**Date:** April 24, 2020
**From:** Jon Klockziem, Director – Property Tax Division
**Subject:** Final Capitalization Rate Study

The Property Tax Division of the Minnesota Department of Revenue is responsible for estimating the market value of utility, pipeline, and railroad operating property, as of January 2 each year. We complete a Capitalization Rate Study each year and use the capitalization rates published in the study to help determine the unitary value of state assessed property.

We posted the 2020 Draft Capitalization Rate Study on February 28, 2020 and welcomed comments until March 28, 2020. We appreciated the thoughtful comments we received.

## COVID-19

COVID-19 began impacting financial markets in early 2020. This Capitalization Rate Study is used, in part, to inform values as of January 2, 2020. For this reason, the rates derived in this study used information known or knowable as of January 2, 2020. We continue to monitor and analyze the impact of COVID-19 on market conditions. The effects of COVID-19 on financial markets will be taken into consideration for the January 2, 2021 assessment.

## Who can I contact with questions?

If you have questions about this final study, contact Holly Soderbeck in our State Assessed Property Section at 651-556-6119 or sa.property@state.mn.us.

Jon Klockziem, Director
Property Tax Division

# 2020 Capitalization Rate Study

Assessment Year 2020

Property Tax Division
Minnesota Department of Revenue
April 24, 2020

# Table of Contents

# Introduction

The Minnesota Department of Revenue determines the estimated market value[1] for utility, pipeline, and railroad operating property, as of January 2 each year. The department determines the unit value of the entire system[2] to estimate the market value of these properties.

This study derives

- A yield capitalization rate (yield rate)
- A direct capitalization rate (direct rate)
- An implied growth rate
- A short-term growth rate
- A long-term growth rate
- An implied inflation rate for each market segment

The market segments are

- Electric
- Gas distribution
- Gas transmission pipeline
- Fluid transportation pipeline
- Class I railroads
- Other railroads

The department's Property Tax Division determines the unit value of these systems, 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.[3]

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

[1] Minnesota Statutes, section 272.03, subdivision 8 defines market value as, "the usual selling price at the place where the property to which the term is applied shall be at the time of assessment; being the price which could be obtained at a private sale or auction sale, if it is determined by the assessor that the price from the auction sale represents an arm's length transaction. The price obtained at a forced sale shall not be considered.

[2] Minnesota Rules, Chapter 8100.0100, subpart 16 defines unit value as, "the value of the entire system of a utility company taken as a whole without regard to the value of its component parts." Minnesota Rules, Chapter 8106.0100, subpart 20 defines unit value as, "the value of the system of a railroad company taken as a whole without any regard to the value of its component parts."

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

Under the income capitalization approach, yield capitalization models use yield rates and direct capitalization models use direct rates.

Both the yield and direct rates use the band of investment method. This method considers equity and debt financing and is a combination of the weighted rates for each, as shown in the table below.

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

This table summarizes the rates derived from this study.

| Market Segments | Yield Rate | Direct Rate | Implied Growth Rate [4] | Short-Term Growth Rate [5] | Long-Term Real Growth Rate [6] | Long-Term Implied Inflation Rate [7] |
|---|---|---|---|---|---|---|
| Electric | 6.40% | 4.25% | 2.15% | 5.50% | 1.90% | 2.00% |
| Gas Distribution | 7.07% | 4.34% | 2.73% | 6.00% | 1.90% | 2.00% |
| Gas Transmission Pipeline | 12.11% | 4.70% | 7.41% | 10.25% | 1.90% | 2.00% |
| Fluid Transportation Pipeline | 10.87% | 6.86% | 4.01% | 7.86% | 1.90% | 2.00% |
| Class I Railroads | 11.13% | 4.94% | 6.19% | 10.22% | 1.90% | 2.00% |
| Other Railroads | 11.19% | 4.28% | 6.91% | 8.04% | 1.90% | 2.00% |

[4] This is the difference between the yield rate and the direct rate for each market segment.

[5] See the short-term growth rate section in this narrative.

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

[7] See the Inflation Section in this narrative.

This table compares the yield rates for each market segment over the past four assessment years.

| Market Segments Yield Rates | 2020 AY | 2019 AY | 2018 AY | 2017 AY |
|---|---|---|---|---|
| Electric | 6.40% | 7.20% | 6.92% | 7.13% |
| Gas Distribution | 7.07% | 7.37% | 7.01% | 6.81% |
| Gas Transmission Pipeline | 12.11% | 12.14% | 8.77% | 8.96% |
| Fluid Transportation Pipeline | 10.87% | 12.45% | 9.50% | 10.08% |
| Class I Railroads | 11.13% | 10.73% | 9.30% | 9.16% |
| Other Railroads | 11.19% | 10.77% | 9.73% | 9.78% |

## Changes Made Since Draft Study

We initially provided this study as a draft version, with a comment period for the public. We provide a summary of the comments we received and our responses in the Public Comments on Draft Study section of this document.

Since the draft version was published, we updated some data points from the Draft Study as data became available:

- The Ex Post, Supply Side, and Duff & Phelps' Recommended equity risk premiums provided by Duff & Phelps Cost of Capital Navigator, used in the Capital Asset Pricing Model. Year-end updates were not available at the time we developed the Draft Study. The Ex Post equity risk premium changed from 6.91% to 7.15%. The Supply Side equity risk premium changed from 6.14% to 6.17%. The Duff & Phelps' Recommended equity risk premium changed from 5.5% to 5%. The recommended rate is paired with Duff & Phelps' normalized risk-free rate of 3%. (Pages 14 – 16, Appendices A, B, C, D, & E).
- Market-to-book ratios for the guideline companies in each market segment. (Pages 39 – 40, Appendices A, B, C, D, & E).
- Additional cost of debt analysis for Otter Tail Power and MGE Energy guideline companies for the electric market segment (Appendix A).
- Additional cost of debt analysis for NuStar Energy LP (through subsidiary, NuStar Logistics) for the fluid transportation pipeline market segment. (Appendix D).

As a result of comments provided during the comment period, we adjusted or updated:

- Mergent Bond Record yield averages updated from 2019 annual averages to December 2019 averages, as originally intended. (Appendices A, B, C, D, & E).
- Placed more reliance on the Dividend Growth Model when selecting the indicated cost of equity for each market segment. (Appendices A, B, C, D, & E).
- Corrected the beta for ALLETE, Inc. from 0.60 to 0.65.
- Included additional debt issuances for subsidiary companies in Appendix G.

- Shifted some reliance on the mean Dividend Growth Model – Earnings for selecting the indicated rate of equity for electric and gas distribution market segments.

## Market News

### *COVID-19*

COVID-19 began impacting financial markets in early 2020. This Capitalization Rate Study is used, in part, to inform values as of January 2, 2020. For this reason, the rates derived in this study used information known or knowable as of January 2, 2020. We continue to monitor and analyze the impact of COVID-19 on market conditions. The effects of COVID-19 on financial markets will be taken into consideration for the January 2, 2021 assessment.

### *General Market News*

The market yield on the 30-year U.S. Treasury bond decreased from 2.97% on January 2, 2019 to 2.33% on January 2, 2020.[8] The corporate bond 12-month average yields for industrial bonds and public utilities bonds decreased in 2019 compared to 2018, calendar years.[9]

The S&P 500 delivered a gain of more than 28% in 2019. Over the past 10 years, the S&P has increased over 188%.[10] However, corporate debt levels are at record highs and a survey of chief financial officers is expecting an economic downturn.

U.S. corporate debt is nearly $10 trillion, which equates to 47% of the overall economy.[11] The Board of Governors of the Federal Reserve System issued their twice-annual Financial Stability Report in May 2019 noting the increase in debt, which has been increasing at greater rates for companies that have higher leverage, higher interest expense ratios, and lower cash holdings. The report also notes that the most risky firms are the ones most likely to be financially constrained and that “any weakening of economic activity could boost default rates and lead to credit-related contractions to employment and investment among these businesses.”[12]

Accounting organization Deloitte surveys chief financial officers (CFOs) quarterly to gauge CFOs’ thoughts across a variety of topics, including the economy. The fourth quarter 2019 survey indicates that

---

8 https://www.federalreserve.gov/datadownload/Download.aspx?rel=H15&series=3789e1acea9322bb755dcc64 7bba1a4b&filetype=spreadsheetml&label=include&layout=seriescolumn&lastObs=20

9 Derived from January 2020 and January 2019 Mergent Bond Record Publications.

10 https://www.cnbc.com/2019/12/31/dow-futures-last-trading-day-of-2019.html

11 https://www.washingtonpost.com/business/economy/corporate-debt-nears-a-record-10-trillion-and-borrowing-binge-poses-new-risks/2019/11/29/1f86ba3e-114b-11ea-bf62-eadd5d11f559_story.html

12 Board of Governors of the Federal Reserve System. (May 2019). Financial Stability Report. Retrieved January 22, 2020 from https://www.federalreserve.gov/publications/files/financial-stability-report-201905.pdf

97% of CFOs surveyed say that a downturn has either already begun or will occur during 2020. Another portion of the study finds, "CFOs' performance projections for revenue and earnings remain near last quarter's multiyear lows, and their expectations for capital spending and hiring are notably depressed."[13]

Companies use dividends and stock buybacks to return cash to shareholders. During 2018, stock buybacks accounted for 69% of net income and dividends accounted for 45% of net income.[14] Dividend net increases in the fourth quarter of 2019 were up 44.2% from the fourth quarter of 2018. According to S&P Global's press release, "the [S&P 500] index already has a 3.3% dividend increase built into 2020, which is more than the recent employment 3.1% wage rate increase and before any of the more than 350 expected dividend increases for 2020." The press release continues, "Looking at the full year 2020, absent a major event or Washington policy change, dividends could return to their double-digit growth rate."[15]

### *Electric Market Segment*

As provided by Value Line Investment Survey, "The Federal Reserve raised interest rates in 2019. When 2019 began, the expectation was that there would be additional tightening this year. Not only has this not happened, the Fed has cut rates three times. This has helped boost the prices of most utility stocks, as lower interest rates make the dividend yields of utility issues relatively more appealing to income-seeking investors. Lower interest rates also reduce borrowing costs for customers. Most utility investors don't just want a good dividend, they want dividend growth, as well. Holders of some utility equities covered in Issue 5 [this issue] benefited from dividend increases that were declared and/or paid in the current quarter. The average annual dividend increase of electric utility stocks is 5%."[16]

### *Gas Distribution Market Segment*

As provided by Value Line Investment Survey, "The main appeal of utility equities is their dividend income, which tends to be well covered by corporate profits. At the time of this industry review, the average yield for the group was about 3.0%, relative to the *Value Line* median of 2.2%. We are optimistic, in general, about the sector's operating performance over the long run. Natural gas ought to remain an abundant resources in the United States, brought about partially by new technologies, so a shortage does not seem probable anytime soon. Too, there are limited alternatives for services the

---

[13] Deloitte. (2019). CFO Signals: Q$ 2019. Retrieved January 22, 2020 from

[14] Derived from Dividends and Buybacks in 2018 – by Country from Dr. Aswath Damodaran's blog, "January 2019 Data Update 8: Dividends and Buybacks – Fact and Fiction". Retrieved January 22, 2020 from http://aswathdamodaran.blogspot.com/2019/02/january-2019-data-update-8-dividends.html

[15] McConvill, Ray. & Silverlatt, Howard. (2020). S&P Dow Jones Indices Reports $10.6 Billion Increase in U.S. Dividend Payments for Q4 2019 and $45.4 billion for 2019. Retrieved January 22, 2020 from http://press.spglobal.com/2020-01-07-S-P-Dow-Jones-Indices-Reports-10-6-Billion-Increase-in-U-S-Dividend-Payments-for-Q4-2019-and-45-4-billion-for-2019

[16] Debbas, Paul, CFA (2019). Electric Utility (Central Industry). Value Line Investment Survey.

companies in this category offer. Furthermore, it's a challenge for new entrants in the market, given such factors as the size of existing competitors and the substantial initial capital outlays that are required. Finally, the country's population ought to remain on a steady, upward trajectory, which augurs well for future demand for utility services."[17]

### *Gas Transmission Pipeline Market Segment*

As provided by Value Line Investment Survey, "Companies in the space have benefited from higher volumes transported year over year, as demand for natural gas continues to grow worldwide. However, lower commodity prices and asset divestments by some companies have caused top-line performers to be mixed. Still, the bottom-line performance has shown some improvements as efforts have been made to reduce overhead costs. Interest rates have been cut by the Fed three times over the past few months, which may affect performance over the short term and change capital allocation plans over the long haul. As for share prices, many stocks in the industry have bounced back a bit over the past few months, decreasing total appreciation potential over the coming three to five years. Notably, the dividend yields here are often greater than the *Value Line* average, while the payouts are poised to grow in the years ahead. The U.S. trade war with China has created some uncertainty, which could lead to reduced volumes there. Even so, we think companies in the space are lined up for solid fourth-quarter performances. The U.S. Federal Reserve lowered interest rates by 25 basis points at each of its last three meetings, but further reductions appear unlikely for now. Several companies have taken action to deleverage their operating structures by paying down debt and through the scale of certain assets. Meantime, others have scaled back capital expansion plans. However, the recent reductions may cause managements to rethink these plans, as lower interest rates may ultimately lead to an increase in leverage and funding new projects. Longer term, earnings growth should be decent over the coming years, as companies have moved into operations that are less dependent on the price of oil and natural gas."[18]

### *Fluid Transportation Pipeline Market Segment*

As provided by Value Line Investment Survey, "The MLP [Master Limited Partnership] Industry consists of tax-advantaged oil and gas transporting, processing, and distribution companies. They do not pay state or federal corporate income taxes. Instead, the general partnerships typically pay out all of their distributable income to unitholders less a small portion retained to fund growth. They do not typically take title to hydrocarbons and, thus, are not generally directly exposed to commodity prices. One plus for the industry has been the relatively low interest-rate environment facelifted by the Federal Reserve. This has allowed MLPs to finance their capital projects at a discount. Many of the more financially sound companies in this space are self-funding their growth projects. As U.S. energy exports continue to surge, MLPs are quickly responding with increased capacity for transportation and processing. An important shift in policy regulations by the Federal Energy Regulatory Commission has applied downward pressure on some companies in the Pipeline MLP Industry. That change disallowed income

[17] Harris, Frederick, III (2019). Natural Gas Utility. Value Line Investment Survey.

