22	4.78	4.61	4.50

Appendix G - Debt Rate Analysis Data

Fluid Transportation - HQM Yield Curve Data

	Treasury HQM	Buckeye Partners	Enbridge Inc. / Enbridge Energy Partners	Holly Frontier / Holly Energy Partners	Magellan Midstream Partners	NuStar Logistics	Plains All American Pipeline
2018	1.83						
2018	1.98						
2019	2.12						
2019	2.23						
2020	2.33						
2020	2.41						
2012	2.49						
2021	2.56						
2022	2.64						
2022	2.71						
2023	2.79						
2023	2.86						
2024	2.94						
2024	3.02						
2025	3.09						
2025	3.17						
2026	3.24						
2026	3.30						
2027	3.36						
2027	3.42	4.35	3.72	4.44	3.55	4.88	4.50
2028	3.47	4.40	3.77	4.49	3.60	4.93	4.55
2028	3.52	4.45	3.82	4.54	3.65	4.98	4.60
2029	3.57	4.50	3.87	4.59	3.70	5.03	4.65
2029	3.61	4.54	3.91	4.63	3.74	5.07	4.69
2030	3.65	4.58	3.95	4.67	3.78	5.11	4.73
2030	3.68	4.61	3.98	4.70	3.81	5.14	4.76
2031	3.71	4.64	4.01	4.73	3.84	5.17	4.79
2031	3.74	4.67	4.04	4.76	3.87	5.20	4.82
2032	3.77	4.70	4.07	4.79	3.90	5.23	4.85
2032	3.79	4.72	4.09	4.81	3.92	5.25	4.87
2033	3.81	4.74	4.11	4.83	3.94	5.27	4.89
2033	3.83	4.76	4.13	4.85	3.96	5.29	4.91
2034	3.85	4.78	4.15	4.87	3.98	5.31	4.93
2034	3.86	4.79	4.16	4.88	3.99	5.32	4.94
2035	3.88	4.81	4.18	4.90	4.01	5.34	4.96
2035	3.89	4.82	4.19	4.91	4.02	5.35	4.97
2036	3.90	4.83	4.20	4.92	4.03	5.36	4.98
2036	3.91	4.84	4.21	4.93	4.04	5.37	4.99
2037	3.92	4.85	4.22	4.94	4.05	5.38	5.00
2037	3.93	4.86	4.23	4.95	4.06	5.39	5.01
2038	3.94	4.87	4.24	4.96	4.07	5.40	5.02
2038	3.95	4.88	4.25	4.97	4.08	5.41	5.03
2039	3.96	4.89	4.26	4.98	4.09	5.42	5.04
2039	3.97	4.90	4.27	4.99	4.10	5.43	5.05
2040	3.98	4.91	4.28	5.00	4.11	5.44	5.06
2040	3.98	4.91	4.28	5.00	4.11	5.44	5.06
2030	3.99	4.92	4.29	5.01	4.12	5.45	5.07
2031	4.00	4.93	4.30	5.02	4.13	5.46	5.08
2032	4.00	4.93	4.30	5.02	4.13	5.46	5.08
2033	4.01	4.94	4.31	5.03	4.14	5.47	5.09
2034	4.02	4.95	4.32	5.04	4.15	5.48	5.10
2035	4.02	4.95	4.32	5.04	4.15	5.48	5.10
2036	4.03	4.96	4.33	5.05	4.16	5.49	5.11
2037	4.03	4.96	4.33	5.05	4.16	5.49	5.11
2038	4.04	4.97	4.34	5.06	4.17	5.50	5.12
2039	4.04	4.97	4.34	5.06	4.17	5.50	5.12
2040	4.05	4.98	4.35	5.07	4.18	5.51	5.13
2040	4.05	4.98	4.35	5.07	4.18	5.51	5.13
2041	4.06	4.99	4.36	5.08	4.19	5.52	5.14
2041	4.06	4.99	4.36	5.08	4.19	5.52	5.14
2042	4.07	5.00	4.37	5.09	4.20	5.53	5.15
2042	4.07	5.00	4.37	5.09	4.20	5.53	5.15
2043	4.08	5.01	4.38	5.10	4.21	5.54	5.16
2043	4.08	5.01	4.38	5.10	4.21	5.54	5.16
2044	4.08	5.01	4.38	5.10	4.21	5.54	5.16
2044	4.09	5.02	4.39	5.11	4.22	5.55	5.17
2045	4.09	5.02	4.39	5.11	4.22	5.55	5.17
2045	4.10	5.03	4.40	5.12	4.23	5.56	5.18

Appendix G - Debt Rate Analysis Data

	Treasury HQM	Buckeye Partners	Enbridge Inc. / Enbridge Energy Partners	Holly Frontier / Holly Energy Partners	Magellan Midstream Partners	NuStar Logistics	Plains All American Pipeline
2046	4.10	5.03	4.40	5.12	4.23	5.56	5.18
2046	4.10	5.03	4.40	5.12	4.23	5.56	5.18
2047	4.11	5.04	4.41	5.13	4.24	5.57	5.19
2047	4.11	5.04	4.41	5.13	4.24	5.57	5.19
2048	4.11	5.04	4.41	5.13	4.24	5.57	5.19
2048	4.11	5.04	4.41	5.13	4.24	5.57	5.19
2049	4.12	5.05	4.42	5.14	4.25	5.58	5.20
2049	4.12	5.05	4.42	5.14	4.25	5.58	5.20
2050	4.12	5.05	4.42	5.14	4.25	5.58	5.20
2050	4.13	5.06	4.43	5.15	4.26	5.59	5.21
2051	4.13	5.06	4.43	5.15	4.26	5.59	5.21
2051	4.13	5.06	4.43	5.15	4.26	5.59	5.21
2052	4.13	5.06	4.43	5.15	4.26	5.59	5.21
2052	4.14	5.07	4.44	5.16	4.27	5.60	5.22
2053	4.14	5.07	4.44	5.16	4.27	5.60	5.22
2053	4.14	5.07	4.44	5.16	4.27	5.60	5.22
2054	4.14	5.07	4.44	5.16	4.27	5.60	5.22
2054	4.15	5.08	4.45	5.17	4.28	5.61	5.23
2055	4.15	5.08	4.45	5.17	4.28	5.61	5.23
2055	4.15	5.08	4.45	5.17	4.28	5.61	5.23
2056	4.15	5.08	4.45	5.17	4.28	5.61	5.23
2056	4.15	5.08	4.45	5.17	4.28	5.61	5.23
2057	4.16	5.09	4.46	5.18	4.29	5.62	5.24
2057	4.16	5.09	4.46	5.18	4.29	5.62	5.24
2058	4.16	5.09	4.46	5.18	4.29	5.62	5.24
2058	4.16	5.09	4.46	5.18	4.29	5.62	5.24
2059	4.16	5.09	4.46	5.18	4.29	5.62	5.24
2059	4.17	5.10	4.47	5.19	4.30	5.63	5.25
2060	4.17	5.10	4.47	5.19	4.30	5.63	5.25
2060	4.17	5.10	4.47	5.19	4.30	5.63	5.25
2061	4.17	5.10	4.47	5.19	4.30	5.63	5.25
2061	4.17	5.10	4.47	5.19	4.30	5.63	5.25
2062	4.17	5.10	4.47	5.19	4.30	5.63	5.25
2062	4.18	5.11	4.48	5.20	4.31	5.64	5.26
2063	4.18	5.11	4.48	5.20	4.31	5.64	5.26
2063	4.18	5.11	4.48	5.20	4.31	5.64	5.26
2064	4.18	5.11	4.48	5.20	4.31	5.64	5.26
2064	4.18	5.11	4.48	5.20	4.31	5.64	5.26
2065	4.18	5.11	4.48	5.20	4.31	5.64	5.26
2065	4.18	5.11	4.48	5.20	4.31	5.64	5.26
2066	4.19	5.12	4.49	5.21	4.32	5.65	5.27
2066	4.19	5.12	4.49	5.21	4.32	5.65	5.27
2067	4.19	5.12	4.49	5.21	4.32	5.65	5.27
2067	4.19	5.12	4.49	5.21	4.32	5.65	5.27

Appendix G - Debt Rate Analysis Data

Railroad - HQM Yield Curve Data

	Treasury HQM	Canadian National	Canadian Pacific	CSX Corp.	Gennesse & Wyoming	Kansas City Southern	Norfolk Southern	Union Pacific
2018	1.83							
2018	1.98							
2019	2.12							
2019	2.23							
2020	2.33							
2020	2.41							
2012	2.49							
2021	2.56							
2022	2.64							
2022	2.71							
2023	2.79							
2023	2.86							
2024	2.94							
2024	3.02							
2025	3.09							
2025	3.17							
2026	3.24							
2026	3.30							
2027	3.36							
2027	3.42	3.18	3.44	3.39	6.50	3.75	3.24	3.11
2028	3.47	3.23	3.49	3.44	6.55	3.80	3.29	3.16
2028	3.52	3.28	3.54	3.49	6.60	3.85	3.34	3.21
2029	3.57	3.33	3.59	3.54	6.65	3.90	3.39	3.26
2029	3.61	3.37	3.63	3.58	6.69	3.94	3.43	3.30
2030	3.65	3.41	3.67	3.62	6.73	3.98	3.47	3.34
2030	3.68	3.44	3.70	3.65	6.76	4.01	3.50	3.37
2031	3.71	3.47	3.73	3.68	6.79	4.04	3.53	3.40
2031	3.74	3.50	3.76	3.71	6.82	4.07	3.56	3.43
2032	3.77	3.53	3.79	3.74	6.85	4.10	3.59	3.46
2032	3.79	3.55	3.81	3.76	6.87	4.12	3.61	3.48
2033	3.81	3.57	3.83	3.78	6.89	4.14	3.63	3.50
2033	3.83	3.59	3.85	3.80	6.91	4.16	3.65	3.52
2034	3.85	3.61	3.87	3.82	6.93	4.18	3.67	3.54
2034	3.86	3.62	3.88	3.83	6.94	4.19	3.68	3.55
2035	3.88	3.64	3.90	3.85	6.96	4.21	3.70	3.57
2035	3.89	3.65	3.91	3.86	6.97	4.22	3.71	3.58
2036	3.90	3.66	3.92	3.87	6.98	4.23	3.72	3.59
2036	3.91	3.67	3.93	3.88	6.99	4.24	3.73	3.60
2037	3.92	3.68	3.94	3.89	7.00	4.25	3.74	3.61
2037	3.93	3.69	3.95	3.90	7.01	4.26	3.75	3.62
2038	3.94	3.70	3.96	3.91	7.02	4.27	3.76	3.63
2038	3.95	3.71	3.97	3.92	7.03	4.28	3.77	3.64
2039	3.96	3.72	3.98	3.93	7.04	4.29	3.78	3.65
2039	3.97	3.73	3.99	3.94	7.05	4.30	3.79	3.66
2040	3.98	3.74	4.00	3.95	7.06	4.31	3.80	3.67
2040	3.98	3.74	4.00	3.95	7.06	4.31	3.80	3.67
2030	3.99	3.75	4.01	3.96	7.07	4.32	3.81	3.68
2031	4.00	3.76	4.02	3.97	7.08	4.33	3.82	3.69
2032	4.00	3.76	4.02	3.97	7.08	4.33	3.82	3.69
2033	4.01	3.77	4.03	3.98	7.09	4.34	3.83	3.70
2034	4.02	3.78	4.04	3.99	7.10	4.35	3.84	3.71
2035	4.02	3.78	4.04	3.99	7.10	4.35	3.84	3.71
2036	4.03	3.79	4.05	4.00	7.11	4.36	3.85	3.72
2037	4.03	3.79	4.05	4.00	7.11	4.36	3.85	3.72
2038	4.04	3.80	4.06	4.01	7.12	4.37	3.86	3.73
2039	4.04	3.80	4.06	4.01	7.12	4.37	3.86	3.73
2040	4.05	3.81	4.07	4.02	7.13	4.38	3.87	3.74
2040	4.05	3.81	4.07	4.02	7.13	4.38	3.87	3.74
2041	4.06	3.82	4.08	4.03	7.14	4.39	3.88	3.75
2041	4.06	3.82	4.08	4.03	7.14	4.39	3.88	3.75
2042	4.07	3.83	4.09	4.04	7.15	4.40	3.89	3.76
2042	4.07	3.83	4.09	4.04	7.15	4.40	3.89	3.76
2043	4.08	3.84	4.10	4.05	7.16	4.41	3.90	3.77
2043	4.08	3.84	4.10	4.05	7.16	4.41	3.90	3.77
2044	4.08	3.84	4.10	4.05	7.16	4.41	3.90	3.77
2044	4.09	3.85	4.11	4.06	7.17	4.42	3.91	3.78
2045	4.09	3.85	4.11	4.06	7.17	4.42	3.91	3.78
2045	4.10	3.86	4.12	4.07	7.18	4.43	3.92	3.79
2046	4.10	3.86	4.12	4.07	7.18	4.43	3.92	3.79
2046	4.10	3.86	4.12	4.07	7.18	4.43	3.92	3.79
2047	4.11	3.87	4.13	4.08	7.19	4.44	3.93	3.80

Appendix G - Debt Rate Analysis Data

	Treasury HQM	Canadian National	Canadian Pacific	CSX Corp.	Gennesse & Wyoming	Kansas City Southern	Norfolk Southern	Union Pacific
2047	4.11	3.87	4.13	4.08	7.19	4.44	3.93	3.80
2048	4.11	3.87	4.13	4.08	7.19	4.44	3.93	3.80
2048	4.11	3.87	4.13	4.08	7.19	4.44	3.93	3.80
2049	4.12	3.88	4.14	4.09	7.20	4.45	3.94	3.81
2049	4.12	3.88	4.14	4.09	7.20	4.45	3.94	3.81
2050	4.12	3.88	4.14	4.09	7.20	4.45	3.94	3.81
2050	4.13	3.89	4.15	4.10	7.21	4.46	3.95	3.82
2051	4.13	3.89	4.15	4.10	7.21	4.46	3.95	3.82
2051	4.13	3.89	4.15	4.10	7.21	4.46	3.95	3.82
2052	4.13	3.89	4.15	4.10	7.21	4.46	3.95	3.82
2052	4.14	3.90	4.16	4.11	7.22	4.47	3.96	3.83
2053	4.14	3.90	4.16	4.11	7.22	4.47	3.96	3.83
2053	4.14	3.90	4.16	4.11	7.22	4.47	3.96	3.83
2054	4.14	3.90	4.16	4.11	7.22	4.47	3.96	3.83
2054	4.15	3.91	4.17	4.12	7.23	4.48	3.97	3.84
2055	4.15	3.91	4.17	4.12	7.23	4.48	3.97	3.84
2055	4.15	3.91	4.17	4.12	7.23	4.48	3.97	3.84
2056	4.15	3.91	4.17	4.12	7.23	4.48	3.97	3.84
2056	4.15	3.91	4.17	4.12	7.23	4.48	3.97	3.84
2057	4.16	3.92	4.18	4.13	7.24	4.49	3.98	3.85
2057	4.16	3.92	4.18	4.13	7.24	4.49	3.98	3.85
2058	4.16	3.92	4.18	4.13	7.24	4.49	3.98	3.85
2058	4.16	3.92	4.18	4.13	7.24	4.49	3.98	3.85
2059	4.16	3.92	4.18	4.13	7.24	4.49	3.98	3.85
2059	4.17	3.93	4.19	4.14	7.25	4.50	3.99	3.86
2060	4.17	3.93	4.19	4.14	7.25	4.50	3.99	3.86
2060	4.17	3.93	4.19	4.14	7.25	4.50	3.99	3.86
2061	4.17	3.93	4.19	4.14	7.25	4.50	3.99	3.86
2061	4.17	3.93	4.19	4.14	7.25	4.50	3.99	3.86
2062	4.17	3.93	4.19	4.14	7.25	4.50	3.99	3.86
2062	4.18	3.94	4.20	4.15	7.26	4.51	4.00	3.87
2063	4.18	3.94	4.20	4.15	7.26	4.51	4.00	3.87
2063	4.18	3.94	4.20	4.15	7.26	4.51	4.00	3.87
2064	4.18	3.94	4.20	4.15	7.26	4.51	4.00	3.87
2064	4.18	3.94	4.20	4.15	7.26	4.51	4.00	3.87
2065	4.18	3.94	4.20	4.15	7.26	4.51	4.00	3.87
2065	4.18	3.94	4.20	4.15	7.26	4.51	4.00	3.87
2066	4.19	3.95	4.21	4.16	7.27	4.52	4.01	3.88
2066	4.19	3.95	4.21	4.16	7.27	4.52	4.01	3.88
2067	4.19	3.95	4.21	4.16	7.27	4.52	4.01	3.88
2067	4.19	3.95	4.21	4.16	7.27	4.52	4.01	3.88

Appendix H – Guideline Companies

Section Contents

Note: The information below is verbatim from Value Line and the company's website.

Market Segment: Electric

Companies Included in the Electric Market Segment

ALLETE, Inc.

Company Summary from Value Line:

ALLETE, Inc. is the parent of Minnesota Power, which supplies electricity to 146,000 customers in northeastern MN, & Superior Water, Light & Power in northwestern WI. Electric rev. breakdown: taconite mining/processing, 26%; paper/wood products, 9%; other industrial, 8%; residential, 12%; commercial, 13%; wholesale, 16% other, 16%. ALLETE Clean Energy owns renewable energy projects. Acq'd U.S. Water Services 2/15. Has real estate operation in FL. Generating sources: coal & lignite, 49%; wind, 12%; other, 6%; purchased, 33%. Fuel costs: 25% of revs. '16 deprec. rate: 3.7%. Has 2,000 employees.

Additional Company Information from Website:

ALLETE (NYSE: ALE) is well-positioned as a reliable provider of competitively-priced energy in the upper Midwest, and invests in transmission infrastructure and other energy-centric businesses. ALLETE's Minnesota Power electric utility serves 145,000 residents, 16 municipalities and some of the nation's largest industrial customers. Other businesses include BNI Energy in North Dakota; ALLETE Clean Energy, a developer of energy projects with limited environmental impact; Superior Water, Light & Power in Superior, Wisconsin; U.S. Water Services, based in St. Michael, Minnesota, which provides integrated water management; ALLETE Renewable Resources, which operates and maintains wind generation facilities in North Dakota; and ALLETE Properties, which owns real estate in Florida.[1]

Why was the company included?
This company is similar (and is one of) to the Electric Companies that the State Assessed Section is responsible for valuing. The company engages in providing energy in the upper Midwest.

Alliant Energy Corp.

Company Summary from Value Line:
Alliant Energy Corp., formerly named Interstate Energy, is a holding company formed through the merger of WPL Holdings, IES Industries, and Interstate Power. Supplies electricity, gas, and other services in Wisconsin, Iowa, and Minnesota. Elect. revs. by state: WI, 44%; IA, 55%; MN, 1%. Elect. rev.: residential, 35%; commercial, 25%; industrial, 29%; wholesale, 9%; other, 2%. Fuel sources, 2016: coal, 44%; gas, 21%; other, 35%. Fuel costs: 49% of revs. 2016 depreciation rate: 5.9%. Estimated plant age: 14 years. Has approximately 4,000 employees.

Additional Company Information from Website:
Alliant Energy has two energy generation and distribution subsidiaries, one in Wisconsin and one in Iowa. The company has a strategic plan built upon two key elements: Growth and Optimization. Growth - The growth element of the strategic plan includes accelerating the growth of customers' electric and gas usage and expanding our portfolio of energy resources to include additional clean and renewable energy. Optimization - The second key element of the strategic plan focuses resources on providing reliable electric and natural gas service to customers in our Iowa and Wisconsin service areas. We do this through continued modernization of the power grid, upgrades to the gas distribution system and optimization of the generation fleet. Alliant Energy owns a portfolio of electric generating facilities operating on a diverse mix of fuels, including coal, natural gas and renewable resources. The output from these generating facilities is supplemented with purchased power. Alliant Energy Resources is the parent company of Alliant Energy's non-regulated businesses. The strategic plan for Alliant Energy's non-regulated operations involves maintaining a portfolio of businesses that add to earnings but do not require significant amounts of capital. Alliant Energy Corporate Services, Inc., supports the company with traditional administrative functions including strategy, accounting, communications, legal, regulatory, information technology, environmental and safety management and more.[2]

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company engages in providing energy in the upper Midwest.

Ameren Corporation

Company Summary from Value Line:
Ameren Corporation is a holding company formed through the merger of Union Electric and CIPSCO. Acq'd CILCORP 1/03; Illinois Power 10/04. Has 1.2 mill. electric and 127,000 gas customers in Missouri; 1.2 mill. electric and 813,000 gas customers in Illinois. Discontinued nonregulated power-generation operation in '13. Electric rev. breakdown: residential, 45%; commercial, 33%; industrial, 12%; other, 10%. Generating sources: coal, 66%; nuclear, 23%; hydro, 3%; purchased & other, 8%. Fuel costs: 28% of revs. '16 reported deprec. rates: 3%-4%. Has 8,600 employees.

Additional Company Information from Website:
Ameren Corporation is a Fortune 500 company that trades on the New York Stock Exchange under the symbol AEE. It is the parent company of Ameren Illinois, based in Collinsville, Ill., and Ameren

[1] http://www.allete.com/, Accessed 12/27/2017

[2] https://www.alliantenergy.com/AboutAlliantEnergy/OperationsValuesandCompliance, Accessed 12/27/2017

Missouri in St. Louis. Ameren Transmission Company, also based in St. Louis, designs and builds regional transmission projects. View our businesses. Ameren was created by the combination of three Illinois utilities (CIPSCO Incorporated, CILCO Inc. and Illinois Power Company) and Union Electric Company of St. Louis. The name comes from combining the words American and Energy. Employing more than 8,500 personnel, Ameren powers the quality of life for 2.4 million electric customers and more than 900,000 natural gas customers across a 64,000-square-mile area. Ameren Missouri ranks as the largest electric power provider in Missouri, and Ameren Illinois ranks as Illinois' third largest natural gas distribution operation in total number of customers. Ameren companies generate a net capacity of nearly 10,200 megawatts of electricity and own more than 7,500 circuit miles of transmission lines. Ameren's rates are some of the lowest in the nation.[3]

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company engages in providing energy in the Midwest.

American Electric Power Company, Inc.

Company Summary from Value Line:
American Electric Power Company, Inc. (AEP), through 10 operating utilities, serves 5.4 mill. customers in Arkansas, Kentucky, Indiana, Louisiana, Michigan, Ohio, Oklahoma, Tennessee, Texas, Virginia, & West Virginia. Electric revenue breakdown: residential, 40%; commercial, 23%; industrial, 19%; wholesale, 15%; other, 3%. Sold SEEBOARD (British utility) ’02; Houston Pipeline ’05; commercial barge operation in ’15. Generating sources not available. Fuel costs: 35% of revenues. ’16 reported depreciation rates (utility): 1.5%-8.6%. Has 17,600 employees.

Additional Company Information from Website:
AEP is one of the largest electric utilities in the U.S., serving nearly 5.4 million customers in 11 states. We own: A more than 40,000-mile electricity transmission network – the largest in the nation. More 765-kilovolt extra-high voltage transmission lines than all other U.S. transmission systems combined. Approximately 26,000 megawatts of generating capacity.[4]

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company engages in providing energy in the Midwest.

Black Hills Corporation

Company Summary from Value Line:
Black Hills Corporation is a holding company for Black Hills Energy, which serves 209,000 electric customers in CO, SD, WY and MT, and 1 million gas customers in NE, IA, KS, CO, WY, and AR. Mines coal & has gas & oil E&P business. Acq’d Cheyenne Light 1/05; utility ops. from Aquila 7/08; SourceGas 2/16. Discont. telecom in ’05; oil marketing in ’06; gas marketing in ’11. Electric rev. breakdown: res’l, 31%; comm’l, 38%; ind’l, 17%; other, 14%. Generating sources: coal, 33%; other, 7%; purchased, 60%. Fuel costs: 32% of revs. ’16 deprec. rate: 3.0%. Has 2,800 employees.

Additional Company Information from Website:
We are a growth-oriented, vertically integrated energy company with a mission of improving life with energy and a vision to be the energy partner of choice. Based in Rapid City, South Dakota, the company

[3] https://www.ameren.com/about/facts, accessed 12/27/2017

[4] https://www.aep.com/about/, accessed 12/27/2017

serves 1.2 million natural gas and electric utility customers in eight states. The company's non-regulated businesses generate wholesale electricity and produce natural gas, oil and coal.[5]

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company engages in providing energy in the Midwest.

CenterPoint Energy, Inc.

Company Summary from Value Line:
CenterPoint Energy, Inc. is a holding company for Houston Electric, which serves 2.4 million customers in Houston and environs, and gas utilities with 3.4 million customers in Texas, Minnesota, Arkansas, Louisiana, and Oklahoma. Owns 54.1% of Enable Midstream Partners. Discontinued Texas Genco Holdings in ’04. Electric revenue breakdown: residential, 52%; commercial, 31%; industrial, 15%; other, 2%. Does not own generating assets. Gas costs: 39% of revenues. ’16 depreciation rate: 6.5%. Has 7,700 employees.

Additional Company Information from Website:
CenterPoint Energy is always there in everything you do, from 24-hour-a-day television broadcasts, to gourmet gas kitchens, comfortable gas heating, hand-held computers and cellular phone connections. We operate in four primary businesses: Natural Gas Distribution - We sell and deliver natural gas to 3.2 million homes and businesses in Arkansas, Louisiana, Minnesota, Mississippi, Oklahoma and Texas, including the high-growth areas of Houston and Minneapolis. Electric Transmission & Distribution (T&D) - We maintain the wires, poles and electric infrastructure serving our 5,000-square-mile electric service territory in the Houston metropolitan area. While our employees ensure the reliable delivery of power from power plants to homes and businesses, we neither generate power nor sell it to customers. Competitive Natural Gas Sales and Services – Our natural gas marketing business, CenterPoint Energy Services (CES), sells non rate-regulated natural gas and related services to approximately 100,000 commercial, industrial and wholesale customers in 32 states. Home Service Plus® (HSP) - For over 80 years, HSP has provided heating and cooling solutions for Minnesota homeowners. We proudly offer expert repair, along with service and maintenance plans, and professional sales for both gas and electric equipment.[6]

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in the Houston metropolitan area.

CMS Energy Corporation

Company Summary from Value Line:
CMS Energy Corporation is a holding company for Consumers Energy, which supplies electricity and gas to lower Michigan (excluding Detroit). Has 1.8 million electric, 1.7 million gas customers. Has 1,034 megawatts of nonregulated generating capacity. Sold Palisades nuclear plant in ’07. Electric revenue breakdown: residential, 45%; commercial, 31%; industrial, 18%; other, 6%. Generating sources: coal, 27%; gas, 16%; other, 3%; purchased, 54%. Fuel costs: 44% of revenues. ’16 reported deprec. rates: 3.9% electric, 2.9% gas, 9.8% other. Has 7,400 employees.

Additional Company Information from Website:
CMS Energy Corporation’s business strategy is focused primarily on its principal subsidiary, Consumers Energy Company, Michigan’s largest electric and natural gas utility, serving 6.7 million of the state’s 10

[5] https://www.blackhillscorp.com/about, accessed on 12/27/2017

[6] http://www.centerpointenergy.com/en-us/corporate/about-us/company-overview, accessed on 12/27/2017

million residents. With our subsidiary, CMS Enterprises Company, we are also engaged in independent power generation in several states. Our business also includes EnerBank® USA, which specializes in providing unsecured home improvement payment option programs for homeowners through nationwide dealer networks.[7]

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in the Midwest.

DTE Energy Company

Company Summary from Value Line:
DTE Energy Company is a holding company for DTE Electric (formerly Detroit Edison), which supplies electricity in Detroit and a 7,600-square-mile area in southeastern Michigan, and DTE Gas (formerly Michigan Consolidated Gas). Customers: 2.1 mill. electric, 1.3 mill. gas. Has various nonutility operations. Electric revenue breakdown: residential, 48%; commercial, 34%; industrial, 13%; other, 5%. Generating sources: coal, 67%; nuclear, 17%; gas, 1%; purchased, 15%. Fuel costs: 52% of revenues. '16 reported deprec. rates: 3.5% electric, 2.4% gas. Has 10,000 employees.

Additional Company Information from Website:
DTE Energy (NYSE: DTE) is a Detroit-based diversified energy company involved in the development and management of energy-related businesses and services nationwide. Its operating units include an electric utility serving 2.2 million customers in Southeastern Michigan and a natural gas utility serving 1.3 million customers in Michigan. The DTE Energy portfolio includes non-utility energy businesses focused on power and industrial projects, natural gas pipelines, gathering and storage, and energy marketing and trading. As one of Michigan's leading corporate citizens, DTE Energy is a force for growth and prosperity in the 450 Michigan communities it serves in a variety of ways, including philanthropy, volunteerism and economic progress. Information about DTE Energy is available on the DTE Energy home page, Twitter account and Facebook page. DTE Energy has more than 10,000 employees in utility and non-utility subsidiaries involved in a wide range of energy-related businesses. The company's growing non-utility businesses are built around the strengths, skills and assets of DTE Energy's electric and gas utilities.[8]

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in the Midwest.

Entergy Corporation

Company Summary from Value Line:
Entergy Corporation supplies electricity to 2.9 million customers through subsidiaries in Arkansas, Louisiana, Mississippi, Texas, and New Orleans (regulated separately from Louisiana). Distributes gas to 202,000 customers in Louisiana. Has a nonutility subsidiary that owns six nuclear units (one no longer operating). Electric revenue breakdown: residential, 37%; commercial, 27%; industrial, 26%; other, 10%. Generating sources: gas, 35%; nuclear, 31%; coal, 7%; purchased, 27%. Fuel costs: 28% of revenues. '16 reported depreciation rate: 2.8%. Has 13,600 employees.

---

[7] http://www.cmsenergy.com/about-cms-energy/default.aspx, accessed 12/27/2017

[8] https://www.newlook.dteenergy.com/wps/wcm/connect/dte-web/home/about-dte/common/about-dte/about-dte, accessed 12/27/2017

Additional Company Information from Website:
Entergy Corporation is an integrated energy company engaged primarily in electric power production and retail distribution operations. Entergy owns and operates power plants with approximately 30,000 megawatts of electric generating capacity, including nearly 9,000 megawatts of nuclear power. Entergy delivers electricity to 2.9 million utility customers in Arkansas, Louisiana, Mississippi and Texas. Entergy has annual revenues of approximately $10.8 billion and nearly 13,000 employees.[9]

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in Arkansas, Louisiana, Mississippi, and Texas.

MGE Energy, Inc.

Company Summary from Value Line:
MGE Energy, Inc. is a holding company for Madison Gas and Electric. It provides electric service to about 149,000 customers in Dane County and gas service to 154,000 customers in seven counties in Wisconsin. Electric revenue breakdown, ’16: residential, 34%; commercial, 53%; industrial, 4%; public authorities, 9%. Generating sources, ’16: coal, 48%; purchased power, 30%; natural gas and other, 22%. Fuel costs: 21% of rev. ’16 depr. rate: 3.5%. Has 704 employees. Off. and dir. own less than 1% of common; The Vanguard Group, Inc., 9.2%; BlackRock, Inc., 6.3% (3/17 proxy).

Additional Company Information from Website:
MGE Energy, a public utility holding company, is headquartered in the state capital Madison, Wis. MGE Energy trades on NASDAQ with the stock ticker MGEE. MGE Energy is dedicated to long-term value for its shareholders. We have increased our dividend for more than 40 consecutive years and have paid dividends for more than 100 years. MGE Energy is the parent company of the following: Madison Gas and Electric Company (MGE) provides natural gas and electric service in south-central and western Wisconsin. MGE Transco Investment holds an ownership interest in ATC LLC, which invests in transmission assets, primarily within Wisconsin. MGEE Transco LLC holds an ownership interest in ATC Holdco, which invests in transmission assets outside ATC LLC service territory. MGE Power owns assets in the West Campus Cogeneration Facility in Madison, Wis. and the Elm Road Generating Station in Oak Creek, Wis. MAGAEL, LLC holds title to properties acquired for future utility plant expansion. Central Wisconsin Development Corporation promotes business growth in MGE's service area. MGE Services, LLC provides construction and other services. Its subsidiary NGV Fueling Services, LLC, installs, owns and maintains equipment used to fuel natural gas-powered vehicles.[10]

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in Wisconsin.

NorthWestern Corporation

Company Summary from Value Line:
NorthWestern Corporation (doing business as North-Western Energy) supplies electricity & gas in the Upper Midwest and Northwest, serving 427,000 electric customers in Montana and South Dakota and 283,000 gas customers in Montana (87% of gross margin), South Dakota (12%), and Nebraska (1%). Electric revenue breakdown: residential, 40%; commercial, 51%; industrial, 5%; other, 4%. Generating

[9] http://entergy.com/about_entergy/, accessed 12/27/2017

[10] https://www.mgeenergy.com/about-us/about.htm, accessed 12/27/2017

sources: hydro, 34%; coal, 30%; other, 10%; purchased, 26%. Fuel costs: 32% of revenues. '16 reported deprec. rate: 3.0%. Has 1,600 employees.

Additional Company Information from Website:
For more than 100 years, NorthWestern Energy has delivered the energy and exceptional service that our customers and communities count on – safely, efficiently and responsibly. We own and operate natural gas production, transmission and distribution systems serving 282,600 customers. We own and operate a diverse generation fleet of wind, water, natural gas and coal-fired resources* and the high-voltage transmission system and distribution system that reliably delivers responsibly-produced electricity to more than 427,000 customers daily.[11]

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. This company operates in Montana, Wyoming, South Dakota, and Nebraska with generating facilities in North Dakota and Iowa.

OGE Energy Corporation

Company Summary from Value Line:
OGE Energy Corp. is a holding company for Oklahoma Gas and Electric Company (OG&E), which supplies electricity to 841,000 customers in Oklahoma (84% of electric revenues) and western Arkansas (8%); wholesale is (8%). Owns 25.7% of Enable Midstream Partners. Electric revenue breakdown: residential, 42%; commercial, 25%; industrial, 15%; other, 18%. Generating sources: coal, 33%; gas, 31%; wind, 5%; purchased, 31%. Fuel costs: 39% of revenues. '16 reported depreciation rate (utility): 3.0%. Has 2,500 employees.

Additional Company Information from Website:
OGE Energy Corp. is headquartered in Oklahoma City, Oklahoma and is publicly traded on the New York Stock Exchange under the symbol OGE. It is the parent company of Oklahoma Gas and Electric (OG&E), a regulated utility and holds a 25.7 percent limited partner interest and 50 percent general partner interest in Enable Midstream Partners, LP, also headquartered in Oklahoma City. Formed in 1902, OG&E is Oklahoma's oldest and largest investor-owned electric utility. We serve more than 830,000 customers in 276 towns and cities in a 30,000 square mile area of Oklahoma and western Arkansas. The largest city on our system, Oklahoma City, has a metro area population of approximately 1.5 million people. But we also serve towns like Enid, Ardmore, Muskogee, Norman, Durant, Ft. Smith Ark., as well as many other smaller communities throughout our service territory. We have approximately 2,500 employees who live and work in the very communities we serve. Our power plants, located throughout Oklahoma, generate electricity using natural gas, coal, wind and solar power. We are extremely proud of the fact that we, as a company, have some of the lowest rates in the entire nation. And, because of our strong system reliability and high customer satisfaction, we're consistently ranked in surveys as one of the highest performing utilities in the nation.[12]

[11] http://www.northwesternenergy.com/our-company/about-us, accessed 12/27/2017

[12] https://www.oge.com/wps/portal/oge/about-us/companyOverview/!ut/p/a1/jZDbCoJAFEW_pR_wHGe07HFszBuhBpHOS1jYJKgTJvn7adFLdDtPe8PasDggIAXR5NdS5l2pmrwau5jurMRFLzT0lYvzJTJK9ChaxtSdkQHIRoDgAn2DBG5IHGQh54kZc923jf_2-OEY_tpvQTyQpwEGQ2QLi4fJ3Kboma_AG8U78MUhACErtR_-sbVBUMcxkY3mrNlTS4Joi2PRFq12UpcO0r7vNamUrArtoGo415sUy7heZ2xyA8Fqh68!/dl5/d5/L2dBISEvZ0FBIS9nQSEh/, accessed 12/27/2017

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in Oklahoma and Arkansas.

Otter Tail Corporation

Company Summary from Value Line:
Otter Tail Corporation is the parent of Otter Tail Power Company, which supplies electricity to over 130,000 customers in Minnesota (53% of retail elec. revs.), North Dakota (38%), and South Dakota (9%). Electric rev. breakdown, ’16: residential, 31%; commercial & farms, 36%; industrial, 31%; other, 2%. Fuel costs: 14.7% of revenues. Also has operations in manufacturing and plastics. 2016 depr. rate: 3.3%. Has 2,054 employees. Off. and dir. own 1.4% of common stock; Cascade Investment, LLC, 8.8%; The Vanguard Group, 8.3%; BlackRock, Inc., 6.3% (3/17 Proxy).

Additional Company Information from Website:
Our strategy is to continue to grow our largest business, the regulated electric utility, which will lower our overall risk, create a more predictable earnings stream, improve our credit quality, and preserve our ability to fund the dividend. Over time, we expect the electric utility business will provide approximately 75-85% of our overall earnings. We expect our manufacturing and plastic pipe businesses will provide 15-25% of our earnings and will continue to be a fundamental part of our strategy. Reliable utility performance along with rate base investment opportunities over the next five years will provide us with a strong base of revenues, earnings, and cash flows. We also look to our manufacturing and plastic pipe companies to provide organic growth. Organic, internal growth comes from new products and services, market expansion, and increased efficiencies. We expect much of our growth in these businesses in the next few years will come from utilizing existing plant capacity from capital investments made in previous years. We will also evaluate opportunities to allocate capital to potential acquisitions in our Manufacturing and Plastics segments. We are a committed long-term owner and therefore we do not acquire companies in pursuit of short-term gains. However, we will divest operating companies that no longer fit into our strategy and risk profile over the long term.[13]

Why was the company included?
This company is similar to (and is one of) the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in the Midwest.

Vectren Corporation

Company Summary from Value Line:
Vectren Corp. is a holding company formed through the merger of Indiana Energy and SIGCORP. Supplies electricity and gas to an area nearly two-thirds of the state of Indiana. Owns gas distribution assets in Ohio. Has a customer base exceeding 1.1 million. 2016 Electricity revenues: residential, 37%; commercial, 27%; industrial, 34%; other, 2%. 2016 Gas revenues: residential, 67%; commercial, 23%; other, 10%. Nonutility operations include Infrastructure Services and Energy Services. Est’d plant age: electric, 10 years. ’16 depreciation rate: 4.0%. Has about 5,800 employees.

Additional Company Information from Website:
Vectren Corporation is an energy holding company headquartered in Evansville, Ind. Vectren's wholly owned subsidiary, Vectren Utility Holdings, Inc., serves as the intermediate holding company for three operating utilities: Vectren Energy Delivery of Indiana - North (Vectren North), Vectren Energy Delivery of Indiana - South (Vectren South) and Vectren Energy Delivery of Ohio (VEDO).[14]

[13] http://www.ottertail.com/corporate-profile, accessed 12/27/2017
[14] https://www.vectren.com/corporate/about, accessed 12/27/2017

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in Indiana and Ohio.

WEC Energy Group

Company Summary from Value Line:
WEC Energy Group, Inc. (formerly Wisconsin Energy) is a holding company for utilities that provide electric, gas & steam service in WI & gas service in IL, MN, & MI. Customers: 1.6 mill. elec., 2.8 mill. gas. Acq'd Integrys Energy 6/15. Sold Point Beach nuclear plant in '07. Elec. rev. breakdown: residential, 35%; small commercial & industrial, 31%; large commercial & industrial, 21%; other, 13%. Generating sources: coal, 52%; gas, 16%; renewables, 3%; purchased, 29%. Fuel costs: 35% of revs. '16 reported deprec. rates (utility): 2.3%-3.3%. Has 8,200 employees.

Additional Company Information from Website:
We are one of the nation's largest electric and natural gas delivery companies, with deep operational expertise, scale and financial resources to meet the region's future energy needs. We focus on reliable service, customer satisfaction and shareholder value. We provide vital services to nearly 4.4 million customers in Wisconsin, Illinois, Michigan and Minnesota. Our scale and geographic proximity allow for operating efficiencies across our 70,000 miles of electric distribution lines, 44,000 miles of natural gas distribution and transmission lines, and 8,800 megawatts of reliable power plant capacity. We're committed to delivering world-class reliability and the very best customer care – anywhere. Our customers are at the heart of our business, and we work every day to help grow and support the communities we serve. As a Fortune 500 company, we value and develop our employees who are making a difference in a mission that matters.[15]

Why was the company included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in the Midwest.

Xcel Energy

Company Summary from Value Line:
Xcel Energy Inc. is the parent of Northern States Power, which supplies electricity to Minnesota, Wisconsin, North Dakota, South Dakota & Michigan & gas to Minnesota, Wisconsin, North Dakota & Michigan; Public Service of Colorado, which supplies electricity & gas to Colorado; & Southwestern Public Service, which supplies electricity to Texas & New Mexico. Customers: 3.6 mill. electric, 1.9 mill. gas. Elec. rev. breakdown: residential, 31%; sm. comm'l & ind'l, 35%; lg. comm'l & ind'l, 18%; other, 16%. Generating sources not available. Fuel costs: 40% of revs. '16 reported depr. rate: 2.9%. Has 11,500 employees.

Additional Company Information from Website:
Every day we power millions of homes and businesses across eight Western and Midwestern States. Our commitment starts with the basics—customers can count on us 24/7 to be there with safe, reliable and affordable energy. But, what we provide goes much deeper than that. We are a recognized industry leader in delivering renewable energy and in reducing carbon and other emissions, efforts that have put us on a path to a more sustainable energy future. Through a growing range of innovative solutions, we continue to empower our customers with industry-leading options and energy alternatives to support their goals and objectives. In a rapidly changing industry, we are taking a smart and thoughtful approach

[15] https://www.wecenergygroup.com/about/aboutus.htm, accessed 12/27/2017

to how we produce and deliver energy, looking for better ways to serve our customers and ensure we are Always Delivering. [16]

Why was the company included?
This company is similar to (and is one of) the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in the Midwest and West.

Companies Not Included in the Electric Market Segment

AVANGRID, Inc.

Company Summary from Value Line:
AVANGRID, Inc., formerly Iberdrola USA, Inc., is a diversified energy and utility company with more than $30 billion in assets and operations in 25 states. It operates regulated utilities and electricity generation through two primary lines of business: Avangrid Networks and Avangrid Renewables. The former group includes eight electric and natural gas utilities, serving customers in New York and New England. The latter operates 6.3 gigawatts of electricity capacity, primarily through wind power, in the U.S. Fuel costs: 22% of ’15 rev. Has 2.2 million elect., 1 million gas customers. Has 6,810 employees.

Additional Company Information from Website:
AVANGRID, Inc. (NYSE: **AGR**) is a diversified energy and utility company with more than $30 billion in assets and operations in 25 states. The company operates regulated utilities and electricity generation through two primary lines of business. Avangrid Networks includes eight electric and natural gas utilities, serving 3.1 million customers in New York and New England. Avangrid Renewables operates 6.3 gigawatts of electricity capacity, primarily through wind power, in states across the United States. AVANGRID employs 7,000 people. The company was formed by a merger between Iberdrola USA and UIL Holdings Corporation in 2015. IBERDROLA S.A. (Madrid: IBE), a worldwide leader in the energy industry, owns 81.5% of AVANGRID.[17]

AVANGRID, Inc. (NYSE: AGR) is a U.S. based diversified energy and utility company with $30 billion in assets and operations in 25 states, created through the merger of Iberdrola USA and UIL Holdings Corp. in December 2015.[18]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Avista Corporation

Company Summary from Value Line:
Avista Corporation (formerly The Washington Water Power Company) supplies electricity & gas in eastern Washington & northern Idaho. Supplies electricity to part of Alaska & gas to part of Oregon. Customers: 392,000 electric, 340,000 gas. Acq’d Alaska Electric Light and Power 7/14. Sold Ecova energy-management sub. 6/14. Electric rev. breakdown: residential, 35%; commercial, 31%; industrial, 11%; wholesale, 11%; other, 13%. Generating sources: hydro, 32%; gas & coal, 30%; purchased, 38%. Fuel costs: 38% of revs. ’16 reported deprec. rate (Avista Utilities): 3.1%. Has 2,000 employees.

[16] https://www.xcelenergy.com/company/corporate_responsibility_report/who_we_are, accessed 12/27/2017
[17] https://www.avangrid.com/AboutAvanGrid/default.html, accessed on 12/19/2016
[18] http://www.avangrid.com/NewsRoom/NewsReleases/default.html, accessed 12/22/2016

Additional Company Information from Website:
We are an energy company involved in the production, transmission and distribution of energy as well as other energy-related businesses. Avista Utilities is our operating division that provides electric service to more than 600,000 electric and natural gas customers. Our service territory covers 30,000 square miles in eastern Washington, northern Idaho and parts of southern and eastern Oregon, with a population of 1.5 million. Alaska Energy and Resources Company, an Avista subsidiary, provides retail electric service in the city and borough of Juneau through its subsidiary Alaska Electric Light and Power Company.[19]

Why was the company not included?
This company is located in the Electric Utility (West) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Consolidated Edison, Inc.

Company Summary from Value Line:
Consolidated Edison, Inc. is a holding company for Consolidated Edison Company of New York, Inc. (CECONY), which sells electricity, gas, and steam in most of New York City and Westchester County. Also owns Orange and Rockland Utilities (O&R), which operates in New York and New Jersey. Has 3.6 million electric, 1.2 million gas customers. Pursues competitive energy opportunities through three wholly owned subsidiaries. Entered into midstream gas joint venture 6/16. Purchases most of its power. Fuel costs: 26% of revenues. ’16 reported depreciation rates: 2.9%- 3.1%. Has 15,000 employees.

Additional Company Information from Website:
We operate one of the world’s largest energy delivery systems. Founded in 1823 as the New York Gas Light company, our electric, gas, and steam service now provides energy for the 10 million people who live in New York City and Westchester County. We’re constantly looking toward the future and exploring ways to innovate and take advantage of developing technology. But, more than anything, we’re listening to you and working hard to give you cleaner, more efficient energy choices, and more control over when and how you use your power.[20]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Dominion Energy, Inc.

Company Summary from Value Line:
Dominion Energy, Inc. (formerly Dominion Resources, Inc.) is a holding company for Virginia Power & North Carolina Power, which serve 2.6 mill. customers in VA & northeastern NC. Serves 2.3 mill. gas customers in OH, WV, & UT. Nonutility ops. incl. independent power production. Owns 70.9% of Dominion Midstream Partners. Acq’d Questar 9/16. Elec. rev. breakdown: residential, 46%; commercial, 32%; industrial, 7%; other, 15%. Generating sources: nuclear, 31%; gas, 31%; coal, 24%; other, 6%; purch., 8%. Fuel costs: 25% of revs. ’16 reported depr. rates: 2.3%-4.1%. Has 16,200 employees.

[19] http://www.avistacorp.com/about/Pages/aboutus.aspx, accessed 12/27/2017

[20] https://www.coned.com/en/about-us/company-information, accessed 12/27/2017

Additional Company Information from Website:
Headquartered in Richmond, VA, Dominion Energy [NYSE: D] is one of the nation's largest producers and transporters of energy, with a portfolio of approximately 25,700 megawatts of electric generation, 15,000 miles of natural gas transmission, gathering, storage and distribution pipeline and 6,600 miles of electric transmission and distribution lines. We operate one of the largest natural gas storage systems in the U.S. with 1 trillion cubic feet of capacity, and serve more than 6 million utility and retail energy customers. Our company is built on a proud legacy of public service, innovation and community involvement. In addition to our core businesses, Dominion Energy and our 16,200 employees invest in the communities where we live and work and by practicing responsible environmental stewardship wherever we operate.[21]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Duke Energy Corporation

Company Summary from Value Line:
Duke Energy Corporation is a holding company for utilities with 7.4 mill. elec. customers in NC, FL, IN, SC, Oh, & KY, and 1.5 mill. gas customers in OH, KY, NC, SC, and TN. Owns independent power plants & has 25% stake in National Methanol in Saudi Arabia. Acq'd Progress Energy 7/12; Piedmont Natural Gas 10/16; discontinued most int'l ops. in '16. Elec. rev. breakdown: residential, 43%; commercial, 29%; industrial, 14%; other, 14%. Generating sources: coal, 27%; nuclear, 27%; gas, 23%; other, 1%; purchased, 22%. Fuel costs: 30% of revs. '16 reported deprec. rate: 2.8%. Has 28,800 employees.

Additional Company Information from Website:
We are one of the largest electric power holding companies in the United States, supplying and delivering electricity to approximately 7.4 million U.S. customers. We have approximately 52,700 megawatts of electric generating capacity in the Carolinas, the Midwest and Florida – and natural gas distribution services serving more than 1.5 million customers in Ohio, Kentucky, Tennessee and the Carolinas. Our commercial business owns and operates diverse power generation assets in North America, including a portfolio of renewable energy assets.[22]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Edison International (formerly SCECorp)

Company Summary from Value Line:
Edison International (formerly SCECorp) is a holding company for Southern California Edison Company (SCE), which supplies electricity to 5.1 mill. customers in a 50,000-sq.-mi. area in central, coastal, & southern CA (excl. Los Angeles & San Diego). Edison Energy is an energy svcs. co. Disc. Edison Mission Energy (independent power producer) in '12. Elec. rev. breakdown: residential, 37%; commercial, 44%; industrial, 6%; other, 13%. Generating sources: gas, 6%; nuclear, 6%; hydro, 5%; purchased, 83%. Fuel costs: 38% of revs. '16 reported depr. rate: 3.8%. Has 12,400 empls.

---

[21]https://www.dominionenergy.com/about-us/who-we-are, accessed 12/27/2017

[22] https://www.duke-energy.com/our-company/about-us, accessed 12/27/2017

Additional Company Information from Website:
Our subsidiary SCE is one of the largest electric utilities in the United States and a longtime leader in renewable energy and energy efficiency. With headquarters in Rosemead, Calif., SCE serves approximately 15 million people in a 50,000 square-mile area of central, coastal and Southern California. SCE has provided electric service in the region for more than 125 years.

Our subsidiary Edison Energy Group provides new products and services in an ever-changing energy marketplace, and invests in and partners with technology leaders in the energy space. Edison Energy Group's goal is to build on Edison International's core strengths to provide commercial and industrial customers with a range of energy services including power management services, distributed generation, electric transportation, and water purification. Edison Energy Group operations are completely independent of and unconnected to Southern California Edison.[23]

Why was the company not included?
This company is located in the Electric Utility (West) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

El Paso Electric Company

Company Summary from Value Line:
El Paso Electric Company (EPE) provides electric service to 416,000 customers in an area of approximately 10,000 square miles in the Rio Grande valley in western Texas (68% of revenues) and southern New Mexico (19% of revenues), including El Paso, Texas and Las Cruces, New Mexico. Wholesale is 13% of revenues. Electric revenue breakdown by customer class not available. Generating sources: nuclear, 49%; gas, 34%; coal, 2%; purchased & other, 15%. Fuel costs: 26% of revenues. '16 reported depreciation rate: 2.3%. Has about 1,100 employees.

Additional Company Information from Website:
El Paso Electric (EPE) first began serving its customers on August 30, 1901. It was then known as the El Paso Electric Railway Company. Initially its primary business consisted of providing transportation via mule-drawn streetcars, which were replaced in 1902 with electric streetcars. Today, El Paso Electric is a regional electric utility providing generation, transmission and distribution service to approximately 417,000 retail and wholesale customers in a 10,000 square mile area of the Rio Grande valley in west Texas and southern New Mexico. Its service territory extends from Hatch, New Mexico to Van Horn, Texas. El Paso Electric takes pride in being an active corporate citizen in the communities it serves. Contributing to our communities is an expressed part of our corporate mission statement, and as such, it helps to define our corporate purpose and mold the actions taken by our employees. The success of El Paso Electric's corporate citizenship programs can be attributed to the caring and generosity of its employees.[24]

Why was the company not included?
This company is located in the Electric Utility (West) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Empire District Electric Company

Company Summary from Value Line:
Not available. Company is not publically traded.

[23] https://www.edison.com/home/about-us/our-companies.html, accessed 12/27/2017

[24] https://www.epelectric.com/, accessed 12/27/2017

Additional Company Information from Website:
Algonquin Power & Utilities Corp announced January 1, 2017 that a subsidiary of Liberty Utilities Co., APUC's wholly-owned regulated utility business successfully completed its acquisition of The Empire District Company for an aggregate purchase price of approximately Cdn$3.2 billion. Empire is now a wholly-owned subsidiary of Liberty Utilities and will cease to be a publicly-held corporation.[25]

Why was the company not included?
Company is no longer publically traded.

Eversource Energy

Company Summary from Value Line:
Eversource Energy (formerly Northeast Utilities) is the parent of utilities that have 3.1 million electric, 504,000 gas customers. Supplies power to most of Connecticut and gas to part of Connecticut; supplies power to three fourths of New Hampshire's population; supplies power to western Massachusetts and parts of eastern Massachusetts & gas to central & eastern Massachusetts. Acquired NSTAR 4/12. Electric revenue breakdown: residential, 52%; commercial, 36%; industrial, 5%; other, 7%. Fuel costs: 33% of revenues. '16 reported deprec. rate: 3.0%. Has 7,800 employees.

Additional Company Information from Website:

Eversource is New England's largest energy delivery company, safely and reliably delivering energy to more than 3.7 million electric and natural gas customers in Connecticut, Massachusetts and New Hampshire.

The company operates more than 4,270 circuit miles of transmission lines, 72,000 pole miles of distribution lines, 578 substations, 449,737 distribution transformers and 6,459 miles of natural gas distribution pipelines across our service territory.

Our customers:

Connecticut: 1.2 million electric in 149 communities, 222,000 natural gas in 71 communities.

Massachusetts: 1.4 million electric in 140 communities, 283,000 natural gas in 51 communities.

New Hampshire: 510,000 electric in 211 communities.[26]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Exelon Corporation

Company Summary from Value Line:
Exelon Corporation is a holding company for Commonwealth Edison, PECO Energy, Baltimore Gas and Electric, Pepco, Delmarva Power, & Atlantic City Electric. Has 8.8 mill. elec., 1.3 mill. gas customers. Has nonregulated generating & energy marketing ops. Acq'd Constellation Energy 3/12; Pepco Holdings 3/16. Elec. rev. breakdown: res'l, 63%; small comm'l & ind'l, 23%; large comm'l &

[25] https://www.prnewswire.com/news-releases/algonquin-power--utilities-corp-completes-acquisition-of-the-empire-district-electric-company-609135805.html, accessed 12/27/2017

[26] https://www.eversource.com/Content/general/about/about-eversource/customer-profile, accessed 12/27/2017

ind'l, 13%; other, 1%. Generating sources: nuclear, 68%; other, 8%; purch., 24%. Fuel costs: 40% of revs. '16 depr. rates: 2.7%-5.9% elec., 2.2% gas. Has 34,400 empls.

Additional Company Information from Website:
We are a FORTUNE 100 company that works in every stage of the energy business: power generation, competitive energy sales, transmission and delivery. As the nation's leading competitive energy provider, Exelon does business in 48 states, D.C., and Canada and had 2016 revenues of $31.4 billion. We employ approximately 34,000 people nationwide.[27]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

FirstEnergy Corporation

Company Summary from Value Line:
FirstEnergy Corp. is a holding company for Ohio Edison, Pennsylvania Power, Cleveland Electric, Toledo Edison, Metropolitan Edison, Penelec, Jersey Central Power & Light, West Penn Power, Potomac Edison, & Mon Power. Provides electric service to 6.1 million customers in OH, PA, NJ, WV, MD, & NY. Acq'd Allegheny Energy 2/11. Electric revenue breakdown by customer class not available. Generating sources: coal, 44%; nuclear, 26%; purchased, 30%. Fuel costs: 38% of revenues. '16 reported deprec. rate: 2.5%. Has 15,700 employees.

Additional Company Information from Website:
We are a forward-thinking electric utility powered by a diverse team of employees committed to making customers' lives brighter, the environment better and our communities stronger. FirstEnergy (NYSE: FE) is dedicated to safety, reliability and operational excellence. Headquartered in Akron, Ohio, FirstEnergy includes one of the nation's largest investor-owned electric systems, more than 24,000 miles of transmission lines that connect the Midwest and Mid-Atlantic regions, and a diverse generating fleet with a total capacity of more than 16,000 megawatts. Our company has invested $10 billion in environmental efforts since 1970, and we have a continuing commitment to cleaner energy resources, smarter technology and a more sustainable planet.[28]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Fortis, Inc.

Company Summary from Value Line:
Fortis Inc.'s main focus is electricity, hydroelectric, and gas utility operations (both regulated and nonregulated) in the United States, Canada, and the Caribbean. Has 2 mill. electric, 1.2 mill. gas customers. Owns UNS Energy (Arizona), Central Hudson (New York), FortisBC Energy (British Columbia), FortisAlberta (Central Alberta), and Eastern Canada (Newfoundland). Sold commercial real estate and hotel property assets in 2015. Acquired ITC Holdings 10/16. Fuel costs: 34% of revenues. '16 reported deprec. rate: 2.8%. Has 8,000 employees.

[27] http://www.exeloncorp.com/company/about-exelon, accessed 12/27/2017

[28] https://www.firstenergycorp.com/about.html, accessed 12/27/2017

Additional Company Information from Website:
Fortis Inc. has its origin in the formation of St. John's Electric Light Company in 1885 in the province now known as Newfoundland and Labrador. That company eventually became Newfoundland Light & Power Co. Limited which became the first wholly owned subsidiary of Fortis Inc. Fortis was created as a holding company in 1987 with the mission to expand and diversify. Today, Fortis is a leader in the North American utility industry with assets of approximately $47 billion and 2016 revenue of $6.8 billion. Our more than 8,000 employees serve utility customers in five Canadian provinces, nine U.S. states and three Caribbean countries.[29]

Why was the company not included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. This company is in the Electric Utility (Central) Value Line Industry. This company trades on the Toronto and New York Stock Exchanges. All data provided by Value Line is in Canadian Dollars, making conversion to US dollars necessary. Since there are enough comparable companies, will not use to limit the number of additional calculations that can decrease the reliability of the data.

Great Plains Energy

Company Summary from Value Line:
Great Plains Energy Incorporated is a holding company for Kansas City Power & Light and two other subsidiaries, which supply electricity to 856,000 customers in western Missouri (71% of revenues) and eastern Kansas (29%). Acquired Aquila 7/08. Sold Strategic Energy (energy-marketing subsidiary) in '08. Electric revenue breakdown: residential, 40%; commercial, 39%; industrial, 9%; other, 12%. Generating sources: coal, 63%; nuclear, 13%; wind, 1%; gas & oil, 1%; purchased, 22%. Fuel costs: 22% of revenues. '16 reported deprec. rate (utility): 3.0%. Has 2,900 employees.

Additional Company Information from Website:
Great Plains Energy Incorporated (NYSE: GXP), through its operating subsidiaries, Kansas City Power & Light Company (KCP&L) and KCP&L Greater Missouri Operations Company (GMO), provides clean, safe and reliable energy to more than 850,000 customers in Kansas and Missouri.[30]

KANSAS CITY, Mo. & TOPEKA, Kan.--(BUSINESS WIRE)--Nov. 21, 2017-- Westar Energy, Inc. (NYSE: WR) and Great Plains Energy Incorporated (NYSE: GXP), the parent company of Kansas City Power & Light ("KCP&L"), today announced at their respective shareholder meetings that shareholders overwhelmingly approved the proposals necessary for the merger between the two companies.[31]

Why was the company not included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in the Midwest. Great Plains Energy and Westar Energy, Inc. shareholders approved the merger on November 21, 2017. Merger is pending regulatory approval. After the acquisition, we will review the company again to see if we should include the company as a guideline company.

Hawaiian Electric Industries, Inc.

Company Summary from Value Line:
Hawaiian Electric Industries, Inc. is the parent company of Hawaiian Electric Company, Inc. (HECO) & American Savings Bank (ASB). HECO & its subs., Maui Electric Co. (MECO) & Hawaii Electric Light Co. (HELCO), supply electricity to 458,000 customers on O‘ahu, Maui, Molokai, Lanai, & Hawaii.

[29] https://www.fortisinc.com/about-us, accessed 12/27/2017

[30] http://www.greatplainsenergy.com/about-gpe/company-information, accessed 12/27/2017

[31] http://www.greatplainsenergy.com/news-releases/news-release-details/great-plains-energy-and-westar-energy-shareholders-approve-0, accessed 12/27/2017

Operating companies' systems are not interconnected. Electric. revenue breakdown: residential, 31%; commercial, 34%; large light & power, 34%; other, 1%. Generating sources: oil, 53%; purchased, 47%. Fuel costs: 43% of revs. '16 reported depr. rate (utility): 3.2%. Has 3,800 empls.

Additional Company Information from Website:
At HEI, we strive to be a catalyst for a better Hawaii. We endeavor to be trusted and valued leaders in improving the economic well-being of the state, promoting the environmental sustainability of our islands, and benefiting the communities we serve. At the Hawaiian Electric Companies, we're committed to achieving a 100 percent renewable energy future for Hawaii. As we continue to add diverse types of local renewable energy, Hawaii will reduce its dependence on imported oil. Our vision is to empower our customers and communities with affordable, reliable, clean energy, and provide innovative energy leadership for Hawaii. At American Savings Bank, we are the bank where everybody is somebody – a place where teammates work together to make banking easy while providing the best customer experience. For more than 90 years we have championed the dreams of generations of island residents and businesses. Our strength comes from helping customers succeed and supporting the communities they live in. HEI works proactively to improve the future of Hawaii and its communities. These efforts are integrated into our core business strategies. By helping our state achieve economic prosperity and a clean environment, and by addressing our communities' needs, we build a sustainable future for our companies and for Hawaii.[32]

Why was the company not included?
This company is located in the Electric Utility (West) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

IDACORP, Inc.

Company Summary from Value Line:
IDACORP, Inc. is a holding company for Idaho Power Company, a regulated electric utility that serves 539,000 customers throughout a 24,000-square-mile area in southern Idaho and eastern Oregon (population: 1 million). Most of the company's revenues are derived from the Idaho portion of its service area. Revenue breakdown: residential, 41%; commercial, 24%; industrial, 14%; irrigation, 12%; other, 9%. Generating sources: hydro, 39%; coal, 25%; gas, 10%; purchased, 26%. Fuel costs: 33% of revenues. '16 reported depreciation rate: 2.6%. Has 2,000 employees.

Additional Company Information from Website:
Boise, Idaho-based IDACORP is a holding company comprised of Idaho Power Company, a regulated electric utility; IDACORP Financial, a holder of affordable housing projects and other real estate investments; and Ida-West Energy, an operator of small hydroelectric generation projects that satisfy the requirements of the Public Utility Regulatory Policies Act of 1978. IDACORP was formed Oct. 1, 1998, following approval by Idaho Power shareholders, the Federal Energy Regulatory Commission and the public utility commissions of Idaho, Oregon, Nevada and Wyoming (states where IDACORP has conducted business or has holdings). Under the holding company structure, Idaho Power Company is the primary subsidiary. This regulated utility, created in 1916, is dedicated to providing quality electric service to nearly 542,000 general business customers in a 24,000-square-mile service area in southern Idaho and eastern Oregon. The backbone of the company's generation portfolio is a series of 17 hydroelectric plants it owns and operates on the Snake River and its tributaries. Idaho Power also owns three natural gas-fired power plants and a partial interest in three coal-fired generating stations.

[32] http://www.hei.com/CustomPage/Index?keyGenPage=1073751872, accessed 12/22/2017

IDACORP's common stock is traded on the New York Stock Exchange under the trading symbol "IDA".[33]

Why was the company included?
This company is part of Value Line's Electric Utility (West) industry, but it is similar to the Electric Companies that the State Assessed Section is responsible for valuing. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

MDU Resources Group, Inc.

Company Summary from Value Line:
MDU Resources Group, Inc. is a regulated energy delivery and construction materials and services business. Segments: construction materials and contracting (45% of '16 revs; 44% of '16 op. inc.), construction services (26%, 13%), natural gas distribution (19%, 16%); electric (8%, 17%) and pipeline and energy services (2%, 17%). Utilities sell gas & electricity in northwest and upper midwest U.S. Construction materials has 1.1 billion tons of construction reserves. Has 9,598 employees. Officers/directors own 1.1% of common stock; The Vanguard Group, 10.3% (3/17 Proxy).

Additional Company Information from Website:
A strong infrastructure is the heart of the American economy. It is the natural gas and electricity that power business, industry and our daily lives. It is the pipes and wires that connect our homes, factories, offices and stores to bring them to life. It is the transportation network of roads, highways and airports that keeps our economy moving. Infrastructure is our business. We provide essential products and services through our regulated energy delivery and construction materials and services businesses. Our company was founded in 1924 as a small electric utility serving a handful of farm communities on the border of Montana and North Dakota. We realized early the value of delivering a variety of services, and we grew our company by developing a core line of businesses. Today, we are a multibillion-dollar corporation headquartered in Bismarck, North Dakota, with operations and customers across the country. MDU Resources is the largest publicly traded company headquartered in North Dakota, and we do business in 48 states. Since 1948, our stock has been traded on the New York Stock Exchange. It trades under the symbol MDU.[34]

Why was the company not included?
This company is reviewed as a potential guideline company because it has an operating subsidiary located in Minnesota. This company is located in the Natural Gas Diversified Company Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota that are very similar to the companies in Minnesota. MDU Resources Group, Inc.'s majority operating segment is construction materials and contracting.

NextEra Energy, Inc.

Company Summary from Value Line:
NextEra Energy, Inc. (formerly FPL Group, Inc.) is a holding company for Florida Power & Light Company (FPL), which provides electricity to 4.9 million customers in a 27,650-sq.-mi. area in eastern & southern Florida. NextEra Energy Resources is a nonregulated power generator with nuclear, gas, & wind ownership. Has a 79.9% stake in NextEra Energy Partners. Rev. breakdown: residential, 55%;

[33] http://www.idacorpinc.com/about-us/at-a-glance, accessed 12/27/2017

[34] http://www.mdu.com/our-business, accessed 12/27/2017

commercial, 36%; industrial & other, 9%. Generating sources: gas, 70%; nuclear, 23%; coal, 4%; purchased, 3%. Fuel costs: 25% of revs. ’16 reported depr. rate (utility): 3.4%. Has 13,800 employees.

Additional Company Information from Website:
NextEra Energy, Inc. (NYSE: NEE) is a leading clean energy company with consolidated revenues of approximately $16.2 billion, approximately 45,900 megawatts of generating capacity, which includes megawatts associated with noncontrolling interests related to NextEra Energy Partners, LP (NYSE: NEP), and approximately 14,700 employees in 30 states and Canada as of year-end 2016. Headquartered in Juno Beach, Florida, NextEra Energy's principal subsidiaries are Florida Power & Light Company, which serves approximately 5 million customer accounts in Florida and is one of the largest rate-regulated electric utilities in the United States, and NextEra Energy Resources, LLC, which, together with its affiliated entities, is the world's largest generator of renewable energy from the wind and sun. Through its subsidiaries, NextEra Energy generates clean, emissions-free electricity from eight commercial nuclear power units in Florida, New Hampshire, Iowa and Wisconsin. A Fortune 200 company and included in the S&P 100 index, NextEra Energy has been recognized often by third parties for its efforts in sustainability, corporate responsibility, ethics and compliance, and diversity, and has been ranked No. 1 in the electric and gas utilities industry in Fortune's 2016 list of "World's Most Admired Companies."[35]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota. This company has nuclear plants in Wisconsin as well as renewable energy generators in Minnesota. However, these operations are very small considering the overall company.