[18] Seibert, John, III. (2019). Oil/Gas Distribution Industry. Value Line Investment Survey.

tax recovery on cost of service rate contracts for interstate pipelines. This past July, the FERC [Federal Energy Regulatory Commission] softened its stance on its original policy, stating that the MLPs could recoup those taxes paid by a corporate parent if one exists. The need to shift their business structures, along with warmer-than-normal weather patterns over the past year in many services territories around the country, and lower natural gas prices, have driven many of these company's stock prices lower."[19]

### Railroad Market Segments

As provided by Value Line Investment Survey, "Railroad Industry stocks have rebounded over the last month, as most operators have made gains with the Precision Scheduled Railroading (PSR) strategy, and we believe investors have looked past the decline in industrywide carloads. Trade tensions between China and the United States, as well as a slowing global economy have hurt volumes over the last two quarters. Nonetheless, railroads continue to improve train velocity and dwell times, as well as carry more freight with fewer cars. We suspect pricing will begin to weaken further, given the current demand environment. We expect volumes to worsen before they get better. For the most part, we lowered our 2020 earnings forecasts for the railroads."[20]

## Yield Capitalization Rate (Yield Rate)

The yield capitalization model is based on the premise that the value of a property is equal to the present value of all anticipated future benefits.[21] 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. We use it when explicit forecasts of anticipated net cash flows (NCF) are available and when the rate of change in the cash flows is not constant.

Net cash flows equal net operating income plus non-cash expenses minus capital expenditures minus change in working capital. Net operating income is an after-tax accounting income before 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 |

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

19 Fong, Bryan. (2019). Pipeline MLPs. Value Line Investment Survey.

20 Collins, Michael. (2019). Railroad Industry. Value Line Investment Survey.

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

Because explicit forecasts of anticipated cash flows are generally not made into perpetuity, after the period of explicit forecasts, the assumption is made that the growth rate in anticipated cash flows will be stable. The next step, reversion, applies a long-term growth rate to the cash flows in perpetuity, after the period of explicitly forecasted cash flows.

This formula shows three periods of explicit forecasts of anticipated cash flows followed by the reversion.

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

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

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

The **Zero Percent Stable Growth Yield Capitalization Model** assumes that the constant growth rate is 0%. This means that the income with remain the same over time.

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

If the net cash flows will be equal to the net operating income (NOI), meaning depreciation will be equal to capital expenditures over time; the formula becomes:

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

This model assumes 0% growth into perpetuity.

## Guideline Companies

The department selects guideline companies by reviewing 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.[22]

The department reviewed companies in the following Value Line industries as possible guideline companies in our market segments:

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

| Value Line's Industry | Department's Market Segment |
|---|---|
| Electric Utility (Central, East, and West) | Electric |
| Natural Gas Utility | Gas Distribution |
| Pipeline MLPs, Natural Gas Diversified, Oil/Gas Distribution | Fluid Transportation Pipeline or Gas Transmission Pipeline |
| Railroad | Class I Railroad or Other Railroad |

The department reviewed possible guideline companies to compare their market segments to the companies doing business in Minnesota. We 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, unless, we determine that those companies are still reflective of the subject companies.

## *Guideline Company Updates*

The department updates the list of guideline companies for this study each year, depending on mergers and acquisitions, market activities, and other factors. We summarized this year's changes below. For details on the companies reviewed for each segment, see Guideline Company Selection (page H-1).

### Electric Market Segment

The department added CenterPoint Energy Inc. as a guideline company. We removed this company from the 2019 Study related to an acquisition that the company completed February 2019.

### Gas Distribution Market Segment

The department:

- Removed NorthWest Natural Gas Company. This company recently acquired substantial water assets.
- Removed Chesapeake Utilities Corporation as a guideline company because this company generated over half of its 2018 revenues from its unregulated business unit.
- Added several guideline companies that are also used in the Electric Market segment. These companies include at least 50% of customers from gas utilities:
    - Black Hills Corporation
    - CenterPoint Energy, Inc.
    - CMS Energy Corporation
    - MGE Energy Inc.
    - WEC Energy Group

  To illustrate that adding these guideline companies does not significantly impact the Gas Distribution Market Segment, the department included analysis of several data points without these companies throughout the Gas Distribution Market Segment Appendix.

### Gas Transmission Pipeline Market Segment

The department changed from using partnerships to corporations as guideline companies for the Gas Transmission Pipeline market segment during the 2019 assessment year, given the transitions in this market segment at that time. [23] We continued using corporations as guideline companies for the 2020 assessment year. However, we:

- Added Enbridge Inc. They were not included last year, due to a merger with Spectra Energy Partners LP during the 2018 calendar year.[24] According to Enbridge Inc.'s webpage, "Enbridge moves about 20 percent of the natural gas consumed in the United States."[25]

  **Note:** Kinder Morgan Inc. and TC Energy Corporation are currently involved or recently completed partial sales of assets.[26&27] We included them as guideline companies. We considered the partial sales when selecting the rates for this market segment.

**Fluid Transportation Pipeline Market Segment**
The department:

- Removed Buckeye Partners LP. It is no longer publicly traded.
- Removed MPLX LP. It announced on July 30, 2019 that it completed its acquisition of Andeavor Logistics LP in a unit-for-unit transaction and assumption of approximately $5 billion of debt.[28]
- Added NuStar Energy LP. We removed it for the 2019 study related to a merger that it since completed.

---

[23] For the 2018 assessment year, the department used five guideline companies for the Gas Transmission Pipeline market segment. Four of those companies are limited partnerships. Two of them have reorganized into their parent corporation and are no longer publicly traded. This left only two partnerships we could have used for this market segment.

[24] Enbridge Inc. and Spectra Energy Partners LP announced 12/17/2018 that they completed the previously announced merger, resulting in Enbridge acquiring all of the outstanding public common units of Spectra Energy Partners. Retrieved 12/27/2019 from https://www.enbridge.com/media-center/news/details?id=123546&lang=en

[25] Retrieved 12/27/2019 from https://www.enbridge.com/about-us/natural-gas-transmission-and-midstream

[26] Pembina Pipeline Corporation announced 8/21/2019 that it entered into an agreement to acquire Kinder Morgan Canada Limited and the U.S. portion of the Cochin Pipeline System from Kinder Morgan In. for a total purchase price of approximately $4.35 billion. Retrieved 11/21/2019 from https://www.prnewswire.com/news-releases/pembina-pipeline-corporation-to-acquire-kinder-morgan-canada-and-the-cochin-pipeline-for-4-35-billion-and-increase-dividend-300904977.html

[27] TC Energy Corporation announced 7/2/2019 that it entered into an agreement to sell its U.S. midstream assets held by its subsidiary, Columbia Midstream Group, to UGI Energy Services, LLC, a subsidiary of UGI Corporation, for approximately $.1275 billion. Retrieved 11/27/2019 from https://www.globenewswire.com/news-release/2019/07/03/1877639/0/en/TC-Energy-enters-agreement-to-sell-Columbia-Midstream-assets-for-US-1-275-billion.html

[28] Retrieved 11/27/2019 from https://www.prnewswire.com/news-releases/mplx-completes-acquisition-of-andeavor-logistics-300893108.html

**Class I Railroad and Other Railroad Market Segments**
The department did not make any changes to the guideline companies in the Class I Railroads and Other Railroads market segments.

**Note:** Genesee & Wyoming Inc. (G&W) (NYSE:GWR) announced December 30, 2019 the completion of its previously announced sale to affiliates of Brookfield Infrastructure and GIC. Under the terms of the sale, each issued and outstanding share of G&W common stock converted into the right to receive $112 in cash. As a result of the completion of the sale, G&W's common stock ceased trading on the NYSE prior to market open today and will no longer be listed for trading on the NYSE.[29] Even though the company was recently acquired and is no longer publicly traded, we were able to use the financial information available prior to acquisition in order to include Genesee & Wyoming as a guideline for the 2020 Capitalization Rate Study. We considered the acquisition when selecting rates for this market segment.

For the 2021 assessment year, Genesee & Wyoming will not be publicly traded and we will not use it as a guideline company. At that time, we will consider using only one rate to apply to all railroads that we value. We will consider not developing two separate rates for the railroad market segment as is done in this study.

## Market Rate of Equity

The department used the Capital Asset Pricing Model (CAPM) and Dividend Growth Model (DGM) to determine the market rate of equity for each market segment. We also considered the Build-Up Model.

We selected the market rate of equity for each market segment 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.

In the past, regulated companies have asked the department to consider the allowed return on equity set by regulators. While regulators establish a maximum allowed rate of return for a specific company, we estimate the cost of equity for each market segment.

### *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 30-year coupon bond yield. We also use a market-specific beta calculated with data from the Value Line Investment Survey.

The CAPM is based on the following assumptions, according to Shannon Pratt and Roger Grabowski [30]:

1. Investors are risk averse.
2. Rational investors seek to hold efficient portfolios (portfolios that are fully diversified).

[29] https://ir.gwrr.com/press-release/acquisitions-investments/genesee-wyoming-announces-completion-sale-brookfield, accessed 1/7/2020

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

3. All investors have identical investment time horizons (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, but there may be corporate income taxes.
7. The rate received from lending money is the same as the cost of borrowing money.
8. The market has perfect divisibility and liquidity (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, 2020. The department used a risk-free rate of 2.33% for this study.[31] This rate includes inflation expectations.[32]

"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."[33]

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, "…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." [34]

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

---

[31] The daily observations rate for 30-year U.S. Treasury coupon bonds was 2.33% as of January 2, 2020.

[32] Preparing for AICPA's Valuation Principles Examination Review (2016). Page 4-6.

[33] 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.

[34] 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

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."[35]

Damodaran, the author of several finance textbooks, also notes: "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"[36].

Some company representatives have suggested that the risk-free rate used in the capital asset pricing model is arbitrarily low due to actions of the Federal Reserve, and that the department should normalize to a higher risk-free rate. According to the Federal Reserve website, "the Federal Reserve controls three tools of monetary policy – open market operations, the discount rate, and reserve requirements."[37] Using the three tools, the Federal Reserve influences the demand for, and supply of, balances that depository institutions hold at Federal Reserve Banks and in this way alters the federal funds rate.[38]

According to Thornton's (2014), "the Fed's ability to control interest rates is exaggerated for the simple reason that historically the effect of policy actions on the total supply of credit has been too small to have a significant effect on the level of the structure of interest rates" (p. 211).[39] According to French (2013), "the evidence says that Fed actions with respect to its target rate TF have little effect on long-term interest rates, and there is substantial uncertainty about the extent of Fed control of short-term rates" (pp. 19-20).[40] The department will continue to use the actual yield on U.S Treasury Securities rather than a "normalized' rate[41].

Some company representatives have suggested using the risk-free rate listed by Damodaran in his data set to match the use of the implied risk premium calculated by Damodaran. The risk-free rate listed in the data set is 1.92%. This is the U.S. Treasury Bond Yield on 10-year securities as of December 31, 2019, not a forward-looking estimate. The department uses the yield on 30-year U.S. Treasury Bonds as

[35] Damodaran, A. (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.

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

[37] Board of Governors of the Federal Reserve System. March 20, 2019. Federal Open Market Committee. Retrieved March 21, 2019 from https://www.federalreserve.gov/monetarypolicy/fomc.htm

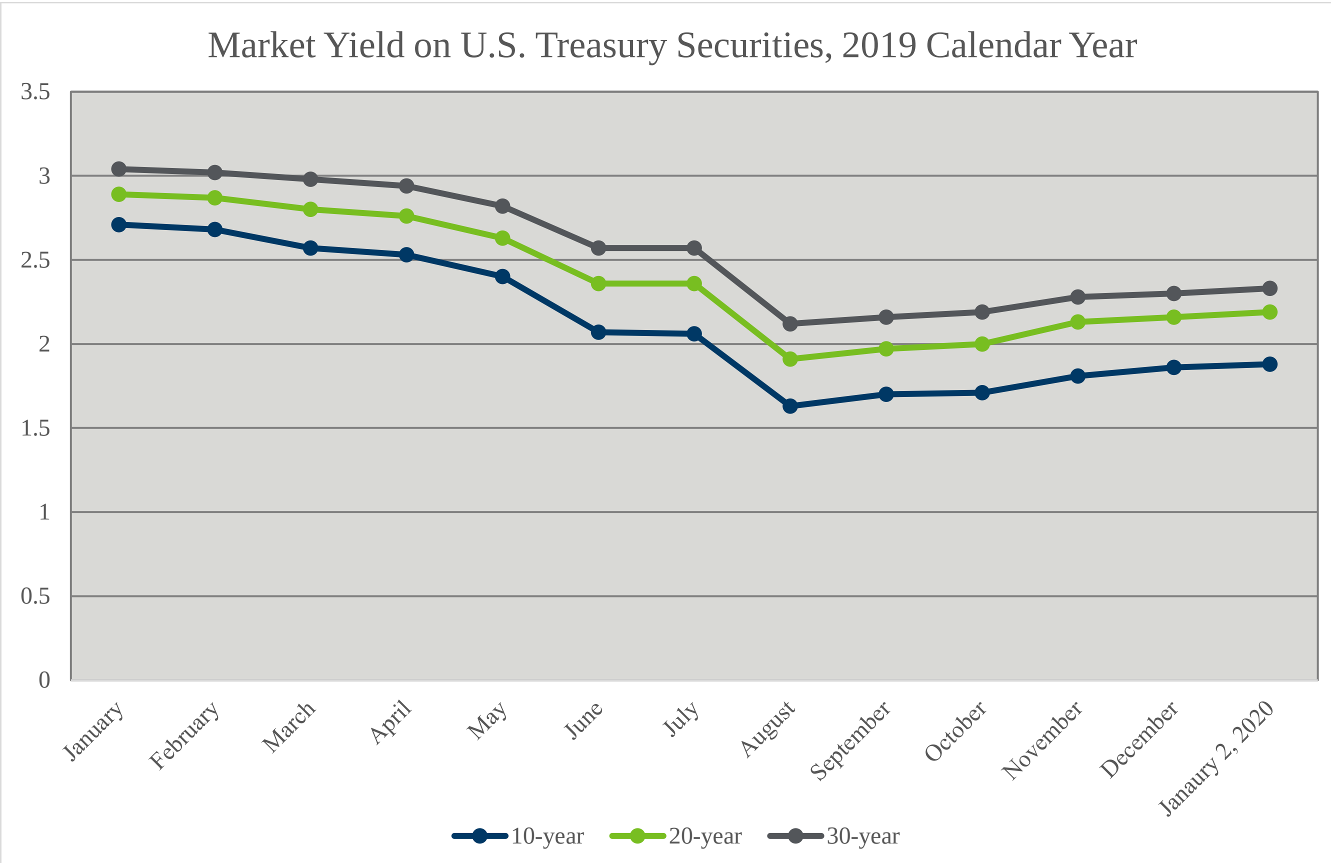
[38] Board of Governors of the Federal Reserve System. January 30, 2019. Federal Open Market Committee. Retrieved January 31, 2019 from https://www.federalreserve.gov/monetarypolicy/fomc.htm

[39] Thorton, D. (2014). Monetary policy: Why money matters (and interest rates don't). *Journal of Macroeconomics.* Volume 40. Pages 202-213. Retrieved January 31, 2019 from http://dx.doi.org/10.1016/j.jmacro.2013.12.005

[40] Fama, Eugene F., Does the Fed Control Interest Rates? (June 29, 2013). The Review of Asset Pricing Studies, Forthcoming; Chicago Booth Research Paper No. 12-23; Fama-Miller Working Paper. Retrieved January 31, 2019 from: https://ssrn.com/abstract=2124039

[41] Except for the normalized rate required to be used in conjunction with the Duff & Phelps equity risk premium.

of January 2, 2020, to match the length of time used in the Yield to Maturities calculation for the cost of debt.