Ormat Technologies, Inc.

Company Summary from Value Line:
Ormat Technologies, Inc., together with its subsidiaries, provides geothermal and recovered energy power and products through two operating segments. Its electricity division (66% of 2016 revs.) develops, constructs, owns, and operates geothermal power plants that sell electricity. Under the product segment (34% of revs.), the company designs and manufactures power units for geothermal plants and power units for recovered generation. Employs 1.250. Off./dir. own 14.7% of outs. stock; FIMI ENRG and Bronicki Invest., 21% each (4/17 Proxy). On 7/26/17, the three aforementioned owners sold a 22% stake in co. to ORIX Corp.

Additional Company Information from Website:
At Ormat Technologies, Inc. (NYSE: ORA), we’re always on; delivering renewable power and energy solutions to our customers around the clock and around the world. Clean, reliable energy solutions provided from geothermal, recovered energy, as well as energy management and storage solutions, is our expertise, commitment and focus. Built on ingenuity and proven experience, Ormat is recognized globally for developing state-of-the-art, environmentally sound power solutions. We design, build and supply power generating equipment for our customers’ geothermal and recovered energy power plants in 30 countries. We understand our customers’ operating challenges, because we are operators too. As a geothermal industry leader, we’ve gained global expertise in exploring, developing, designing, manufacturing, building, owning and operating geothermal power plants in Kenya, Guadalupe, Guatemala, Honduras and the United States. Our vertically integrated structure enables us to leverage

[35] http://www.investor.nexteraenergy.com/phoenix.zhtml?c=88486&p=irol-homeProfile, accessed 12/27/2017

our renewable energy expertise, our core capabilities, and our global experience to supply and develop geothermal, recovered energy, and energy management and storage solutions.[36]

Why was the company not included?
This company is located in the Power Company Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to or in Minnesota. Ormat does have generating facilities in Minnesota, but they are a very small portion of their overall company and Ormat is not an accurate reflection of the types of companies we are valuing.

PG&E Corporation (Pacific Gas and Electric Company, Inc.)

Company Summary from Value Line:
PG&E Corporation is a holding company for Pacific Gas and Electric Company and nonutility subsidiaries. Supplies electricity and gas to most of northern and central California (population 16 million). Has 5.4 million electric and 4.5 million gas customers. Electric revenue breakdown: residential, 40%; commercial, 39%; industrial, 11%; agricultural, 9%; other, 1%. Generating sources: nuclear, 24%; hydro, 11%; gas, 7%; purchased, 58%. Fuel costs: 30% of revenues. '16 reported depreciation rate (utility): 3.8%. Has 24,000 employees.

Additional Company Information from Website:
PG&E Corporation, incorporated in California in 1995, is a holding company whose primary operating subsidiary is Pacific Gas and Electric Company, a public utility operating in northern and central California. The Utility was incorporated in California in 1905. PG&E Corporation became the holding company of the Utility and its subsidiaries in 1997. The Utility generates revenues mainly through the sale and delivery of electricity and natural gas to customers.[37]

Why was the company not included?
This company is located in the Electric Utility (West) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Pinnacle West Capital Corporation

Company Summary from Value Line:
Pinnacle West Capital Corporation is a holding company for Arizona Public Service Company (APS), which supplies electricity to 1.2 million customers in most of Arizona, except about half of the Phoenix metro area, the Tucson metro area, and Mohave County in northwestern Arizona. Discontinued SunCor real estate subsidiary in '10. Electric revenue breakdown: residential, 50%; commercial, 40; industrial, 5%; other, 5%. Generating sources: nuclear, 28%; gas & other, 26%; coal, 20%; purchased, 26%. Fuel costs: 31% of revenues. '16 reported deprec. rate: 2.7%. Has 6,300 employees.

Additional Company Information from Website:
Pinnacle West Capital Corporation (NYSE: PNW) is an investor owned electric utility holding company based in Phoenix, Arizona with consolidated assets of nearly $17 billion. For over 125 years, Pinnacle West and our affiliates have provided energy and energy-related products to people and businesses throughout Arizona -- our history and Arizona's history are bound together. Pinnacle West derives essentially all of our revenues and earnings from our wholly-owned subsidiary, Arizona Public Service ("APS"). APS is a vertically-integrated electric utility that provides either retail or wholesale electric service to most of the State of Arizona, 1.2 million customers in total. APS is also the operator and co-

[36] http://www.ormat.com/en/company/welcome/profile/ accessed 12/27/2017

[37] http://www.pgecorp.com/investors/financial_reports/annual_report_proxy_statement/ar_pdf/2016/2016_Annual_Report.pdf, accessed 12/27/2017

owner of the Palo Verde Generating Station – a primary source of electricity for the Southwest. Pinnacle West's other principal subsidiary is Bright Canyon Energy.[38]

Why was the company not included?
This company is located in the Electric Utility (West) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

PNM Resources, Inc.

Company Summary from Value Line:
PNM Resources, Inc. is a holding company with two regulated electric utilities. Public Service Company of New Mexico (PNM) serves 520,000 customers in north central New Mexico, incl. Albuquerque and Santa Fe. Texas-New Mexico Power Company (TNMP) transmits and distributes power to 247,000 customers in Texas. Electric rev. breakdown: residential, 29%; commercial, 31%; industrial, 18%; other, 22%. Generating sources: coal, 57%; nuclear, 30%; gas/oil, 12%; solar, 1%. Fuel costs: 49% of revenues. '16 depreciation rate: 3.3%. Has 1,800 employees.

Additional Company Information from Website:
PNM Resources, Inc. is an investor-owned energy holding company based in Albuquerque, New Mexico. It provides electricity and electric services in New Mexico and Texas through its two utilities, PNM and TNMP. PNM and TNMP have approximately 2,791 megawatts of generation capacity and serve electricity to more than 761,000 homes and businesses in New Mexico and Texas. PNM Resources has a solid reputation for shareholder value, customer satisfaction and service reliability. It is publicly traded on the New York Stock Exchange as PNM. In 2016, consolidated operating revenues totaled $1.4 billion.[39]

Why was the company not included?
This company is located in the Electric Utility (West) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Portland General Electric Company

Company Summary from Value Line:
Portland General Electric Company (PGE) provides electricity to 872,000 customers in 52 cities in a 4,000-square-mile area of Oregon, including Portland and Salem. The company is in the process of decommissioning the Trojan nuclear plant, which it closed in 1993. Electric revenue breakdown: residential, 47%; commercial, 35%; industrial, 11%; other, 7%. Generating sources: gas, 27%; coal, 16%; wind, 9%; hydro, 8%; purchased, 40%. Fuel costs: 32% of revenues. '16 reported depreciation rate: 3.5%. Has 2,700 employees.

Additional Company Information from Website:
Serving Portland, Salem and nearby communities with highly reliable power. For more than 125 years, we've been powering the pioneering spirit of our region — keeping energy safe, reliable and responsibly generated. We are deeply committed to the success of the communities we serve and strive to bring innovative solutions to our customers and a bright energy future for Oregon. [40]

[38] http://www.pinnaclewest.com/about-us/default.aspx, accessed 12/27/2017

[39] http://www.pnmresources.com/about-us.aspx, accessed 12/27/2017

[40] https://www.portlandgeneral.com/our-company/pge-at-a-glance/quick-facts, 12/27/2017

Why was the company not included?
This company is located in the Electric Utility (West) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

PPL Corporation

Company Summary from Value Line:
PPL Corporation (formerly PP&L Resources, Inc.) is a holding company for PPL Electric Utilities (formerly Pennsylvania Power & Light Company), which distributes electricity to 1.4 million customers in eastern & central PA. Acq'd Kentucky Utilities and Louisville Gas and Electric (1.2 million customers) 11/10. Has electric distribution sub. in U.K. (7.8 million customers). Sold gas distribution subsidiary in '08. Spun off power generating subsidiary in '15. The company no longer breaks out data on electric operating statistics. Fuel costs: 20% of revs. '16 reported deprec. rate: 2.7%. Has 12,700 employees.

Additional Company Information from Website:
PPL Corporation and our family of companies provide essential energy services to more than 10 million customers in the United States and the United Kingdom. We provide an outstanding service experience for our customers, consistently ranking among the best utilities in the U.S. and the U.K. As one of the largest purely regulated utility companies in the United States, we understand the electricity we provide is vital to our customers and communities. To that end, we are investing more than $16 billion through 2021 in new infrastructure and technology that will create a smarter, more reliable and resilient energy grid for generations to come. As the energy grid evolves, so do we. Our companies are addressing new challenges head-on and are finding ways to accommodate new technologies, distributed generation and renewable power sources on our grid. We are also taking steps to reduce our environmental impact and advance a cleaner, more balanced energy mix. We are a positive force in the cities and towns where we do business, and the spirit of volunteerism and philanthropy runs deep at PPL. Our more than 13,000 employees generously volunteer their time and energy to help others. We also partner with hundreds of nonprofit organizations to enhance educational programs, help develop the workforce and revitalize our communities. PPL is committed to providing essential energy in extraordinary ways, and we deliver.[41]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Public Service Enterprise Group, Inc.

Company Summary from Value Line:
Public Service Enterprise Group Incorporated is a holding company for Public Service Electric and Gas Company (PSE&G), which serves 2.2 million electric and 1.8 million gas customers in New Jersey, and PSEG Power LLC, a nonregulated power generator with nuclear, gas, and coal-fired plants in the Northeast. PSEG Energy Holdings is involved in renewable energy. The company no longer breaks out data on electric and gas operating statistics. Fuel costs: 31% of revenues. '16 reported depreciation rate (utility): 2.5%. Has 12,700 employees.

Additional Company Information from Website:
PSEG is a diversified energy company. Established in 1903, the company has long had a key role in fueling New Jersey's economy and supporting the state's quality of life. Public Service Electric and Gas (PSE&G) is New Jersey's largest provider of electric and gas service – serving 2.2 million electric

[41] https://www.pplweb.com/who-we-are/about-us/, accessed 12/27/2017

customers and 1.8 million gas customers or nearly three out of every four people in the state. PSEG also owns and operates a diverse fleet of power plants with approximately 12,000 megawatts of generating capacity located primarily in the Mid-Atlantic and Northeast regions and has solar energy facilities throughout the United States. Another member of the PSEG family of companies, PSEG Long Island, operates the electric transmission and distribution system of the Long Island Power Authority, with 1.1 million customers. PSEG has approximately 13,100 employees, who are carrying forward a proud tradition of dedicated service over more than 100 years.[42]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

SCANA Corporation

Company Summary from Value Line:
SCANA Corporation is a holding company for South Carolina Electric & Gas Company, which supplies electricity to 718,000 customers in central, southern, and southwestern South Carolina. Supplies gas service to 1.4 million customers in North Carolina, South Carolina, and Georgia. Electric revenue breakdown: residential, 46%; commercial, 33%; industrial, 17%; other, 4%. Generating sources: coal, 38%; gas & oil, 27%; nuclear, 23%; hydro & other, 4%; purchased, 8%. Fuel costs: 40% of revenues. ’16 reported depreciation rate: 2.6%. Has 5,900 employees.

Additional Company Information from Website:
Headquartered in Cayce, South Carolina, SCANA is an energy-based holding company that has brought power and fuel to homes in the Carolinas and Georgia for 170 years. SCANA is principally engaged, through subsidiaries, in regulated electric and natural gas utility operations and other non-regulated energy-related businesses in South Carolina, North Carolina and Georgia. In 1846, local business leaders met to form the Charleston Gas Light Company. Two years later, the company lit the streets of Charleston with gas streetlights. SCANA Corporation, a diversified holding company, was formed on December 31, 1984. Over half a million electric customers in 25 counties throughout South Carolina. More than 1.3 million customers in South Carolina, North Carolina and Georgia. Nearly 6,000 full and part-time employees.[43]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Sempra Energy

Company Summary from Value Line:
Sempra Energy is a holding co. for San Diego Gas & Electric Company, which sells electricity & gas mainly in San Diego County, & Southern California Gas Company, which distributes gas to most of Southern California. Customers: 1.4 mill. electric, 6.6 mill. gas. Electric rev. breakdown: residential, 41%; commercial, 42%; industrial, 10%; other, 7%. Purchases most of its power; the rest is gas. Has subsidiaries in gas pipeline & storage, power generation, & liquefied natural gas. Sold commodities business in ’10. Power costs: 38% of revs. ’16 reported deprec. rates: 2.4%-6.6%. Has 17,400 employees.

---

[42] https://www.pseg.com/family/index.jsp, accessed 12/27/2017

[43] https://www.scana.com/about, accessed 12/27/2017

Additional Company Information from Website:
Sempra Energy® is a Fortune 500 company focused on two main ideals — supporting the communities we serve and planning for our shared tomorrow. Our 16,000 employees pride themselves as leaders in the energy services industry, serving approximately 32 million consumers worldwide. From our San Diego headquarters to our operations throughout the Americas, we are making great strides in developing forward-thinking energy solutions and delivering the everyday power our customers count on. In 2016, Sempra Energy generated more than $10 billion in revenues and shareholder return of 112 percent over the past 5 years. With impactful strategies in place and an inspiring vision, our strong financial performance will keep us on the path for sustainable long-term growth.[44]

Why was the company not included?
This company is located in the Electric Utility (West) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Southern Company

Company Summary from Value Line:
The Southern Company, through its subs., supplies electricity to 4.6 million customers in GA, AL, FL, and MS. Also has a competitive generation business. Acq'd AGL Resources (renamed Southern Company Gas, 4.5 mill. customers in GA, FL, NJ, IL, VA, & TN) 7/16. Electric rev. breakdown: residential, 38%; commercial, 32%; industrial, 19%; other, 11%. Retail revs. by state: GA, 50%; AL, 34%; FL, 9%; MS, 7%. Generating sources: gas & oil, 44%; coal, 32%; nuclear, 15%; hydro, 3%; purchased, 6%. Fuel costs: 31% of revs. '15 reported depr. rate (utility): 3.0%. Has 32,000 employees.

Additional Company Information from Website:
While Atlanta is our home base, we bring energy to homes and businesses across the country. We've made our name as a leading producer of clean, safe, reliable and affordable energy, and approach each day as a vital step in building its future. We're always looking ahead, and our innovations in the industry—from nuclear advancement to electric transportation and drone technology—help brighten the lives and businesses of millions of customers nationwide.[45]

Why was the company not included?
This company is located in the Electric Utility (East) Value Line Industry. We are limiting the guideline companies for electric to the Electric Utility (Central) Value Line Industry as well as those companies that are located in or directly next to Minnesota.

Westar Energy

Company Summary from Value Line:
Westar Energy, Inc., formerly Western Resources, is the parent of Kansas Gas & Electric Company. Westar supplies electricity to 700,000 customers mostly in Kansas. Electric revenue sources: residential and rural, 33%; commercial and business, 29%; industrial, 16%; other, 22%. The company sold its investment in ONEOK in 2003 and 85% ownership in Protection One in 2004. 2016 depreciation rate: 4.2%. Estimated plant age: 17 years. Fuels: coal, 43%; nuclear, 7%; gas, 32%; renewable, 18%. Has 2,254 employees.

Additional Company Information from Website:
Westar Energy is the largest electric energy provider in Kansas. We provide generation, transmission and distribution to approximately 687,000 customers in much of east and east-central Kansas. Westar

[44] http://www.sempra.com/about-us, accessed 12/27/2017

[45] https://www.southerncompany.com/about-us.html, accessed 12/27/2017

Energy is dedicated to operating the best electric utility in the Midwest and providing quality service at below average prices. The company is headquartered in Topeka, and employs about 2,400 people in Kansas. Our energy centers in eleven Kansas communities generate more than 7,000 megawatts of electricity, and we operate and coordinate 34,000 miles of transmission and distribution lines.[46]

KANSAS CITY, Mo. & TOPEKA, Kan.--(BUSINESS WIRE)--Nov. 21, 2017-- Westar Energy, Inc. (NYSE: WR) and Great Plains Energy Incorporated (NYSE: GXP), the parent company of Kansas City Power & Light ("KCP&L"), today announced at their respective shareholder meetings that shareholders overwhelmingly approved the proposals necessary for the merger between the two companies.[47]

Why was the company not included?
This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. The company serves an electric service territory in Kansas. Great Plains Energy and Westar Energy, Inc. shareholders approved the merger on November 21, 2017. Merger is pending regulatory approval. After the acquisition, we will review the company again to see if we should include the company as a guideline company.

Market Segment: Gas Distribution

Companies Included in the Gas Distribution Market Segment

Atmos Energy Corporation

Company Summary from Value Line:
Atmos Energy Corporation is engaged primarily in the distribution and sale of natural gas to roughly three million customers through six regulated natural gas utility operations: Louisiana Division, West Texas Division, Mid-Tex Division, Mississippi Division, Colorado-Kansas Division, and Kentucky/Mid-States Division. Gas sales breakdown for fiscal 2016: 67%, residential; 28%, commercial; 2%, industrial; and 3% other. The company sold Atmos Energy Marketing, 1/17. Officers and directors own approximately 1.6% of common stock (12/16 Proxy).

Additional Company Information from Website:
Atmos Energy Corporation, headquartered in Dallas, is the country's largest, fully-regulated, natural-gas-only distributor, serving over three million natural gas distribution customers in over 1,400 communities in eight states from the Blue Ridge Mountains in the East to the Rocky Mountains in the West. Atmos Energy also manages company-owned natural gas pipeline and storage assets, including one of the largest intrastate natural gas pipeline systems in Texas.[48]

Why was the company included?
This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

Chesapeake Utilities Corporation

Company Summary from Value Line:
Chesapeake Utilities Corporation consists of two units: Regulated Energy and Unregulated Energy. The Regulated Energy segment (60% of 2016 revenues) distributes natural gas in Delaware, Maryland, and Florida; distributes electricity in Florida; and transmits natural gas on the Delmarva Peninsula and in Florida. The Unregulated Energy operation (40% of 2016 revenues) wholesales and distributes propane;

[46] http://investors.westarenergy.com/phoenix.zhtml?c=89455&p=irol-irhome, accessed 12/27/2017
[47] http://www.greatplainsenergy.com/news-releases/news-release-details/great-plains-energy-and-westar-energy-shareholders-approve-0, accessed 12/27/2017
[48] https://www.atmosenergy.com/company/about-atmos-energy, accessed 12/5/2017

markets natural gas; and provides other unregulated energy services, including midstream services in Ohio. Officers and directors own 4.2% of common stock; T. Rowe Price, 9.4; BlackRock, 6.0% (4/17 Proxy).

Additional Company Information from Website:
We strive to provide operational excellence and positive experiences for our customers and the communities we serve. Chesapeake's regulated energy businesses include natural gas distribution and transmission operations on the Delmarva Peninsula and in Florida, and electric distribution operations in Florida. Chesapeake's unregulated energy businesses include its natural gas marketing subsidiary, its propane distribution operations, and its propane wholesale marketing subsidiary based in Houston, Texas.[49]

Why was the company included?
This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

New Jersey Resources Corporation

Company Summary from Value Line:
New Jersey Resources Corp. is a holding company providing retail/wholesale energy svcs. to customers in New Jersey, and in states from the Gulf Coast to New England, and Canada. New Jersey Natural Gas had about 521,200 customers at 9/30/16 in Monmouth and Ocean and other N.J. counties. Fiscal 2016 volume: 337 bill. cu. ft. (18% interruptible, 17% residential and commercial and electric utility, 65% incentive programs). N.J. Natural Energy subsidiary provides unregulated retail/wholesale natural gas and related energy svcs. 2016 dep. rate: 2.6%. Has 1,034 empls. Off./dir. own about 1.5% of common (12/16 Proxy).

Additional Company Information from Website:
New Jersey Resources (NJR), a Fortune 1000 company, provides reliable energy and natural gas services including transportation, distribution and asset management in states from the Gulf Coast to New England, including the Mid-Continent region, the West Coast and Canada, while investing in and maintaining an extensive infrastructure to support future growth. NJR safely and reliably operates and maintains 7,300 miles of natural gas transportation and distribution infrastructure serving more than half a million customers; develops and manages a diverse portfolio of more than 1.6 Bcf/day of transportation capacity and 45 Bcf of storage capacity; and provides appliance installation, repair and contract service to homes and businesses. Additionally, NJR holds investments in midstream assets through equity partnerships, including Steckman Ridge and its stake in Dominion Midstream Partners, L.P., as well as equity interest in the PennEast Pipeline project. NJR and its more than 1,000 employees are committed to helping customers save energy and money by promoting conservation and encouraging efficiency through Conserve to Preserve® and initiatives such as The SAVEGREEN Project® and The Sunlight Advantage®.[50]

Why was the company included?
This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

NiSource, Inc.

Company Summary from Value Line:
NiSource Inc. is a holding company for Northern Indiana Public Service Company (NIPSCO), which supplies electricity and gas to the northern third of Indiana. Customers: 461,000 electric in Indiana, 3.4

[49] http://www.chpk.com/our-company/our-companies/, accessed 12/5/2017

[50] http://www.njresources.com/about/our-companies.asp, accessed 12/5/2017

million gas in Indiana, Ohio, Pennsylvania, Kentucky, Virginia, Maryland, Massachusetts through its Columbia subsidiaries. Revenue breakdown, 2016: electrical, 34%; gas, 66%; other, less than 1%. Generating sources, 2016: coal, 77.3%; purchased & other, 22.7%. 2016 reported depreciation rates: 3.0% electric, 1.8% gas. Has 7,596 employees.

Additional Company Information from Website:
We're a leading natural gas and electric utility company. Our nearly 8,000 employees ensure Columbia Gas and NIPSCO customers have the energy they need across seven states. Focused on strategically investing in our energy infrastructure – between $1.6 billion - $1.8 billion annually through 2020 – we will be able to meet our customer commitments for the next 100 years. We offer a compelling long-term total return investment opportunity for our shareholders. Our more than $30 billion in long-term, identified investment opportunities in our regulated utility assets, mean we expect to grow both our earnings and dividend by 5-7 percent annually through 2020. Virtually all of our revenues are generated from regulated utility operations and investments. We maintain investment grade credit ratings and our balanced and diverse geographic profile provides a balanced business risk. Headquartered in Merrillville, Indiana – about 35 miles from Chicago – we also have a significant corporate presence in Columbus, Ohio.[51]

Why was the company included?
This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

Northwest Natural Gas Company

Company Summary from Value Line:
Northwest Natural Gas Co. distributes natural gas to 90 communities, 704,000 customers, in Oregon (89% of customers) and in southwest Washington state. Principal cities served: Portland and Eugene, OR; Vancouver, WA. Service area population: 2.5 mill. (77% in OR). Company buys gas supply from Canadian and U.S. producers; has transportation rights on Northwest Pipeline system. Owns local underground storage. Rev. breakdown: residential, 35%; commercial, 22%; industrial, gas transportation, and other, 43%. Employs 1,092. BlackRock Inc. owns 11.9% of shares; officers and directors, 1.5% (4/17 proxy).

Additional Company Information from Website:
In 1852, H. C. Leonard and John Green moved from Astoria to Portland. A few years earlier, after emigrating from the East Coast, they had founded a store serving the frontier community. But believing that Portland was the city of the future, they moved upriver. Among other businesses, they founded a gas company. Their purpose was to bring gas lamps to Portland’s streets, homes and businesses. On Jan. 7, 1859, they obtained a perpetual franchise from the territorial government to distribute gas. Weeks later, on Feb. 14, Oregon became a state. Today, more than 150 years later, NW Natural carries on the tradition started by Leonard and Green and the Portland Gas Light Co. A business that started with 49 customers in one square mile of Portland now serves more than 730,000 homes and businesses in 107 communities in Oregon and Southwest Washington. The company remains headquartered in Portland, just a few blocks from its original site. NW Natural also serves customers out of service centers in Albany, Astoria, Coos Bay, Eugene, Lincoln City, Salem and The Dalles in Oregon, and Vancouver, Washington.[52]

[51] https://www.nisource.com/company, accessed 12/5/2017

[52] https://www.nwnatural.com/AboutNWNatural/TheCompany/Overview, accessed 12/5/2017

Why was the company included?
This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

RGC Resources, Inc.

Company Summary from Value Line:
RGC Resources, Inc. is an energy services company primarily engaged in the regulated sale and distribution of natural gas to approximately 60,800 residential, commercial, and industrial customers in Roanoke, Virginia and the surrounding localities through its Roanoke Gas Company subsidiary. Natural gas service is provided at rates and for terms and conditions set by the Virginia State Corporation Commission (SCC). Resources also provides certain unregulated services through Roanoke Gas and its other subsidiaries. Such unregulated operations represent less than 2% of total revenues and margin of Resources on an annual basis. The company's utility operations are regulated by the SCC, which oversees the terms, conditions, and rates to be charged to customers for natural gas service, safety standards, extension of service, accounting, and depreciation. Over 98% of its annual revenues are derived from the sale and delivery of natural gas to Roanoke Gas customers. Has 126 employees.

Additional Company Information from Website:
RGC Resources Inc. is a public utility holding Company providing energy and related products and services through its operating subsidiaries Roanoke Gas Company and RGC Midstream, LLC. Roanoke Gas, which began in 1883, provides safe, reliable natural gas service to more than 60,000 customers in the greater Roanoke Valley. RGC Midstream owns a 1 percent interest in the Mountain Valley Pipeline project.[53]

Why was the company included?
This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

South Jersey Industries, Inc.

Company Summary from Value Line:
South Jersey Industries, Inc. is a holding company. Subsidiary South Jersey Gas Co. distributes natural gas to 377,625 customers in New Jersey's southern counties. Gas revenue mix '16: residential, 42%; commercial, 21%; cogeneration and electric generation, 16%; industrial, 21%. Nonutility operations include: South Jersey Energy, South Jersey Resources Group, South Jersey Exploration, Marina Energy, South Jersey Energy Service Plus, and SJI Midstream. Has about 750 employees. Off./dir. own less than 1% of common; BlackRock, Inc., 11.6%; The Vanguard Group, Inc., 9.0% (3/17 proxy).

Additional Company Information from Website:
South Jersey Industries (NYSE: SJI), an energy services holding company based in Folsom, NJ, operates its business through two primary subsidiaries. South Jersey Gas, one of the fastest growing natural gas utilities in the nation, strongly advocates the efficient use of energy while safely and reliably delivering natural gas in southern New Jersey. South Jersey Energy Solutions, the parent of SJI's non-regulated businesses, provides innovative, environmentally-friendly energy solutions that help customers control energy costs. South Jersey Energy acquires and markets natural gas and electricity for retail customers throughout New Jersey and also offers businesses energy-related services to reduce their energy costs. Marina Energy develops and operates on-site energy projects including thermal facilities, serving hot and chilled water for casinos, cogeneration plants, solar system installations and landfill gas to electricity facilities. South Jersey Resources Group provides wholesale commodity marketing and risk

[53] https://www.rgcresources.com/about/, accessed 12/5/2017

management services in the mid-Atlantic region and also oversees the company's activities in the Marcellus Shale.[54]

Why was the company included?
This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

Southwest Gas Holdings, Inc.

Company Summary from Value Line:
Southwest Gas Holdings, Inc. is the parent holding company of Southwest Gas and Centuri Construction Group. Southwest Gas is a regulated gas distributor serving about 2.0 million customers in sections of Arizona, Nevada, and California. Centuri provides construction services. 2016 margin mix: residential and small commercial, 85%; large commercial and industrial, 3%; transportation, 12%. Total throughput: 2.1 billion therms. Has 6,277 employees. Off. & dir. own 1.1% of common stock; BlackRock Inc., 11.3%; The Vanguard Group, Inc., 9.4% (3/17 Proxy).

Additional Company Information from Website:
Southwest Gas Corporation was founded in 1931 and is a subsidiary of Southwest Gas Holdings Inc. We provide natural gas service to Arizona, Nevada, and portions of California. Our communities, and the more than 1.9 million customers we serve, are the reasons why we've been heating things up for decades. So, whether you're enjoying a backyard barbeque with friends, getting cozy indoors during the winter, or preparing an epicurean delight in your new restaurant, Southwest Gas is here to support your comfort and your lifestyle.[55]

Why was the company included?
This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

Spire, Inc., formerly The Laclede Group

Company Summary from Value Line:
Spire Inc., formerly known as the Laclede Group, Inc., is a holding company for natural gas utilities, which distributes natural gas across Missouri, including the cities of St. Louis and Kansas City. Has roughly 1.7 million customers. Acquired Missouri Gas 9/13, Alabama Gas Co 9/14. Utility therms sold and transported in fiscal 2017: 3.0 bill. Revenue mix for regulated operations: residential, 29%; commercial and industrial, 15%; transportation, 49%; other, 6%. Has around 3,279 employees. Officers and directors own 3.1% of common shares (1/17 proxy).

Additional Company Information from Website:
We're dedicated to understanding our customers' needs and goals to better serve them today and tomorrow. Spire's natural gas utilities and other related businesses work together to enrich the lives of the 1.7 million customers we serve across Missouri, Mississippi and Alabama. Our gas marketing business maintains the balance between our natural gas supplies and our customers' needs, ensuring the highest reliability at the lowest costs. And we're investing in infrastructure to strengthen the regions we serve for a better, more resilient tomorrow.[56]

[54] https://www.sjindustries.com/about-sji/company-overview, accessed 12/5/2017

[55] https://www.swgas.com/en/about-us, accessed 12/5/2017

[56] https://www.spireenergy.com/about-spire, accessed 12/5/2017

Why was the company included?
This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

Companies Not Included in the Gas Distribution Market Segments

Adams Resources and Energy, Inc.

Company Summary from Value Line:
Adams Resources & Energy, Inc. engages in marketing crude oil, natural gas, and petroleum products. It purchases crude oil and arranges sales and deliveries to refiners and other customers in Texas and Louisiana with additional operations in Michigan and New Mexico; purchases, distributes, and markets natural gas; offers value added services by providing access to common carrier pipelines and handling daily volume balancing requirements, as well as risk management services. The company also markets branded and unbranded refined petroleum products, such as motor fuels and lubricants. In addition, it transports liquid chemicals on a for-hire basis in the continental US and Canada, as well as engages in the exploration and development of domestic oil and natural gas properties. As of December 31, 2016, Adams had estimated proved natural gas reserves of 4.21 billion cubic feet and crude oil reserves of 187,000 barrels. Has 645 employees.

Additional Company Information from Website:
Adams Resources & Energy, Inc. (NYSE:AE) ("Adams" or "AE") is primarily engaged in the business of crude oil marketing and tank truck transportation of liquid chemicals and dry bulk through its two wholly-owned subsidiaries GulfMark Energy, Inc. ("GulfMark") and Service Transport Company.[57]

Why was the company not included?
The company's main business segments market crude oil, natural gas, and petroleum products.

Delta Natural Gas Company

Company Summary from Value Line:
Not available. Company is not publically traded.

Additional Company Information from Website:
Delta Natural Gas (NASDAQ:DGAS) (Delta) today announced that it has entered into a definitive agreement to merge with an affiliate of Peoples Natural Gas (Peoples). Delta is headquartered in Winchester, Kentucky, and serves approximately 36,000 customers in central and southeastern Kentucky. Peoples, headquartered in Pittsburgh, PA, serves approximately 700,000 customers in Pennsylvania, West Virginia and Kentucky. Peoples is controlled by SteelRiver Infrastructure Fund North America LP (SteelRiver). Under the terms of the transaction, Delta shareholders will receive $30.50 in cash per Delta share, which represents a premium of 17% to Delta's closing share price on February 17, 2017, the last trading day prior to the announcement of the agreement.[58]

Why was the company not included?
Company is no longer publically traded. Last trading day was 2/17/2017.

Gas Natural, Inc.

Company Summary from Value Line:
Not available. Company is not publically traded.

---

[57] https://www.adamsresources.com/about-us/, accessed 12/5/2017

[58] http://www.businesswire.com/news/home/20170221005844/en/Delta-Natural-Gas-Enters-Agreement-Acquired-Peoples, accessed 12/5/2017

Additional Company Information from Website:
Gas Natural Inc., a holding company, distributes and sells natural gas to end-use residential, commercial and industrial customers. It distributes approximately 26 billion cubic feet of natural gas to approximately 68,000 customers through regulated utilities operating in Montana, Ohio, Maine and North Carolina. The Company's other operations include natural gas production and natural gas marketing. The Company's Montana public utility was originally incorporated in 1909. Gas Natural's strategy for growth is to expand throughput, particularly in the Maine and North Carolina markets, while looking for acquisitions that are either adjacent to its existing utilities or in under saturated markets.[59]

Why was the company not included?
Company is no longer publically traded.

Aug. 4, 2017-- A fund managed by BlackRock Real Assets' Global Energy & Power Infrastructure group has completed the acquisition of Gas Natural Inc. (NYSE American: EGAS). The proposed transaction was initially announced in October 2016 by First Reserve Energy Infrastructure Funds, which BlackRock Real Assets acquired in June 2017. The acquisition of Gas Natural establishes a new platform in the natural gas distribution space for BlackRock's Global Energy & Power Infrastructure group. Gas Natural will benefit from enhanced access to capital while continuing to provide safe, reliable and cost-effective natural gas service. Gas Natural distributes and sells approximately 21 billion cubic feet of natural gas to roughly 70,000 residential, commercial and industrial customers through regulated utilities operating in Montana, Ohio, Maine and North Carolina.[60]

Star Group, L.P. (formerly Star Gas Partners, L.P.)

Company Summary from Value Line:
Star Group, L.P., formerly Star Gas Partners, L.P., is a full-service provider specializing in the sale of home heating products and services to approximately 441,000 full-service residential and commercial customers to heat their homes and buildings. It also services and sells heating and air conditioning equipment to home heating oil and propane customers and, to a lesser extent, provides these offerings to customers outside of its home heating oil and propane customer base. In certain marketing areas, Star provides home security and plumbing services, primarily to its home heating oil and propane customer base. The company also sells diesel fuel, gasoline, and home heating oil to approximately 74,000 customers on a delivery-only basis. Star is the nation's largest retail distributor of home heating oil, based upon sales volume, operating throughout the northeast and mid-Atlantic. Kestrel Heat, LLC is the general partner of the company. Has 3140 employees.

Additional Company Information from Website:
Star Group, L.P. (formerly Star Gas Partners, L.P.) is a full service energy provider specializing in the sale of home heating products and services to residential and commercial customers. The Partnership also services and sells heating and air conditioning equipment and, in certain areas, provides home security and plumbing services. In addition, Star sells diesel fuel, gasoline and home heating oil on a delivery-only basis. Star is the nation's largest retail distributor of home heating oil, based upon sales volume, operating throughout the Northeast and Mid-Atlantic. Star Group, L.P. is a limited partnership that has approved an election to be treated as a corporation for U.S. federal income tax purposes effective November 1, 2017. Common units, representing limited partner interests in the Partnership, are listed and trade on the New York Stock Exchange ("NYSE") under the symbol "SGU." For Partnership activity through October 31, 2017, our unitholders are required to report for U.S. federal income tax purposes their allocable share of our income, gains, losses, deductions and credits, regardless of whether

[59] http://www.egas.net/, accessed 12/5/2017

[60] http://investor.egas.net/phoenix.zhtml?c=96426&p=irol-newsArticle&ID=2291982, accessed 12/5/2017

we make cash distributions. This activity will be reported on final 2017 Schedules K-1, which will be issued in March of 2018. After that, the Partnership will no longer issue Schedules K-1. Cash distributions made on or after November 1, 2017, by Star Group, L.P. to its unitholders will be treated like dividends paid by a corporation and will be reported on Form 1099-DIV and may be subject to U.S. federal income tax, as well as any applicable state or local income tax.[61]

Why was the company not included?
This company's business segments include sale of home heating products and services to residential and commercial customers. Also, this company was recently involved in acquisitions.

Star Gas Partners, L.P. (the "Partnership" or "Star") (NYSE:SGU), a home energy distributor and services provider, today [August 7, 2017] announced the acquisition of two businesses that further expand its customer base and, in one case, its geographic footprint. The Partnership purchased certain assets of one entity in Imlay City, Michigan and another located in Plainview, New York. The former serves approximately 3,000 accounts with annual volume (propane and motor fuel) of 3.8 million gallons, while the latter has roughly 16,800 accounts with annual volume (heating oil, propane, and motor fuel) of approximately 15.5 million gallons. Additional terms were not disclosed.[62]

UGI Corporation

Company Summary from Value Line:
UGI Corp. operates six business segments: AmeriGas Propane (accounted for 14.2% of net income in 2016), UGI International (35.8%), Gas Utility (27.1%), Midstream & Marketing (24.2%), and Corp. & Other -1.3%. UGI Utilities distributes natural gas and electricity to over 626,000 customers mainly in Pennsylvania; 26%- owned AmeriGas Partners is the largest U.S. propane marketer, serving about 1.3 million users in 50 states. Acquired remaining 80% interest in Antargaz (3/04); Energy Transfer Partners (1/12). The Vanguard Group holds 10.2% of stock; Wellington Mngt., 9.3%; Offs./dir., 2.2% (12/16 proxy). Has 8,300 empls.

Additional Company Information from Website:
UGI Corporation is a holding company that, through subsidiaries, distributes, stores, transports and markets energy products and related services. We are a domestic and international retail distributor of propane and butane (which are liquefied petroleum gases ("LPG")); a provider of natural gas and electric service through regulated local distribution utilities; a generator of electricity; a regional marketer of energy commodities; an owner and manager of midstream assets; and a regional provider of heating, ventilation, air conditioning, refrigeration and electrical contracting services.[63]

Why was the company not included?
This company's non-gas utility segments accounted for almost 73% of net income in 2016. Their gas utility segment only accounted for 27% of their net income.

WGL Holdings, Inc.

Company Summary from Value Line:
WGL Holdings, Inc. is the parent of Washington Gas Light, a natural gas distributor in Washington, D.C. and adjacent areas of VA and MD to resident'l and comm'l users (1,129,865 meters). Hampshire Gas, a federally regulated sub., operates an underground gas-storage facility in WV. Non-regulated subs.: Wash. Gas Energy Svcs. sells and delivers natural gas and provides energy-related products in the

---

[61] http://www.star-gas.com/about-us, accessed 12/5/2017

[62] https://globenewswire.com/news-release/2017/08/07/1081020/0/en/Star-Gas-Partners-L-P-Announces-Two-Acquisitions.html, accessed 12/5/2017

[63] http://www.ugicorp.com/about-us/, accessed 12/5/2017

D.C. metro area; Wash. Gas Energy Sys. designs/installs comm'l heating, ventilating, and air cond. systems. The Vanguard Group owns 9.8% of common stock; Off./dir. less than 1% (1/17 proxy).

Additional Company Information from Website:
WGL Holdings, Inc. is a public utility holding company serving the Washington, D.C. metropolitan region. Washington Gas, our leading subsidiary, has provided safe, reliable natural gas service to customers in the D.C. area for over 160 years and, today, serves more than one million customers in the District of Columbia, Maryland and Virginia. Our unregulated subsidiaries provide energy-related services to residential and commercial customers, including government organizations. Whether we are distributing clean natural gas safely to a customer's home, providing electric power through renewable wind energy, or installing energy-efficient systems for the federal government, our vision is consistent and clear throughout our business: to be the preferred source of clean and efficient energy solutions.[64]

WGL Holdings, Inc. (NYSE: WGL) (WGL) and AltaGas Ltd. (TSX: ALA) (AltaGas) today [January 25, 2017] announced that the Boards of Directors of both companies have unanimously approved a definitive agreement and plan of merger for WGL to be acquired by AltaGas in an all cash transaction for approximately $6.4 billion in cash.[65]

AltaGas Ltd. (AltaGas) (TSX:ALA) and WGL Holdings, Inc. (NYSE:WGL) (WGL) announced today [December 4, 2017] the achievement of a significant milestone in the regulatory approval process in Maryland, with the signing of a settlement agreement with the Maryland Energy Administration (MEA), Montgomery County, Prince George's County, and the Laborers' International Union of North America, its affiliated District Council, and Local Unions serving or located in Washington D.C. (collectively, LiUNA) on key terms for the merger of AltaGas and WGL currently before the Maryland Public Service Commission (PSC). The settlement is subject to review and approval by the PSC. AltaGas continues to anticipate closing the transaction in the first half of 2018.[66]

Why was the company not included?
This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing. However, this company is currently in the middle of an acquisition.

Market Segment: Gas Transmission Pipeline and Fluid Transportation Pipeline

Companies Included in the Gas Transmission Pipeline Market Segment

Boardwalk Pipeline Partners, L.P.

Company Summary from Value Line:
Boardwalk Pipeline Partners, L.P. engages in the transportation, gathering, and storage of natural gas in the United States. Customers include local gas distributors, interstate and intrastate pipelines, direct industrial users, electric power generators, marketers, and producers. Owns and operates 14,365 miles of natural gas and NGL pipelines. Storage capacity of 205 Bcf (natural gas) and 24 MMbls (NGLS). Of 2016 revenues, 81% derived from firm contacts, 12% from volumes actually transported, and 7% from

[64] http://wglholdings.com/company.cfm, accessed 12/5/2017

[65] http://files.shareholder.com/downloads/WGL-II/5673262011x0x925234/4E244BFD-9996-4EF9-9436-A2298946E1E2/WGL_News_2017_1_25_General_Releases.pdf, accessed 12/5/2017

[66] http://wglholdings.com/releasedetail.cfm?ReleaseID=1050534, accessed 12/5/2017

other. Boardwalk GP, is the general partner. Loews Corp. owns 51.2% of equity through subs. Has 1,200 emplys.

Additional Company Information from Website:
Boardwalk Pipeline Partners, LP (NYSE: BWP) is a midstream master limited partnership that primarily provides transportation and storage of natural gas and liquids for our customers. Through our subsidiaries, we own and operate approximately 13,930 miles of interconnected natural gas pipelines, directly serving customers in thirteen states and indirectly serving customers throughout the northeastern and southeastern United States through numerous interconnections with unaffiliated pipelines. We also own and operate more than 435 miles of liquids pipelines in Louisiana and Texas. In 2016, our pipeline systems transported approximately 2.3 trillion cubic feet (Tcf) of natural gas and approximately 64.8 million barrels (MMBbls) of liquids. Average daily throughput on our natural gas pipeline system during 2016 was approximately 6.3 Bcf. Our natural gas storage facilities are comprised of 14 underground storage fields located in four states with an aggregate working gas capacity of approximately 205 Bcf, and our liquids storage facilities consist of nine salt-dome caverns located in Louisiana with an aggregate storage capacity of 24 MMBbls. We also own three salt-dome caverns and a brine pond for use in providing brine supply services and to support the liquids storage operations. We serve a broad mix of customers, including producers, local distribution companies (LDCs), marketers, electric power generators, direct industrial users and interstate and intrastate pipelines.[67]

Why was the company included?
This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing. The company primarily provides transportation and storage of natural gas and liquids.

Enterprise Products Partners

Company Summary from Value Line:
Enterprise Products Partners, LP, is a leading integrated provider of natural gas and natural gas liquids (NGLs) processing, fractionation, transportation, and storage services in the U.S. and Canada. Acquired GulfTerra Energy 9/04; TEPPCO, L.P. 10/09; M2 Midsteam, 5/10; Enterprise GP, 11/10; Oiltanking Partner, 2/15. Assets include 49,300 miles of pipelines, 260 MMBbls of storage capacity for liquids and 14 Bcf for natural gas. Four segments: NGL Pipeline (57% of 2016 revenues); Crude Oil Pipelines, (16%); Petrochemical & Refined Products, (12%); Natural Gas Pipelines, (14%); Employs 6,800.

Additional Company Information from Website:
Enterprise Products Partners L.P. is one of the largest publicly traded partnerships and a leading North American provider of midstream energy services to producers and consumers of natural gas, NGLs, crude oil, refined products and petrochemicals. Our services include: natural gas gathering, treating, processing, transportation and storage; NGL transportation, fractionation, storage and import and export terminals; crude oil gathering, transportation, storage and terminals; petrochemical and refined products transportation, storage and terminals; and a marine transportation business that operates primarily on the United States inland and Intracoastal Waterway systems.[68]

Why was the company included?
This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing. The company engages in the transportation, gathering, and storage of natural gas.

[67] http://www.bwpmlp.com/AboutUsBWP.aspx, accessed 12/5/2017

[68] http://www.enterpriseproducts.com/about-us, accessed 12/5/2017

Kinder Morgan, Inc.

Company Summary from Value Line:
Kinder Morgan, Inc. owns the general partner and limited partner interests in both Kinder Morgan Energy Partners, L.P. (KMP) and El Paso Pipeline Partners, L.P. (EPB). With more than 80,000 miles of pipelines and 180 terminals, it is the largest domestic transporter of petroleum products, natural gas, and carbon dioxide. Kinder also owns the only pipeline that serves the West Coast of Canada. The company employs more than 11,535 individuals. Chairman: Richard D. Kinder. CEO: Steven J. Kean. Officers/ directors own 14.0% of the common stock; The Vanguard Group, 5.9% (4/17 proxy).

Additional Company Information from Website:
Kinder Morgan is one of the largest energy infrastructure companies in North America. We own an interest in or operate approximately 84,000 miles of pipelines and 155 terminals. Our pipelines transport natural gas, gasoline, crude oil, carbon dioxide (CO2) and more. Our terminals store and handle petroleum products, chemicals and other products.The revolutionary shale plays across the United States are creating a tremendous need for more energy infrastructure, which bodes well for us. We invest billions of dollars each year to grow the company by building new and expanding existing assets to help ensure that a variety of energy products get delivered into the marketplace. In most of our businesses we operate like a giant toll road and receive a fee for our services, generally avoiding commodity price risk. Our customers include major oil companies, energy producers and shippers, local distribution companies and businesses across many industries.[69]

Why was the company included?
This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing. The company engages in the transportation natural gas as well as operates terminals and storage facilities.

TC PipeLines, L.P.

Company Summary from Value Line:
TC PipeLines, LP, a wholly owned subsidiary of TransCanada Corp., acquires, owns, and participates in the management of energy infrastructure assets in North America. The company owns interests in six natural gas interstate pipeline systems, through which it transports approximately 9.1 billion cubic feet of natural gas per day from producing regions and import facilities to market hubs and consuming markets, primarily in the western and midwestern United States. It serves large utilities, local distribution companies, and natural gas marketers and producing companies. Also, the company invests in long term critical energy infrastructure that provides reliable delivery of energy to customers in the United States; develops or acquires assets that provide stable cash distributions and opportunities for new capital additions; and maximize the utilization of pipeline systems, with a commitment to safe and reliable operations.

Additional Company Information from Website:
TC PipeLines, LP is a United States limited partnership with a long history of stable and growing cash distributions which has delivered value to its investors while maintaining a solid cash distribution coverage ratio. Through its disciplined investment philosophy, TC PipeLines now has investments in eight critical FERC regulated, low-risk energy infrastructure pipelines, capable of moving 9.4 billion cubic feet per day of natural gas. Revenues from these assets are derived almost entirely from fee-based charges. With access to new gas supplies through support from its sponsor, TransCanada Corporation, who also operates our assets on our behalf, TC PipeLines' assets are connected to two of the largest supply basins in North America that are positioned to grow over the next decade. With a strong and

[69] https://www.kindermorgan.com/pages/default.aspx, accessed 12/5/2017

conservative balance sheet, a low general partner cash take and an ample amount of available liquidity, we are well positioned for growth.[70]

Why was the company included?
This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing. The company owns and actively participates in the management of natural gas pipelines and related assets.

Williams Partners, L.P.

Company Summary from Value Line:
Williams Partners L.P. is a master limited partnership providing oil, natural gas, and natural gas liquids processing, fractionation, transportation, and storage services. Acquired by Access Midland Partners on 1/1/15 in a stock swap. Access Partners continued to operate under the name of Williams Partners L.P. As of 1/17, has four operating segments: Northeast G&P; Atlantic-Gulf; West; and NGL and Petrochemicals Services. Williams Partners GP, LLC is the company's general partner. Employs 5,604. The Williams Companies (WMB) owns WPZ's general partner and 74% of common units.

Additional Company Information from Website:
Williams Partners L.P. (NYSE:WPZ) is a master limited partnership focused on being the premier provider of large-scale infrastructure connecting the growing supply of North American natural gas and natural gas products to growing global demand for clean fuels and feedstock. Williams Partners is dedicated to increasing the quarterly cash distributions we pay to our unitholders over time while ensuring the ongoing stability of our business.[71]

Energy Transfer Equity announced merger on 9/28/2015 with the Williams Companies.[72] The Williams Companies owns Williams Partners, L.P. general partner and 73% of common units. This company's parent, Energy Transfer Equity, announced a merger on 9/28/2015 with the Williams Companies.[73] Mergers can make analysts' opinions of the company unreliable if they are considering the proposed merger.

Energy Transfer Equity, L.P. (NYSE:ETE) ("ETE" or the "Partnership") today announced that it has terminated its merger agreement with The Williams Companies, Inc. ("Williams") effective June 29, 2016.[74]

Why was the company included?
This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing. The company provides oil, natural gas, and natural gas liquids processing, fractionation, transportation, and storage services

[70] http://www.tcpipelineslp.com/, accessed 12/5/2017

[71] http://investor.williams.com/williams-partners-lp, accessed 12/5/2017

[72] Press Release Energy Transfer to Combine with Williams, 9/28/815, Business Wire. http://ir.energytransfer.com/phoenix.zhtml?c=106094&p=irol-newsArticle_print&ID=2090796

[73] Press Release Energy Transfer to Combine with Williams, 9/28/815, Business Wire. http://ir.energytransfer.com/phoenix.zhtml?c=106094&p=irol-newsArticle_print&ID=2090796

[74] http://ir.energytransfer.com/phoenix.zhtml?c=106094&p=irol-newsArticle&ID=2180700, accessed 12/5/2017

Companies Included in the Fluid Transportation Pipeline Market Segment

Buckeye Partners, L.P.

Company Summary from Value Line:
Buckeye Partners, L.P., is a master limited partnership engaged in common carriage transportation of refined petroleum products, including gasoline (53% of 2016 volume), jet fuel (25%), distillates (20%), and other (2%). Its subs. own and operate 6,000 miles of pipeline mostly in the Northeast and upper Midwest. The L.P. also owns over 120 liquid petro. product terminals. Marine terminal Buckeye Bahamas Hub, is one of the world's largest. Acquired 50% of VITTI from Vitrol, 1/17; 80% Buckeye Texas Part. 9/14; storage assets from Hess, 12/13. Off./Dir. own .4% of outs. units; Tortoise Cap., 8.2%; ALPS Adv., 6.8% (4/17 proxy).

Additional Company Information from Website:
Buckeye Partners, L.P. (NYSE: BPL) is a publicly traded master limited partnership and owns and operates a diversified network of integrated assets providing midstream logistic solutions, primarily consisting of the transportation, storage, and marketing of liquid petroleum products. Buckeye is one of the largest independent liquid petroleum products pipeline operators in the United States in terms of volumes delivered, with approximately 6,000 miles of pipeline. Buckeye also uses its service expertise to operate and/or maintain third-party pipelines and perform certain engineering and construction services for its customers. Additionally, Buckeye is one of the largest independent terminalling and storage operators in the United States in terms of capacity available for service.[75]

Why was the company included?
This company is similar to the Fluid Transportation Pipeline Companies that the State Assessed Section is responsible for valuing. The company engages in the common transportation of refined petroleum products.

Enbridge Energy Partners, L.P.

Company Summary from Value Line:
Enbridge Energy Partners, LP owns and operates crude oil and liquid petroleum transportation and storage assets, natural gas gathering, treating, processing, transmission and marketing assets in the US. The company's activities include interstate pipeline transportation and storage of crude oil, liquid petroleum, natural gas and NGLs. EEP has no direct employees. The majority of EEP is owned by its parent holding companies Enbridge Inc., Enbridge Energy and Enbridge Energy Management. The remaining 44.5% is publicly traded.

Additional Company Information from Website:
Over the past 65 years, Enbridge has become a leader in the safe and reliable delivery of energy in North America and is proud to be recognized as one of the Global 100 Most Sustainable Corporations in the World. We transport energy, operating the world's longest, most sophisticated crude oil and liquids transportation system. We have a significant and growing presence in the natural gas transmission and midstream businesses, and an increasing involvement in power transmission. We generate energy, expanding our interests in renewable and green energy technologies including wind and solar energy and geothermal. We distribute energy, owning and operating Canada's largest natural gas distribution company, and provide distribution services in Ontario, Quebec, New Brunswick and New York State. Enbridge Inc., headquartered in Calgary, Alberta, manages and has a 84.6 percent economic interest in Enbridge Income Fund, a 34.9 percent economic interest in Enbridge Energy Partners, L.P. and a 75.0 percent equity interest in Spectra Energy Partners, LP. Both Enbridge Energy Partners, L.P. and Spectra Energy Partners, LP are headquartered in Houston. Enbridge manages several investment options that

[75] http://www.buckeye.com/AboutUs/tabid/54/Default.aspx, accessed 12/5/2017

trade on the New York and/or Toronto stock exchanges, including Enbridge Inc. (ENB), Enbridge Energy Partners, L.P. (EEP), Enbridge Energy Management, L.L.C. (EEQ), Spectra Energy Partners, LP (SEP) and Enbridge Income Fund (ENF).[76]

CALGARY, ALBERTA--(Marketwired - Feb. 27, 2017) - Enbridge Inc. (TSX:ENB)(NYSE:ENB) (Enbridge) announced the completion today of the previously announced stock-for-stock merger transaction (the Transaction) to acquire all of the outstanding common stock of Spectra Energy Corp (NYSE:SE) (Spectra Energy).[77]

Spectra Energy Corp and Enbridge Inc. will combine to create North America's largest energy infrastructure company. This transaction creates the largest energy infrastructure company in North America with an enterprise value of approximately C$165 billion (US$127 billion), a C$74 billion (US$57 billion) inventory of current and potential growth projects and anticipated annual dividend growth of 10-12 percent through 2024. The combined company will be exceedingly well positioned to invest in critical infrastructure to meet the needs of our customers and create value for our shareholders.[78]

Why was the company included?
This company is similar to, and is one of, the Fluid Transportation Pipeline Companies that the State Assessed Section is responsible for valuing. The company engages in the common transportation of refined petroleum products. Even though Enbridge, Inc. completed the stock-for-stock merger transaction of Spectra Energy Corp on February 27, 2017, still including Enbridge Energy Partners, L.P. as a guideline company. Enbridge, Inc. is the parent of Enbridge Energy Partners, L.P., which could affect the financial information for the current year for all companies involved.

Holly Energy Partners, L.P.

Company Summary from Value Line:
Holly Energy Partners, L.P. (HEP) is a publicly held master limited partnership. The company is engaged in ownership and operation of petroleum product and crude oil pipelines, terminal, tankage and loading rack facilities, and refinery processing units that support HollyFrontier Corp.'s (HFC) refining and marketing operations in the mid-continent, southwest, and northwest regions of the US and Alon USA, Inc.'s refinery in Big Spring, TX. As of September 30, 2017, it owned a 75% interest in UNEV Pipeline, LLC, a 50% interest in Frontier Aspen LLC, a 50% interest in Osage Pipe Line Company, LLC, a 50% interest in Cheyenne Pipeline LLC, and a 25% interest in SLC Pipeline LLC. On October 31, 2017, HEP and HollyFrontier closed the restructuring transaction under which HFC now holds 59.6 million HEP common units, representing 59% of the outstanding common units, with a market value of $2.0 billion based the on closing price of $34.19.

Additional Company Information from Website:
Holly Energy Partners, L.P. ("HEP") is a Delaware limited partnership formed in early 2004 by HollyFrontier and is headquartered in Dallas, Texas. HEP provides petroleum product and crude oil transportation, terminalling, storage and throughput services to the petroleum industry, including HollyFrontier Corporation subsidiaries. The Partnership, through its subsidiaries and joint ventures, owns and/or operates petroleum product and crude gathering pipelines, tankage and terminals in Texas, New Mexico, Arizona, Washington, Idaho, Oklahoma, Utah, Nevada, Wyoming and Kansas as well as refinery processing units in Kansas and Utah.[79]

---

[76] https://www.enbridgepartners.com/About-Enbridge/Company-Overview.aspx, accessed 12/7/2017

[77] https://www.enbridge.com/media-center/news/details?id=2126823&lang=en&year=2017, accessed 12/7/2017

[78] http://www.spectraenergy.com/Transaction/, accessed 12/28/2016

[79] http://www.hollyenergy.com/about-us/corporate-structure/default.aspx, accessed 12/5/2017

Holly Energy Partners, L.P. (NYSE:HEP) ("Holly Energy") today [August 10, 2017] announced it has entered into definitive agreements to acquire a 50% interest in Frontier Aspen LLC ("Frontier"), the owner of the Frontier Aspen Pipeline, and a 75% interest in the SLC Pipeline LLC ("SLC"), the owner of the Salt Lake City Pipeline, from affiliates of Plains All American Pipeline, L.P. (NYSE:PAA) ("Plains") for an aggregate purchase price of $250 million in cash. Holly Energy currently owns 50% of Frontier and 25% of SLC. As a result, following the transactions, SLC and Frontier will be wholly-owned subsidiaries of Holly Energy. The Frontier Aspen Pipeline is a 289-mile crude pipeline from Casper, Wyoming to Frontier Station, Utah that supplies Canadian and Rocky Mountain crudes to Salt Lake City area refiners through a connection to the SLC Pipeline. The Salt Lake City Pipeline is a 95-mile crude pipeline that transports crude oil into the Salt Lake City area from the Utah terminal of the Frontier Pipeline and from Wahsatch station. The acquired interest in both pipelines is expected to generate approximately $23 million in annual forecasted EBITDA.[80]

Why was the company included?
This company is similar to the Fluid Transportation Pipeline Companies that the State Assessed Section is responsible for valuing. The company engages in the common transportation of refined petroleum products.

Even though Holly Energy Partners, L.P. recently announced a definitive agreement to acquire 50% interest in Frontier Aspen LLC, and a 75% interest in the SLC Pipeline, LLC from Plains All American Pipeline, L.P., including both as guideline companies.

Magellan Midstream Partners, L.P.

Company Summary from Value Line:
Magellan Midstream Partners, L.P., engages in the transportation, storage, and distribution of hydrocarbons and related products, largely in the U.S. Gulf coast and upper midwest regions. Segments: Refined products (71% of 2016 Revs., 56% of operating income) has 9,700 miles of pipeline and 53 terminals; Crude oil (21%, 36%) has 2,200 miles of pipeline and storage capacity of 27 million barrels; Marine storage (9%, 8%) has storage capacity of 26 million barrels. Acq'd. Longhorn Pipeline, 7/09; storage and pipeline from BP, 9/10. Employs 1,747. Offs./dirs. Own 0.2% of out. shares; Tortoise Cap. 6.3% (2/17 proxy).

Additional Company Information from Website:
Magellan Midstream Partners, L.P. is a publicly traded oil pipeline, storage and transportation company based in Tulsa, Okla. Formerly a part of Williams Companies, Magellan began trading as Williams Energy Partners in February 2001. In September 2003, we changed our name to Magellan Midstream Partners and began trading under the stock ticker MMP. In 2004, Magellan purchased significant assets from Shell, including more than 3,000 miles of refined product pipelines as well as terminals and storage capacity. In 2007, another acquisition expanded Magellan's footprint again with increased capabilities in Texas. In 2009, we bought the Longhorn Pipeline running from Houston to El Paso. The reversal of this line has played a key part in Magellan's growth the last few years. In 2010, Magellan purchased another 100 miles of pipeline and 7.8 million barrels of storage from BP. In 2013, Magellan acquired approximately 800 miles of refined petroleum products pipeline, four terminals and 1.7 million barrels of storage from Plains All American Pipeline. This purchase added assets in Colorado, New Mexico, South Dakota and Wyoming. Today, Magellan has 9,700-mile refined products pipeline system with 53 connected terminals as well as 27 independent terminals not connected to our pipeline system and our 1,100-mile ammonia pipeline system. In addition, we own approximately 2,200 miles of crude oil pipelines and storage facilities with an aggregate storage capacity of about 26 million barrels, of which

[80] http://www.businesswire.com/news/home/20170810006075/en/Holly-Energy-Partners-Acquire-Remaining-Interests-Frontier, accessed 12/5/2017

16 million are used for leased storage. We also operate five marine terminals located along coastal waterways with an aggregate storage capacity of approximately 26 million barrels. The foundation of our business strategy is safe and efficient operations combined with superior customer service. Upon that foundation, we strive to increase cash distributions to our unitholders through internally-generated growth projects which expand the profitability of our existing asset base and through acquisitions of energy infrastructure assets possessing a reasonable risk/reward profile.[81]

Why was the company included?
This company is similar to, and is one of, the Fluid Transportation Pipeline Companies that the State Assessed Section is responsible for valuing. The company engages in the common transportation of refined petroleum products.

NuStar Energy, L.P.

Company Summary from Value Line:
NuStar Energy, LP, through its subsidiaries, engages in the transportation, terminalling, and storage of crude oil and refined products. It conducts operations through its subsidiaries, primarily NuStar Logistics, LP, and NuStar Pipeline Operating Partnership, LP. The company's Storage segment provides storage and handling services on a fee basis for petroleum products, specialty chemicals and other liquids, including crude oil and other feedstocks. Its Pipeline segment owns common carrier refined product pipelines in Colorado, Iowa, Kansas, Minnesota, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, and Texas. Within its Fuels Marketing operations, the company purchases crude oil and refined petroleum products for resale. NuStar currently has 9,300 miles of pipeline and 81 terminal and storage facilities that store and distribute crude oil, refined products, and specialty liquids. Has 1661 employees.

Additional Company Information from Website:
Since it went public in 2001, NuStar Energy L.P. has grown from 160 employees to about 1,600 today; from $387 million in assets to $6.1 billion; and from $100 million in revenues to $2.1 billion. As a result of its growth, NuStar currently has more than 9,200 miles of pipeline and 81 terminal and storage facilities that store and distribute crude oil, refined products and specialty liquids. The partnership's combined system has more than 96 million barrels of storage capacity at its facilities around the world, and NuStar has operations in the United States, Canada, Mexico, the Netherlands, including St. Eustatius in the Caribbean, and the United Kingdom.[82]

Why was the company included?
This company is aligned with, and is one of, the fluid transportation companies that the State Assessed Section is responsible for valuing.

Plains All American Pipeline, L.P.

Company Summary from Value Line:
Plains All American Pipeline, L.P., is a publicly traded master limited partnership which operates through various subsidiaries. It engages in the transportation, storage, terminaling, and marketing of crude oil, refined products, and liquefied petroleum gas. As of December 31, 2016, the company owned or leased approximately 19,200 miles of active pipelines and gathering systems. Storage capacity 32 million barrels of natural gas liquids (NGL) storage facilities; approximately 80 million barrels of crude oil and refined products; 97 Bcf of natural gas. Has about 5,100 employees.

[81] https://www.magellanlp.com/AboutUs/Default.aspx, accessed 12/5/2017

[82] http://nustarenergy.com/en-us/Company/Pages/CompanyMain.aspx, accessed 12/5/2017

Additional Company Information from Website:
Plains All American Pipeline is one of the largest and most admired midstream energy companies in North America. Plains All American Pipeline (Plains) is a publicly-traded master limited partnership that owns and operates midstream energy infrastructure and provides logistics services for crude oil, natural gas liquids (NGL), natural gas, and refined products. We own an extensive network of pipeline transportation, terminalling, storage and gathering assets in key crude oil and NGL producing basins and transportation corridors, and at major market hubs in the United States and Canada. On average, PAA handles more than 5 million barrels per day of crude oil and NGL in its Transportation segment. The company is headquartered in Houston, Texas.[83]

Holly Energy Partners, L.P. (NYSE:HEP) ("Holly Energy") today [August 10, 2017] announced it has entered into definitive agreements to acquire a 50% interest in Frontier Aspen LLC ("Frontier"), the owner of the Frontier Aspen Pipeline, and a 75% interest in the SLC Pipeline LLC ("SLC"), the owner of the Salt Lake City Pipeline, from affiliates of Plains All American Pipeline, L.P. (NYSE:PAA) ("Plains") for an aggregate purchase price of $250 million in cash. Holly Energy currently owns 50% of Frontier and 25% of SLC. As a result, following the transactions, SLC and Frontier will be wholly-owned subsidiaries of Holly Energy. The Frontier Aspen Pipeline is a 289-mile crude pipeline from Casper, Wyoming to Frontier Station, Utah that supplies Canadian and Rocky Mountain crudes to Salt Lake City area refiners through a connection to the SLC Pipeline. The Salt Lake City Pipeline is a 95-mile crude pipeline that transports crude oil into the Salt Lake City area from the Utah terminal of the Frontier Pipeline and from Wahsatch station. The acquired interest in both pipelines is expected to generate approximately $23 million in annual forecasted EBITDA.[84]

Why was the company included?
This company is similar to the Fluid Transportation Pipeline Companies that the State Assessed Section is responsible for valuing. The company engages in the common transportation of refined petroleum products.

Companies Not Included in the Gas Transmission Pipeline or Fluid Transportation Market Segments

American Midstream Partners, L.P.

Company Summary from Value Line:
American Midstream Partners, LP (AMID) owns, operates, develops and acquires a portfolio of midstream energy assets. Through its segments, gathering and processing, transmission and terminals, AMID is engaged in gathering, treating, processing, and transporting natural gas; gathering, transporting, storing, treating and fractionating natural gas liquids; gathering, storing and transporting crude oil and condensates; and storing specialty chemical products. It owns or has ownership interests in gathering systems, interstate pipelines and intrastate pipelines, natural gas processing plants, fractionation facilities, offshore semisubmersible floating production system, and marine terminal sites. In November 2017, American Midstream proposed to merge Southcross Energy Partners, L.P. into a wholly owned subsidiary of the company. The pro forma partnership with an enterprise value of $3 billion is expected to generate annualized 2018 adjusted EBITDA in excess of $300 million.

---

[83] https://www.plainsallamerican.com/about-us, accessed 12/5/2017

[84] http://www.businesswire.com/news/home/20170810006075/en/Holly-Energy-Partners-Acquire-Remaining-Interests-Frontier, accessed 12/5/2017

Additional Company Information from Website:
American Midstream Partners, LP is a growth-oriented limited partnership formed to provide critical midstream infrastructure that links producers of natural gas, crude oil, NGLs, condensate and specialty chemicals to end-use markets. American Midstream's assets are strategically located in some of the most prolific onshore and offshore basins in the Permian, Eagle Ford, East Texas, Bakken and Gulf Coast. American Midstream owns or has an ownership interest in approximately 4,000 miles of interstate and intrastate pipelines, as well as ownership in gas processing plants, fractionation facilities, an offshore semisubmersible floating production system with nameplate processing capacity of 100 MBbl/d of crude oil and 240 MMcf/d of natural gas; and terminal sites with approximately 6.7 MMBbls of storage capacity. The Partnership owns the third largest cylinder exchange business and one of the largest regional retail propane providers.[85]

American Midstream Partners, LP (NYSE: AMID) ("AMID" or "American Midstream") announced today [November 1, 2017] that it has signed an agreement to acquire certain assets of Southcross Holdings, LP ("Southcross Holdings"), and has proposed to merge Southcross Energy Partners, L.P. (NYSE: SXE) ("SXE" or "Southcross Energy") (collectively, with Southcross Holdings referred to as "Southcross") into a wholly owned subsidiary of AMID in two separate transactions valued at approximately $815 million, including the repayment of net debt. As a result of the transactions, the pro forma partnership with an enterprise value of $3 billion is expected to generate annualized 2018 Adjusted EBITDA in excess of $300 million.[86]

HOUSTON--(BUSINESS WIRE)-- American Midstream Partners, LP (NYSE:AMID) ("American Midstream" or "Partnership") and JP Energy Partners LP (NYSE: JPEP) ("JP Energy") today [March 8, 2017] announced the successful completion of the previously announced merger.[87]

Why was the company not included?
This company is mainly located in the Gulf Coast. The Gulf Coast is a different market than the market of the companies for which the State Assessed Section is responsible for valuing. Also, this company engages in gathering, treating, processing, fractionating, storing specialty chemical products, etc. Also, American Midstream announced on November 1, 2017 agreement to acquire certain assets of Southcross Energy Partners, L.P. and successfully merged with JP Energy Partners, L.P. on March 8, 2017.