### *Beta*

The beta[42] selected for each market segment indicates the segment's systematic risk relative to the market. The department used the Hamada formula to analyze the effects of un-levering and re-levering guideline companies' betas for the selected capital structure for each market segment, with one exception. [43]

First, we unlevered the beta for each guideline company using the company-specific components:

---

[42] "Beta is the measure of sensitivity of a stock's return to the return on the market portfolio." (p. 340) Brealey, Myers, & Marcus (2009) *Fundamentals of Corporate Finance* 6th ed. McGraw-Hill/Irwan, New York, New York. ISBN 978-0-07-338230.

[43] Guideline companies in the Fluid Transportation Pipeline market segment are limited partnerships and the income tax liability is "passed-through" to the shareholders. Therefore, the Hamada formula, which includes a component for income taxes is not applicable.

Unlevered beta = Levered beta / [1 + (1 – Tax Rate) x (Debt / Equity)].

Next, we re-levered the beta for each guideline company using the average tax rate and the selected capital structure for the market segment:

Re-levered beta = Unlevered Beta x [1 + (1 – Tax Rate) x (Debt / Equity)].[44]

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.[45] 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.[46] 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."[47]

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

**Ex Post** (7.15%)
A long-horizon expected equity risk premium from Duff & Phelps Cost of Capital Navigator.[48] Large company stock total returns minus long-term government bond income returns.[49] As provided in Duff & Phelps Valuation Handbook (2017), the long-term "historical" equity risk premium is calculated as, "the average annual return of the S&P 500 total return index minus the

---

44 Pratt, Shannon and Grabowski, Roger, (2010). *Cost of Capital Applications and Examples,* 4th Ed., Pages 188-189

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

46 Cornell, Bradford, (1999). *The Equity Risk Premium,* Page 18

47 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

48 Duff & Phelps. (2020). *Cost of Capital Navigator*. Historical long-term (1926-present) equity risk premium. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/landing

49 Duff & Phelps. (2017). *Valuation Handbook: Guide to Cost of Capital*. Hoboken: John Wiley & Sons. Chapter 3, Page 1

average annual return of the SBBI long-term (20-year) government bond income return series over the 1926-2016 time period" (p. 5-14). [50]

**Supply Side** (6.17%)
A long-horizon expected equity risk premium forecasted by the use of supply side models from Duff & Phelps Cost of Capital Navigator.[51] 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." [52]

**Three Stage Ex Ante** (5.12%)
A forward looking model using a three-stage dividend growth model of the Standard & Poor's 500. The department calculates this equity risk premium. [53] According to 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." [54]
The department received suggestions for completing a single-stage Ex Ante calculation. The three-stage model:

1. The first stage uses the short-term growth estimate of the S&P 500
2. The second stage applies a linear decline in the growth rate until reaching the long-term expected growth rate of the U.S. economy
3. The third stage uses the long-term expected growth rate of the U.S. economy

Applying the short-term growth rate (11.23%) to a single-stage model would imply that the S&P 500 will continue to grow at 11.23% in perpetuity. Financial theory suggests that the sustainable growth rate used in a single-stage model cannot exceed the long-term growth rate of the economy as a whole. Therefore, the department did not complete a single-stage Ex Ante calculation.

---

[50] Duff & Phelps. (2017). *Valuation Handbook: Guide to Cost of Capital*. Hoboken: John Wiley & Sons. Chapter 5, p. 14.

[51] Duff & Phelps. (2020). *Cost of Capital Navigator*. Supply side (1926-present) equity risk premium. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/landing

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

[53] See Appendix F for this calculation.

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

**Damodaran** (5.20%)
An implied equity risk premium as calculated by Damodaran, Professor of Finance at the Stern School of Business at New York University.[55] Dr. Damodaran estimates equity risk premium using the current level of index, the expected dividends on stock, and the expected growth rate in earnings. The expected growth rate from 1960 to 1985 Dr. Damodaran estimated using historical growth rates. From 1985 onwards, we use the Zacks Investment Research consensus estimate of growth for the stocks in the S&P 500.[56]

Some company representatives have debated that the correct equity risk premium to use as calculated by Damodaran is the historical risk premium comparing Stocks to Treasury Bonds from 1928 to the current year. While this is a similar calculation to the Duff & Phelps equity risk premium and the Ex Post equity risk premium, we find that using Damodaran's forward-looking approach allows for a different calculation than already provided by the other equity risk premium estimates.

**Duff & Phelps** (5%)
A recommended equity risk premium (conditional), to use with 3% "normalized risk-free rate"[57]. Duff & Phelps develops the "Duff & Phelps Recommended ERP [equity risk premium]" and publishes the rate in their Cost of Capital Navigator. As provided by Duff & Phelps Valuation Handbook (2017), "Duff & Phelps employs a multi-faceted analysis to estimate the conditional ERP that takes into account broad range of economic information and multiple ERP estimation methodologies to arrive at its recommendation" (p. 3-38)[58]

**Duke CFO Global Business Outlook Survey** (4.99%)
Duke CFO Global Business Outlook is conducted quarterly. The survey polls CFOs of both public and private companies around the globe. According to the December 2019 Cross-Tab Tables for the United States, the survey results indicate that respondents of the survey expect that the average annual S&P 500 return will be 6.81%. This is paired with the annual yield on 10-year Treasury Bonds of 1.82%.[59] Graham & Harvey also published a paper (2018) regarding their survey. They state, "The hurdle rates are significantly higher than the cost of capital implied

---

[55] Damodaran, Aswath (2020). Implied Equity Risk Premium on January 1, 2020. Retrieved on January 6, 2020 from http://pages.stern.nyu.edu/~adamodar/

[56] Damodaran, A. Variables used in Data Set. http://people.stern.nyu.edu/adamodar/New_Home_Page/datafile/variable.htm

[57] Duff & Phelps. (2020). *Cost of Capital Navigator*. Recommended equity risk premium and normalized risk-free rate. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/landing

[58] Duff & Phelps. (2017). *Valuation Handbook: Guide to Cost of Capital*. Hoboken: John Wiley & Sons. Chapter 3, p. 38.

[59] Duke CFO Global Business Outlook Survey (2020). Retrieved January 10, 2020 from https://www.cfosurvey.org/ and https://www.cfosurvey.org/wp-content/uploads/2019/12/2019-Q4-US-Banners.pdf

by the market risk premium estimates" (p. 1). "Given capital constraints, firms often impose a higher hurdle rate on their investment. For example, to allocate capital to an investment that promises a projected return exactly at a firm's WACC [weighted average cost of capital] is equivalent to accepting a zero net present value project" (p. 9).[60]

**Fernandez, Martinez, and Acin** (5.6%)
A 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. [61]

This formula calculates the market rate of equity using the Capital Asset Pricing Model (CAPM).

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

| Key – Variables in Equations | |
|---|---|
| **$RP_e$** | Equity risk premium |
| **$R_f$** | Risk-free rate |
| **$\beta$** | Beta |

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 2018, putting this approach into play, I estimated an equity risk premium of 5.08% for the S&P 500.* [62]

## *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 to changes in the beta coefficient.

---

[60] Graham, J. R., and Harvey, C. R. (28 March 2018). *The Equity Risk Premium in 2018*. SSRN Electronic Journal. doi:10.2139/ssrn.3155709

[61] Fernandez, P., Martinez, V., and Acín, I. F. (April 2019). *Market Risk Premium and Risk-Free Rate Used for 69 Countries in 2019: A Survey*. SSRN Electronic Journal. doi:10.2139/ssrn3358901

[62] Damodaran, A. 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

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."[63]

This formula calculates the market rate of equity using the Empirical Capital Asset Pricing Model (ECAPM).

Market Rate of Equity for Market Segment = $(RP_e \times \beta \times 75\%) + (RP_e \times 25\%) + R_f$

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

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

## *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.[64] The CAPM assumes that the risk premium portion of a security's expected return is a function of that security's systematic risk.[65]

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.[66]

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

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

When the inputs are not available for the CAPM, one can use the Build-Up Model. The department was able to complete the CAPM for each market segment and did not need to resort to the Build-Up Model.

[63] 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

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

[65] Ibid, p. 105

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

## *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.[67] 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 previously, referred to as Stable Growth Yield Capitalization, using a stable growth rate.

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' expectations 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."[68]

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. We discuss this in detail in the Stock Buybacks section.

| Key – Variables in Equations | |
|---|---|
| **DY** | Dividend Yield |
| **DG** | Dividend Growth |
| **EG** | Earnings Growth |

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. We reviewed both dividend and earnings growth models.

**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

---

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

68 Cornell, Bradford, (1999). *The Equity Risk Premium*, Page 105

Another formulaic expression of the Dividend Growth Model is:

$$K_E = D_1 / P_0 + G_1$$

| | |
|---|---|
| **$K_E$** | 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 |

In this expression, we estimate the Cost of Equity 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 previously. The Stable Growth Yield Capitalization formula is:

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

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

Value Line Investment Survey provides analysts' estimates of change in earnings and dividends from 2016-2018 to 2022-2024. We use these growth rates in the Dividend Growth Model for each market segment.[69]

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. We use this 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."[70] Pratt and Grabowski also state, "Long-term growth rates exceeding the real growth in GDP [Gross Domestic Product] plus inflation are generally not sustainable."[71]

[69] In previous studies, Value Line did not provide sufficient data for earnings or dividend growth rates for guideline companies for the Gas Transmission Pipeline and Fluid Transportation Pipeline market segment. The department used other investment survey estimates. For the 2020 Study, Value Line does have sufficient data for these market segments and the department is using Value Line in order to remain consistent with the other market segments.

[70] 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

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

### *Multi-Stage Dividend Growth Model*

The department completed a multi-stage dividend growth model (multi-stage DGM) to account for the short-term growth estimates available. Unlike the model discussed in the previous section, the multi-stage DGM 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, and then a period of long-term sustainable 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:

$$K_E = (DY \text{ x } (1+.5(G)) + 0.67(G_1) + 0.33(g)$$

| Key – Variables in Equations | |
|---|---|
| $K_E$ | Cost of Equity |
| DY | Dividend Yield |
| $G_1$ | Projected 5-year Growth Rate |
| G | Average of $G_1$ and g |
| g | Stable Growth |

### *Stock Buybacks*

A company's net income represents income that the company can reinvest or distribute to its owners.[72] 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.[73]

Because a company cannot act as its own shareholder, it absorbs repurchased shares, reducing the number of outstanding shares on the market. This increases the relative ownership stake of each investor because there are fewer shares, or claims, on the company earnings. 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.[74] As provided by Sanders and Schumer (2019), "between 2008 and 2017, 466 of the S&P 500 companies spent around $4 trillion on stock buybacks, equal to 53 percent of profits. An additional 40 percent of corporate profits went to dividends."[75] Another article notes, "U.S. companies have spent $1 trillion this

---

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

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

74 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

75 Schumer, C., & Sanders, B. (2019). Schumer and Sanders: Limit Corporate Stock Buybacks. *The New York Times.* Retrieved February 11, 2019 from https://www.nytimes.com/2019/02/03/opinion/chuck-schumer-bernie-sanders.html

year on buying back their own stock – a record figure reached three weeks before year's end."[76] In 2019, the S&P 500 paid an aggregate $485.48 billion to shareholders, up 6.4% from 2018, and marks the eight consecutive year of record payments.[77] The S&P 500 Index spent $806 billion in stock buybacks in 2018 and $370 billion in repurchases during the first half of 2019.[78] Debt-funded repurchases reached a record level of 34% of the total in 2017 with most repurchases funded with cash in 2018.[79]

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

Beginning with the 2018 study, the department analyzed the guideline companies' actual cost of debt and used them to estimate debt rates.[80] For the 2020 study, we will continue to analyze the guideline companies' actual cost of debt as an estimate for each market segment.

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

The department calculated the YTMs for each guideline company based on the following information: the issuers' stated coupon rate, maturity date, settlement date (3 business days following pricing date, the normal settlement for corporate debt), closing market price, and eventual redemption price. As provided by the Western States Association of Tax Administrators Appraisal handbook,

---

[76] Ivanova, I. (2018). U.S. companies spent record $1 trillion buying back own stock this year. *CBS News*. Retrieved February 11, 2019 from https://www.cbsnews.com/news/copmanies-spent-record-1-trillion-buying-back-their-own-stock-this-year/

[77] Badkar, M. (2020). S&P 500 companies paid #485.4bn in dividends last year. *Financial Times*. Retrieved January 8, 2020 from https://www.ft.com/content/69aa638e-3164-11ea-9703-eea0cae3f0de

[78] Lazonikc, W., Sakinc, M. E., & Hopkins, M. (2020). Why stock buybacks are dangerous for the economy. *Harvard Business Review*. Retrieved January 8, 2020 from https://hbr.org/2020/01/why-stock-buybacks-are-dangerous-for-the-economy

[79] Calderone, G. (2019). Debt-financed share buybacks dwindle to lowest level since 2009. *Bloomberg*. Retrieved January 8, 2020 from https://www.bloomberg.com/news/articles/2019-01-27/debt-financed-share-buybacks-dwindle-to-lowest-level-since-2009

[80] In previous years, the department used the Corporate Bond Yield Averages for Public Utility Bonds from Mergent Bond Record as an estimate of the cost of debt for the Electric and Gas Distribution market segments and the Corporate Bond Yield Averages for Industrial Bonds from Mergent Bond Record, for the Gas Transmission Pipeline, Fluid Transportation Pipeline, and Railroad market segments.

> *Four basic conditions are present in a bond: (a) coupon rate, (b) period of years to maturity, (c) present value of the bond, and (d) yield to maturity… Effective rates for new issues and yield to maturity rates based on current market prices usually provide an excellent pattern of debt rates to determine the debt costs of a particular industry. The current cost of a closely held bond issue, which is not publicly traded, can be ascertained by comparing it with similar publicly traded bond with the same risk and term to maturity.*[81]

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

1. Accessed public information available for specific corporate bond mutual funds. This includes either the Form N-Q or Form N-PORT-EX, downloaded from the Securities & Exchange Committee's (SEC) website.[82] For year-end data, we also reviewed information available on the website for specific funds.[83]
2. Pulled out company-specific marketable debt securities data, which include: issue name, coupon rate, maturity date, holding (face) amount, and market value amount.
3. Combined the data with reasonable assumptions to calculate the cost of debt.
4. Derived 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 from the date listed on the fund (12/31/2019).
   - 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.)

---

[81] Western States Association of Tax Administrators (2009). Appraisal Handbook – Unit Valuation of Centrally Assessed Properties, Pages III-28 -29

[82] As part of investment company reporting modernization reforms, Form N-PORT-EX is replacing Form N-Q. https://www.sec.gov/investment/investment-company-reporting-modernization-faq#n-port

[83] Data downloaded on February 11, 2020 from: https://www.tiaa.org/public/investment-performance/mutualfunds/profile?ticker=20739663; https://investor.vanguard.com/mutual-funds/profile/portfolio/VLTCX/portfolio-holdings; and https://www.blackrock.com/us/individual/products/239460/ishares-credit-bond-etf

We calculated 31 of the 39[84] guideline companies' cost of debt and YTM using the method outlined above. For eight companies, we employed a spread analysis tool using long-term debt information from the guideline company's most recently published Form 10-K.

We focused on a long-term average industry YTM.[85] 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.

As provided by Pratt & Grabowski:

> *Traditionally, the relevant market "yield" has been either the yield to maturity or the yield-to-call date. Either of these yields represents the total return the debt holder expects to receive over the life of the debt instrument, including current yield and any appreciation or depreciation from the market price, to the redemption of the debt at either its maturity or its call date, if callable. If the stated interest rate is above current market rates, the bond would be excited to sell at a premium. The yield-to-call date would probably be the appropriate yield, because it is likely to be in the issuer's best interest to call it (redeem it) as soon as possible and refinance it at a lower interest cost. If the stated interest rate is below current market rates, then it usually would not be attractive to the issuer to call it, and the yield to maturity would be the most appropriate rate.*[86]

### *Why use Yield to Maturity?*

The Yield to Maturity (YTM) calculation is the most popular measure of yield in the bond market.[87] YTM represents a summation of the present values of the interest cash-flows that equal the current market price of the bond, as well as the accrued interest due on that principle. The financial sector accepts YTM calculations on secondary corporate bonds as a clear representation of the borrower's current cost of capital for that specific maturity, no matter the issue date.

We used information filed publicly with the Securities and Exchange Committee to calculate the YTM for each guideline company. We used the YTM as the cost of debt for each market segment.

### *Yield to Maturity Example*

The overarching popularity of the YTM calculation stems from its ability to constantly adjust its yield through various interest rate environments over time. For example, let us assume:

- XYZ Corp. comes to market on January 2, 2010, to borrow money for 20 years.

---

[84] The 39 guideline company total does not double count the guideline companies used in both the electric and gas distribution market segments.

[85] The indexed cost of debt analysis in the Capitalization Rate Studies prior to the 2018 assessment year also used a long-term basis.

[86] Pratt, Shannon and Grabowski, Roger. (2010). *Cost of Capital Applications and Examples,* 4th Ed., Pages 65-66

[87] Fabozzi, Frank Ph.D. CFA. (2000). *Fixed Income Analysis*. p.187

- XYZ's prevailing cost of debt is 10%, and its bond is issued with a 10% coupon rate.
- A decade later (January 2, 2020), XYZ's cost of debt is now 5%.

An investor will pay more for the XYZ Corp. bond on January 2, 2020, because the coupon rate of 10% is higher than the market rate of 5%. In this example, the price is $142 – as shown in this table – a $42 premium over the original (par) value of $100.

| Purchase Date | Market Rate | Coupon | Maturity Date | Market Price | Yield to Maturity |
|---|---|---|---|---|---|
| January 2, 2010 | 10% | 10% | January 2, 2030 | $100.00 | 10% |
| January 2, 2020 | 5% | 10% | January 2, 2030 | $142.00 | 5% |

This premium will disappear as time progresses and the bond eventually matures at its par value of $100 on January 2, 2030. An investor who purchases the bond in 2020 does not recover the $42 premium. The bond yields 10% interest each year, but the premium reduces the investor's actual yield for the 10 years they hold the bond to 5% – the bond's YTM.

This behavior explains why cost-of-debt indexes rely on YTM calculations to ensure accuracy in the face of changing market rates. The YTM tracks a company's current cost of debt – even if the company is not currently looking to borrow capital or has not recently borrowed capital.

### 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 Rate)

Appraisers use direct capitalization to convert an estimate of a single year's net operating income expectancy into an indication of value in one direct step.[88]

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

To indicate the market value (value), apply the market observed direct rate to the net operating income (NOI) of the property.

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

| Key – Variables in Equations | |
|---|---|
| $D_0$ | Direct Rate |
| $NOI_1$ | Net Operating Income for the next year |
| **Value** | Market Value |

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

## Guideline Companies

The department selects guideline companies by reviewing 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.[89]

The department reviewed companies in the following Value Line industries as possible guideline companies in our market segments:

| Value Line's Industry | Department's Market Segment |
|---|---|
| Electric Utility (Central, East, and West) | Electric |
| Natural Gas Utility | Gas Distribution |
| Pipeline MLPs, Natural Gas Diversified, Oil/Gas Distribution | Fluid Transportation Pipeline or Gas Transmission Pipeline |
| Railroad | Class I Railroad or Other Railroad |

The department reviewed possible guideline companies to compare their market segments to the companies doing business in Minnesota. We 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, unless, we determine that those companies are still reflective of the subject companies.

### *Guideline Company Updates*

The department updates the list of guideline companies for this study each year, depending on mergers and acquisitions, market activities, and other factors. We summarized this year's changes below. For details on the companies reviewed for each segment, see Guideline Company Selection (page H-1).

**Electric Market Segment**

The department added CenterPoint Energy Inc. as a guideline company. We removed this company from the 2019 Study related to an acquisition that the company completed February 2019.

**Gas Distribution Market Segment**

The department:

- Removed NorthWest Natural Gas Company. This company recently acquired substantial water assets.
- Removed Chesapeake Utilities Corporation as a guideline company because this company generated over half of its 2018 revenues from its unregulated business unit.

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

- Added several guideline companies that are also used in the Electric Market segment. These companies include at least 50% of customers from gas utilities:
    - Black Hills Corporation
    - CenterPoint Energy, Inc.
    - CMS Energy Corporation
    - MGE Energy Inc.
    - WEC Energy Group

  To illustrate that adding these guideline companies does not significantly impact the Gas Distribution Market Segment, the department included analysis of several data points without these companies throughout the Gas Distribution Market Segment Appendix.

**Gas Transmission Pipeline Market Segment**

The department changed from using partnerships to corporations as guideline companies for the Gas Transmission Pipeline market segment during the 2019 assessment year, given the transitions in this market segment at that time. [90] We continued using corporations as guideline companies for the 2020 assessment year. However, we:

- Added Enbridge Inc. They were not included last year, due to a merger with Spectra Energy Partners LP during the 2018 calendar year.[91] According to Enbridge Inc.'s webpage, "Enbridge moves about 20 percent of the natural gas consumed in the United States."[92]

  **Note:** Kinder Morgan Inc. and TC Energy Corporation are currently involved or recently completed partial sales of assets.[93&94.] We included them as guideline companies. We considered the partial sales when selecting the rates for this market segment.

---

[90] For the 2018 assessment year, the department used five guideline companies for the Gas Transmission Pipeline market segment. Four of those companies are limited partnerships. Two of them have reorganized into their parent corporation and are no longer publicly traded. This left only two partnerships we could have used for this market segment.

[91] Enbridge Inc. and Spectra Energy Partners LP announced 12/17/2018 that they completed the previously announced merger, resulting in Enbridge acquiring all of the outstanding public common units of Spectra Energy Partners. Retrieved 12/27/2019 from https://www.enbridge.com/media-center/news/details?id=123546&lang=en

[92] Retrieved 12/27/2019 from https://www.enbridge.com/about-us/natural-gas-transmission-and-midstream

[93] Pembina Pipeline Corporation announced 8/21/2019 that it entered into an agreement to acquire Kinder Morgan Canada Limited and the U.S. portion of the Cochin Pipeline System from Kinder Morgan In. for a total purchase price of approximately $4.35 billion. Retrieved 11/21/2019 from https://www.prnewswire.com/news-releases/pembina-pipeline-corporation-to-acquire-kinder-morgan-canada-and-the-cochin-pipeline-for-4-35-billion-and-increase-dividend-300904977.html

[94] TC Energy Corporation announced 7/2/2019 that it entered into an agreement to sell its U.S. midstream assets held by its subsidiary, Columbia Midstream Group, to UGI Energy Services, LLC, a subsidiary of UGI Corporation, for approximately $.1275 billion. Retrieved 11/27/2019 from https://www.globenewswire.com/news-release/2019/07/03/1877639/0/en/TC-Energy-enters-agreement-to-sell-Columbia-Midstream-assets-for-US-1-275-billion.html

**Fluid Transportation Pipeline Market Segment**
The department:

- Removed Buckeye Partners LP. It is no longer publicly traded.
- Removed MPLX LP. It announced on July 30, 2019 that it completed its acquisition of Andeavor Logistics LP in a unit-for-unit transaction and assumption of approximately $5 billion of debt.[95]
- Added NuStar Energy LP. We removed it for the 2019 study related to a merger that it since completed.

**Class I Railroad and Other Railroad Market Segments**
The department did not make any changes to the guideline companies in the Class I Railroads and Other Railroads market segments.

**Note:** Genesee & Wyoming Inc. (G&W) (NYSE:GWR) announced December 30, 2019 the completion of its previously announced sale to affiliates of Brookfield Infrastructure and GIC. Under the terms of the sale, each issued and outstanding share of G&W common stock converted into the right to receive $112 in cash. As a result of the completion of the sale, G&W's common stock ceased trading on the NYSE prior to market open today and will no longer be listed for trading on the NYSE.[96] Even though the company was recently acquired and is no longer publicly traded, we were able to use the financial information available prior to acquisition in order to include Genesee & Wyoming as a guideline for the 2020 Capitalization Rate Study. We considered the acquisition when selecting rates for this market segment.

For the 2021 assessment year, Genesee & Wyoming will not be publicly traded and we will not use it as a guideline company. At that time, we will consider using only one rate to apply to all railroads that we value. We will consider not developing two separate rates for the railroad market segment as is done in this study.

## Equity Component

The department used an inverse of the Price to Earnings (P/E) Ratio to estimate the equity component in the direct rate. For this estimate, we used the Price to Earnings Ratio (P/E Ratio) as calculated by Value Line Investment Survey; if the P/E Ratio was not calculated, we used the Trailing P/E Ratio as calculated by Value Line. We selected the P/E ratio most indicative of the market segment data. The inverse of the selected ratio is the equity component of the direct rate.

---

[95] Retrieved 11/27/2019 from https://www.prnewswire.com/news-releases/mplx-completes-acquisition-of-andeavor-logistics-300893108.html

[96] https://ir.gwrr.com/press-release/acquisitions-investments/genesee-wyoming-announces-completion-sale-brookfield, accessed 1/7/2020

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

## Debt Component

Beginning with the 2018 study, the department analyzed the guideline companies' actual cost of debt and used them to estimate debt rates.[97] For the 2020 study, we will continue to analyze the guideline companies' actual cost of debt as an estimate for each market segment.

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

The department calculated the YTMs for each guideline company based on the following information: the issuers' stated coupon rate, maturity date, settlement date (3 business days following pricing date, the normal settlement for corporate debt), closing market price, and eventual redemption price. As provided by the Western States Association of Tax Administrators Appraisal handbook,

> *Four basic conditions are present in a bond: (a) coupon rate, (b) period of years to maturity, (c) present value of the bond, and (d) yield to maturity… Effective rates for new issues and yield to maturity rates based on current market prices usually provide an excellent pattern of debt rates to determine the debt costs of a particular industry. The current cost of a closely held bond issue, which is not publicly traded, can be ascertained by comparing it with similar publicly traded bond with the same risk and term to maturity.*[98]

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

1. Accessed public information available for specific corporate bond mutual funds. This includes either the Form N-Q or Form N-PORT-EX, downloaded from the Securities & Exchange

[97] In previous years, the department used the Corporate Bond Yield Averages for Public Utility Bonds from Mergent Bond Record as an estimate of the cost of debt for the Electric and Gas Distribution market segments and the Corporate Bond Yield Averages for Industrial Bonds from Mergent Bond Record, for the Gas Transmission Pipeline, Fluid Transportation Pipeline, and Railroad market segments.