AmeriGas Partners, L.P.

Company Summary from Value Line:
AmeriGas Partners, L.P., is one of the country's largest retail propane distributors, serving approximately two million customers (including residential, commercial, industrial, agricultural, and motor fuel) in all 50 states via some 1,900 propane distribution locations. It also sells, installs, and services propane appliances. Fiscal 2016 sales by customer: residential, 38%; commercial/ industrial, 36%; motor fuel, 17%; agricultural, 5%; other, 4%. UGI Corp., through subsidiaries, is the sole general partner and owns 26% of the company, while the public holds the remaining 74%.

Additional Company Information from Website:
AmeriGas Partners, L.P. is a publicly traded master limited partnership (NYSE: APU). We are the nation's largest retail propane marketer, serving approximately 2 million customers in all 50 states from

[85] http://www.americanmidstream.com/about-us/default.aspx, accessed 12/5/2017

[86] http://www.americanmidstream.com/investor-relations/press-releases/press-release-details/2017/American-Midstream-Partners-to-Acquire-Southcross-Energy-Partners-and-Certain-Assets-of-Southcross-Holdings-Forming-3-Billion-Partnership/default.aspx, accessed 12/5/2017

[87] http://www.americanmidstream.com/investor-relations/press-releases/press-release-details/2017/American-Midstream-Partners-Announces-Successful-Completion-of-Merger-with-JP-Energy-Partners/default.aspx, accessed 12/6/2017

approximately 2,100 distribution locations. We conduct our business principally through our subsidiary AmeriGas Propane, L.P. UGI Corporation, through subsidiaries, is the sole General Partner and owns 26% of the Partnership.[88]

Why was the company not included?
This company operates as a retail and wholesale distributor of propane gas.

Andeavor Logistics, L.P. (formerly Tesoro Logistics, L.P.)

Company Summary from Value Line:
Andeavor Logistics LP, formerly Tesoro Logistics LP, is a full-service logistics company operating primarily in the western and midcontinent US. It owns/operates a network of crude oil, refined products, & natural gas pipelines; terminals with storage capacity for crude oil and refined products, rail facilities, marine terminals, a trucking fleet, and natural gas processing and fractionation complexes. Business incl.: Terminalling/Transportation (50% of ’16 rev.), Gathering (28%), and Processing (22%). Employs 1088. Off./dir own less than 1% of units; Tesoro Corp., 34.4%; Tortoise Cap’l, 10.6%; Center Coast Cap’l, 5.1% (’16 10-K).

Additional Company Information from Website:
Andeavor Logistics LP is a leading full-service logistics company operating primarily in the western and mid-continent regions of the United States. We are highly focused on delivering a superior customer experience through safe, reliable performance, attention to detail, and offering smart, flexible solutions. Andeavor Logistics owns and operates a network of crude oil, refined products and natural gas pipelines. We also own and operate crude oil and refined products truck terminals, marine terminals and dedicated storage facilities. In addition, Andeavor Logistics owns and operates natural gas processing and fractionation complexes. Headquartered in San Antonio, Texas, we have operations across nine states. Our assets are well positioned around key basins and connected to major gathering, storage, transportation and processing hubs. By optimizing our existing operations, pursuing organic expansion opportunities and growing through strategic acquisitions, Andeavor Logistics is on a distinctive path and the premier partner of choice for midstream service.[89]

SAN ANTONIO, TEXAS - October 30, 2017 - Andeavor Logistics LP (NYSE: ANDX) and Andeavor (NYSE: ANDV) today announced that Andeavor Logistics has completed its acquisition of Western Refining Logistics, LP (NYSE: WNRL) in a unit-for-unit transaction and assumption of $280 million of net debt for a total enterprise value of approximately $1.7 billion, based on Andeavor Logistics' closing unit price of $45.90 on October 30, 2017. The strategic combination of the two companies further positions Andeavor Logistics as a growth-oriented, full-service and diversified midstream company with greater organic growth opportunities across the combined geographic footprint. As a result of this acquisition, Andeavor Logistics is well positioned to compete and grow organically in the highly attractive Permian Basin, principally in the Delaware basin where Andeavor and Andeavor Logistics have a strong logistics asset base, crude oil marketing capability and meaningful refining offtake.[90]

Why was the company not included?
This company is more aligned with the fluid transportation companies that the State Assessed Section is responsible for valuing. In the past, the department considered the company’s pipeline transportation business segment to be a smaller part of its overall operations. For the 2016 calendar year, terminalling

[88] http://investors.amerigas.com/investor-relations/ir-home/default.aspx, accessed 12/6/2017

[89] http://www.andeavorlogistics.com/about/, accessed 1/4/2017

[90] http://ir.andeavorlogistics.com/phoenix.zhtml?c=242247&p=irol-newsArticle&ID=2312595, accessed 12/6/2017

and transportation were 50% of revenues. Will consider this company for future studies. Not including for the 2018 study because the company was recently involved in an acquisition of Western Refining Logistics, L.P.

Antero Midstream Partners, L.P.

Company Summary from Value Line:
Antero Midstream Partners, LP is a limited partnership formed by Antero Resources Corp. (AR) to own, operate, and develop midstream energy assets to service its energy production. The partnership's assets consist of gathering pipelines, compressor stations, and interests in processing and fractionation plants that collect and process natural gas, NGLs, and oil from AR's wells in the Marcellus and Utica Shales. Also owns water handling and treatment infrastructure that deliver fresh water and wastewater handling services for well completion operations. As of 2/15/17, AR owns 58.6% of outstanding units; Off. & dir. less than 1%. Employs 480.

Additional Company Information from Website:
Headquartered in Denver, Colorado, Antero Midstream Partners LP (NYSE:AM) is a growth-oriented limited partnership formed by Antero Resources Corporation (NYSE:AR) to own, operate and develop midstream energy assets to service Antero Resources' rapidly increasing production. Our assets consist of gathering pipelines and compressor stations, processing and fractionation plants, and water handling and treatment infrastructure, through which we provide midstream services to Antero Resources under long-term, fixed-fee contracts. Our assets are located in the rapidly developing liquids-rich southwestern core of the Marcellus Shale in northwest West Virginia and liquids-rich core of the Utica Shale in southern Ohio. We invite you to discover our impressive assets and learn more about our significant organic growth potential.[91]

Why was the company not included?
This company is mainly provides gathering services and water for hydro fracturing. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

ARC Logistics Partners

Company Summary from Value Line:
In August 2017, Arc Logistics Partners, LP along with Lightfoot Capital Partners GP, LLC and Lightfoot Capital Partners, LP entered into a merger agreement with Zenith Energy US, LP. Under the terms of the agreement, all Arc Logistics common unitholders, other than Lightfoot, will receive $16.50 per common unit in cash for each common unit they own. Due to this news, the company's ranks were suspended. Arc Logistics Partners is a limited partnership formed by Lightfoot Capital Partners and its general partner, Lightfoot Capital Partners GP, to operate a diversified portfolio of complementary energy logistics assets. As of September 30, 2017, its assets consisted of: 21 terminals with approximately 7.8 million barrels of crude oil, and petroleum product; four rail transloading facilities with approximately 126,000 bpd of throughput capacity; and the LNG Interest in connection with the LNG Facility, which has 320,000 M3 of LNG storage, and 1.5 bcf/d natural gas sendout capacity. Has 111 employees.

Additional Company Information from Website:
Arc Logistics Partners LP (NYSE: ARCX) logistics assets are strategically located along the East Coast, West Coast, Gulf Coast, and Midwest regions of the United States to receive and supply a diverse group of third-party customers, including major oil and gas companies, independent refiners, crude oil and petroleum product marketers, distributors and various industrial manufacturers. The location of our

[91] http://www.anteromidstream.com/, accessed 12/6/2017

assets, combined with our connectivity to major U.S. energy infrastructure, allows us to meet the evolving needs of our customers.We provide customers with storage alternatives to handle a wide array of products including gasoline, distillates, aviation gas, asphalt, fuel oil, crude oil, ethanol, bio-diesel, methanol and crude tall oil. Many of our facilities manage multiple products and offer additional capacity to support the changing needs of our customers. Our customer-focused business model, combined with a diverse asset base, provides us with the opportunity to attract new customers and expand services to our existing customers.[92]

Why was the company not included?
This company's operations focus mainly on storage and a wide variety of products. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing. Also, this company entered into a merger agreement in August 2017 (see Company Summary from Value Line).

Archroc, Inc.

Company Summary from Value Line:
Archrock, Inc. is a pure play natural gas contract operations services business and the leading provider of natural gas compression services to customers in the oil and natural gas industry throughout the US and a leading supplier of aftermarket services to customers that own compression equipment in the US. The company operates in two business segments. As of December 31, 2016, its contract operations business was largely comprised of its significant equity investment in Archrock Partners, L.P. and its subsidiaries, in addition to the company's owned fleet of natural gas compression equipment that it uses to provide operations services to its customers. Archrock's aftermarket services business provides a full range of services to support the compression needs of customers. The company sells parts and components and provide operations, maintenance, overhaul and reconfiguration services to customers who own compression equipment. Has 1700 employees.

Additional Company Information from Website:
Archrock, Inc. (NYSE:AROC) is a pure-play U.S. natural gas contract compression services business. Archrock, Inc. holds interests in Archrock Partners, L.P. (NASDAQ: APLP), a master limited partnership and the leading provider of natural gas compression services to customers in the oil and natural gas industry throughout the United States.[93]

Why was the company not included?
This company provides compression services. This business segment is not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

Archrock Partners, L.P.

Company Summary from Value Line:
Archrock Partners, LP, a Delaware limited partnership formed in June 2006, is the leading provider of natural gas contract compression services. It provides comprehensive contract operations services, including the personnel, equipment, tools, materials, and supplies to meet its customers' natural gas compression needs. Based on the operating specifications at the customer's location and the customer's unique compression needs, these services include designing, sourcing, owning, installing, operating, servicing, repairing, and maintaining equipment. When providing contract operations services, the company works closely with a customer's field service personnel so that the compression services can be adjusted to efficiently match changing characteristics of the natural gas reservoir and the natural gas

[92] http://arcxlp.com/company/, accessed 12/6/2017

[93] http://www.archrock.com/aboutus, accessed 12/6/2017

produced. Archrock, Inc. owns an equity interest in Archrock Partners, including all of the general partner interest.

Additional Company Information from Website:
Archrock Partners, L.P. (NASDAQ:APLP), a master limited partnership, is the leading provider of natural gas contract compression services to clients throughout the United States. An equity interest in the company is owned by Archrock, Inc. (AROC), a pure-play U.S. natural gas contract compression services leader.[94]

Why was the company not included?
This company provides compression services. This business segment is not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

Azure Midstream Partners, L.P.

Company Summary from Value Line:
Not available. Company is not publically traded.

Additional Company Information from Website:
Azure Midstream Partners, LP, headquartered in Dallas, Texas, is a fee-based, growth-oriented limited partnership formed to develop, operate, and acquire midstream energy assets. The Partnership provides natural gas gathering, transportation, and processing services; as well as NGL transportation and crude oil logistics services. The Partnership's assets include 963 miles of gathering lines in the Shelby Trough sub-play of the Haynesville Shale and the horizontal Cotton Valley play located in east Texas and north Louisiana that are capable of gathering 1.9 Bcf/d. The Partnership also has three natural gas processing facilities with 210 MMcf/d of cumulative processing capacity located in the Panola, San Augustine and Tyler Counties of Texas, two NGL transportation pipelines that connect its Panola County and Tyler County processing facilities to third party NGL pipelines capable of transporting 20,000 barrels per day, and three crude oil transloading facilities containing six crude oil transloaders with a combined capacity of 31,200 Bbls/d.[95]

Why was the company not included?
Company is no longer publically traded.

Blueknight Energy Partners, L.P.

Company Summary from Value Line:
Blueknight Energy Partners, LP, a publicly traded master limited partnership, provides integrated terminalling, storage, processing, gathering, transportation, and marketing services for companies engaged in the production, distribution, and marketing of crude oil and asphalt products. It manages its operations through four segments: asphalt terminalling services; crude oil terminalling and storage services; crude oil pipeline services; and crude oil trucking and producer field services. Its diversified portfolio of assets consist of roughly 9.6 million barrels of combined asphalt product and residual fuel oil storage at 54 terminals in 26 states, 7.2 million barrels of crude oil storage in Oklahoma and Texas, about 6.6 million barrels of which are located at the Cushing, Oklahoma Interchange, 670 miles of crude oil pipeline located primarily in Oklahoma and Texas, and 200 crude oil transportation and oilfield services vehicles deployed in Kansas, Oklahoma, and Texas. Has 380 employees.

Additional Company Information from Website:
Blueknight Energy Partners, L.P. is a publicly traded master limited partnership formed in July 2007. Blueknight owns and operates a diversified portfolio of complementary midstream energy assets. The

[94] http://www.archrock.com/aplp, accessed 12/5/2017

[95] http://www.azuremidstreampartners.com/pages/about-us, accessed 12/5/2017

depth of our experience in the midstream energy business is second to none. Our strategically located assets allow us to be a leading provider of midstream services in the energy industry. We provide services to our customers by focusing on two operational areas: 1. Product terminalling (Liquid asphalt and Crude oil) and 2. Crude oil logistics (Pipeline transportation and Trucking and producer field services).[96]

Why was the company not included?
This company focuses on two operational areas: 1. Product Terminalling (which includes liquid asphalt and crude oil) and 2. Crude Oil Logistics (which includes pipeline transportation and trucking and producer field services). This business segment is not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

BP Midstream Partners, L.P.

Company Summary from Value Line:
Unable to access information for this company from Value Line.

Additional Company Information from Website:
We are a fee-based, growth-oriented master limited partnership recently formed by BP Pipelines (which is an indirect wholly owned subsidiary of BP), to own, operate, develop and acquire pipelines and other midstream assets. Our initial assets consist of interests in entities that own crude oil, natural gas, refined products and diluent pipelines serving as key infrastructure for BP and other customers to transport onshore crude oil production to BP's Whiting Refinery and offshore crude oil and natural gas production to key refining markets and trading and distribution hubs. Certain of our assets deliver refined products and diluent from the Whiting Refinery and other U.S. supply hubs to major demand centers We have a strategic relationship with BP, one of the largest producers of crude oil and natural gas as well as one of the leading petroleum products refiners in the United States, who will maintain a significant interest in us. BP and its subsidiaries own a substantial amount of retained midstream assets and may provide BPMP with significant growth opportunities in the future.[97]

We own one onshore crude oil pipeline system, one onshore refined products pipeline system, one onshore diluent pipeline system, interests in four offshore crude oil pipeline systems and an interest in one offshore natural gas pipeline system.[98]

Why was the company not included?
This company's initial public offering was 10/16/2017. Consider this company in the future after it has at least three to five years of financial data available.[99] Consider the location of the assets and the type of assets before including as a guideline company.

Cheniere Energy, Inc.

Company Summary from Value Line:
Cheniere Energy, Inc. engages in the liquefied natural gas (LNG) business and related natural gas pipelines in the Gulf Coast of the U.S. It operates the Sabine Pass LNG terminal in western Louisiana on the Sabine Pass Channel, and is developing Corpus Christi LNG near Corpus Christi, Texas; and Creole Trail LNG at the Calcasieu Channel in Louisiana. It operates the Creole Trail Pipeline, consisting of 94 miles of pipeline

---

[96] http://www.bkep.com/about, accessed 12/6/2017

[97] https://www.bp.com/en_us/midstream/bp-midstream-partners.html, accessed 12/6/2017

[98] https://www.bp.com/en_us/midstream/bp-midstream-partners/our-assets.html, accessed 12/6/2017

[99] https://www.bp.com/en_us/bp-us/media-room/press-releases/bp-midstream-partners-lp-launches-initial-public-offering.html, accessed 10/17/2017

connecting the Sabine Pass LNG terminal to various existing interstate natural gas pipelines in southwest Louisiana. Has 642 employees.

Additional Company Information from Website:
Cheniere Energy, Inc. (NYSE MKT: LNG) (Cheniere), is a Houston-based energy company primarily engaged in LNG-related businesses. We own and operate the Sabine Pass LNG receiving terminal and Creole Trail Pipeline located in Louisiana, through our general partner ownership interest in and management agreements with Cheniere Energy Partners, L.P. (NYSE MKT: CQP) (Cheniere Partners) and our partial ownership interest in Cheniere Energy Partners LP Holdings, LLC (NYSE MKT: CQH). Cheniere Partners is developing, constructing and operating a liquefaction project at the Sabine Pass LNG terminal (the "SPL Project") adjacent to the existing regasification facilities for up to six trains, with expected aggregate nominal production capacity, which is prior to adjusting for planned maintenance, production reliability and potential overdesign, of approximately 27.0 mtpa of LNG. Train 1 commenced operations in May 2016, Train 2 commenced operations in September 2016 and Train 3 commenced operations in March 2017. Trains 4-5 are currently under construction. All regulatory approvals have been received to construct and operate Train 6, and FID is expected to be reached upon obtaining an EPC contract, commercial contracts and financing sufficient to support construction. Cheniere is developing and constructing additional liquefaction facilities near Corpus Christi, Texas (the "Corpus Christi LNG terminal"). The Corpus Christi LNG terminal is being designed for up to five trains, with expected aggregate nominal production capacity, which is prior to adjusting for planned maintenance, production reliability and potential overdesign, of approximately 22.5 mtpa of LNG, three LNG storage tanks with capacity of approximately 13.5 Bcfe and two marine berths. Construction began on the first two trains in May 2016. All regulatory approvals have been received to construct and operate Train 3, and FID is expected to be reached upon obtaining commercial contracts and financing sufficient enough to support construction. Cheniere has also filed the NEPA pre-filing to commence the regulatory process on Train 4 and 5. Cheniere is also engaged in the LNG and natural gas marketing business. Through its subsidiary, Cheniere Marketing, LLC (together with its subsidiaries, “Cheniere Marketing”), it is developing a portfolio of long-, medium- and short-term SPAs offering LNG on an FOB or DAT basis. Cheniere Marketing has purchased LNG from the SPL Project and other locations worldwide and transported and unloaded commercial LNG cargoes. Cheniere Marketing is expected to have access to excess LNG from the SPL Project and the Corpus Christi LNG terminal not sold under long-term sale and purchase agreements to third parties. Cheniere continues to evaluate the energy markets for additional development and/or marketing opportunities that would leverage the existing platform and strategically fit within the Cheniere organization.[100]

Why was the company not included?
This company is mainly located in the Gulf Coast. The Gulf Coast is a different market than the market of the companies for which the State Assessed Section is responsible for valuing. If this company and its subsidiaries was similar to the companies for which the State Assessed Section is responsible for valuing, would most likely use the subsidiaries.

Cheniere Energy Partners, L.P.

Company Summary from Value Line:
Cheniere Energy Partners, LP (Cheniere Partners) is a limited partnership formed by Cheniere Energy, Inc. to own and operate the Sabine Pass liquefied natural gas (LNG) terminal on the Sabine Pass deep-water shipping channel less than four miles from the Gulf Coast. The Sabine Pass LNG terminal has regasification facilities owned by its wholly owned subsidiary, Sabine Pass LNG, LP, that include existing infrastructure of five LNG storage tanks with capacity of 16.9 Bcfe, two marine berths that can

---

[100] http://cheniere.com/about-us/cheniere-energy/, accessed 12/6/2017

accommodate vessels of up to 266,000 cubic meters, and vaporizers with regasification capacity of roughly 4.0 Bcf/d. Cheniere develops and constructs natural gas liquefaction facilities at the Sabine Pass LNG terminal adjacent to the existing regasification facilities through Sabine Pass Liquefaction. The company is developing and constructing natural gas liquefaction facilities at the Sabine Pass LNG terminal adjacent to the existing regasification facilities through its wholly owned subsidiary, SPL.

Additional Company Information from Website:
Cheniere Energy Partners, L.P. (NYSE MKT: CQP) (Cheniere Partners) is a Delaware limited partnership formed by Cheniere Energy, Inc. Through wholly owned subsidiaries, it owns and operates the Sabine Pass LNG receiving terminal and the Creole Trail Pipeline located in western Cameron Parish, Louisiana on the Sabine-Neches Waterway. Its primary business objectives are to generate stable cash flows sufficient to pay the initial quarterly distribution to unitholders and, over time, to increase quarterly cash distributions. Cheniere Partners is currently developing, constructing and operating liquefaction facilities (SPL Project) situated adjacent to the regasification facilities at the Sabine Pass LNG terminal. The SPL Project currently consists of up to six natural gas liquefaction trains with expected aggregate nominal production capacity of approximately 27.0 mtpa, or roughly equivalent to over 3.5 Bcf/d. Train 1 commenced operations in May 2016, and Trains 2-5 are currently under construction. All regulatory approvals have been received to construct and operate Train 6, and FID is expected to be reached upon obtaining an EPC contract, commercial contracts and financing sufficient to support the construction.[101]

Why was the company not included?
This company is mainly located in the Gulf Coast. The Gulf Coast is a different market than the market of the companies for which the State Assessed Section is responsible for valuing.

Clean Energy Fuels Corp

Company Summary from Value Line:
Clean Energy Fuels Corp. provides natural gas as an alternative fuel for vehicle fleets in the United States and Canada. It designs, builds, finances, and operates fueling stations and supplies compressed natural gas and liquefied natural gas. It serves about 650 fleet customers operating over 30,600 natural gas vehicles in various markets, including public transit, refuse hauling, airports, taxis, and trucking. It owns, operates, and supplies about 224 natural gas fueling stations. The company also constructs fueling stations and sells or leases the stations to customers. Has about 710 employees.

Additional Company Information from Website:
We Are Pioneers and Your Partner in Natural Gas for Transportation. Clean Energy is changing the way the world fuels its vehicles. Energy independence is an undisputed goal for our nation, and we at Clean Energy know just how realistic and attainable that goal is with natural gas fuel. Moving forward in our thinking as well as in our vehicles means a safer, healthier planet for all of us. This change is already happening. Natural gas is abundant and domestically available and is already used as a cleaner source of energy around the world.[102]

Why was the company not included?
This company provides natural gas an alternative fuel for vehicle fleets. This business segment is not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

[101] http://www.cheniere.com/about-us/cheniere-partners/, accessed 12/6/2017

[102] https://www.cleanenergyfuels.com/about-us/, accessed 12/6/2017

Columbia Pipeline Partners, L.P.

Company Summary from Value Line:
Not available. Company is not publically traded.

Additional Company Information from Website:
Columbia Pipeline Partners LP is a Delaware master limited partnership with interests in three regulated U.S. natural gas pipelines which serve markets extending from New York to the Gulf of Mexico, as well as storage and related midstream assets. The Partnership's general partner became an indirect, wholly-owned subsidiary of TransCanada Corporation (NYSE:TRP) on July 1, 2016, and as a result, the Partnership is effectively managed by TransCanada.[103]

Why was the company not included?
Company is no longer publically traded.

Cone Midstream Partners, L.P.

Company Summary from Value Line:
CONE Midstream Partners, LP is a master limited partnership formed by CONSOL Energy, Inc. and Noble Energy, Inc. (sponsors) to own, operate, develop, and acquire natural gas gathering and other midstream energy assets to service sponsors' production in the Marcellus Shale in Pennsylvania and West Virginia. Its assets include natural gas gathering pipelines, compression and dehydration facilities, and condensate gathering, collection, separation and stabilization facilities. Its Anchor Systems include its midstream systems that generate the substantial majority of current cash flows; and the Growth Systems, which comprise of high-growth, developing gathering systems that will require substantial expansion capital expenditures over the next several years. The partnership's general partner is CONE Midstream GP LLC, a wholly owned subsidiary of CONE Gathering LLC. Has about 100 employees.

Additional Company Information from Website:
CONE Midstream Partners (NYSE:CNNX) is a fee-based, growth-oriented master limited partnership that owns, operates, develops and acquires natural gas gathering and other midstream energy assets to service the rapidly growing production in the Marcellus Shale in Pennsylvania and West Virginia. Our assets include natural gas gathering pipelines and compression and dehydration facilities, as well as condensate gathering, collection, separation and stabilization facilities. We generate all of our revenues under long-term, fixed-fee gathering agreements that are intended to mitigate our direct commodity price exposure and enhance the stability of our cash flows. Our gathering agreements also include substantial acreage dedications currently totaling approximately 500,000 net acres in the Marcellus Shale. CONE Midstream was formed by CONSOL Energy Inc. (NYSE: CNX) and Noble Energy, Inc. (NYSE: NBL), whom we refer to as our Sponsors. Each of our Sponsors is a large, independent oil and natural gas exploration and production company with a substantial resource base and a history of growing production in its areas of operation. Our Sponsors hold one of the largest aggregate acreage positions in the Marcellus Shale, which is widely viewed as a premier North American shale play due to its significant hydrocarbon resources in place, consistent and predictable geology, high well recoveries relative to drilling and completion costs and proximity to high-demand metropolitan markets in the northeastern United States. We believe that our strategically located assets, our relationship with our Sponsors and our Sponsors' intention to use us as their primary midstream services company in the Marcellus Shale position us to become a leading midstream energy company.[104]

[103] http://www.columbiapipelinepartners.com/about-us, accessed 12/27/2016
[104] http://www.conemidstream.com/CustomPage/Index?KeyGenPage=328650, accessed 12/6/2017

Why was the company not included?
This company is mainly involved in natural gas gathering services. This business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

Crestwood Equity Partners, L.P.

Company Summary from Value Line:
Crestwood Equity Partners, LP is a publicly traded Delaware limited partnership that develops, acquires, owns or controls, and operates primarily fee-based assets and operations within the energy midstream sector. Its portfolio of assets are located primarily in the Marcellus Shale, Bakken Shale, Delaware Permian Basin, PRB Niobrara Shale, Barnett Shale, and Fayetteville Shale. Grestwood offers infrastructure solutions across the value chain to service premier liquids-rich natural gas and crude oil shale plays across the US. It owns and operates a diversified portfolio of crude oil and natural gas gathering, processing, storage and transportation assets, and connects essential energy supply with energy demand across North America. The partnership is a holding company and all of its consolidated operating assets are owned through its subsidiary, Crestwood Midstream. Has 1219 employees.

Additional Company Information from Website:
Crestwood Equity Partners LP (NYSE: CEQP) is a publicly traded master limited partnership that owns and operates midstream assets located primarily in the Marcellus Shale, Bakken Shale, Delaware Permian Basin, PRB Niobrara Shale, Barnett Shale and Fayetteville Shale. Our operations and financial results are divided into three segments that include Gathering & Processing, Storage & Transportation and Marketing, Supply & Logistics. Across our three segments Crestwood is engaged in the gathering, processing, treating, compression, storage and transportation of natural gas; storage, transportation, terminalling and marketing of NGLs; gathering, storage, transportation, terminalling and marketing of crude oil.[105]

Why was the company not included?
This company is involved in three business segments: gathering and processing; storage and transportation; and marketing, supply, and logistics. The company's transportation services are small lines in key areas. The business segments are not closely related to the companies the State Assessed Section is responsible for valuing.

CrossAmerica Partners, L.P.

Company Summary from Value Line:
CrossAmerica Partners, LP is a wholesale distributor of motor fuels and owner and lessee of real estate used in the retail distribution of motor fuels. Its general partner, CrossAmerica GP LLC, is a wholly owned subsidiary of CST Brands, Inc., one of the largest independent retailers of motor fuels and convenience merchandise in North America. The company conducts business through two operating segments, Wholesale and Retail. The wholesale segment includes the wholesale distribution of motor fuel to lessee dealers, independent dealers, commission agents, DMS, CST and company operated retail sites. The Retail segment includes the sale of convenience merchandise items, the retail sale of motor fuel at company operated retail sites and the retail sale of motor fuel at retail sites operated by commission agents. It is a distributor of branded and unbranded petroleum for motor vehicles in the US and distributes motor fuel to nearly 1,200 sites located in 29 states. Has 744 employees.

Additional Company Information from Website:
Formed in 2012, CrossAmerica Partners LP, is a publicly traded master limited partnership that is a leading wholesale distributor of motor fuels and owner and lessee of real estate used in the retail distribution of motor fuels. CrossAmerica Partners distributes branded and unbranded petroleum for motor vehicles in the United States to approximately 1,200 locations and owns or leases approximately

[105] http://www.crestwoodlp.com/about-us/default.aspx, accessed 12/6/2017

900 sites. Units of CrossAmerica Partners are traded on the New York Stock Exchange under the symbol "CAPL..[106]

Why was the company not included?
This company is a wholesale distributor of motor fuels. Also, owner and lessee of real estate used in the retail distribution of motor fuels. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

DCP Midstream Partners, L.P.

Company Summary from Value Line:
DCP Midstream, LP (formerly DCP Midstream Partners, LP) was formed through a January, 2017 merger with DCP Midstream, LLC. It owns, operates, and develops a diversified portfolio of domestic midstream energy assets, including more than 60 plants and 64,000 miles of natural gas and natural gas liquids (NGLs) pipelines. It is the nation's largest NGL producer and natural gas processor. Has three segments: Natural Gas Services, NGL Logistics, and Wholesale Propane Logistics. Officers/directors own less than 1% of units; DCP Midstream, LLC, 36.8%; four institutions combined, 17.6% ('16 10-K).

Additional Company Information from Website:
DCP Midstream is one of the largest producers of NGLs and one of the largest natural gas processing companies in the U.S. We gather and/or process about 12 percent of our nation's gas supply. We have a competitive footprint and strong geographic diversity with leading positions in key economic-producing basins where producers are focused, including the DJ Basin, the Permian Basin, and the STACK/SCOOP areas of the Midcontinent. We provide natural gas gathering services to the wellhead, and we're leveraging our strategic footprint to extend the value chain through our integrated NGL pipelines and other marketing and logistics infrastructure. Through our DCP 2020 framework, DCP is committed to being sustainable in any market environment, with a focus on operational excellence, including industry-leading safety performance.[107]

We are a must-run sector that gathers, compresses, treats, processes, transports, stores, and sells natural gas, as well as produces, fractionates, transports, stores and sells natural gas liquids and recovers and sells condensate, and transports, stores and sells propane in wholesale markets.[108]

Why was the company not included?
This company was involved in a merger in the beginning of 2017. Will consider for future studies, depending on the size of the different types of business segments.

Delek Logistics Partners, L.P.

Company Summary from Value Line:
Delek Logistics Partners, LP owns and operates logistics and marketing assets for crude oil, and intermediate and refined products in the United States. The company consists of assets, including pipelines and trucks and ancillary assets that provide crude oil gathering and crude oil, intermediate and finished products transportation, and storage services primarily in support of the Tyler and El Dorado refineries, as well as offers crude oil and other products transportation services to third parties. It operates approximately 400 miles of crude oil transportation pipelines; 366 miles of refined product pipelines; and approximately 600 miles of crude oil gathering and trunk lines with an aggregate of approximately 7.3 million barrels of active shell capacity. The company provides marketing,

[106] http://www.crossamericapartners.com/about-us/about-lehigh-gas-partners/page.aspx?id=1002, accessed 12/6/2017

[107] http://www.dcpmidstream.com/company, accessed 12/6/2017

[108] http://www.dcpmidstream.com/company/business-segments, accessed 12/6/2017

transporting, storing, and terminalling refined products and services to independent third parties. Delek Logistics Partners, LP was founded in 2012 and is headquartered in Brentwood.

Additional Company Information from Website:
Delek Logistics Partners LP (NYSE: DKL), headquartered in Brentwood, Tennessee, is a growth-oriented publicly traded master limited partnership (MLP) formed by Delek US Holdings in 2012 to own, operate, acquire, and construct crude oil and refined products logistics and marketing assets. A substantial majority of our existing assets are integral to the success of Delek's refining and marketing operations. We gather, transport and store crude oil and market, distribute, transport and store refined products in select regions of the southeastern United States and west Texas for Delek and third parties, primarily in support of Delek's refineries in Tyler, Texas and El Dorado, Arkansas. Learn more about our parent company at DelekUS.com.[109]

Why was the company not included?
This company is mainly located in the Texas, Louisiana, Arkansas, and Tennessee area. This operating area is a different market than the market of the companies for which the State Assessed Section is responsible for valuing.

Dominion Energy Midstream Partners, L.P.

Company Summary from Value Line:
Dominion Energy Midstream Partners, LP is a Delaware limited partnership formed in March 2014 by Dominion MLP Holding Company, LLC and Dominion Energy Midstream GP, LLC, both indirect wholly owned subsidiaries of Dominion Energy, to grow a portfolio of natural gas terminaling, processing, storage, transportation, and related assets. Dominion Energy Midstream holds the preferred equity Interest and non-economic general partner interest in Cove Point, the owner and operator of the Cove Point LNG Facility and the Cove Point Pipeline. In addition, Dominion Energy Midstream owns Dominion Energy Carolina Gas Transmission, LLC (DECG) and a 25.93% noncontrolling partnership interest in Iroquois, both of which are FERC-regulated interstate natural gas pipelines. Dominion Energy Questar Pipeline owns and operates nearly 2,200 miles of interstate natural gas pipelines and 18 transmission and storage compressor stations in the western US.