[98] Western States Association of Tax Administrators (2009). Appraisal Handbook – Unit Valuation of Centrally Assessed Properties, Pages III-28 -29

Committee's (SEC) website.[99] For year-end data, we also reviewed information available on the website for specific funds.[100]

2. Pulled out company-specific marketable debt securities data, which include: issue name, coupon rate, maturity date, holding (face) amount, and market value amount.
3. Combined the data with reasonable assumptions to calculate the cost of debt.
4. Derived 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 from the date listed on the fund (12/31/2019).
   - 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 calculated 31 of the 39[101] guideline companies' cost of debt and YTM using the method outlined above. For eight companies, we employed a spread analysis tool using long-term debt information from the guideline company's most recently published Form 10-K.

We focused on a long-term average industry YTM.[102] 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.

As provided by Pratt & Grabowski:

> *Traditionally, the relevant market "yield" has been either the yield to maturity or the yield-to-call date. Either of these yields represents the total return the debt holder expects to receive over the life of the debt instrument, including current yield and any appreciation or depreciation from the market price, to the redemption of the debt at*

---

[99] As part of investment company reporting modernization reforms, Form N-PORT-EX is replacing Form N-Q. https://www.sec.gov/investment/investment-company-reporting-modernization-faq#n-port

[100] Data downloaded on February 11, 2020 from: https://www.tiaa.org/public/investment-performance/mutualfunds/profile?ticker=20739663; https://investor.vanguard.com/mutual-funds/profile/portfolio/VLTCX/portfolio-holdings; and https://www.blackrock.com/us/individual/products/239460/ishares-credit-bond-etf

[101] The 39 guideline company total does not double count the guideline companies used in both the electric and gas distribution market segments.

[102] The indexed cost of debt analysis in the Capitalization Rate Studies prior to the 2018 assessment year also used a long-term basis.

*either its maturity or its call date, if callable. If the stated interest rate is above current market rates, the bond would be excited to sell at a premium. The yield-to-call date would probably be the appropriate yield, because it is likely to be in the issuer's best interest to call it (redeem it) as soon as possible and refinance it at a lower interest cost. If the stated interest rate is below current market rates, then it usually would not be attractive to the issuer to call it, and the yield to maturity would be the most appropriate rate.*[103]

### Why use Yield to Maturity?

The Yield to Maturity (YTM) calculation is the most popular measure of yield in the bond market.[104] YTM represents a summation of the present values of the interest cash-flows that equal the current market price of the bond, as well as the accrued interest due on that principle. The financial sector accepts YTM calculations on secondary corporate bonds as a clear representation of the borrower's current cost of capital for that specific maturity, no matter the issue date.

We used information filed publicly with the Securities and Exchange Committee to calculate the YTM for each guideline company. We used the YTM as the cost of debt for each market segment.

### Yield to Maturity Example

The overarching popularity of the YTM calculation stems from its ability to constantly adjust its yield through various interest rate environments over time. For example, let us assume:

- XYZ Corp. comes to market on January 2, 2010, to borrow money for 20 years.
- XYZ's prevailing cost of debt is 10%, and its bond is issued with a 10% coupon rate.
- A decade later (January 2, 2020), XYZ's cost of debt is now 5%.

An investor will pay more for the XYZ Corp. bond on January 2, 2020, because the coupon rate of 10% is higher than the market rate of 5%. In this example, the price is $142 – as shown in this table – a $42 premium over the original (par) value of $100.

| Purchase Date | Market Rate | Coupon | Maturity Date | Market Price | Yield to Maturity |
|---|---|---|---|---|---|
| January 2, 2010 | 10% | 10% | January 2, 2030 | $100.00 | 10% |
| January 2, 2020 | 5% | 10% | January 2, 2030 | $142.00 | 5% |

This premium will disappear as time progresses and the bond eventually matures at its par value of $100 on January 2, 2030. An investor who purchases the bond in 2020 does not recover the $42 premium. The bond yields 10% interest each year, but the premium reduces the investor's actual yield for the 10 years they hold the bond to 5% – the bond's YTM.

---

[103] Pratt, Shannon and Grabowski, Roger. (2010). *Cost of Capital Applications and Examples,* 4th Ed., Pages 65-66

[104] Fabozzi, Frank Ph.D. CFA. (2000). *Fixed Income Analysis*. p.187

This behavior explains why cost-of-debt indexes rely on YTM calculations to ensure accuracy in the face of changing market rates. The YTM tracks a company's current cost of debt – even if the company is not currently looking to borrow capital or has not recently borrowed capital.

## 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.[105] The correct procedure for the economic analysis of flotation costs does not alter the weighted average cost of capital.[106]

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. The department does not make flotation cost adjustments 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 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."[107]

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.[108]

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.

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

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

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

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

## Company-Specific Risk

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

The department does not include size premium adjustments based on the guideline companies' average market capitalization size; we do 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.[109] 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.[110]

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."[111]

Similarly, the equity risk premium surveys by Graham and Harvey find no evidence that the weighted average cost of capital is larger for smaller firms.[112]

## 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 illiquidity, management, and various risks – a discount rate that is constructed by adding allowances for these components can be misleading and inaccurate" (p. 458).*[113]

109 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

110 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.

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

112 Graham, J. R., and Harvey, C. R. (28 March 2018). The Equity Risk Premium in 2018. SSRN Electronic Journal. doi:10.2139/ssrn.3155709

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

# Growth

The growth rate is important because 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 anticipated net cash flows for each period. These inputs can be estimated by the department if they are not provided by the company.

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."[114] 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."[115]

## 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.

Zacks Investment Research provides industry growth estimates for the next five years, by industry. We downloaded this data on December 30, 2019.

| Electric | Gas Distribution | Gas Transmission Pipeline | Fluid Transportation Pipeline | Class I Railroads | Other Railroads |
|---|---|---|---|---|---|
| 6.7% | 7.2% | 5.0% | 4.7% | 8.7% | 8.7% |

We compared the median growth rates for each market segment from CFRA (from S&P NetAdvantage), Reuters, Value Line Investment Survey, Yahoo! Finance, and Zacks Investment Research.

[114] Ibid., Page III-9

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

| Source | CFRA[116] | Reuters[117] | Value Line[118] Earnings | Value Line Dividends[119] | Yahoo! Finance[120] | Zacks[121] |
|---|---|---|---|---|---|---|
| Electric | 5.00% | 5.70% | 5.50% | 5.50% | 4.83% | 5.83% |
| Gas Distribution | 6.00% | 5.90% | 7.25% | 6.00% | 4.80% | 6.10% |
| Gas Transmission Pipeline | 16.00% | 12.49% | 17.00% | 6.00% | 8.00% | 6.40% |
| Fluid Transportation Pipeline | 21.00% | 15.85% | 9.50% | 5.50% | 6.22% | 2.50% |
| Class I Railroads | 10.00% | 13.48% | 13.25% | 10.00% | 9.28% | 10.44% |
| Other Railroads | N/A | -3.10% | 13.50% | --- | 8.04% | N/A |

The median short-term growth rate for each market segment from the above sources is:

| Electric | Gas Distribution | Gas Transmission Pipeline | Fluid Transportation Pipeline | Class I Railroads | Other Railroads |
|---|---|---|---|---|---|
| 5.5% | 6.0% | 10.2% | 7.9% | 10.2% | 8.0% |

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

---

116 CFRA (as downloaded from S&P NetAdvantage) three-year projected earnings per share compound annual growth rate. CFRA stock reports dated December 21 – 23, 2019.

117 Reuters five-year earnings per share growth rates downloaded December 27, 2019.

118 Value Line Investment Survey provides estimated growth rates for dividends and earnings 2016-2018 to 2022-2014. Value Line tear sheets are dated October 25, 2019 – December 13, 2019.

119 Value Line Investment Survey provides estimated growth rates for dividends and earnings 2016-2018 to 2022-2014. Value Line tear sheets are dated October 25, 2019 – December 13, 2019.

120 Yahoo! Finance growth estimates, next five years (per annum) downloaded on December 30, 2019.

121 Zacks Investment Research provides expected earnings per share growth (3-5 years). Data downloaded December 30, 2019.

of the economy in which it operates, the constant growth rate cannot be greater than the overall growth rate of the economy."[122] These sources indicate varying rates of growth in the U.S. economy over the long-term:

- The market yield on 30-year U.S. Treasury was 2.33% on January 2, 2020.[123]
- The Federal Reserve Bank projects their "longer run" estimate of change in U.S. real Gross Domestic Product (GDP) at 1.9%[124].
- The World Bank forecasts U.S. GDP will grow 1.4% in 2020, 1.5% in 2021, and 1.5% in 2022.[125]
- Trading Economics projects the U.S. GDP annual growth rate to trend around 1.8% in 2020.[126]
- The Economist Intelligence Unit forecasts U.S. real GDP will grow 1.9% from 2019 to 2050.[127]
- The Congressional Budget Office projects that real GDP will grow 2.2% in 2020, 1.9% in 2021, and 1.7% in 2022. The CBO projects that real GDP will grow at an annual average of 1.6% in 2023 to 2024, and 1.7% from 2025 to 2030.[128]
- The International Monetary Fund projects U.S. real GDP growth at 1.6% in 2024.[129]

---

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

[123] Board of Governors of the Federal Reserve System, H.15, Selected Interest Rates, Market Yield on U.S. Treasury Securities 30-year constant maturity quoted on investment bases, daily observations, January 2, 2019. Accessed on January 22, 2019 from http://www.federalreserve.gov/

[124] Board of Governors of the Federal Reserve System, Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents under their individual assessments of projected appropriate monetary policy. December 2019 Retrieved December 17, 2019 from https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20191211.pdf

[125] World Bank Group Flagship Report, Global Economic Prospects: Slow growth, policy changes. January 2020. Page 4. Retrieved January 13, 2020 from http://www.worldbank.org/en/publication/global-economic-prospects

[126] Trading Economics, United States GDP Growth Rate Forecast. Retrieved February 5, 2020 from https://tradingeconomics.com/united-states/gdp-growth

[127] The Economist Intelligence Unit. September 1, 2019 Retrieved December 18, 2019 from http://country.eiu.com/article.aspx?articleid=1418456125&Country=United States&topic=Economy&subtopic=Long-term+outlook&subsubtopic=Summary

[128] Congressional Budget Office. (January 2020). The Budget and Economic Outlook: 2020 to 2030. Retrieved January 28, 2020 from https://www.cbo.gov/system/files/2020-01/56020-CBO-Outlook.pdf

[129] International Monetary Fund. World Economic Outlook: Challenges to Steady Growth. October 2019. Retrieved on December 18, 2019 from https://www.imf.org/en/Publications/WEO/Issues/2019/10/01/world-economic-outlook-october-2019

After considering the above sources, the department finds the indicated long-term real growth rate of the U.S. economy to be 1.9%.

## 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.[130]

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."[131] According to Damodaran, "An inflation-indexed Treasury security does not offer a guaranteed nominal return to buyers, but instead provides a guaranteed real return."[132]

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."[133] 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."[134]

The U.S. Treasury issues inflation-indexed securities. Comparing the inflation-indexed securities to the non-inflation indexed securities, one can calculate the inflation rate. Using the 10-year, 20-year, and 30-year securities, the department calculated the inflation rates as of January 2, 2020.[135]

| | 10-Year | 20-Year | 30-Year |
|---|---|---|---|
| Calculated Inflation | 1.80% | 1.87% | 1.83% |

130 http://economictimes.indiatimes.com/definition/inflation

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

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

133 Cornell, Bradford, (1999). *The Equity Risk Premium*, Page 29

134 Ibid. Page 31

135 Difference between inflation-indexed and non-inflation indexed securities for 10-year, 20-year, and 30-year daily rates as of January 2, 2020. Retrieved January 6, 2020 from www.federalreserve.gov

The Update to the Budget and Economic Outlook: 2020-2030, published by the Congressional Budget Office (CBO), estimates that inflation for personal consumption expenditures will change from year to year by 2% in 2020 and 2.1% in 2021 and 2022, 2% 2023 to 2024, and 1.9% 2035 to 2030.[136]

The Federal Reserve Board members and the Federal Reserve Bank presidents estimated the longer-run personal consumption expenditures inflation rate at 2%.[137]

The department used the expected, longer-run personal consumption expenditures inflation rate of 2% as the estimate of inflation for this study.

Given the indicated long-term real growth rate of 1.9% and the expected inflation rate of 2%, the department estimates the long-term growth rate at 3.9%.[138]

## 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.

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 2017 Purchase Price Allocation Study, published in December 2018.[139] The Houlihan Lokey 2018 Purchase Price Allocation Study is not yet published as of April 2020. The department is relying on the 2017 Purchase Price Allocation Study as the 2018 Purchase Price Allocation Study was not available in time for this publication. Houlihan Lokey reviewed public filings for 1,266 completed transactions in 2017. Search criteria included transactions that closed in 2017, acquirer was a U.S. publicly traded company,

---

136 Congressional Budget Office. (January 2020). The Budget and Economic Outlook: 2020 to 2030. Retrieved January 28, 2020 from https://www.cbo.gov/system/files/2020-01/56020-CBO-Outlook.pdf

137 Board of Governors of the Federal Reserve System, Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents under their individual assessments of projected appropriate monetary policy. December 2019 Retrieved December 17, 2019 from https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20191211.pdf

138 As provided by Pratt & Grabowski, "Long-term growth rates exceeding the real growth in GDP plus inflation are generally not sustainable" (p. 1195). Pratt, Shannon and Grabowski, Roger, (2014). *Cost of Capital Applications and Examples,* 5th Ed.

139 Houlihan Lokey. (December 2018). *2017 Purchase Price Allocation Study*. Retrieved February 6, 2019 from https://houlihanlokey.lpages.co/2017-purchase-price-allocation-study/

ownership percentage sought by acquirer was 50% or greater, and base equity purchase price was disclosed. There was sufficient disclosures for 404 transactions.