Additional Company Information from Website:
Dominion Energy Midstream Partners is a Delaware limited partnership formed by Dominion Energy, Inc., to grow a portfolio of natural gas terminaling, processing, storage, transportation and related assets. It is headquartered in Richmond, Va. [110]

Cove Point's operations currently consist of LNG import and storage services at the Dominion Energy Cove Point LNG Facility and the transportation of domestic natural gas and regasified LNG to Mid-Atlantic markets via the Cove Point Pipeline. Following binding commitments from counterparties and regulatory approvals, construction is in progress on a liquefaction facility that will enable Dominion Energy to operate the Cove Point facility as a bi-directional facility, able to import LNG and vaporize it as natural gas or to liquefy domestic natural gas and export it as LNG. The Dominion Energy Cove Point LNG Facility includes an offshore pier, LNG storage tanks, regasification facilities and associated equipment required to (1) receive imported LNG from tankers, (2) store LNG in storage tanks, (3) regasify LNG and (4) deliver regasified LNG to the Cove Point Pipeline.[111]

[109] http://www.deleklogistics.com/phoenix.zhtml?c=251361&p=irol-IRHome, accessed 12/7/2017
[110] http://www.dommidstream.com/aboutus/index.php, accessed 12/7/2017
[111] http://www.dommidstream.com/aboutus/asset_overview.php, accessed 12//2017

Why was the company not included?
This company's main business segments include importing natural gas and storage. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

Emerge Energy Service, L.P.

Company Summary from Value Line:
Emerge Energy Services, LP is a growth oriented energy services company engaged in the business of mining, producing, and distributing silica sand that is a key input for the hydraulic fracturing of oil and gas wells. The Sand business conducts mining and processing operations from facilities in Wisconsin and Texas. In addition to mining and processing silica sand for the oil and gas industry, the Sand business sells its product for use in building products and foundry operations. Emerge previously owned a fuel business that operated transmix processing facilities in the Dallas-Fort Worth area and in Birmingham, Alabama. The Fuel business also offered third-party bulk motor fuel storage and terminal services, biodiesel refining, sale, and distribution of wholesale motor fuels, reclamation services, and blending of renewable fuels. Emerge completed that sale of this business in August 2016 for $167.7 million in cash.

Additional Company Information from Website:
Emerge Energy Services LP is a growth-oriented limited partnership engaged in the businesses of mining, producing, and distributing silica sand, a key input for the hydraulic fracturing of oil and natural gas wells. Emerge Energy also processes transmix, distributes refined motor fuels, operates bulk motor fuel storage terminals, and provides complementary fuel services. Emerge Energy operates its sand segment through its subsidiary Superior Silica Sands LLC and its fuel segment through its subsidiaries Direct Fuels LLC and Allied Energy Company LLC. Our Sand operations are primarily located in Barron County, WI as well as in neighboring counties, with an additional facility in Kosse, TX and headquarters in Fort Worth, TX. Our Fuel Processing and Distribution operations are located in Birmingham, AL and Euless, TX. Through our direct access to multiple rail lines and pipelines, we are uniquely positioned to service customers across North America.[112]

Why was the company not included?
This company's main business segments are mining, producing, and distributing silica sand for hydraulic fracturing. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

Enable Midstream Partners, L.P.

Company Summary from Value Line:
Enable Midstream Partners, LP owns natural gas and crude oil infrastructure assets. It has two segments: Gathering & Processing and Transportation & Storage. Enable's assets include 12,900 miles of gathering pipelines, 14 major processing plants with 2.5 billion cubic feet per day of capacity, 7,800 miles of interstate pipelines, 2,200 miles of intrastate pipelines, and eight storage facilities. 2016 depr. rate: 2.9%. Has 1,600 employees. CenterPoint Energy owns 54.1% of shares out.; OGE Energy, 25.7%; ArcLight Cap'l. Partners, 10.1%; off. and dir., less than 1% (2016 10-K).

Additional Company Information from Website:
Enable Midstream Partners, LP is a publicly traded Master Limited Partnership (MLP) where approximately 1,900 employees focus on providing customers timely, reliable and affordable solutions. We were formed as a joint venture by affiliates of CenterPoint Energy, Inc., OGE Energy Corp and

[112] http://ir.emergelp.com/phoenix.zhtml?c=251428&p=irol-homeProfile&t=&id=&, accessed 12/7/2017

ArcLight Capital Partners, LLC in May 2013. Our general partner is equally controlled by CenterPoint Energy and OGE.[113]

Operations

- 12,900 miles of gathering lines
- 14 major processing plants with approximately 2.5 billion cubic feet per day with construction on one new plant underway
- ~7,800 miles of interstate pipelines (including Southeast Supply Header, LLC) with 8.4 billion cubic feet per day of transport capacity
- ~2,200 miles of intrastate pipelines
- 85.0 billion cubic feet of natural gas storage capacity[114]

Why was the company not included?
This company began trading on April 11, 2014. As of January 2, 2018, the company has less than four full years of financials. This company performs a substantial amount of gathering and processing functions. We would consider this company in the future, based on the size of operating segments after at least five full years of financials.

Enbridge, Inc.

Company Summary from Value Line:
Enbridge Inc. is a leader in energy transportation and distribution in North America and intl. As a transporter of energy, it operates the world's longest crude oil and liquids pipeline system. The company also has international oper. and a growing involvement in natural gas transmission and midstream businesses. As a distributor of energy, it owns and operates Canada's largest natural gas distribution company, and provides services in Ontario, Quebec, New Brunswick, and New York State. Owns 38.9% of Noverco. In '17, Merged with Spectra Energy Corp. (SE). Emplys. 8,600.

Additional Company Information from Website:
Enbridge exists to fuel people's quality of life, and has done so for more than 65 years. A North American leader in delivering energy, Enbridge has been ranked on the Global 100 Most Sustainable Corporations index for the past eight years. Enbridge operates the world's longest crude oil and liquids transportation system. We're also a North American leader in the gathering, transportation, processing and storage of natural gas, and we have an increasing involvement in power transmission. Enbridge is Canada's largest natural gas distribution provider, with about 3.6 million retail customers in Ontario, Quebec, New Brunswick and New York State. Enbridge has interests in nearly 3,000 MW of net renewable generation and power transmission capacity, based on projects in operation or under construction, and continues to expand into wind, solar and geothermal power.[115]

CALGARY, ALBERTA--(Marketwired - Feb. 27, 2017) - Enbridge Inc. (TSX:ENB)(NYSE:ENB) (Enbridge) announced the completion today of the previously announced stock-for-stock merger transaction (the Transaction) to acquire all of the outstanding common stock of Spectra Energy Corp (NYSE:SE) (Spectra Energy).[116]

Spectra Energy Corp and Enbridge Inc. will combine to create North America's largest energy infrastructure company. This transaction creates the largest energy infrastructure company in North America with an enterprise value of approximately C$165 billion (US$127 billion), a C$74 billion

[113] https://www.enablemidstream.com/html/pages/p001-homepage.html, accessed 12/7/2017

[114] http://www.enablemidstream.com/html/pages/p002-about.html, accessed 12/7/2016

[115] https://www.enbridge.com/about-us accessed 12/7/2017

[116] https://www.enbridge.com/media-center/news/details?id=2126823&lang=en&year=2017, accessed 12/7/2017

(US$57 billion) inventory of current and potential growth projects and anticipated annual dividend growth of 10-12 percent through 2024. The combined company will be exceedingly well positioned to invest in critical infrastructure to meet the needs of our customers and create value for our shareholders.[117]

As of June 28, 2017, Enbridge Inc. closed the transaction to acquire 100% of Midcoast Energy Partners from Enbridge Energy Partners, L.P. On April 27, 2017, MEP was privatized under Enbridge Inc. with the purchase of all outstanding publicly-traded units.[118]

Why was the company included?
This company was not included because we would use Enbridge Energy Partners, L.P.

Energy Transfer Partners, L.P.

Company Summary from Value Line:
Energy Transfer Partners, L.P. (ETP) owns and operates natural gas midstream and intrastate transportation and storage as well as interstate natural gas transportation and storage through ET Interstate and Panhandle. The partnership also has liquids operations, including natural gas liquids (NGLs) transportation, storage and fractioning services, and crude oil, NGLs and refined product trans, terminaling and acquisition and marketing through Sunoco Logistics. ETP was formed following the 4/17 acquisition of Energy Transfer Partners by Sunoco Logistics. Roughly 8,480 employees.

Additional Company Information from Website:
We are pleased to announce that the merger between Energy Transfer Partners (ETP) and Sunoco Logistics Partners (SXL) is complete and the entities are now operating as one Partnership known as Energy Transfer Partners.[119]

Energy Transfer Partners, L.P. (NYSE: ETP) is a master limited partnership that owns and operates one of the largest and most diversified portfolios of energy assets in the United States. Strategically positioned in all of the major U.S. production basins, ETP owns and operates a geographically diverse portfolio of complementary natural gas midstream, intrastate and interstate transportation and storage assets; crude oil, natural gas liquids (NGL) and refined product transportation and terminalling assets; NGL fractionation; and various acquisition and marketing assets. ETP's general partner is owned by Energy Transfer Equity, L.P. (NYSE: ETE).[120]

DALLAS & NEWTOWN SQUARE, Pa.--(BUSINESS WIRE)--Apr. 28, 2017-- Sunoco Logistics Partners L.P. (NYSE: SXL) ("SXL") and Energy Transfer Partners, L.P. (NYSE: ETP) ("ETP") today announced the completion of their previously announced merger of an indirect subsidiary of SXL, with and into ETP, with ETP surviving the merger as a wholly owned subsidiary of SXL.[121]

Why was the company included?
This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing. The company engages in the transportation, gathering, and storage of natural gas. However, this company completed a merger with Sunoco Logistics Partners, L.P. on April 28, 2017

---

[117] http://www.spectraenergy.com/Transaction/, accessed 12/28/2016

[118] http://www.midcoastpartners.com/, accessed 12/12/2017

[119] http://www.energytransfer.com/, accessed 12/7/2017

[120] http://www.energytransfer.com/company_overview.aspx, accessed 12/7/2017

[121] http://ir.energytransfer.com/phoenix.zhtml?c=106094&p=irol-newsArticle&ID=2267001, accessed 12/7/2017

Energy Transfer Equity, L.P.

Company Summary from Value Line:
Energy Transfer Equity, LP is a master limited partnership that owns the general partner and 100% of the incentive distribution rights (IDRs) of Energy Transfer Partners, LP (ETP), and Sunoco, LP, (SUN). The company also owns approximately 2.6 ETP million common units and approximately 81.0 million ETP class H units. Energy Transfer Equity also owns the Lake Charles LNG Company. On a consolidated basis, the ETE family owns and operates approximately 71,000 miles of natural gas pipeline along with retail fuel operations. Has about 31,000 employees.

Additional Company Information from Website:
Energy Transfer Equity, L.P. (NYSE: ETE) is a master limited partnership that owns the general partner and 100% of the incentive distribution rights (IDRs) of Energy Transfer Partners, L.P. (NYSE: ETP) and Sunoco LP (NYSE: SUN). ETE also owns Lake Charles LNG Company. On a consolidated basis, ETE's family of companies owns and operates a diverse portfolio of natural gas, natural gas liquids, refined products, and crude oil pipelines, as well as retail and wholesale motor fuel operations and LNG terminalling.[122]

Why was the company included?
This company owns the general partner and 100% of the incentive distribution rights of Energy Transfer Partners, L.P. and Sunoco, L.P. Energy Transfer Partners, L.P. is currently entered in an agreement for its acquisition by Sunoco Logistics Partners, L.P. Energy Transfer Partners, L.P. would be considered as a guideline company, not the parent, Energy Transfer Equity, L.P.

EnLink Midstream Partners, L.P.

Company Summary from Value Line:
EnLink Midstream Partners L.P., formerly Crosstex Energy, L.P., is a master limited partnership (MLP) that provides midstream energy services, including gathering, transmission, processing, fractionation, and marketing, to producers of natural gas, natural gas liquids (NGLs), crude oil, and condensate. Has five segments: Texas (25% of ’16 revenues, 47% of gross operating margin); Louisiana (47%, 22%); Oklahoma (10%, 21%); Crude & Condensate (28%, 11%); and Corporate (-10%, -1%). Has 1,472 employees. Devon Energy Corp. owns 46% of total units; Enfield Holdings, L.P, 13%; Off./dir., less than 1% (’16 10-K).

Additional Company Information from Website:
EnLink Midstream provides integrated midstream services across natural gas, crude oil, condensate, and NGL commodities. Our expansive gathering, processing, fractionation, transportation, and logistics assets are located in the top U.S. basins and are strategically focused on our core growth areas of the Permian’s Midland and Delaware basins, Oklahoma’s Midcontinent, and Louisiana’s Gulf Coast.[123]

Why was the company not included?
Most of this company’s operations are located in Texas and Oklahoma. This is a different market than the market of the companies for which the State Assessed Section is responsible for valuing.

[122] http://www.energytransfer.com/company_overview.aspx, accessed 12/7/2017
[123] http://www.enlink.com/operations/, accessed 12/7/2017

EQT MidStream Partners, L.P.

Company Summary from Value Line:
EQT Midstream Partners, LP is a growth-oriented limited partnership formed by EQT Corp. to own, operate, acquire, and develop midstream assets in the Appalachian Basin of Pennsylvania, West Virginia and Ohio. The partnership provides substantially all of its natural gas transmission, storage, and gathering services under contracts with long-term, firm reservation and/or usage fees. EQT Corp. accounted for approximately 75% of Partnership revenues for the year ended December 31, 2016. EQT Midstream Svcs., LLC serves as the general partner of the company.

Additional Company Information from Website:
EQT Midstream Partners, LP (EQM) is a growth-oriented limited partnership formed by EQT Corporation to own, operate, acquire and develop midstream assets in the Appalachian Basin. EQM provides substantially all of its natural gas gathering, transmission and storage services under contracts with long-term, firm reservation and/or usage fees. This contract structure enhances the stability of EQM's cash flows and limits its direct exposure to commodity price risk. EQM's operations are primarily focused in southwestern Pennsylvania and northern West Virginia, a strategic location in the natural gas shale plays known as the Marcellus, Upper Devonian, and Utica Shales. This same region is also the core operating area of EQT, EQM's largest customer that accounted for approximately 75% of EQM's revenues generated for the year ended December 31, 2016. EQM provides midstream services to EQT and multiple third parties across 24 counties in Pennsylvania, West Virginia, and Ohio through its two primary assets: the gathering system, which delivers natural gas from wells and other receipt points to transmission pipelines, and the transmission and storage system, which serves as a header system transmission pipeline. EQM believes that its strategically located assets, combined with its working relationship with EQT, position it as a leading Appalachian Basin midstream energy company. The principal business objective for EQT Midstream Partners is to increase the quarterly cash distributions that it pays to our unitholders over time, while ensuring the ongoing stability of its business. EQM intends to achieve this objective by capitalizing on economically attractive organic growth opportunities; increasing access to existing and new delivery markets; attracting additional third party volumes; and focusing on stable, fixed-fee business.[124]

Why was the company not included?
This company's operations are located in the Appalachian Basin, which is a different market than the market of the companies for with the State Assessed Section is responsible for valuing.

Ferrellgas Partners, L.P.

Company Summary from Value Line:
Ferrellgas Partners, L.P., through its operating partnership, Ferrellgas, L.P., and subsidiaries, serves propane customers in all 50 states, the District of Columbia, and Puerto Rico, and provides midstream services to major energy companies in the US. It operations primarily include the distribution and sale of propane and related equipment and supplies. Sales from propane distribution are generated principally from transporting propane purchased from third parties to propane distribution locations and then to tanks on customers' premises or to portable propane tanks delivered to nationwide and local retailers. Sales from portable tank exchanges, nationally branded under the name Blue Rhino, are generated through a network of independent and partnership-owned distribution outlets. Ferrellgas conducts crude oil logistics operations and related activity under the Bridger Logistics tradename, as well as water solutions operations, under midstream operations segment.

[124] https://www.eqtmidstreampartners.com/about-us/home, accessed 12/11/2017

Additional Company Information from Website:
Ferrellgas Partners, L.P. is a publicly-traded Master Limited Partnership. Through strategic partnerships with diverse and growth-oriented companies, we deliver rigorous results, and we do so ethically, honestly, and transparently. We take pride in this position, and the peace of mind it provides our stakeholders. Our headquarters are located in Liberty, Missouri and our Initial Public Offering was June 28, 1994. As of October 31, 2017, we have 97,152,665 units, with our employees indirectly owning 22.8 million units of the partnership through an Employee Stock Ownership Plan. We trade on the New York Stock Exchange under the symbol FGP.[125]

At Ferrellgas, we are in the business of providing meaningful moments, memories full of warmth, dependability you can trust, and outcomes you had only dreamed possible. Whatever your day has in store, we are here to provide you with the advantage. Propane is our supply; fueling what matters to you is our purpose.[126]

Why was the company not included?
This company's main business segment is propane, which is a different business segment of the companies for with the State Assessed Section is responsible for valuing.

Genesis Energy, L.P.

Company Summary from Value Line:
Genesis Energy, LP is a growth-oriented master limited partnership focused on the midstream segment of the crude oil and natural gas industry. Its segments consist of: offshore pipeline transportation and processing of crude oil and natural gas in the Gulf of Mexico; sodium minerals and sulfur services involving trona and trona-based exploring, processing, and selling activities, and processing of high sulfur gas streams for refineries to remove the sulfur, and selling the related by-product, sodium hydrosulfide (NaHS); onshore facilities and transportation, which include terminalling, storing, and transporting crude oil, petroleum products, and CO 2; and marine transportation to provide waterborne transportation of petroleum products and crude oil throughout North America. In September 2017, Genesis acquired Tronox Limited's trona and tronabased exploring, mining, processing, and selling business (Alkali Business) for approximately $1.325 billion in cash. Has 1200 employees.

Additional Company Information from Website:
Genesis Energy, L.P., is a growth-oriented master limited partnership headquartered in Houston, Texas. Through our four divisions: offshore pipeline transportation, refinery services, marine transportation and onshore facilities and transportation, we provide an integrated suite of services to refineries, oil producers, and industrial and commercial enterprises. Our operations are primarily located in Texas, Louisiana, Arkansas, Mississippi, Alabama, Florida, Wyoming and the Gulf of Mexico. Our business activities are primarily focused on providing services around and within refinery complexes. Upstream of refineries, we provide gathering and transportation of crude oil. Within refineries, we provide services to assist in their sulfur balancing requirements. Downstream of refineries, we provide transportation services as well as market outlets for the finished refined products. We have a diverse portfolio of customers, operations and assets, including pipelines, refinery-related plants, storage tanks and terminals, railcars, rail loading and unloading facilities, barges and trucks. We also have interests in pipelines offshore in the Gulf of Mexico. That business includes approximately 2,600 miles of offshore crude oil and natural gas pipelines and six offshore hub platforms that serve some of the most active drilling and development regions in the United States, including deepwater production fields in the Gulf of Mexico offshore of Texas, Louisiana, Mississippi, and Alabama. Safety, health and the environment are at the center of our operations. Our regard for the safety of our employees, contractors, and the

[125] https://www.ferrellgas.com/our-company/investor-information/, accessed 12/11/2017
[126] https://www.ferrellgas.com/our-company/, accessed 12/11/2017

communities in which we operate is evident in our project design, construction and day to day operations.[127]

Why was the company not included?
This company's main business segments are grouped in four divisions: offshore pipeline transportation, refinery services, marine transportation, and onshore facilities and transportation. These market segments are not similar enough to the market segments of the companies for which the State Assessed Section is responsible for valuing.

Global Partners, L.P.

Company Summary from Value Line:
Global Partners, LP is engaged in the purchasing, selling, and logistics of transporting petroleum and related products, including domestic and Canadian crude oil, gasoline and gasoline blendstocks (such as ethanol and naphtha), distillates (such as home heating oil, diesel, and kerosene), residual oil, renewable fuels, natural gas and propane. It also receives revenue from convenience store sales and gasoline station rental income. Global owns, controls, or has access to one of the largest terminal networks of refined petroleum products and renewable fuels in the northeast. It owns transload and storage terminals in North Dakota and Oregon that extend its origin-todestination capabilities from the mid-continent region of the US and Canada to the east and west coasts. In October 2017, Global Partners acquired retail fuel and convenience store assets from Honey Farms, Inc. in a cash transaction valued at approximately $36 million. Has 1770 employees.

Additional Company Information from Website:
A publicly traded master limited partnership, Global is a midstream logistics and marketing company that owns, controls or has access to one of the largest terminal networks of petroleum products and renewable fuels in the Northeast. Global also is one of the largest distributors of gasoline, distillates, residual oil and renewable fuels to wholesalers, retailers and commercial customers in New England and New York. The Partnership is engaged in the transportation of crude oil and other products by rail from the mid-continental U.S. and Canada to the East and West Coasts for distribution to refiners and others. With approximately 1,500 locations, primarily in the Northeast, Global also is one of the largest independent owners, suppliers and operators of gasoline stations and convenience stores.[128]

Why was the company not included?
This company is one of the largest distributors of gasoline, distillates, residual oil and renewable fuels to wholesalers, retailers, and commercial customers in New England and New York. This type of business segment is different than the business segments of the companies for which the State Assessed Section is responsible for valuing.

Green Plains Partners, L.P.

Company Summary from Value Line:
Green Plains Partners L.P. provides fee-based fuel storage and transportation services by owning, operating, developing and acquiring ethanol and fuel storage tanks, terminals, transportation assets, and other related assets and businesses. The company was formed by Green Plains, Inc., a vertically integrated ethanol producer, to support its marketing and distribution activities as its primary downstream logistics provider. The company generates a substantial portion of its revenues under fee-based commercial agreements with Green Plains Trade for receiving, storing, transferring and transporting ethanol and other fuels, which are supported by minimum volume or take-orpay capacity commitments. Green Plains owns 38 ethanol storage facilities at or near 17 ethanol production plants in

[127] http://genesisenergy.com/about/, accessed 12/11/2017

[128] http://www.globalp.com/, accessed 12/11/2017

Indiana, Illinois, Iowa, Michigan, Minnesota, Nebraska, Tennessee, Texas, and Virginia, and which have a current combined ethanol production capacity of roughly 1.5 billion gallons annually.

Additional Company Information from Website:
Green Plains Partners LP is a fee-based, limited partnership formed by our parent, Green Plains Inc., to provide ethanol and fuel storage, terminal and transportation services by owning, operating, developing and acquiring ethanol and fuel storage tanks, terminals, transportation assets and other related assets and businesses.[129]

Our transportation assets include a leased railcar fleet of approximately 2,700 railcars with an aggregate capacity of 81.0 million gallons that is dedicated to transporting products under commercial agreements with our parent, including ethanol and other fuels, from our fuel terminal facilities or third-party production facilities to refineries throughout the United States and international export terminals.[130]

Why was the company not included?
This company's main operating segments are ethanol storage, fuel terminals, and transportation. The transportation segment includes railcars. This is not similar to the transportation companies that the State Assessed Section is responsible for valuing.

JP Energy Partners, L.P.
Company Summary from Value Line:
Not available. Company is not publically traded.

Additional Company Information from Website:
HOUSTON--(BUSINESS WIRE)-- American Midstream Partners, LP (NYSE:AMID) ("American Midstream" or "Partnership") and JP Energy Partners LP (NYSE: JPEP) ("JP Energy") today [March 8, 2017] announced the successful completion of the previously announced merger.[131]

Why was the company not included?
Company is no longer publically traded.

Martin Midstream Partners, L.P.
Company Summary from Value Line:
Martin Midstream Partners, L.P. is a publicly traded limited partnership with a diverse set of operations focused primarily in the US Gulf Coast region. Its four primary business lines include: natural gas services, including liquids transportation and distribution services and natural gas storage; terminalling and storage services for petroleum products and by-products, including the refining of naphthenic crude oil, blending and packaging of finished lubricants; sulfur and sulfur-based products processing, manufacturing, marketing and distribution; and marine transportation services for petroleum products and byproducts. In October 2017, West Texas LPG Pipeline Limited Partnership joint venture (of which Martin Midstream owns a 20% interest with ONEOK, Inc. owning and operating the other 80% interest) plans to invest approximately $200 million to expand its natural gas liquids (NGL) system into the prolific Delaware Basin in service by the third quarter 2018.

Additional Company Information from Website:
Martin Midstream Partners L.P. is a publicly traded limited partnership with a diverse set of operations focused primarily in the United States Gulf Coast region. Our four primary business lines

[129] http://www.greenplainspartners.com/, accessed 12/11/2017

[130] http://www.greenplainspartners.com/operations/transportation-assets/, accessed 12/11/2017

[131] http://www.americanmidstream.com/investor-relations/press-releases/press-release-details/2017/American-Midstream-Partners-Announces-Successful-Completion-of-Merger-with-JP-Energy-Partners/default.aspx, accessed 12/11/2017

include:Terminalling, storage and packaging services for petroleum products and by-products including refining, blending and packaging of finished lubricants; Natural gas liquids transportation and distribution services and natural gas storage; Sulfur and sulfur-based products gathering, processing, manufacturing, marketing and distribution including fertilizer manufacturing and distribution; and Marine transportation services for petroleum products and by-products. The petroleum products and by-products we collect, transport, store and distribute are produced primarily by the independent oil and gas companies who often turn to third parties, such as us, for the transportation and disposition of these products. In addition to these major and independent oil and gas companies, our primary customers include independent refiners, large chemical companies, fertilizer manufacturers and other wholesale purchasers of these products. We operate primarily in the Gulf Coast region of the U.S., which is a major hub for petroleum refining, natural gas gathering and processing and support services for the exploration and production industry. Our diversified asset base enables us to offer our customers an integrated distribution network consisting of transportation terminalling, distribution and midstream logistical services.[132]

Why was the company not included?
This company is mainly located in the Gulf Coast. The Gulf Coast is a different market than the market of the companies for which the State Assessed Section is responsible for valuing.

Midcoast Energy Partners, L.P.

Company Summary from Value Line:
Not available. Company is not publically traded.

Additional Company Information from Website:
As of June 28, 2017, Enbridge Inc. closed the transaction to acquire 100% of Midcoast Energy Partners from Enbridge Energy Partners, L.P. On April 27, 2017, MEP was privatized under Enbridge Inc. with the purchase of all outstanding publicly-traded units.[133]

Why was the company not included?
Company is no longer publically traded.

MPLX, L.P.

Company Summary from Value Line:
MPLX, LP is a diversified, growth-oriented master limited partnership (MLP) formed in 2012 by Marathon Petroleum Corporation to own, operate, develop and acquire midstream energy infrastructure assets. It is engaged in the gathering, processing, storage marketing, and transportation of natural gas, crude oil, and other refined petroleum products. MPLX's assets consist of a network of common carrier crude oil and products pipelines located in the Midwest and Gulf Coast regions of the US. Has no direct employees. Officers/directors own less than 1.0% of common units (12/16 10-k).

Additional Company Information from Website:
MPLX LP (MPLX) is a diversified, growth-oriented master limited partnership formed in 2012 by Marathon Petroleum Corporation to own, operate, develop and acquire midstream energy infrastructure assets. MPLX provides services in the midstream sector across the hydrocarbon value chain through the Logistics and Storage and Gathering and Processing segments. MPLX transports and stores crude oil, refined products and other hydrocarbon based products, primarily in the Midwest and Gulf Coast regions of the U.S. Assets consist of a network of crude oil and refined product pipeline systems, associated storage assets and an inland marine business. MPLX owns, leases, operates or has interest in

[132] http://www.martinmidstream.com/about-us, accessed 12/12/2017
[133] http://www.midcoastpartners.com/, accessed 12/12/2017

3,500 miles of crude oil pipelines and 2,400 miles of light product pipelines. MPLX also has 59 owned and operated, one leased and two partially owned light product terminals, butane and NGL storage caverns, an inland marine business, crude oil and product storage facilities (tank farms) and a barge dock facility. MPLX's marine transportation operations include 18 owned towboats as well as more than 200 owned and leased barges that transport refined products and crude oil on the Ohio, Mississippi and Illinois rivers and their tributaries and inter-coastal waterways. MPLX operates several natural gas gathering systems in six states. The scope of gathering services provided depends on the composition of the raw or untreated gas at producer customers' wellheads. MPLX's natural gas processing complexes remove the heavier and more valuable hydrocarbon components from natural gas. MPLX currently operates natural gas processing complexes in the Marcellus shale, Utica shale, Appalachia region, and Southwest region. Once natural gas has been processed at a natural gas processing complex, the heavier and more valuable hydrocarbon components, which have been extracted as a mixed natural gas liquid (NGL) stream, can be further separated into their component parts through the process of fractionation. Our NGL fractionation facilities separate the mixture of extracted NGLs into individual purity product components for end-use sale. Assets include approximately 5.9 billion cubic feet per day of gathering capacity, 7.8 billion cubic feet per day of natural gas processing capacity and 570,000 barrels per day of fractionation capacity.[134]

Why was the company not included?
This company has some common carrier pipelines that transport crude oil and refined products in the midwest. However, the company also has extensive natural gas gathering systems in six states. This company also engages in the marketing of natural gas liquids.

Noble Midstream Partners, L.P.

Company Summary from Value Line:
Noble Midstream Partners, LP is a growth oriented Delaware master limited partnership formed in December 2014 by Noble Energy, Inc. to own, operate, develop, and acquire a wide range of domestic midstream infrastructure assets. It provides crude oil, natural gas, and water-related midstream services through long-term, fixed fee contracts. The company's current focus areas are in the Denver-Julesburg (DJ) Basin in Colorado and the Southern Delaware Basin position of the Permian Basin (Delaware Basin) in Texas. It also serves as the operator of the Advantage system, which includes a 70 -mile crude oil pipeline in the southern Delaware Basin from Reeves County, TX to Crane County, TX, with 150,000 barrels of daily shipping capacity and 490,000 barrels of storage capacity. In November 2017, Noble Energy signed an agreement with SRC Energy Inc. to divest about 30,200 net acres from the company's non-core DJ Basin position in Weld County, CO in the transaction valued at $608 million. Has 90 employees.

Additional Company Information from Website:
Noble Midstream Partners is a growth-oriented master limited partnership formed by Noble Energy to own, operate, develop and acquire midstream infrastructure assets. Our assets reside in two of the most resilient oil basins in the United States: the DJ Basin in Colorado and the Delaware Basin in Texas. In these areas, we provide crude oil, natural gas and water-related midstream services for Noble Energy and third parties. In the Denver-Julesburg Basin (DJ Basin) in Colorado, we have acreage dedications spanning approximately 300,000 acres (235,000 dedicated acres from Noble and 65,000 from a third party). We have approximately 111,000 dedicated acres in Reeves County in the Delaware Basin where we will provide crude oil, natural gas and water-related midstream services under long-term, fixed fee contracts. In addition to these existing operations and acreage dedications, Noble Energy has granted us rights of first refusal (ROFR) on a combination of midstream assets. Retained assets include natural gas gathering and processing facilities serving the East Pony area in the DJ Basin and approximately 31,000 acres in Webb and Dimmit Counties in the Eagle Ford Shale area of South Texas. Noble Midstream Partners owns and operates the Advantage

[134] http://www.mplx.com/About_MPLX/, accessed 12/12/2017

Pipeline, a 16-inch common carrier crude oil pipeline serving the southern Delaware Basin (assets owned by joint venture with Plains All American Pipeline).[135]

Why was the company not included?
The main assets owned by this company are related to gathering, oil treating, terminals, and storage. A main business segment of the companies the State Assessed Section is responsible for valuing is fluid transportation pipeline services or gas transmission pipeline services.

NuStar GP Holdings, LLC

Company Summary from Value Line:
NuStar GP Holdings, LLC is a publicly traded limited liability company. It has no operations or sources of income or cash flows other than its investment in NuStar Energy L.P., a publicly held Delaware limited partnership engaged in the transportation of petroleum products and anhydrous ammonia, the terminalling, storage, and marketing of petroleum products. NuStar Energy has pipelines in the US, as well as terminal and storage facilities in the US, Canada, Mexico, the Netherlands, including St. Eustatius in the Caribbean, and the United Kingdom. As of September 30, 2017, the company had an approximate 13% ownership in NuStar Energy, consisting of the general partner interest; 100% of the incentive distribution rights issued by NuStar Energy, which entitle it to receive increasing percentages of the cash distributed by NuStar Energy, currently at the maximum percentage of 23% ; and 100,214,626 common units of NuStar Energy.

Additional Company Information from Website:
NuStar GP Holdings, LLC owns general partner and limited partner interests in NuStar Energy L.P. that engages in the transportation of petroleum products and anhydrous ammonia, the terminalling and storage of petroleum products and the marketing of petroleum products. It holds a 2% general partner interest, 13.0% limited partner interest, and 100% of the incentive distribution rights in NuStar Energy L.P. The company, through NuStar Energy L.P., has interests in 79 terminal and storage facilities with approximately 93 million barrels of storage capacity; and approximately 8,700 miles of crude oil and refined product pipelines. The company has operations in the United States; Canada; Mexico; the Netherlands, including St. Eustatius in the Caribbean; and the United Kingdom. NuStar GP Holdings, LLC was founded in 2000 and is based in San Antonio, Texas.[136]

Why was the company not included?
This company was not included because we use (or would use) NuStar Energy L.P.

ONEOK, Inc.

Company Summary from Value Line:
ONEOK, Inc. is the sole general partner and owner of ONEOK Partners. ONEOK Partners gathers, processes, fractionates, transports, stores, markets, and distributes natural gas and natural gas liquids. ONEOK has three operating segments: natural gas liquids, natural gas gathering and processing, and natural gas pipelines. Completed separation of natural gas distribution business in February of 2014. Has 2,384 employees. BlackRock, Inc. owns 10.9% of common stock; The Vanguard Group, Inc., 10.6%; off. and dir., less than 1.0% (4/17 Proxy).

Additional Company Information from Website:
ONEOK, Inc. (pronounced ONE-OAK) (NYSE: OKE) is one of the largest energy midstream service providers in the U.S., connecting prolific supply basins with key market centers. It owns and operates one of the nation's premier natural gas liquids (NGL) systems and is a leader in the gathering, processing, storage and transportation of natural gas. ONEOK's operations include a 38,000-mile

[135] http://www.nblmidstream.com/about-us/, accessed 12/12/2017

[136] http://www.nustargpholdings.com/phoenix.zhtml?c=197894&p=irol-default, accessed 12/12/2017

integrated network of NGL and natural gas pipelines, processing plants, fractionators and storage facilities in the Mid-Continent, Williston, Permian and Rocky Mountain regions. ONEOK is a FORTUNE 500 company and is included in Standard & Poor's (S&P) 500 index.[137]

TULSA, Okla., June 30, 2017 /PRNewswire/ -- ONEOK, Inc. (NYSE: OKE) today announced that it has closed the acquisition of all outstanding common units of ONEOK Partners, L.P. (NYSE: OKS) it did not previously own, and the merger of ONEOK Partners with a subsidiary of ONEOK will be effective at the end of today. As a result of the acquisition, ONEOK Partners common units will no longer be publicly traded on the New York Stock Exchange.[138]

Why was the company not included?
This company was not included because of the acquisition of ONEOK Partners, L.P.

ONEOK Partners, L.P.

Company Summary from Value Line:
Not available. Company is not publically traded.

Additional Company Information from Website:
TULSA, Okla., June 30, 2017 /PRNewswire/ -- ONEOK, Inc. (NYSE: OKE) today announced that it has closed the acquisition of all outstanding common units of ONEOK Partners, L.P. (NYSE: OKS) it did not previously own, and the merger of ONEOK Partners with a subsidiary of ONEOK will be effective at the end of today. As a result of the acquisition, ONEOK Partners common units will no longer be publicly traded on the New York Stock Exchange.[139]

Why was the company not included?
Company is no longer publically traded.

PBF Logistics, L.P.

Company Summary from Value Line:
PBF Logistics, LP is a fee-based, growth oriented master limited partnership formed by PBF Energy, Inc. to own or lease, operate, develop and acquire crude oil and refined petroleum products terminals, pipelines, storage facilities, and similar logistics assets. The company operates in two segments: Transportation and Terminaling, and Storage. The transportation and terminaling segment consists of the DCR Rail Terminal, which serves PBF Holding's Delaware City and Paulsboro refineries; the DCR West Rack, which serves PBF Holding's Delaware City refinery; the Toledo Truck Terminal, which serves PBF Holding's Toledo refinery, comprised of LACT units; a propane truck loading facility, located within the Toledo Storage Facility; the Delaware City Products Pipeline; and the Delaware City Truck Rack, which consists of a truck loading rack utilized to distribute gasoline. The storage segment consists of the Toledo Storage Facility.

Additional Company Information from Website:
PBF Logistics LP, headquartered in Parsippany, New Jersey, is a fee-based, growth-oriented master limited partnership formed by PBF Energy to own or lease, operate, develop and acquire crude oil and refined petroleum products, terminals, pipelines, storage facilities and similar logistics assets.[140]

[137] http://www.oneok.com/, accessed 12/12/2017

[138] http://ir.oneok.com/news-and-events/press-releases/2017/06-30-2017-211557242, accessed 12/12/2017

[139] http://ir.oneok.com/news-and-events/press-releases/2017/06-30-2017-211557242, accessed 12/12/2017

[140] http://www.pbflogistics.com/, accessed 12/12/2017

Why was the company not included?
This company's market segments are terminaling and storage. A main business segment of the companies the State Assessed Section is responsible for valuing is fluid transportation pipeline services or gas transmission pipeline services.

Pembina Pipeline Corporation

Company Summary from Value Line:
Pembina Pipeline Corp. gathers, processes, and transports oil and natural gas in Western Canada. It owns and operates an integrated system of pipelines, gas gathering and processing facilities, and an oil and NGL infrastructure and logistics line. 2016 net revenues (operating income): Conventional Pipelines: 16% (37%); Oil Sands & Heavy Oil: 5% (11%); Midstream: 73% (37%); Gas Services: 6% (15%). Daily 2016 liquids throughput: 1.72 mill. barrels; Oil Sands & Heavy Oil, 51%; Conventional Pipelines, 36%; Midstream NGLs, 7%; Gas Services, 6%. Acq'd Provident Energy, 4/12. Has 1,111 employees.

Additional Company Information from Website:
Pembina Pipeline Corporation is a reliable energy transportation and service provider and a trusted member of the community. We are Calgary-based, and own and operate pipelines that transport conventional and synthetic crude oil and natural gas liquids produced in western Canada; oil sands and heavy oil pipelines; gas gathering and processing facilities; and, an oil and natural gas liquids infrastructure and logistics business. With facilities strategically located in western Canada and in natural gas liquids markets in eastern Canada and the U.S., Pembina also offers a full spectrum of midstream and marketing services that span across our operations. Our integrated assets and commercial operations enable us to offer services needed by the energy sector along the hydrocarbon value chain.[141]

Why was the company not included?
This company is not traded on an American Stock Exchange.

Phillips 66 Partners, L.P.

Company Summary from Value Line:
Phillips 66 Partners LP is engaged in the ownership, operation, development, and acquisition of crude oil, refined petroleum, and natural gas liquids pipelines and terminals. As of 12/31/16, its assets included more than 2,000 miles of pipelines with a gross capacity of approximately 2,040 million barrels per day (MBD). It also owns more than 25 terminals and other storage assets. Phillips 66 Partners LP is managed by the executives of its general partners, Phillips 66 Partners GP LLC.

Additional Company Information from Website:
HOUSTON--(BUSINESS WIRE)-- Phillips 66 Partners LP (NYSE: PSXP) (the "Partnership") has reached agreement with Phillips 66 (NYSE: PSX) to acquire its 25 percent interest in each of Dakota Access, LLC and Energy Transfer Crude Oil Company, LLC (collectively, the "Bakken Pipeline") and 100 percent interest in Merey Sweeny, L.P. ("MSLP"), the owner of fuel-grade coke processing units at the Phillips 66 Sweeny Refinery. The acquisition is expected to be immediately accretive to the Partnership and its unitholders and is anticipated to close in early October 2017. The total transaction value of $2.4 billion includes $625 million in proportional non-consolidated, non-recourse Bakken Pipeline debt and $100 million of MSLP debt. The value reflects an approximate 8.9 times multiple, based on the acquired assets' forecasted full year 2018 adjusted earnings before interest, taxes, depreciation and amortization (EBITDA) of approximately $270 million. In connection with the MSLP

[141] http://www.pembina.com/, accessed 12/12/2017

acquisition, Phillips 66 Partners will enter into a new 15-year tolling agreement that includes a base throughput fee and minimum volume commitment from Phillips 66. [142]

Phillips 66 Partners (NYSE: PSXP) began trading on the New York Stock Exchange on July 23, 2013. Headquartered in Houston, Texas, Phillips 66 Partners is a growth-oriented, traditional master limited partnership formed by Phillips 66 to own, operate, develop and acquire primarily fee-based crude oil, refined petroleum product and natural gas liquids ("NGL") pipelines and terminals and other transportation and midstream assets.[143]

Why was the company not included?
This company began trading publicly on July 23, 2013. The 2018 calendar year will be the fifth full year of financial information, consider for the 2019 Capitalization Rate Study. Also, the company recently reached and agreement to acquire 25% interest in Dakota Access, LLC and Energy Transfer Crude Oil Company, LLC and 100% in Merey Sweeney, L.P.

Plains GP Holdings, L.P.

Company Summary from Value Line:
Plains GP Holdings, L.P. is a publicly traded entity that owns an indirect, non-economic controlling general partner interest in Plains All American Pipeline, L.P. (PAA) and an indirect limited partner interest in PAA. PAA, is a publicly traded master limited partnership that owns and operates midstream energy infrastructure and provides logistics services for crude oil, natural gas liquids (NGL), natural gas, and refined products. PAA owns an extensive network of pipeline transportation, terminalling, storage and gathering assets in key crude oil and NGL producing basins, and transportation corridors and at major market hubs in the US And Canada. On average, PAA handles over five million barrels per day of crude oil and NGL in its transportation segment.

Additional Company Information from Website:
Plains GP Holdings, L.P. ("PAGP") is a Delaware limited partnership formed in July 2013 that has elected to be taxed as a corporation for United States federal income tax purposes. PAGP does not directly own any operating assets; as of December 31, 2016, its principal sources of cash flow are derived from its indirect investment in Plains All American Pipeline, L.P ("PAA"), a publicly traded Delaware limited partnership.[144]

Why was the company not included?
This company was not included because we used Plains All American Pipeline, L.P.

Rice Midstream Partners, L.P.

Company Summary from Value Line:
Rice Midstream Partners, LP, growth oriented limited partnership formed by Rice Energy, owns, operates, develops and acquires midstream assets in the Appalachian Basin. The company operates in two business segments, which are managed separately due to their distinct operational differences: gathering and compression and water services. The natural gas gathering and compression assets consist of natural gas gathering and compression systems that service high quality producers in the rapidly developing dry gas core of the Marcellus Shale in southwestern Pennsylvania. The water services assets consist of water pipelines, impoundment facilities pumping stations, take point facilities and measurement facilities which are used to support well completion activities and to collect and recycle or

[142] http://unitholder.phillips66partners.com/financial-information/news-releases/news-release-details/2017/Phillips-66-Partners-Announces-24-Billion-Acquisition/default.aspx, accessed 12/12/2017

[143] http://www.phillips66partners.com/, accessed 12/12/2017

[144] http://www.edgarexplorer.com/EFX_dll/EdgarPro.dll?FetchFilingConvPDF1?SessionID=FS0sqyvAnOPqo-9&ID=11876657, accessed 12/12/2017

dispose of flowback and produced water for Rice Energy and third parties in Washington and Greene counties, Pennsylvania and Belmont County, Ohio.

Additional Company Information from Website:
Rice Midstream Partners is set up for success through owning, operating, developing and acquiring midstream assets in the prolific Appalachian Basin. Our anchoring relationship with Rice Energy; our strong portfolio of strategically located assets; our flexibility to deliver our customers' gas to premium markets; and our visible growth opportunities position us to become a leading midstream energy company in the Appalachian Basin.[145]

Our natural gas gathering and compression assets consist of natural gas gathering and compression systems that service high quality producers in the dry gas core of the Marcellus Shale in southwestern Pennsylvania. Our water services assets consist of water pipelines, impoundment facilities, pumping stations, take point facilities and measurement facilities, which are used to support well completion activities and to collect and recycle or dispose of flowback and produced water for EQT Corporation (NYSE: EQT) and third parties in Washington and Greene Counties, Pennsylvania and Belmont County, Ohio. We provide our services under long-term, fee-based contracts, primarily to EQT.[146]

Why was the company not included?
This company's main operations are gas gathering and compression and water services. A main business segment of the companies the State Assessed Section is responsible for valuing is fluid transportation pipeline services or gas transmission pipeline services.

Shell Midstream Partners, L.P.

Company Summary from Value Line:
Shell Midstream Partners, L.P. is a fee-based, growth-oriented master limited partnership formed by Royal Dutch Shell plc to own, operate, develop, and acquire pipelines and other midstream assets. Its assets consist of interests in entities that own crude oil and refined products pipelines serving as key infrastructure to transport onshore and offshore crude oil production to Gulf Coast and Midwest refining markets and to deliver refined products from those markets to major demand centers, as well as interests in entities that own natural gas and refinery gas pipelines which transport offshore natural gas to market hubs and deliver refinery gas from refineries and plants to chemical sites along the Gulf Coast. As of September 30, 2017, it owns interests in nine crude oil pipeline systems, three refined products systems, one natural gas gathering pipeline system, one gas pipeline system, and a crude tank storage and terminal system. In September 2017, Shell Midstream agreed to sell 10,370,000 units for $275 million.

Additional Company Information from Website:
We are a fee-based, growth-oriented master limited partnership recently formed by Shell to own, operate, develop and acquire pipelines and other midstream assets. Our assets consist of pipelines, crude tank storage and terminal systems that serve as key infrastructure to transport and store onshore and offshore crude oil production to Gulf Coast and Midwest refining markets and to deliver refined products from Gulf Coast markets to major demand centers.[147]

Houston, May 05, 2017 (GLOBE NEWSWIRE) -- Shell Midstream Partners, L.P. (NYSE: SHLX) entered into a purchase and sale agreement to acquire a 100% interest in the Refinery Gas Pipelines, Delta Pipeline and Na Kika Pipeline for $630 million from wholly owned subsidiaries of Shell. The acquisition price reflects an approximate 8.4 times multiple of the assets' forecasted next twelve months adjusted earnings before interest, taxes, depreciation and amortization and is expected to be immediately

[145] http://www.ricemidstream.com/Home/default.aspx, accessed 12/12/2017

[146] http://www.ricemidstream.com/operations/default.aspx, accessed 12/12/2017

[147] http://www.shellmidstreampartners.com/, accessed 12/12/2017

accretive to unitholders. Shell Midstream Partners intends to fund the acquisition with a combination of borrowings under existing credit facilities and cash on hand. The acquisition is expected to close on or around May 10, 2017, subject to customary closing conditions.[148]

Why was the company not included?
This company is mainly services the Gulf Coast (including offshore assets), the Gulf Coast to New York City, and the Gulf Coast to the Midwest. The Explorer pipeline system from the Gulf Coast to the Midwest transports gasoline, diesel, fuel oil, and jet fuel from the US Gulf Coast to Hammon, IL. The Explorer pipeline system is the company's only asset that is similar to the companies the State Assessed Property Section is responsible for valuing. The Explorer pipeline system is not a large enough portion of the company's overall business segments (Shell Midstream Partners, L.P. only owns 2.62% ownership interest in Explorer). Also, this company was formed on March 19, 2014.

Southcross Energy Partners, L.P.

Company Summary from Value Line:
In November 2017, American Midstream Partners, LP (AMID) signed an agreement to acquire certain assets of Southcross Holdings, LP, and proposed to merge Southcross Energy Partners, L.P. (SXE) into a wholly owned subsidiary of AMID in two separate transactions valued at approximately $815 million. As a result of the transactions, the pro forma partnership with an enterprise value of $3 billion is expected to generate annualized 2018 Adjusted EBITDA in excess of $300 million. Due to this news, the company's ranks were suspended. Southcross Energy Partners, L.P. provides natural gas gathering, processing, treating, compression and transportation services and NGL fractionation and transportation services. It also sources, purchases, transports, and sells natural gas and NGL. Its assets are located in Alabama, Mississippi, and South Texas, and include two gas processing plants, one fractionation plant, and roughly 3,100 miles of pipeline.

Additional Company Information from Website:
Southcross Energy Partners, L.P. ("Southcross") is a master limited partnership that provides natural gas gathering, processing, treating, compression and transportation services and NGL fractionation and transportation services. It also sources, purchases, transports and sells natural gas and NGLs. Its assets are located in South Texas, Mississippi and Alabama and include two cryogenic gas processing plants, a fractionation facility and approximately 3,100 miles of pipeline. The South Texas assets are located in or near the Eagle Ford shale region. Southcross is headquartered in Dallas, Texas.[149]

HOUSTON--(BUSINESS WIRE)-- American Midstream Partners, LP (NYSE: AMID) ("AMID" or "American Midstream") announced today [November 1, 2017] that it has signed an agreement to acquire certain assets of Southcross Holdings, LP ("Southcross Holdings"), and has proposed to merge Southcross Energy Partners, L.P. (NYSE: SXE) ("SXE" or "Southcross Energy") (collectively, with Southcross Holdings referred to as "Southcross") into a wholly owned subsidiary of AMID in two separate transactions valued at approximately $815 million, including the repayment of net debt. As a result of the transactions, the pro forma partnership with an enterprise value of $3 billion is expected to generate annualized 2018 Adjusted EBITDA in excess of $300 million.[150]

[148] http://www.shellmidstreampartners.com/releasedetail.cfm?releaseid=1025062, accessed 12/12/2017

[149] http://www.southcrossenergy.com/about/, accessed 12/12/2017

[150] http://www.americanmidstream.com/investor-relations/press-releases/press-release-details/2017/American-Midstream-Partners-to-Acquire-Southcross-Energy-Partners-and-Certain-Assets-of-Southcross-Holdings-Forming-3-Billion-Partnership/default.aspx/, accessed 12/12/2017

Why was the company not included?
This company is located in Texas, Mississippi, and Alabama. Those locations are in a different market than the market of the companies for which the State Assessed Section is responsible for valuing.

Spectra Energy Corporation

Company Summary from Value Line:
Not available. Company is not publically traded.

Additional Company Information from Website:
CALGARY, ALBERTA--(Marketwired - Feb. 27, 2017) - Enbridge Inc. (TSX:ENB)(NYSE:ENB) (Enbridge) announced the completion today of the previously announced stock-for-stock merger transaction (the Transaction) to acquire all of the outstanding common stock of Spectra Energy Corp (NYSE:SE) (Spectra Energy).[151]

Why was the company not included?
Company is no longer publically traded.

Spectra Energy Partners, L.P.

Company Summary from Value Line:
Spectra Energy Partners, L.P., through its subsidiaries and equity affiliates, is engaged in the transmission, storage and gathering of natural gas, the transportation and storage of crude oil, and the transportation of natural gas liquids (NGLs) through interstate pipeline systems. Spectra's operations in the United States and Canada include more than 21,000 miles of natural gas, NGLs, and crude oil pipelines; roughly 300 Bcf of natural gas storage; and 4.8 million barrels of crude oil storage. Has 2,500 employees. Officers/ directors own about 2.8% of common units. ('16 10-k).

Additional Company Information from Website:
Spectra Energy Partners, LP (NYSE: SEP), an Enbridge company, is a Houston-based master limited partnership. Spectra Energy Partners is one of the largest MLPs in the United States and owns interests in pipeline and storage facilities that connect growing supply areas to high-demand markets for natural gas and crude oil. These assets include more than 15,000 miles of transmission pipelines, 170 billion cubic feet of natural gas storage and approximately 5.6 million barrels of crude oil storage. Our natural gas storage and transportation assets generate steady cash flows, primarily backed by long-term contracts. Our crude oil pipelines have annual rate escalators that further enhance our favorable cash generation profile. All of our business is fee-based, and more than 90 percent of our assets' revenues come from fees that reserve capacity on our pipelines and in our storage facilities. This profile supports steady cash flows and minimizes our exposure to commodity price swings. Spectra Energy Partners assets reach across the U.S. to virtually all major supply basins and link us to key growth markets. Our ability to deliver growth and investor value is anchored by our quality assets, record of operational excellence, strong balance sheet and ample liquidity.[152]

CALGARY, ALBERTA--(Marketwired - Feb. 27, 2017) - Enbridge Inc. (TSX:ENB)(NYSE:ENB) (Enbridge) announced the completion today of the previously announced stock-for-stock merger transaction (the Transaction) to acquire all of the outstanding common stock of Spectra Energy Corp (NYSE:SE) (Spectra Energy).[153]

Spectra Energy Corp and Enbridge Inc. will combine to create North America's largest energy infrastructure company. This transaction creates the largest energy infrastructure company in North

[151] https://www.enbridge.com/media-center/news/details?id=2126823&lang=en&year=2017, accessed 12/7/2017
[152] http://www.spectraenergypartners.com/, accessed 12/12/2017
[153] https://www.enbridge.com/media-center/news/details?id=2126823&lang=en&year=2017, accessed 12/7/2017

America with an enterprise value of approximately C$165 billion (US$127 billion), a C$74 billion (US$57 billion) inventory of current and potential growth projects and anticipated annual dividend growth of 10-12 percent through 2024. The combined company will be exceedingly well positioned to invest in critical infrastructure to meet the needs of our customers and create value for our shareholders.[154]

Why was the company not included?
This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing. The company engages in the transportation, gathering, and storage of natural gas. However, the Spectra Energy Partners, L.P.'s general partner, Spectra Energy Corp, recently completed a merger with Enbridge, Inc., which could affect the financial information for the current year for all companies involved.

Sprague Resources, L.P.

Company Summary from Value Line:
Sprague Resources, LP is a Delaware limited partnership formed in June 2011 by Sprague Holdings and its general partner (Sprague Resources GP LLC) to engages in the purchase, storage, distribution, and sale of refined products and natural gas, and to provide storage and handling services for a broad range of materials. The company owns, operates and/or controls a network of refined products and materials handling terminals strategically located throughout the northeast US and in Quebec, Canada that have a combined storage capacity of 14.8 million barrels for refined products and other liquid materials, as well as 2.0 million square feet of materials handling capacity. In October 2017, Sprague's subsidiary, Sprague Operating Resources, LLC, purchased the membership interests of Coen Energy, LLC and Coen Transport, LLC, as well as assets consisting of four bulk plants and underlying real estate. Has about 600 employees.

Additional Company Information from Website:
We are a Delaware limited partnership formed in June 2011 by Sprague Holdings and our General Partner to engage in the purchase, storage, distribution and sale of refined products and natural gas, and to provide storage and handling services for a broad range of materials. We are one of the largest independent wholesale distributors of refined products in the Northeast United States based on aggregate terminal capacity. We own, operate and/or control a network of 19 refined products and materials handling terminals strategically located throughout the Northeast United States and in Quebec, Canada that have a combined storage capacity of 14.1 million barrels for refined products and other liquid materials, as well as 2.0 million square feet of materials handling capacity. We also have an aggregate of 2.1 million barrels of additional storage capacity attributable to 48 storage tanks not currently in service. These tanks are not necessary for the operation of our business at current levels. In the event that such additional capacity were desired, additional time and capital would be required to bring any of such storage tanks into service. Furthermore, we have access to approximately 60 third party terminals in the Northeast United States through which we sell or distribute refined products pursuant to rack, exchange and throughput agreements. We operate under four business segments: refined products, natural gas, materials handling and other operations.[155]

Why was the company not included?
This company purchases and sells various refined products and purchases, sells and distributes natural gas. The company also offloads, stores, and prepares for delivery of customer owned products. The

[154] http://www.spectraenergy.com/Transaction/, accessed 12/28/2016
[155] http://www.spragueenergy.com/investor-relations#tab5, 2016 10-K, accessed 12/12/2017

company engages in the marketing and distribution of coal. These specializations are not the same market segments as the companies in which the State Assessed Section is responsible for valuing.

Suburban Propane Partners, L.P.

Company Summary from Value Line:
Suburban Propane Partners, L.P., is a master limited partnership (MLP) that markets and distributes propane, fuel oil, and other refined fuels in the U.S., operating in Propane; Fuel Oil and Refined Fuels; Natural Gas and Electricity; and Heating, Ventilation, and Air Conditioning (HVAC). As of 9/24/16, serves about 1.1 million active propane customers through more than 675 locations in 41 states, concentrated on the east and west coasts of the United States. Sold approximately 415 million gallons of propane and 30.9 million gallons of fuel oil in fiscal 2016. Has 3,417 employees.

Additional Company Information from Website:
Headquartered in Whippany, New Jersey, Suburban Propane is a nationwide marketer and distributor of a diverse array of products to meet the energy needs of our customers. Specializing in propane, heating oil and refined fuels, as well as the marketing of natural gas and electricity in deregulated markets. With nearly 3,200 full-time employees, Suburban Propane maintains business operations in 41 states, providing prompt, reliable service to approximately 1.1 million residential, commercial, industrial and agricultural customers through 668 locations.[156]

Why was the company not included?
This company specializes in marketing and distributing fuel oil and refined fuels as well as the marketing of natural gas and electricity in deregulated markets. These specializations are not the same market segments as the companies in which the State Assessed Section is responsible for valuing.

Summit Midstream Partners, L.P.

Company Summary from Value Line:
Summit Midstream Partners, LP is focused on developing, owning, and operating midstream energy infrastructure assets. It provides natural gas, crude oil, and produced water gathering services under long-term and fee-based gathering and processing agreements with customers in five unconventional resource basins: Appalachian Basin (Marcellus and Utica shale formations in West Virginia and Ohio); Williston Basin (Bakken and Three Forks shale formations in North Dakota); Fort Worth Basin (Barnett Shale formation in Texas); Piceance Basin (Mesaverde formation and Mancos and Niobrara shale formations in Colorado and Utah); and Denver-Julesburg Basin (Niobrara and Codell shale formations in Colorado and Wyoming). In November 2017, Summit priced an underwritten public offering of 300,000 of its 9.50% series A fixed-to-floating rate cumulative redeemable perpetual preferred units representing limited partner interests in the partnership at $1,000 per unit.

Additional Company Information from Website:
Headquartered in The Woodlands, Texas, Summit Midstream Partners, LP (NYSE: SMLP) is a growth-oriented master limited partnership focused on developing, owning and operating midstream energy infrastructure assets that are strategically located in the core producing areas of unconventional resource basins, primarily shale formations, in the continental United States. We currently operate natural gas, crude oil and produced water gathering systems in five unconventional resource basins: the Appalachian Basin, which includes the Marcellus and Utica shale formations in West Virginia and Ohio; the Williston Basin in North Dakota, which includes the Bakken and Three Forks shale formations; the Fort Worth Basin in Texas, which includes the Barnett Shale formation; the Piceance Basin in Colorado and Utah, which includes the liquids-rich Mesaverde formation as well as the emerging Mancos and Niobrara Shale formations; and the Denver-Julesburg Basin, which includes the Niobrara and Codell

[156] https://suburbanpropane.com/about/about-suburban-propane.php, accessed 12/12/2017

shale formations in Colorado. Our systems and the basins they serve are as follows: the Mountaineer Midstream system, which serves the Appalachian Basin; the Bison Midstream system, which serves the Williston Basin; the Polar & Divide system, which serves the Williston Basin; the DFW Midstream system, which serves the Fort Worth Basin; the Grand River system, which serves the Piceance Basin; the Summit Utica system, which serves the Appalachian Basin; the Tioga Midstream system, which serves the Williston Basin; and the Niobrara G&P system, which serves the DJ Basin. SMLP also owns substantially all of a 40% ownership interest in Ohio Gathering, which is included in the Utica Shale segment. Ohio Gathering is developing natural gas gathering and condensate stabilization infrastructure in the Utica Shale in southeastern Ohio. We generate a substantial majority of our revenue under primarily long-term and fee-based gathering agreements with our customers. The majority of our gathering agreements are underpinned by areas of mutual interest ("AMIs") and minimum volume commitments ("MVCs"). Our AMIs provide that any production drilled by our customers within the AMIs will be shipped on our gathering systems. The MVCs are designed to ensure that we will generate a minimum amount of gathering revenue over the life of each respective gathering agreement. The fee-based nature of the majority of the gathering agreements enhances the stability of our cash flows and limits our direct commodity price exposure. Since our formation in 2009, our management team has established a track record of executing this growth strategy through the acquisition and subsequent development of DFW Midstream, Grand River, Bison Midstream, Polar & Divide, Mountaineer Midstream, Summit Utica, Tioga Midstream, and Niobrara G&P.[157]

Why was the company not included?
This company's main business segments are natural gas gathering, treating and compression services, which are not the same main business segments of the companies in which the State Assessed Section is responsible for valuing.

Sunoco Logistics Partners, L.P.

Company Summary from Value Line:
Not available. Company is not publically traded.

Additional Company Information from Website:
DALLAS & NEWTOWN SQUARE, Pa.--(BUSINESS WIRE)--Apr. 28, 2017-- Sunoco Logistics Partners L.P. (NYSE: SXL) ("SXL") and Energy Transfer Partners, L.P. (NYSE: ETP) ("ETP") today announced the completion of their previously announced merger of an indirect subsidiary of SXL, with and into ETP, with ETP surviving the merger as a wholly owned subsidiary of SXL.[158]

Why was the company not included?
Company is no longer publically traded.

Tallgrass Energy GP, L.P.

Company Summary from Value Line:
Tallgrass Energy GP, LP (TEGP) is a limited partnership that has elected to be treated as a corporation for US federal income tax purposes. TEGP owns a controlling membership interest in Tallgrass Equity, LLC through its role as the sole managing member. Tallgrass Equity, LLC owns, both directly and through its ownership of the general partner of Tallgrass Energy Partners, LP, (TEP), all of TEP's incentive distribution rights, 100 % of the general partner interest in TEP and 20,000,000 TEP common units. It provides natural gas transportation and storage services for customers in the Rocky Mountain and Midwest regions. It performs water business services in Colorado and Texas through BNN Water Solutions, LLC. Its operations are located in and provide services to certain main US hydrocarbon basins, including the Denver-Julesburg,

[157] http://www.summitmidstream.com/about, accessed 12/12/2017

[158] http://ir.energytransfer.com/phoenix.zhtml?c=106094&p=irol-newsArticle&ID=2267001, accessed 12/7/2017

Powder River, Wind River, Permian and Hugoton-Anadarko Basins and the Niobrara, Mississippi Lime, Eagle Ford, and Bakken shale formations.

Additional Company Information from Website:
Tallgrass Energy GP, LP (NYSE: TEGP) is a limited partnership that has elected to be treated as a corporation for U.S. federal income tax purposes. TEGP owns a controlling membership interest in Tallgrass Equity, LLC through its role as the sole managing member. Tallgrass Equity, LLC owns, both directly and through its ownership of the general partner of TEP, all of TEP's incentive distribution rights, 100 percent of the general partner interest in TEP and 20,000,000 TEP Common Units.[159]

Why was the company not included?
This company was not included because we would use Tallgrass Energy Partners, L.P.

Tallgrass Energy Partners, L.P.

Company Summary from Value Line:
Tallgrass Energy Partners, LP is a growth oriented limited partnership formed to own, operate, acquire, and develop midstream energy assets in North America. Its Natural Gas Transportation segment is engaged in the operation of FERC-regulated interstate natural gas pipelines and integrated natural gas storage facilities. The Crude Oil Transportation segment operates a FERC regulated crude oil pipeline system. The Gathering, Processing & Terminalling segment is engaged in operations of natural gas gathering, processing, treating, and fractionation facilities; crude oil gathering, storage, and terminalling facilities; the provision of water business services to the oil and gas exploration and production industry; and the transportation of NGLs. In September 2017, Tallgrass Energy Partners and its subsidiary, Tallgrass Energy Finance Corp., priced an offering of $500 million in aggregate principal amount of 5.50% senior unsecured notes due 2028 at price equal to 100% of par.

Additional Company Information from Website:
Tallgrass Energy Partners, LP (NYSE: TEP) is a publicly traded, growth-oriented limited partnership formed to own, operate, acquire and develop midstream energy assets in North America. We currently provide crude oil transportation to customers in Wyoming, Colorado, and the surrounding regions through Tallgrass Pony Express Pipeline, LLC, which owns a crude oil pipeline commencing in Guernsey, Wyoming and terminating in Cushing, Oklahoma that includes a lateral in Northeast Colorado that commences in Weld County, Colorado, and interconnects with the pipeline just east of Sterling, Colorado. We provide crude oil storage and terminalling services through Tallgrass Terminals, LLC, which owns and operates crude oil terminals near Sterling, Colorado and in Weld County, Colorado. Terminals also owns a 20% membership interest in Deeprock Development, LLC, which owns a crude oil terminal in Cushing, Oklahoma. We provide natural gas transportation and storage services for customers in the Rocky Mountain, Midwest and Appalachian regions of the United States through: (1) our 49.99% membership interest in Rockies Express Pipeline LLC, a Delaware limited liability company which owns the Rockies Express Pipeline, a FERC-regulated natural gas pipeline system extending from Opal, Wyoming and Meeker, Colorado to Clarington, Ohio, (2) the Tallgrass Interstate Gas Transmission system, a FERC-regulated natural gas transportation and storage system located in Colorado, Kansas, Missouri, Nebraska and Wyoming, and (3) the Trailblazer Pipeline system, a FERC-regulated natural gas pipeline system extending from the Colorado and Wyoming border to Beatrice, Nebraska. We also provide services for customers in Wyoming at the Casper and Douglas natural gas processing facilities and the West Frenchie Draw natural gas treating facility, and NGL transportation services in Northeast Colorado. We also provide gathering services for natural gas flowing into the Douglas processing facility. We perform water business services in Colorado and Texas through BNN Water Solutions, LLC. Our operations are strategically located in and provide services to

[159] http://ir-tep.tallgrassenergylp.com/, accessed 12/12/2017

certain key United States hydrocarbon basins, including the Denver-Julesburg, Powder River, Wind River, Permian and Hugoton-Anadarko Basins and the Niobrara, Mississippi Lime, Eagle Ford, Bakken, Marcellus and Utica shale formations.[160]

Why was the company not included?
This company was formed in 2013. Consider using when there are five full years of financials.

TransCanada Corporation

Company Summary from Value Line:
TransCanada Corp. operates the most extensive natural gas pipeline system in Canada, transporting natural gas from the Alberta border to Ontario, Quebec, and the U.S. with more than 91,500 mi. of natural gas pipelines, and 2,700 mi. of liquids pipeline (Keystone). Its three major segments are natural gas pipelines (53% of ’16 rev.), oil pipelines (14%), and energy (33%). It has interests in 10,700 mw of power generation assets, and has 653 bill. Bcf of regulated/nonregulated gas storage. Acq. ANR 2/07. Has more than 7,165 employees.

Additional Company Information from Website:
With one of North America’s largest energy infrastructure portfolios, no one powers day-to-day life like TransCanada. We share technical, stakeholder and operating expertise across all of our operations. Natural Gas: Safe operation of 91,500 km (56,900 miles) of pipeline & 653 billion ft3 of natural gas storage. Oil & Liquids: Safe operation of approximately 4,800 km (3,000 miles) of pipeline. Power: Approximately 6,200 megawatts of capacity – enough to power more than six million homes.[161]

Why was the company not included?
This company was not included because we use TC PipeLines, L.P.