The Houlihan Lokey study reviews the amount of purchase consideration allocated to tangible assets, identifiable intangible assets, and goodwill.[140] The 2017 study finds that:

- The median percentage of purchase consideration allocated to intangible assets in 2017 and 2016 was 35% and 33%, respectively (p. 17).
- The median percentage of purchase consideration allocated to goodwill in 2017 and 2016 was 40% and 36%, respectively (p. 17).
- Larger transactions generally recorded lower allocations to intangible assets and higher allocations to goodwill (p. 24).
- Indefinite-lived intangible assets accounted for approximately 12% of the total intangible asset value. Trademarks and trade names were the most common intangible assets to be considered indefinite lived (p. 27).
- Notable transaction activities in the Energy industry included:
  - Enbridge Inc. acquiring Spectra Energy Corp, with a purchase consideration of $62,158 million with 2% allocated to intangible assets
  - EQT Corporation acquiring Rice Energy Inc. with a purchase consideration of $11,675 million with 6% allocated to intangible assets.
- Seventy-one percent of the transactions allocated 25% or more of purchase consideration to goodwill. The mean and median allocations of purchase considerations to goodwill were 40% and 39%, respectively (p. 47).

## Public Comments on Draft Study

The department posted the Draft 2020 Capitalization Rate Study (Draft Study) on our website February 28, 2020. We accepted comments on the Draft Study until March 28, 2020. We appreciate the thoughtful responses we received. Your opinions and feedback are important, and we carefully considered every comment.

We received comments from ALLETE Inc. (electric), Northern States Power/Xcel Energy Inc. (electric and gas distribution), Enbridge Energy LP (fluid transportation pipeline), NuStar Pipeline Operating Partnership (fluid transportation pipeline), BNSF Railway (railroad), and Union Pacific Railroad (railroad).

This section summarizes the comments we received on the Draft Study, including our responses:

- Overall reduction in yield rates
- Additional guideline company considerations

[140] "PC [purchase consideration] is defined as the sum of the purchase price paid and liabilities assumed in connection with a business combination. PC is equivalent to the fair value of the total assets of the target" *Ibid*, page 15.

- Cost of debt
- Cost of equity
    - Less or no reliance on the Capital Asset Pricing Model
    - More or all reliance on the Dividend Growth Model
    - Comparing the department’s cost of equity to the allowed rate of return established by regulatory agencies
- Additional adjustments
    - Flotation costs
    - Illiquidity
    - Size premium
    - Use longer-term averages rather than year-end data
    - Electric market segment’s cost of capital should be at least as high as the gas distribution market segment
- Direct Capitalization Rate
- Additional models

## Overall Reduction in Yield Rates

Some comments focused on the decrease in the yield rates in the Draft Study compared to the department’s 2019 Capitalization Rate Study. Comments expressed concern about the percentage decrease, concern that the rates may rebound in the following assessment and concerns that change in yield rate represents a large impact on a company’s individual valuation, holding all else equal.

The Minnesota Department of Revenue determines the estimated market value[141] for utility, pipeline, and railroad operating property, as of January 2 each year. The department determines the unit value of the entire system[142] to estimate the market value of these properties.

The department’s Property Tax Division determines the unit value of these systems, in part, with the income capitalization approach to valuation. The department completes the Capitalization Rate Study each year to develop rates to use in the income approach for these systems. Both the individual valuation

---

[141] Minnesota Statutes, section 272.03, subdivision 8 defines market value as, “the usual selling price at the place where the property to which the term is applied shall be at the time of assessment; being the price which could be obtained at a private sale or auction sale, if it is determined by the assessor that the price from the auction sale represents an arm’s length transaction. The price obtained at a forced sale shall not be considered.

[142] Minnesota Rules, Chapter 8100.0100, subpart 16 defines unit value as, “the value of the entire system of a utility company taken as a whole without regard to the value of its component parts.” Minnesota Rules, Chapter 8106.0100, subpart 20 defines unit value as, “the value of the system of a railroad company taken as a whole without any regard to the value of its component parts.”

and the study use information known or knowable as of January 2 each year. The department completes the study based on empirical market data and independent of the valuations.

Some comments expressed concern about the percentage decrease in yield rate for their market segment. The department reviewed the percentage decreases and noted that several inputs and data points within the study for every market segment decreased. Specifically, the risk free rate used in the Capital Asset Pricing Model decreased over 21% in the current study compared to the previous year's study. There are numerous inputs and judgments when calculating yield rates. The department updates the inputs annually based on year-end information, as available. Analyzing each input separately, holding all else constant, a majority of the inputs caused a decrease in the yield rates for each market segment. Some inputs would cause an increase in the yield rates, but were outweighed by the decreases. The department detailed changes in inputs from the 2019 Capitalization Rate Study to the Draft Study at the State Assessed Property Spring Forum, held on March 11, 2020. You can view the 2020 Spring Forum Presentation on the State Assessed Property Forums webpage.

The department uses judgment throughout the selection of reconciled rates in the study. The department generally selects the mean or median results of the guideline companies. The exception to this is selecting the reconciled cost of equity. In the Draft Study, the department placed equal reliance on the Capital Asset Pricing Model using an Ex Post equity risk premium and the Dividend Growth Model using estimate of earnings growth as the indicated rate of equity for each market segment. In the 2019 Capitalization Rate Study, the department placed the greatest reliance on the Dividend Growth Model using estimate of earnings growth and secondary reliance on the Capital Asset Pricing Model using the Ex Post equity risk premium. In the Draft Study, the department placed less reliance on the Dividend Growth Model using estimate of earnings growth compared to the 2019 Capitalization Rate Study as the estimate of earnings growth is a 3-5 year growth estimate.

After reviewing the comments on the Draft Study, the department shifted some of the reliance on the Capital Asset Pricing Model to the Dividend Growth Model when selecting the indicated rate of equity for each market segment. The reliance on each model for this study is now closely related to the reliance placed on the models in the 2019 Capitalization Rate Study.

**Predictability and Stability**

Some comments suggested that the department consider the budgeting challenges for local counties and utility customers because of a significant decrease in the yield rate. The comments suggested that the current market swings may continue, creating opposite result year after year, which are inconsistent and unpredictable.

The department values property as of January 2, each year. The department considers information and data that is known or knowable as of January 2. Each year, the data changes as markets are in a continual state of change and market forces constantly influence the value of property.

## Additional Guideline Companies

**Electric Market Segment**

Comments requested the department include a broader selection, without regard to location, or include at least three additional guideline companies in the electric market segment: El Paso Electric Company, PNM Resources Inc., and Portland General Electric Company. The electric market segment uses 15 guideline companies. Including additional guideline companies from Value Line Investment Survey's

Electric Utility West and Electric Utility East, without regard to location, would increase the number of guideline companies to 37. The department observes that it would not be a fair reflection to include only the three selected guidelines without considering why those three were selected out of the additional 22 available companies. The department does not find that we need to include 22 additional guideline companies from different parts of the county as the department has sufficient guideline companies for the electric market segment that are currently operating in or near the market as the department's subject companies. The department agrees that the size of the subject company is important, it is also important to consider the size of a likely buyer.

It is difficult to speculate the overall impact to the yield rate by including the three additional guideline companies. However, based on an analysis of the Draft Study as published and the Draft Study with the three additional companies, the following changes indicate that the rate either would not change significantly or would decrease:

- the capital structure would shift less than 100 basis points, possibly round to the same capital structure used in the Draft Study
- the beta would remain the same
- equity component decreases slightly
- the multi-stage DGM would decrease slightly
- the median DGM – Earnings would decrease
- the median DGM – Dividends would increase
- the Capital Asset Pricing Models would not change since the beta did not change

Two of the three suggested additional guideline companies have not appeared to issue debt during 2019 for the department to consider in the cost of debt analysis. One of the guideline companies did and would potentially increase the cost of debt for the market segment by less than 4 basis points

**Fluid Transportation Pipeline Market Segment**

Comments requested the department consider including Shell Midstream LP as a guideline company for the fluid transportation pipeline market segment. The comment indicates that Shell Midstream is one of the seven fluid pipelines included in the Value Line data.

The department reviewed 38 companies in Value Line's Pipeline MLP [master limited pipeline] industry and selected five of those as guideline companies for the fluid transportation pipeline market segment. It is unclear to the department why Shell Midstream LP should be considered above the other 33 companies in the industry that the department did not include. As mentioned in Appendix H, Guideline Company Selection, Shell Midstream Partners entered into an agreement to increase their ownership share of Explorer Pipeline, which was expected to close in the second quarter of 2019.[143] Given the timing of the acquisition, the department observes that the company's interest in Explorer increased

[143] https://www.shellmidstreampartners.com/news-releases/news-release-details/shell-midstream-partners-lp-announces-agreement-acquire, accessed 1/7/2020

from 2.62% to 38.59% during the middle of the 2019 calendar year. The increased interest is not fully reflected in the company's financials.

## Cost of Debt

The department received several comments related to the yield to maturity calculations used to estimate the cost of debt for each market segment. Several comments suggested the department utilize Mergent Bond Record's yield averages as opposed to the department's yield to maturity calculations for different reasons. We summarized the comments about the cost of debt in the following topics:

- Bond ratings
- Calculation concerns
- Data source concerns
- Difference between Mergent bond yield averages and department's yield to maturity calculations

**Bond Ratings**

Some comments suggested that the yield to maturity calculations estimate the cost of debt at levels equivalent to better ratings than the guideline companies. The example provided included the debt rating for the guideline companies around Baa, yet the department's yields were equivalent to Mergent Bond Ratings for companies rated Aa.

Some comments suggested that because the department's cost of debt analysis compares a guideline company's yield to maturity to the Treasury High Quality Market Corporate Bond Yield Curve that the department is not properly adjusting for the rating of the guideline company. The commenter indicated that because the HQM Curve utilizes U.S. Corporate bonds with credit ratings of –AAA, AA, and A, that the department needs to make an additional adjustment if the guideline company is not rated at that level.

The department compares the guideline company's yield to maturity for the selected debt issuance to the High Quality (Corporate Bond spot rate) Market Curve and uses this spread to extrapolate yields across future maturities. The extrapolated yields include the difference for the guideline company and the guideline company's rating, to the HQM Curve.

The yield to maturity results are different from the Mergent Bond yield average. The department performs thorough analysis of which guideline companies to select for each market segment (see Appendix H for detailed analysis of guideline company selection).

Mergent Bond yield averages based on debt rating do not include a list of the companies included in the Public Utility Bonds and Industrial Bonds yield averages. In addition to not being able to review the companies included, the debt issuances, reviewed, etc., the Mergent Bond yield average for industrial bonds rated Aa is 3%, which is lower than yield average for industrial bonds rated Aaa, which is 3.01%.

The department provides the guideline companies analyzed. The department also provides the debt issuances reviewed and which issuances were included in our calculations to estimate the cost of debt. We are not able to analyze the companies or debt issuances included in Mergent Bond Record yield averages. Limiting analysis to the selected guideline companies provides a more accurate reflection of the market segment than using averages.

Specifically for the fluid transportation market segment, one commenter pointed out that three guideline companies have debt ratings below investment grade and questions how the department calculated a cost of debt near investment grade level for the market segment.

The department notes that although the debt rating for some guideline companies is below investment grade, the yield to maturity calculations factors in the company's specific debt issuance and the coupon, face, and market value of a particular issuance. The yield to maturity calculation considers the actual cost for a guideline company's recently issued debt.

**Calculation concerns**

Some comments suggested that the department's yield to maturity calculation includes errors because the spread calculated for each guideline company's yield to maturity compared to the HQM Curve only uses one debt issuance for each guideline company.

The department utilizes one debt issuance for each guideline company as it encompasses all of the credit risks thereby determined by the market at that time. Not unlike dividends demanded by investors, the YTM is the suitable amount of interest a lender would need to compensate them for all risks currently presented to them. That YTM is then spread across the HQM to reach the study's risk-free rate maturity.

**Data source concerns**

Some comments questioned the number of data sources the department used for each guideline company's debt issuances used in the yield to maturity calculations.

The department lists each issuance we reviewed in Appendix G and highlights the selected issuance for each guideline company.

Another comment suggested that the department's reduction in issuances listed in Appendix G in the Draft Study compared to the 2019 Capitalization Rate Study is a concern of the data quality. The comments pointed to companies listed in Appendix G in the 2019 study, which reflect subsidiaries of the guideline companies. The comments suggest that because the department no longer lists subsidiaries that the department is changing its position, making the analysis difficult to follow, understand, and rely on. Comments continued that the department updated its source data for issuances from the Securities & Exchange Committee's (SEC) Form N-Q (now N-PORT) to mutual fund websites.

Because of the comment, the department included issuances for subsidiaries in Appendix G. The department placed most reliance on the guideline company when selecting the issuance to utilize for the cost of debt analysis. As the SEC changes from Form N-Q to N-PORT, the department found the necessary information as of December 31 on the mutual funds' websites rather than the SEC website. The department will utilize Form N-Q/ N-PORT if available when compiling data for the study each year. However, if the N-Q/N-PORT is not yet available, the department will subsequently use the mutual funds' websites.

Comments suggested that it is not accurate to utilize debt issuance information from a guideline company's 10-K when the issuance information is not available from a mutual fund data source because the date most likely does not match the HQM Curve.

The department utilizes the best available information that is known or knowable as of January 2 and accessible at the time of compiling data for this study. Although the issuances in the 10-K may not be as of December 31, 2019, the yields listed for the issuances are strongly correlated with the HQM. Given the strong correlation and subsequent direct placement with accredited investors, the department finds the issuances listed in the 10-K to be reliable indication of the cost of debt for the company

Comments suggested that the department should not include short-term debt issuances in our cost of debt analysis.

With respect to debt markets, the short-term is typically defined as a bond with under 1 year to maturity. The Department does not use short-term debt, under this definition, in its cost of debt calculation.

**Difference between Mergent bond yield averages and department's yield to maturity calculations**
Some comments suggested that the difference between the Mergent bond yield averages and the department's yield to maturity calculations is a cause for concern and questioned the data used in the department's calculations.

The department also has questions about the Mergent bond yield average calculations because the department would like to limit the analysis to the selected guideline companies and analyze which issuances are used and how yields are calculated. The department also notes that the yield for Aa industrial rated bonds is lower than the yield for the higher rated Aaa industrial rated bonds.

The department provides the guideline companies we analyzed. The department provides the debt issuances we reviewed and which issuances we included in our calculations to estimate the cost of debt. This information is missing from the Mergent Bond Record yield averages.