TransMontaigne Partners, L.P.

Company Summary from Value Line:
TransMontaigne Partners, LP is a terminaling and transportation company based in Denver, Colorado with operations in the US along the Gulf Coast, in the Midwest, in Houston and Brownsville, Texas, along the Mississippi and Ohio Rivers, and in the Southeast. It provides integrated terminaling, storage, transportation, and related services for customers engaged in the distribution and marketing of light refined petroleum products, heavy refined petroleum products, crude oil, chemicals, fertilizers, and other liquid products. In November 2017, one of TransMontaigne’s wholly owned subsidiaries agreed to acquire the Martinez Terminal and Richmond Terminal (West Coast Facilities) from an affiliate of Plains All American Pipeline, L.P., for $275 million. Also, TransMontaigne commenced an underwritten public offering to sell 2,500,000 units representing limited partner interests in the partnership. Has 452 employees.

Additional Company Information from Website:
TransMontaigne Partners (NYSE: TLP) is a leading provider of terminaling, storage, transportation and related services to the energy industry. We are a growth-oriented master limited partnership that owns and operates a diversified network of midstream terminals located in strategic markets throughout the United States. Our highly-contracted terminals and pipelines provide essential storage and transportation services to our customers, who are distributors and marketers for a wide array of petroleum products, crude oil, chemicals, fertilizers and other liquid products.[162]

---

[160] http://ir-tep.tallgrassenergylp.com/CorporateProfile, accessed 12/12/2017

[161] https://www.transcanada.com/en/operations/, accessed 12/12/2017

[162] http://www.transmontaignepartners.com/about-us/company-overview/, accessed 12/12/2017

Why was the company not included?
This company's main business segments are terminaling and storage. A main business segment of the companies the State Assessed Section is responsible for valuing is a fluid transportation pipeline services or gas transmission pipeline services.

Valero Energy Partners, L.P.

Company Summary from Value Line:
Valero Energy Partners, LP is a fee-based, traditional master limited partnership formed by Valero Energy Corp. to own, operate, develop, and acquire crude oil and refined petroleum products pipelines, terminals, and other transportation and logistics assets. With headquarters in San Antonio, the partnership's assets include crude oil and refined petroleum products pipeline and terminal systems in the Gulf Coast and Mid-Continent regions of the United States. The systems are integral to the operations of Valero's refinery in Port Arthur, Texas, its McKee refinery in Sunray, Texas, and its refinery in Memphis, Tennessee. In October 2017, Valero Energy Partners announced that the board of directors of its general partner approved the partnership's acquisitions of the Port Arthur terminal assets and Parkway Pipeline, LLC from Valero Energy Corp. for total consideration of $508 million.

Additional Company Information from Website:
Valero Energy Partners LP (NYSE: VLP) began trading on the New York Stock Exchange on Dec. 11, 2013. Headquartered in San Antonio, Texas, Valero Energy Partners is a fee-based, growth-oriented, traditional master limited partnership formed by Valero Energy Corporation to own, operate, develop and acquire crude oil and refined petroleum products pipelines, terminals and other transportation and logistics assets. The partnership serves as Valero's primary vehicle to expand the transportation and logistics assets supporting its business. Assets consist of crude oil and refined petroleum products pipeline and terminal systems in the Gulf Coast and Mid-Continent regions of the United States, which are integral to the operations of Valero's refineries located in Port Arthur, Sunray (McKee refinery), Houston, Three Rivers and Corpus Christi (Bill Greehey refineries), Texas; Meraux and Norco (St. Charles refinery), Louisiana; Memphis, Tennessee; and Ardmore, Oklahoma. The Port Arthur Logistics System includes the Lucas Crude System, the Port Arthur Products System and the Port Arthur Terminal. The McKee Logistics System consists of the McKee Crude System, the McKee Products System and the McKee Terminal. The Memphis Logistics System includes the Collierville Crude System and the Memphis Products System. The Ardmore Logistics System consists of the Wynnewood Products System and the Ardmore Crude System. The St. Charles Logistics System consists of the St. Charles Terminal and the Parkway Pipeline. The Three Rivers Logistics System includes the Three Rivers Crude System and the Three Rivers Terminal. The Houston Terminal is a crude oil, intermediates and refined petroleum products terminal. The Corpus Christi Terminals move crude oil, intermediates and refined petroleum products for the Bill Greehey refineries' east and west plants. The Meraux Terminal is a crude oil, intermediates and refined petroleum products terminal. These assets are integral to the Valero refining and marketing operations they support.[163]

SAN ANTONIO, Oct. 26, 2017 (GLOBE NEWSWIRE) -- Valero Energy Partners LP (NYSE:VLP) (the "Partnership") today announced that the board of directors of its general partner has approved the Partnership's acquisitions of the Port Arthur terminal assets and Parkway Pipeline LLC ("Parkway Pipeline") from Valero Energy Corporation (NYSE:VLO) ("Valero") for total consideration of $508 million. In the first twelve months of operation, the acquired operations are expected to contribute a total

[163] https://www.valeroenergypartners.com/Pages/About.aspx, accessed 12/12/2017

of approximately $24 million and $60 million of net income and EBITDA, respectively. The transaction is expected to close effective November 1, 2017.[164]

Why was the company not included?
This company's main business segments include refineries and terminalling. A main business segment of the companies the State Assessed Section is responsible for valuing is a fluid transportation pipeline services or gas transmission pipeline services.

Western Gas Equity Partners, L.P.

Company Summary from Value Line:
Western Gas Equity Partners, LP (WGP) is a Delaware master limited partnership formed in September 2012 to own three types of partnership interests in Western Gas Partners, LP (WES), which includes the general partner interest in WES, held through WES GP; 100% of the incentive distribution rights in WES, which entitle WGP to receive increasing percentages, up to the maximum level of 48% of any incremental cash distributed by WES as certain target distribution levels are reached in any quarter; and a significant limited partner interest in WES. WES was formed by Anadarko Petroleum Corp. in 2007 to acquire, own, develop, and operate midstream energy assets. With midstream assets located in the Rocky Mountains, the Mid-Continent, north-central Pennsylvania and Texas, WES is engaged in the business of gathering, processing, compressing, treating, and transporting natural gas, condensate, natural gas liquids, and crude oil for Anadarko, as well as for other producers and customers.

Additional Company Information from Website:
Western Gas Equity Partners, LP is a Delaware master limited partnership formed by Anadarko to own WES's general partner, all of WES's incentive distribution rights, and a substantial limited partner interest in WES. Through its ownership of WES's general partner, WGP manages and controls WES. The incentive distribution rights entitle WGP to increasing percentages, up to a maximum level of 48.0%, of any incremental cash distributed by WES as certain target distribution levels are reached with respect to any quarter.[165]

Why was the company not included?
This company's main business segments include gathering and treating. A main business segment of the companies the State Assessed Section is responsible for valuing is a fluid transportation pipeline services or gas transmission pipeline services.

Western Gas Partners, L.P.

Company Summary from Value Line:
Western Gas Partners, LP engages in the acquisition, ownership, and operation of midstream energy assets in East and West Texas, the Rocky Mountains, and the Mid-Continent. It is involved in the gathering, compressing, treating, and transporting of natural gas for its ultimate parent, Anadarko Petroleum Corporation, and third-party producers and customers. The company's assets consist of gathering systems, natural gas treating facilities, processing facilities, pipelines, and interests accounted for under the equity method. Western Gas Holdings, LLC serves as the general partner.

Additional Company Information from Website:
Western Gas Partners, LP is a growth-oriented Delaware master limited partnership formed by Anadarko to own, operate, acquire and develop midstream energy assets. WES's assets are located in

[164] https://globenewswire.com/news-release/2017/10/26/1154138/0/en/Valero-Energy-Partners-LP-Announces-Acquisitions-of-the-Port-Arthur-Terminal-Assets-and-Parkway-Pipeline-LLC-for-508-Million.html, accessed 12/12/2017

[165] http://www.westerngas.com/About/, accessed 12/12/2017

East, West and South Texas, the Rocky Mountains (Colorado, Utah and Wyoming), North-Central Pennsylvania and the Mid-Continent (Kansas and Oklahoma), and WES is engaged in the business of gathering, processing, compressing, treating and transporting natural gas, condensate, natural gas liquids and crude oil for Anadarko, as well as third-party producers and customers.[166]

Why was the company not included?
This company's main business segments include gathering and treating. A main business segment of the companies the State Assessed Section is responsible for valuing is a fluid transportation pipeline services or gas transmission pipeline services.

Western Refining Logistics, L.P.

Company Summary from Value Line:
Not available. Company is not publically traded.

Additional Company Information from Website:
SAN ANTONIO, TEXAS - October 30, 2017 - Andeavor Logistics LP (NYSE: ANDX) and Andeavor (NYSE: ANDV) today announced that Andeavor Logistics has completed its acquisition of Western Refining Logistics, LP (NYSE: WNRL) in a unit-for-unit transaction and assumption of $280 million of net debt for a total enterprise value of approximately $1.7 billion, based on Andeavor Logistics' closing unit price of $45.90 on October 30, 2017. The strategic combination of the two companies further positions Andeavor Logistics as a growth-oriented, full-service and diversified midstream company with greater organic growth opportunities across the combined geographic footprint. As a result of this acquisition, Andeavor Logistics is well positioned to compete and grow organically in the highly attractive Permian Basin, principally in the Delaware basin where Andeavor and Andeavor Logistics have a strong logistics asset base, crude oil marketing capability and meaningful refining offtake.[167]

Why was the company not included?
Company is no longer publically traded.

Williams Companies, Inc.

Company Summary from Value Line:
The Williams Companies, Inc., gathers, processes, and transports natural gas throughout the United States. It also performs gas marketing services. Acquired Access Midstream Partners, 7/14; Barrett Resources, 8/01; MAPCO, 3/98. Sold Texas Gas Pipeline, 5/03; Kern River Pipeline, 3/02. Spun off Williams Communications, 4/01; WPX Energy, 1/12. Initial public offering for Williams Partners L.P., 8/05; Williams Pipeline Partners L.P., 1/08. Has about 4,910 employees.

Additional Company Information from Website:
Williams (NYSE:WMB) is one of the leading energy infrastructure companies in the United States. It owns the general partner of and controlling interests in Williams Partners L.P. (NYSE:WPZ). Williams' strategy is to be the premier provider of large-scale infrastructure connecting the growing supply of U.S. natural gas and natural gas products to growing global demand for clean fuels and feedstock. Williams strives to deliver sustained shareholder value growth through disciplined capital allocation while executing its long-term strategy with absolute focus on safe, reliable operations and project execution.[168]

---

[166] http://www.westerngas.com/About/, accessed 12/12/2017

[167] http://ir.andeavorlogistics.com/phoenix.zhtml?c=242247&p=irol-newsArticle&ID=2312595, accessed 12/6/2017

[168] http://investor.williams.com/williams, accessed 12/12/2017

Why was the company not included?
This company was not included because we would use Williams Partners, L.P.

World Fuel Services Corp.

Company Summary from Value Line:
World Fuel Services Corp., a leading global fuel logistics company, is engaged in the worldwide marketing and sale of marine, aviation, and land fuel products and related services. Its Marine segment offers fuel and related services to maritime customers, including international container and tanker fleets among others. The Aviation segment provides aviation fuel to commercial airlines, and others. The Land segment provides fuel and related services to petroleum distributors among others. Has 2,758 employees.

Additional Company Information from Website:
World Fuel Services (NYSE: INT) is 103 on the Fortune 500 list. We provide energy procurement advisory services, supply fulfillment, and transaction and payment management solutions to commercial and industrial customers, principally in the aviation, marine and land transportation industries.[169]

Why was the company not included?
This company is a global fuel distributor. A main business segment of the companies the State Assessed Section is responsible for valuing is a fluid transportation pipeline services or gas transmission pipeline services.

World Point Terminals, L.P.

Company Summary from Value Line:
Not available. Company is not publically traded.

Additional Company Information from Website:
ST. LOUIS--(BUSINESS WIRE)--World Point Terminals, LP (the "Partnership"), a Delaware limited partnership (NYSE: WPT), announced today that it has entered into a Transaction Agreement, dated as of June 1, 2017, by and among World Point Terminals, Inc. (the "Offeror"), WPT GP, LLC (the "General Partner") and the Partnership (together with any amendments or supplements thereto, the "Transaction Agreement"), pursuant to which the Offeror has commenced a tender offer to purchase all issued and outstanding common units (the "Units") of the Partnership that are not already beneficially owned by the Offeror or its affiliates, at a price per Unit equal to $17.30 (the "Offer Price"), net to the holder in cash, without interest thereon and less any applicable tax withholding (the "Offer"). The Offer Price represents an increase of $0.50 per Unit, or approximately 3.0%, when compared to the original offer of $16.80 per Unit made by the Offeror on April 3, 2017. The Offer is being made upon the terms and subject to the conditions specified in the Offer to Purchase, dated June 2, 2017 (the "Offer to Purchase"). The initial scheduled expiration time of the Offer is 11:59 p.m., New York City time, on June 29, 2017, unless the Offer is extended as described in the Offer to Purchase.[170]

Why was the company not included?
Company is no longer publically traded.

[169] https://www.wfscorp.com/about-wfs, accessed 12/12/2017

[170] https://www.businesswire.com/news/home/20170602005203/en/World-Point-Terminals-LP-World-Point-Terminals, accessed 12/12/2017

Market Segment: Railroad, Class I and Other Railroads

Companies Included in the Railroad Market Segment

Canadian National Railway Company

Company Summary from Value Line:

Canadian National Railway operates Canada's largest railroad system with 20,000 route miles spanning East-West across Canada and North-South to the Gulf of Mexico through the U.S. Midwest. Acquired Wisconsin Central 10/01; BC Rail and GLT mid-'04; EJ&E 1/09. Petroleum & Chemicals, 18% of '16 revenues; Metals & Minerals, 10%; Forest Products, 15%; Intermodal, 24%; Coal, 4%; Grain & Fertilizer, 17%; Automotive, 6%; Other, 6%. 2016 labor costs: 18% of revenue. 2016 operating ratio: 55.9%. Has about 22,250 employees. Offs./dirs. own less than 1% of stock

(2016 40-F).

Additional Company Information from Website:

CN [Canadian National] is engaged in the rail and related transportation business. CN's network of approximately 20,000 route miles of track spans Canada and mid-America, uniquely connecting three coasts: the Atlantic, the Pacific and the Gulf of Mexico and serving the cities and ports of Vancouver, Prince Rupert (British Columbia), Montreal, Halifax, New Orleans, and Mobile (Alabama), and the metropolitan areas of Toronto, Edmonton, Winnipeg, Calgary, Chicago, Memphis, Detroit, Duluth (Minnesota)/Superior (Wisconsin), and Jackson (Mississippi), with connections to all points in North America. CN's extensive network and efficient connections to all Class I railroads provide CN customers access to all three North American Free Trade Agreement (NAFTA) nations. CN handles over $250 billion worth of goods annually and carries almost 300 million tons of cargo, serving exporters, importers, retailers, farmers and manufacturers. CN's freight revenues are derived from seven commodity groups representing a diversified and balanced portfolio of goods transported between a wide range of origins and destinations. This product and geographic diversity better positions the Company to face economic fluctuations and enhances its potential for growth opportunities. In 2016, no individual commodity group accounted for more than 24% of total revenues. From a geographic standpoint, 17% of revenues relate to U.S. domestic traffic, 34% transborder traffic, 18% Canadian domestic traffic and 31% overseas traffic. The Company is the originating carrier for approximately 85% of traffic moving along its network, which allows it both to capitalize on service advantages and build on opportunities to efficiently use assets. Revenues generated by the Company during the year are influenced by seasonal weather conditions, general economic conditions, cyclical demand for rail transportation, and competitive forces in the transportation marketplace. Operating expenses reflect the impact of freight volumes, seasonal weather conditions, labor costs, fuel prices, and the Company's productivity initiatives.[171]

Why was the company included?

This company is similar to (and is the parent of) the railroad companies that the State Assessed Section is responsible for valuing. The company engages in railroad transportation services.

Canadian Pacific Railway Limited

Company Summary from Value Line:

Canadian Pacific Railway Limited provides rail and intermodal freight transportation services over a 12,500-mile network from Montreal to Vancouver. It extends into the U.S. midwest and northeast via

[171] https://www.cn.ca/en/investors/regulatory-filings, accessed 12/13/2017, 2016 Annual Report Information, page 12

Soo Line, Delaware & Hudson, and DM&E (purchased 10/4/07) subsidiaries. Alliances with other carriers extend market reach beyond its owned network. Grain shipments 24%, of 2016 freight revenue; intermodal, 22%; chemicals/plastics, 12%; coal, 10%; other, 32%. Operating ratio in 2016: 58.6%. Employs 11,653 as of 12/31/16.

Additional Company Information from Website:
CP [Canadian Pacific] operates and owns a transcontinental freight railway in Canada and the United States, providing industry-leading transportation services and supply chain solutions for a diverse book of business.[172]

Why was the company included?
This company is similar to (and is the parent of) the Railroad Companies that the State Assessed Section is responsible for valuing. The company engages in railroad transportation services.

CSX Corporation

Company Summary from Value Line:
CSX Corporation provides rail, intermodal transportation, and rail-to-truck transload services. Has about 21,000 route miles in 23 states and two Canadian provinces, with links to more than 240 short-line railroads. Connects the Northeast, Midwest, and Canada with the Southeast. Principal freight: coal, fertilizer, chemicals, automobiles & parts, agricultural products, and intermodal cargo. Sold CSX World Terminals 2/05. 2016 rail operating ratio: 70.4%. Had about 27,000 employees, as of 12/31/16. Vanguard Group owns 7.2% of common stock; Capital Research, 5.9%; offs/dirs, 4.8% (4/17 proxy).

Additional Company Information from Website:
CSX is a leading supplier of rail-based freight transportation in North America. But there’s more to CSX than you might expect. Learn all about CSX and discover what we’re doing for our customers, environment and communities.[173]

Why was the company included?
This company is similar to the Railroad Companies that the State Assessed Section is responsible for valuing. The company engages in railroad transportation services.

Genesee & Wyoming, Inc.

Company Summary from Value Line:
Genesee & Wyoming owns and operates 122 short line and regional freight railroads. Also performs contract coal loading and railcar switching for industrial customers. Has operations in North America (74% of ’16 revenue), Australia (14%), and U.K./Europe/ (12%). ’16 freight revenue mix: Pulp & Paper, 8%; Coal, 8%; Minerals & Stone, 13%; Metals, 11%; Other, 60%. Has 7,300 employees. ’16 operating ratio: 85.5%. Off. & dir. own 2.3% of class A and 92.0% of class B shares outstanding (representing 12.0% of total voting rights); Wellington Man., 9.5% of Class A; FMR, 8.9%; Vanguard, 6.6% (4/17 proxy).

Additional Company Information from Website:
Genesee & Wyoming Inc. owns or leases 122 freight railroads worldwide (collectively "G&W" or the "company")* organized in nine locally managed operating regions with 8,000 employees serving 3,000 customers. G&W’s seven North American regions serve 41 U.S. states and four Canadian provinces and include 115 short line and regional freight railroads with more than 13,000 track-miles. G&W’s Australia Region serves New South Wales, the Northern Territory and South Australia and operates the

[172] http://s21.q4cdn.com/736796105/files/doc_downloads/fact-book/2017/CPR-FactBook-2017-Print.pdf, accessed 12/13/2017 (page 4)

[173] https://www.csx.com/index.cfm/about-us/, accessed 12/13/2017

1,400-mile Tarcoola-to-Darwin rail line. The Australia Region is 51.1% owned by G&W and 48.9% owned by a consortium of funds and clients managed by Macquarie Infrastructure and Real Assets. G&W's UK/Europe Region includes the U.K.'s largest rail maritime intermodal operator and second-largest freight rail provider, as well as regional rail services in Continental Europe. G&W subsidiaries and joint ventures also provide rail service at more than 40 major ports, rail-ferry service between the U.S. Southeast and Mexico, transload services, contract coal loading and railcar switching and repair.[174]

Why was the company included?
This company is similar to (and is the parent of) the Railroad Companies that the State Assessed Section is responsible for valuing. The company engages in railroad transportation services.

Kansas City Southern

Company Summary from Value Line:
Kansas City Southern, Inc. is a holding company that has railroad investments in the U.S., Mexico, and Panama. Kansas City Southern, its primary holding, serves the central and south central U.S. Kansas City Southern de Mexico serves northeastern and central Mexico, as well as the port cities of Lazaro Cardenas, Tampico, and Veracruz. Panama Canal Railway (50% stake) provides ocean-to-ocean service along the Panama Canal. 2016 rail operating ratio: 65.0%. Has 6,820 employees. Officers & directors own less than 1.0% of common stock; The Vanguard Group, 9.1%; BlackRock, 8.9% (4/17 Proxy).

Additional Company Information from Website:
KCS is a complete network of capabilities, possibilities and advantages for businesses and shippers of all sizes. You produce it or need it and we can ship it. From accordions to zippers, KCS can ship your cargo. We are a full-service railroad capable of shipping anything from the tiniest plastic pieces to the largest machinery. Liquid or metal. Large or small. Finished or Unfinished. We've got your shipment needs covered.[175]

Why was the company included?
This company is similar to the Railroad Companies that the State Assessed Section is responsible for valuing. The company engages in railroad transportation services.

Norfolk Southern Corporation

Company Summary from Value Line:
Norfolk Southern Corp. is the holding company formed by the merger of Norfolk & Western Railway and Southern Railway on 6/1/82. Its Norfolk Southern Railway subsidiary operates approximately 19,500 route miles of track in 22 eastern and southern states, plus the District of Columbia. Also owns a 58% stake in Conrail. '16 freight revenue mix: coal, 15%; intermodal, 22%; agriculture/ consumer prod./gov't, 16%; metals/construction, 13%; other, 34%. '16 labor costs: about 28% of revenue. '16 operating ratio: 68.9%. Has 28,044 employees; Off. & Dir. own 1% of common stock (3/17 Proxy).

Additional Company Information from Website:
Norfolk Southern Corporation is one of the nation's premier transportation companies. Its Norfolk Southern Railway subsidiary operates approximately 19,500 route miles in 22 states and the District of Columbia, serves every major container port in the eastern United States, and provides efficient connections to other rail carriers. Norfolk Southern operates the most extensive intermodal network in the East and is a major transporter of coal, automotive, and industrial products.[176]

---

[174] https://www.gwrr.com/about_us, accessed 12/13/2017

[175] http://www.kcsouthern.com/en-us/why-choose-kcs/what-we-ship, accessed 12/13/2017

[176] http://www.nscorp.com/content/nscorp/en/about-ns/corporate-profile.html, accessed 12/13/2017

Why was the company included?
This company is similar to the Railroad Companies that the State Assessed Section is responsible for valuing. The company engages in railroad transportation services.

Union Pacific Corporation

Company Summary from Value Line:
Union Pacific Corporation owns Union Pacific Railroad, the largest railroad in the U.S. in both track miles and total revenues, with nearly 32,070 route miles serving the western two-thirds of the United States. ’16 railroad revenue mix: Coal, 13%; Intermodal, 20%; Agricultural, 19%; Industrial, 18%; Chemicals, 19%; Automotive, 11%. Divested Overnite Transportation in 11/03. ’16 RR operating ratio: 63.5%. Has about 42,900 employees. Officers/ directors own less than 1% of stock; The Vanguard Group, 6.3%; BlackRock, 5.9%; Capital Research Investors, 5.1% (4/17 proxy).

Additional Company Information from Website:
Union Pacific Corporation (NYSE:UNP) is one of America's leading transportation companies. Its principal operating company, Union Pacific Railroad, is North America's premier railroad franchise, covering 23 states across the western two-thirds of the United States. Union Pacific Railroad is the principal operating company of Union Pacific Corporation (NYSE: UNP). One of America's most recognized companies, Union Pacific Railroad connects 23 states in the western two-thirds of the country by rail, providing a critical link in the global supply chain. From 2007-2016, Union Pacific invested $34 billion in its network and operations to support America's transportation infrastructure. The railroad's diversified business mix is classified into its Agricultural Products, Energy, Industrial and Premium business groups. Union Pacific serves many of the fastest-growing U.S. population centers, operates from all major West Coast and Gulf Coast ports to eastern gateways, connects with Canada's rail systems and is the only railroad serving all six major Mexico gateways. Union Pacific provides value to its roughly 10,000 customers by delivering products in a safe, reliable, fuel-efficient and environmentally responsible manner.[177]

Why was the company included?
This company is one of the Railroad Companies that the State Assessed Section is responsible for valuing. The company engages in railroad transportation services.

Companies Not Included in the Railroad Market Segment

American Railcar Industries, Inc.

Company Summary from Value Line:
American Railcar Industries, Inc. designs and manufactures hopper (used to transport dry bulk products) and tank railcars. The company’s operations are divided into three segments: Manufacturing (accounted for 67% of 2016 total revenues); Railcar leasing (21%); and Railcar Services (12%). At 12/31/16, its backlog exceeded 3,813 railcars of which 57% are for direct sale and 70% are scheduled for delivery in 2016. It has more than 2,159 employees. Officers/directors own 62.3% of the common stock; Dimensional Fund Advisors, 7.3% (4/17 proxy).

Additional Company Information from Website:
ARI [American Railcar Industries] is a leading North American designer and manufacturer of hopper and tank railcars. ARI provides its railcar customers with integrated solutions through a comprehensive set of high quality products and related services. ARI manufactures and sells railcars, custom designed railcar parts, and other industrial products. ARI and its subsidiaries also lease railcars manufactured by the company to certain markets. In addition, ARI provides railcar services through its various repair

[177] http://www.up.com/aboutup/corporate_info/uprrover/index.htm, accessed 12/13/2017

facilities, including mini-shops and mobile units, offering a range of services from full to light repair. We partner in two separate and distinct joint ventures: Axis, LLC, and Ohio Castings Company, LLC.[178]

Why was the company not included?
This company designs and manufactures railcars.

Berkshire Hathaway, Inc.

Company Summary from Value Line:
Berkshire Hathaway Inc. is a holding company owning subsidiaries engaged in property and casualty insurance on a direct and reinsurance basis through GEICO, General Re and Berkshire Reinsurance. Other business activities include electric utilities, railroads, flight training services, candy manufacturing, ice cream, building products, newspapers, retailing, fine jewelry, etc. Also, fractional ownership programs for general aviation (NetJets), energy (Mid-American Energy). Has approximately 367,700 employees. Officers & directors control 22.1% of voting power (3/17 proxy).

Additional Company Information from Website:
Berkshire Hathaway Inc. ("Berkshire," "Company" or "Registrant") is a holding company owning subsidiaries engaged in a number of diverse business activities. The most important of these are insurance businesses conducted on both a primary basis and a reinsurance basis, a freight rail transportation business and a group of utility and energy generation and distribution businesses. Berkshire also owns and operates a large number of other businesses engaged in a variety of activities, as identified herein. Berkshire is domiciled in the state of Delaware, and its corporate headquarters are located in Omaha, Nebraska. Berkshire's operating businesses are managed on an unusually decentralized basis. There are essentially no centralized or integrated business functions (such as sales, marketing, purchasing, legal or human resources) and there is minimal involvement by Berkshire's corporate headquarters in the day-to-day business activities of the operating businesses. Berkshire's corporate office senior management participates in and is ultimately responsible for significant capital allocation decisions, investment activities and the selection of the Chief Executive to head each of the operating businesses. It also is responsible for establishing and monitoring Berkshire's corporate governance practices, including, but not limited to, communicating the appropriate "tone at the top" messages to its employees and associates, monitoring governance efforts, including those at the operating businesses, and participating in the resolution of governance-related issues as needed. Berkshire and its consolidated subsidiaries employ approximately 367,700 people worldwide.[179]

Why was the company not included?
We reviewed Berkshire Hathaway, Inc. because the company is the parent of BNSF Railway, which operates in Minnesota. However, BNSF Railway is not the majority business segment of Berkshire Hathaway, Inc.

GATX Corporation

Company Summary from Value Line:
GATX Corp. specializes in tank car, freight car, and locomotive leasing. The company owns or has an interest in 148,941 railcars, and manages 425 railcars for third-party owners. Specialty unit finances marine and industrial equipment. American Steamship unit operates a fleet of vessels on the Great Lakes, providing waterborne transportation of dry bulk commodities. Invests in joint ventures that complement existing businesses. Has about 2,260 employees. Off. & dir. own 3.5% of common; State Farm, 16.4%; GAMCO, 13.0%; BlackRock, 10.3%; Wellington, 8.5%; Dimensional Fund, 8.7% (3/17 Proxy).

[178] http://www.americanrailcar.com/Home/About, accessed 12/13/2017
[179] http://www.berkshirehathaway.com/2016ar/201610-K.pdf, accessed 12/13/2017

Additional Company Information from Website:
GATX Corporation, founded in 1898, is the leading global railcar lessor. We strive to be recognized as the finest railcar leasing company in the world by our customers, our shareholders, our employees, and the communities where we operate. We own railcar fleets in North America, Europe, and Asia. In addition, we operate the largest fleet of US-flagged vessels on the Great Lakes and own and manage other long-lived, widely-used assets. We operate through four business segments: Rail North America, Rail International, American Steamship Company ("ASC"), and Portfolio Management.[180]

Why was the company not included?
This company's business segments include substantial non railroad investments, including financing marine and industrial equipment.

Greenbrier Companies, Inc.

Company Summary from Value Line:
The Greenbrier Companies, Inc. designs, manufactures, repairs, and markets railroad freight cars and related equipment in North America and Europe. It also manufactures oceangoing marine barges. The company operates in three business segments: Manufacturing (80% of 2017 revenues); Wheel Services, Refurbishment & Parts (16%); Leasing & Services (4%). Inc.: OR. At 8/31/17, its backlog consisted of 28,600 railcars. Has about 10,000 employees.

Additional Company Information from Website:
The Greenbrier Companies, headquartered in Lake Oswego, Oregon, is a leading international supplier of equipment and services to the freight rail transportation markets. We are one of the leading designers, manufacturers and marketers of railroad freight car equipment in North America and Europe. We manufacture railcars in Brazil and are a manufacturer and marketer of marine barges in North America. Through our European manufacturing operations, we also deliver railcars for the Saudi Arabian market. We are a leading provider of wheel services, parts, leasing and other services to the railroad and related transportation industries in North America and a provider of railcar repair, refurbishment and retrofitting services in North America through an unconsolidated joint venture. Through other unconsolidated affiliates we produce rail and industrial castings, tank heads and other components. We operate an integrated business model in North America that combines freight car manufacturing, wheel services, repair, refurbishment, retrofitting, component parts, leasing and fleet management services. Our model is designed to provide customers with a comprehensive set of freight car solutions utilizing our substantial engineering, mechanical and technical capabilities as well as our experienced commercial personnel. We believe our integrated model is difficult to duplicate and provides greater value for our customers.[181]

Why was the company not included?
This company designs, manufactures, repairs, and markets railroad freight cars and related equipment.

Packaging Corporation of America

Company Summary from Value Line:
Packaging Corporation of America is the fourth-largest producer of containerboard and corrugated products in the United States in terms of production capacity. Revenue breakdown; Packaging (79% of 2016 sales), Paper (18%), and Corporate and Other and Eliminations (3%). In 2016, it produced 3.7 million tons of containerboard at its mills. Corrugated products manufacturing plants sold about 51.3

[180] http://www.gatx.com/wps/wcm/connect/GATX/GATX_SITE/Home/About/, accessed 12/1/2017
[181] http://www.gbrx.com/about-us/, accessed 12/13/2017

billion square feet. Has 14,000 employees. Acquired Boise (10/13). Off/dirs. own 1.2% of common stock; Black- Rock, 14.5%; The Vanguard Group, 8.3% (3/17 proxy).

Additional Company Information from Website:
At PCA, we think of ourselves as more than a box manufacturer. We are an ideas and solutions company. We seek to be the leader in helping our customers — large and small — package, transport and display products of all kinds. It just happens to be that corrugated products are our area of expertise. So a partnership with PCA isn't just about buying boxes. It's about building a relationship with a knowledgeable, trusted, committed source; adding value to your business; and actively contributing to your success in the marketplace. Whether you are looking for conventional shipping containers, custom-printed corrugated boxes, custom packaging or eye-catching retail visual displays, PCA is here to deliver the right packaging solution on time and on budget.[182]

Why was the company not included?
We reviewed Packaging Corporation of America because the company is the parent of Boise Paper, which is the parent of Minnesota, Dakota & Western Railroad. Minnesota, Dakota & Western Railroad operates in Minnesota. However, Minnesota, Dakota & Western Railroad is not the majority business segment Packaging Corporation of America.

Trinity Industries, Inc.

Company Summary from Value Line:
Trinity Industries, Inc. manufactures a variety of metal products for many industries. Its five principal operating segments are: Rail (railcars and component parts), Construction Products (highway safety products, concrete, and aggregate), Inland Barge (barges and related products), Energy Equipment (wind towers), and Railcar Leasing and Management. Acquired Thrall 10/01. '16 depr. rate: 3.4%. Has about 17,680 employees. Officers & directors own 2.0% of common stock; ValueAct Capital 10.2%; Vanguard Group, 7.7%; BlackRock, 7.6% (4/17 Proxy).

Additional Company Information from Website:
Trinity Industries, Inc. is a diversified industrial company that owns complementary, market-leading businesses providing products and services to the energy, chemical, agriculture, transportation, and construction sectors. Trinity reports its financial results in five principal business segments: the Rail Group, the Railcar Leasing and Management Services Group , the Inland Barge Group , the Construction Products Group , and the Energy Equipment Group . Our common stock is traded on the New York Stock Exchange under the symbol TRN.[183]

Why was the company not included?
This company manufactures metal products for many industries.

[182] https://www.packagingcorp.com/our-company, accessed 12/13/2017
[183] http://www.trin.net/, accessed 12/13/2017