Comments indicated that the Mergent Bond Record is a long standing and well-respected source of information for bond data, also used by other states completing similar studies. The department agrees that Mergent is well respected. However, the department completes our own cost of debt analysis to allow greater transparency in the calculations and to identify guideline companies and issuances used. Using guideline companies provides a more accurate reflection of the market segment than using averages.

## Cost of Equity

Several comments related to the selected cost of equity. These comments, although using different means, would result in a higher cost of equity. We summarized the comments about the cost of equity in the following topics:

- Less or no reliance on the Capital Asset Pricing Model
- More or all reliance on the Dividend Growth Model
- Comparing the department's cost of equity to the allowed rate of return established by regulatory agencies
- Using averages instead of medians
- Changing certain calculations from guideline-specific to averages of all guidelines

**Less or no reliance on the Capital Asset Pricing Model**
One comment suggested that the indicated cost of equity determined by the Capital Asset Pricing Models are not realistic for regulated market segments.

The Capital Asset Pricing Model is a widely accepted model. The commenter provided a press release dated November 21, 2019 from the Federal Energy Regulatory Commission that stated, "it will use the DCF [Discounted Cash Flows] model and capital asset pricing model to determine if an existing base ROE [return on equity] is unjust and unreasonable, and, if so, what replacement ROE is appropriate. The Commission found these models are the two method investors most commonly use to estimate the cost of equity."[144] The department notes that the commenter included this reference as an indication that regulators allow a higher return on equity than the cost of equity determined in the department's study. For the department's response on regulators' allowed rates of return, see below.

Comments suggested that the risk-free rate used by the department puts downward bias on all of our Capital Asset Pricing Model calculations. One commenter continued that other cost of capital studies make adjustments to the risk-free rate. Duff & Phelps' is provided as an example.

The department notes that while Duff & Phelps' recommended equity risk premium is paired with an adjusted risk-free rate, the resulting indicated cost of equity is lower than Capital Asset Pricing Model utilizing the historical, Ex Post equity risk premium. The department places more reliance on the Ex Post equity risk premium, resulting in a higher cost of equity estimate than the Duff & Phelps' adjusted risk-free rate paired with the Duff & Phelps' recommended equity risk premium.

The department finds that the risk-free rate should not be adjusted, as discussed in further detail on the Risk-Free Rate section.  The downward trend in the risk-free rate has continued for years. This chart shows the long-term decline in yields on 30-year U.S. Treasury Securities[145]:

[144] https://www.ferc.gov/media/news-releases/2019/2019-4/11-21-19-E-11.asp#.Xos6DLlOk6Y

[145] Board of Governors of the Federal Reserve System. Data Download Program. Retrieved February 24, 2020 from https://www.federalreserve.gov/datadownload/H15/H15/RIFLGFCY30_N.A


Specifically for the fluid pipeline market segment, one commenter suggested the Capital Asset Pricing Model is less reliable for master limited partnership because their beta is biased downward because of their trading pattern. The commenter does not find that the volatility in oil markets is reflected in the beta.

The department notes that the beta for three of the guideline companies in the fluid pipeline market segment are below 1.05. The median beta for this market segment is 1.05 and the department selected the average of 1.17 as the beta for the market segment. The Value Line Pipeline MLPs [master limited partnerships] summary dated November 29, 2019 states, "They [MLP Industry] do not typically take title to hydrocarbons and, thus, are not generally directly exposed to commodity prices."[146] The department finds that the beta considers the volatility that influences these master limited partnerships.

Another comment suggested that the indicated cost of capital from the capital asset pricing model is artificially low and not sustainable. The current rates are not reflective of a true market equilibrium.

The department does not agree that the cost of equity indicated by the capital asset pricing model is artificially low. Companies can borrow for a lower cost than they have in the past and, as a result, many companies are expanding capital expenditures.

[146] Value Line Investment Survey. "Pipeline MLPs". Dated November 29, 2019

**More or all reliance on the Dividend Growth Model**
Several comments suggested the department place more or all reliance on the Dividend Growth Model when selecting the indicated rate of equity. One comment suggested that earnings and dividends are the strongest indicators for equity investors.

Specifically for the electric market segment, a commenter noted that a cost of equity range between 7.74%-8.20% is still too low, but far more realistic than the current range.[147] The commenter continued that the mean cost of equity indicated from the Capital Asset Pricing Models of 5.71% is comparable to a pre-tax cost of long-term debt and that the department should place much more reliance on the Dividend Growth Model as it is closest to the cost of equity set by state regulators.

Specifically for the electric market segment, another commenter noted that dividends are the primary reason investors are attracted to electric utilities, especially when Treasury yields are low, as provided by a Value Line Summary for the Electric Utility (West) Industry dated January 25, 2019.

The department notes that the Value Line summary provides that, “income-oriented investors are attracted to utility stocks for their dividend yields (and the possibility of dividend growth)”.

Given the comments we received requesting more reliance on the Dividend Growth Model, we placed more reliance on the dividend growth model for each market segment. However, the department notes that utilizing the short-term growth estimates in the dividend growth model contradicts the income model that the department uses to complete valuations. The department uses an income model that assumes zero percent growth into perpetuity.

Another commenter suggested that the department place more reliance on the Dividend Growth Model because it is forward-looking rather than the Capital Asset Pricing Model utilizing the Ex Post (historical) looking equity risk premium. The commenter also suggests changes to the department’s forward-looking Ex Ante equity risk premium as it implicitly assumes the expected returns on the market will decline and the payout ratios remain constant.

The department agrees that forward-looking models have value. However, the Dividend Growth Model uses short-term growth estimates as a forecast for growth into perpetuity. The department finds that the Ex Ante equity risk premium calculation is a widely accepted and forward-looking model. The department used other forward-looking equity risk premium estimates that also indicated a lower cost of equity, specifically Dr. Damodaran’s equity risk premium and the equity risk premiums indicated by surveys.

**Comparing the department’s cost of equity to the allowed rate of return established by regulatory agencies**
Comments suggested that if the market segment is regulated, the indicated cost of equity should be in line with the allowed rate of return by regulators. The comments continued that for regulated industries,

[147] The Dividend Growth Models for the electric market segment indicate a range of 7.74%-8.20%.

the rates are set based on a cost of service, return on equity model and that investors expect the rate of return on their capital or the investors invest elsewhere.

The department determines the cost of equity by reviewing market evidence of returns for a market segment, rather than for rate-making for a particular company as regulatory agencies do when authorization return on equity. We observe that authorized rates of return are not equivalent to a market segment's cost of equity for valuation purposes. Regulatory agencies set rates that allow companies to earn a fair return while also protecting consumers from natural monopolies.[148] The department estimates the cost of equity for each market segment.

**Using means instead of medians**
One comment requested that the department use means as selected indicated rates instead of medians for certain data selections. These changes result in a higher cost of equity estimate. The commenter urged the department to consider the mean rather than the median as it is more statistically sound when there is a large selection of guideline companies and that the median is better suited when there are less guideline companies.

The mean and median are both measures of central tendency. The department used judgment, informed by the mean or median, when selecting the indicated rates. The median reduces the influences of outliers and is a reliable measure of central tendency. The department observed that the median reduces the influences of outliers. For example, the median Dividend Growth Model – Earnings for the electric market segment is 8.10%. The mean is 8.59%. If the department were to remove the guideline companies with the largest and smallest results, the mean is reduced to 8.33% and the median remains at 8.10%. This indicates that the mean is heavily influenced by outliers in this data set. Given the wide range of values, the department selected the median result as the indicated rate for certain data points for most market segments. The department shifted some reliance to the mean for the electric and gas distribution market segments

**Changing certain calculations**
Another comment suggested the department should change their calculation from utilizing the median cost of equity result for each guideline company (each guideline company's dividend yield plus growth estimate) to utilize the median indicated growth rate and the median dividend yield to estimate the cost of equity (median dividend yield plus median growth rate).

Changing the methodology for calculating the dividend growth model for one market segment may have the opposite effect for another market segment or may have the opposite effect in subsequent years' studies.

## Additional Adjustments

**Flotation costs**
Some comments suggested the department adjust the yield rates for flotation costs.

[148] Parcell, D. (2010) "The Cost of Capital: A Practitioner's Guide. Society of Utility Regulatory Financial Analysts.

The department does not include an adjustment for flotation costs. See the Flotation Costs section for a detailed discussion.

**Illiquidity**

One commenter suggested the department include an illiquidity adjustment related to the size of a company, indicating that smaller stocks offer returns in excess of the returns calculated by the capital asset pricing model.

Some comments suggested the department include an illiquidity adjustment because the required return on traded debt and equity securities is not comparable to companies.

The department does not adjust capitalization rates for illiquidity. See the Illiquidity section for a detailed discussion. The department does not include size premium adjustments. See the Company Specific Risk section for a detailed discussion.

**Size premium**

One commenter suggests that the department include an adjustment for size premium, specifically the size premium based on the market capitalization of the company the department is valuing, provided by Duff & Phelps Cost of Capital Navigator.

Another commenter suggested that if the department were to place any reliance on the Capital Asset Pricing Model, we would first have to make a size premium adjustment.

The department does not include size premium adjustments. See the Company Specific Risk section for a detailed discussion.

**Electric market segment's cost of capital should be at least as high as the gas distribution market segment**

One commenter suggested that the cost of capital for the electric market segment should be at least as high as the gas distribution market segment.

The department analyzed each market segment separately. There are numerous inputs to selecting the overall yield rate for a market segment. As the commenter pointed out, the higher cost of equity for the gas distribution market segment could be because of a higher growth rate expectation and continued that the electric industry's growth rate expectation is slightly lower. The commenter is correct that the department uses several of the guidelines companies for both the electric and gas distribution market segments. The department used similar indicators for selected rates (such as median or mean, reliance on certain indicators), and the rates for the two segments are different, based on market data.

**Declining common equity values for guideline companies**

One commenter pointed to declining common equity values for most guideline companies in a market segment and underperformance of the sector as reasons why investors require higher rates of return for that market segment. The commenter also suggested that a shift toward debt in the capital structure should result in a higher cost of capital.

The department does not find that declining common equity values specifically lead to investors requiring a higher rate of return. The department analyze market data to estimate the cost of equity for each market segment. The fluid transportation pipeline market segment's beta decreased significantly.

This does not indicate that investors are requiring a higher rate of return. Analysts' estimates of growth decreased significantly. This does not indicate that investors are requiring a higher rate of return. There are numerous inputs in developing the yield rates for each market segment. The department detailed changes in inputs from the 2019 Capitalization Rate Study to the Draft Study at the State Assessed Property Spring Forum, held on March 11, 2020. You can view the 2020 Spring Forum Presentation on the State Assessed Property Forums webpage.

The department notes that a shift toward debt in the capital structure, mathematically, results in a lower cost of capital, unless offset by an increase in the cost of debt. The cost of debt did not increase.

**Error in Dividend Growth Model calculations for the railroad market segment.**
Commenters pointed out that Union Pacific Railroad was not included in the Dividend Growth Model calculations in the draft study.

The department included Union Pacific Railroad in the Dividend Growth Model calculations in the final study.

### Direct Capitalization Rate

Comments suggested that the department's direct capitalization rate is not appropriate and other comments suggested it does not follow appraisal texts for developing direct capitalization rates.

The department noes that several other states utilize a direct capitalization rate model and the Western Stats Association of Tax Administrator's Appraisal Handbook discusses the applicability of the direct capitalization rate model. The department will continue to develop a direct capitalization rate and apply it in a direct capitalization model.

### Additional Models

One commenter suggested the department consider a Plowback Model or Retention Growth Model. The commenter notes that this model is similar to a Dividend Growth Model, but calculates a market growth factor based on a company's long-term outlook for return on equity and retention ratio, which is added to the Dividend Yield to develop a cost of equity. The commenter notes that this is a valid method and is considered by other states.

The department will review this model and will consider using it in subsequent studies.

## State Assessed Property Spring Forum

The department held the 2020 State Assessed Property Spring Forum on March 11, 2020. Industries and interested parties did not offer data or presentations.

The department presented the 2020 Draft Capitalization Rate Study and additional data.

## Looking Forward to the 2021 Capitalization Rate Study

As the department prepared the 2020 Draft Capitalization Rate Study, we identified several topics we are going to research and consider for updating in the 2021 Study.

### COVID-19

COVID-19 began impacting financial markets in early 2020. This Capitalization Rate Study is used, in part, to inform values as of January 2, 2020. For this reason, the rates derived in this study used information known or knowable as of January 2, 2020. We continue to monitor and analyze the impact of COVID-19 on market conditions. The effects of COVID-19 on financial markets will be taken into consideration for the January 2, 2021 assessment.

### Treasury Securities

The U.S. Department of the Treasury announced on January 16, 2020 that it plans to issue a 20-year nominal coupon bond in the first half of calendar year 2020.[149] As the Treasury begins this new issue, the department will consider using the yield on the 20-year bond as the risk-free rate in the capital asset pricing models. The department will consider using 20-years as the length of time when calculating yield to maturities for the cost of debt.

### Railroad Guideline Companies

For the 2020 assessment year, the department developed separate rates for Class I Railroads and Other Railroads. The Other Railroads rates utilized Genesee & Wyoming as the main guideline company. For the 2021 assessment year, Genesee & Wyoming will not be publicly traded[150] and we will not use it as a guideline company. At that time, we will consider developing rates for one market segment for railroad, which will apply all railroads that we value.

### Multi-Stage Dividend Growth Models

The department currently uses a two-stage dividend growth model for each market segment. This model applies two-thirds weight on short-term growth estimates and one-third weight on a long-term growth estimate. Throughout the next year, we will analyze different dividend growth models that use two or more stages for growth estimate to replace the current model. One consideration is a model that more closely reflects the department's three-stage dividend growth model used in the Ex Ante equity risk premium calculation.

### Equity Risk Premium Data Sources

The department currently uses Duff & Phelps Cost of Capital Navigator for the Ex Post equity risk premium, supply-slide equity risk premium, and Duff & Phelps recommend equity risk premium. We will review and consider replacing these equity risk premium estimates with estimates of equity risk premiums from Business Valuation Resources' Cost of Capital Professional Platform.

---

[149] U.S. Department of the Treasury. (2020). "Treasury to Issue New 20-Year Bond in First Half of 2020." Retrieved January 23, 2020 from https://home.treasury.gov/news/press-releases/sm878

[150] Genesee & Wyoming Inc. (G&W) (NYSE:GWR) announced December 30, 2019 the completion of its previously announced sale to affiliates of Brookfield Infrastructure and GIC. Under the terms of the sale, each issued and outstanding share of G&W common stock converted into the right to receive $112 in cash. As a result of the completion of the sale, G&W's common stock ceased trading on the NYSE prior to market open today and will no longer be listed for trading on the NYSE. https://ir.gwrr.com/press-release/acquisitions-investments/genesee-wyoming-announces-completion-sale-brookfield, accessed 1/7/2020

### *Plowback Model or Retention Growth Model*

The department is reviewing the applicability of the Plowback Model or Retention Growth Model. This model is similar to a Dividend Growth Model, but calculates a market growth factor based on a company's long-term outlook for return on equity and retention ratio, which is added to the Dividend Yield to develop a cost of equity.

### *Debt Issuances Provided in Appendix G*

The department is considering analyzing long-term debt issuances from guideline companies for the yield to maturity calculations. The department lists several issuances in Appendix G that we review. However, the department places the most reliance on longer-term issuances of guideline companies.

We will welcome feedback on these topics in preparation for the 2021 Capitalization Rate Study and during the 2021 Draft Capitalization Rate Study open comment period.

## Questions?

If you have questions about the 2020 Capitalization Rate Study, contact Holly Soderbeck at 651-556-6119 or sa.property@state.mn.us.

# Appendix A - Electric

## Yield Rate

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Long-Term Debt** | 34.00% | 3.78% | 1.29% |
| **Common Equity** | 66.00% | 7.74% | 5.11% |
| **Yield Rate** | | | **6.40%** |

| | |
|---|---|
| **Electric Yield Rate** | **6.40%** |

## 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. | 1,404,900,000 | None | 4,135,510,482 | 5,540,410,482 | 25.36% | 0.00% | 74.64% |
| Alliant Energy Corp | 5,535,100,000 | 400,000,000 | 12,666,073,412 | 18,601,173,412 | 29.76% | 2.15% | 68.09% |
| Ameren Corp | 8,651,000,000 | 142,000,000 | 18,159,458,948 | 26,952,458,948 | 32.10% | 0.53% | 67.38% |
| American Electric Power Company In | 24,554,000,000 | None | 44,890,340,675 | 69,444,340,675 | 35.36% | 0.00% | 64.64% |
| Black Hills Corp | 3,049,700,000 | None | 4,712,860,091 | 7,762,560,091 | 39.29% | 0.00% | 60.71% |
| CenterPoint Energy Inc. | 14,014,000,000 | 1,778,000,000 | 12,254,698,041 | 28,046,698,041 | 49.97% | 6.34% | 43.69% |
| CMS Energy Corp | 12,121,000,000 | 37,000,000 | 17,351,290,680 | 29,509,290,680 | 41.08% | 0.13% | 58.80% |
| DTE Energy Company | 13,858,000,000 | None | 22,743,001,205 | 36,601,001,205 | 37.86% | 0.00% | 62.14% |
| Entergy Corp | 16,938,000,000 | 219,400,000 | 23,279,015,544 | 40,436,415,544 | 41.89% | 0.54% | 57.57% |
| MGE Energy Inc. | 490,200,000 | None | 2,660,104,030 | 3,150,304,030 | 15.56% | 0.00% | 84.44% |
| Northwestern Corp | 2,177,700,000 | None | 3,699,484,633 | 5,877,184,633 | 37.05% | 0.00% | 62.95% |
| OGE Energy Corp | 3,363,500,000 | None | 8,429,420,414 | 11,792,920,414 | 28.52% | 0.00% | 71.48% |
| Otter Tail Corp | 590,000,000 | None | 1,954,555,095 | 2,544,555,095 | 23.19% | 0.00% | 76.81% |
| WEC Energy Group | 10,897,000,000 | 30,400,000 | 27,843,499,971 | 38,770,899,971 | 28.11% | 0.08% | 71.82% |
| Xcel Energy Inc. | 15,996,000,000 | None | 32,522,924,631 | 48,518,924,631 | 32.97% | 0.00% | 67.03% |

| | | | |
|---|---|---|---|
| **Mean** | 33.22% | 0.70% | 66.08% |
| **Median** | 33.73% | 0.00% | 66.01% |

| | | | |
|---|---|---|---|
| **Indicated Industry Capital Structure** | **34.00%** | **0%** | **66.00%** |

We placed more reliance on the median when selecting the indicated capital structure for the market segment, rounding to 34% debt and 66% equity.

# Indexed Rate of Debt

| Company | Debt Rating | Long-Term Debt Rate |
|---|---|---|
| ALLETE Inc. | Baa1 | 3.22% |
| Alliant Energy Corp | Baa2 | 3.22% |
| Ameren Corp | Baa1 | 3.22% |
| American Electric Power Company Inc. | Baa1 | 3.22% |
| Black Hills Corp | Baa2 | 3.22% |
| CenterPoint Energy Inc. | Baa2 | 3.22% |
| CMS Energy Corp | Baa1 | 3.22% |
| DTE Energy Company | Baa2 | 3.22% |
| Entergy Corp | Baa2 | 3.22% |
| MGE Energy Inc. | A1 | 3.40% |
| Northwestern Corp | Baa2 | 3.22% |
| OGE Energy Corp | Baa1 | 3.22% |
| Otter Tail Corp | Baa2 | 3.22% |
| WEC Energy Group | Baa1 | 3.22% |
| Xcel Energy Inc. | Baa1 | 3.22% |

| | |
|---|---|
| **Mean** | 3.23% |
| **Median** | 3.22% |
| **Mode** | 3.22% |

**Public Utility Bond Yield Averages from Mergent Bond Record, January 2020 Edition**

Public Utility Bond Averages, December 2019

| Mergent | S&P | Dec. Yield Avg. |
|---|---|---|
| Aaa, Aa1, Aa2 Aa3 | AAA, AA+, AA, AA- | 3.22% |
| A1, A2, A3 | A+, A, A- | 3.40% |
| Baa1, Baa2, Baa3 | BBB+, BBB, BBB- | 3.73% |

## Current Actual Cost of Debt

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

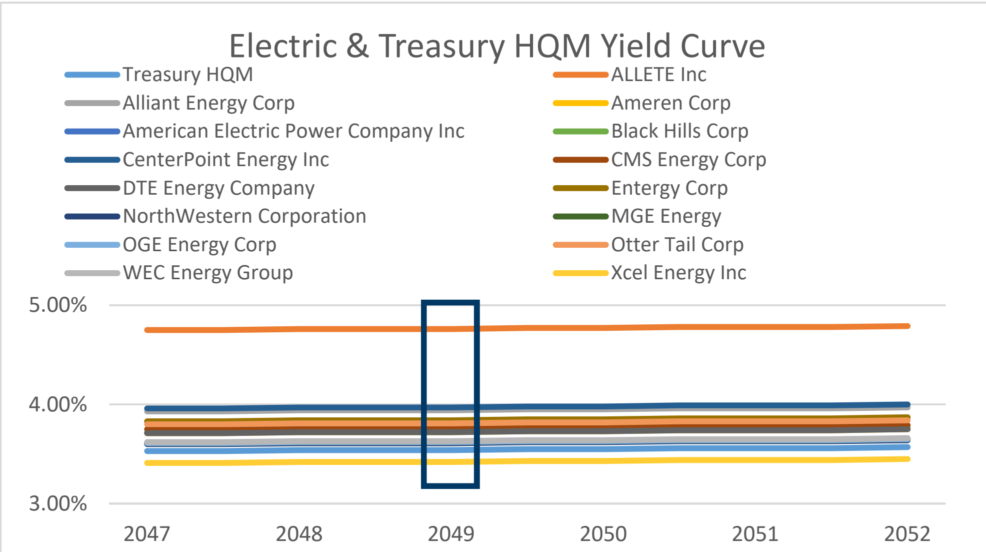
Yield-to-Maturities (YTMs) are based on year-end filings of Form N-Q, NPORT EX or 10-K with the SEC.

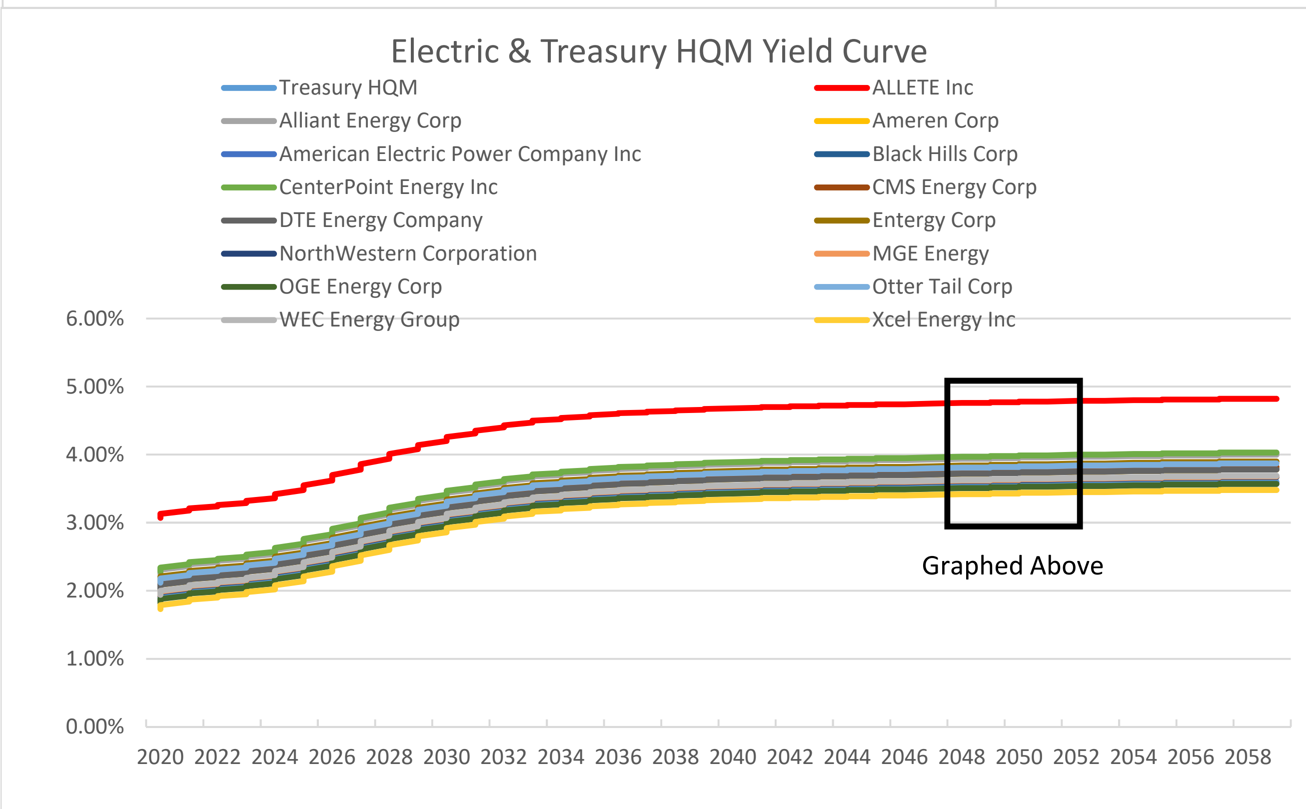
30-year YTMs are based on an observed spread to the Treasury Quality Market Corporate Bond Spot rate curve (equation to the left) and followed out to 30 years.

| **Indicated Rate of Debt** | **3.78%** |
|---|---|

Average YTM at 2049 in below graph.

See Appendix G for more information about debt issuances.



| | Treasury HQM | ALLETE Inc | Alliant Energy Corp | Ameren Corp | American Electric Power Company Inc | Black Hills Corp | CenterPoint Energy Inc | CMS Energy Corp | DTE Energy Company | Entergy Corp | NorthWestern Corporation | MGE Energy | OGE Energy Corp | Otter Tail Corp | WEC Energy Group | Xcel Energy Inc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2020 | 1.85% | 3.07% | 2.25% | 2.03% | 1.93% | 2.04% | 2.28% | 2.07% | 2.03% | 2.15% | 1.92% | 1.93% | 1.82% | 2.12% | 1.94% | 1.73% |
| 2020.5 | 1.91% | 3.13% | 2.31% | 2.09% | 1.99% | 2.10% | 2.34% | 2.13% | 2.09% | 2.21% | 1.98% | 1.99% | 1.88% | 2.18% | 2.00% | 1.79% |
| 2021 | 1.96% | 3.18% | 2.36% | 2.14% | 2.04% | 2.15% | 2.39% | 2.18% | 2.14% | 2.26% | 2.03% | 2.04% | 1.93% | 2.23% | 2.05% | 1.84% |
| 2021.5 | 1.99% | 3.21% | 2.39% | 2.17% | 2.07% | 2.18% | 2.42% | 2.21% | 2.17% | 2.29% | 2.06% | 2.07% | 1.96% | 2.26% | 2.08% | 1.87% |
| 2022 | 2.02% | 3.24% | 2.42% | 2.20% | 2.10% | 2.21% | 2.45% | 2.24% | 2.20% | 2.32% | 2.09% | 2.10% | 1.99% | 2.29% | 2.11% | 1.90% |
| 2022.5 | 2.04% | 3.26% | 2.44% | 2.22% | 2.12% | 2.23% | 2.47% | 2.26% | 2.22% | 2.34% | 2.11% | 2.12% | 2.01% | 2.31% | 2.13% | 1.92% |
| 2023 | 2.07% | 3.29% | 2.47% | 2.25% | 2.15% | 2.26% | 2.50% | 2.29% | 2.25% | 2.37% | 2.14% | 2.15% | 2.04% | 2.34% | 2.16% | 1.95% |
| 2023.5 | 2.10% | 3.32% | 2.50% | 2.28% | 2.18% | 2.29% | 2.53% | 2.32% | 2.28% | 2.40% | 2.17% | 2.18% | 2.07% | 2.37% | 2.19% | 1.98% |
| 2024 | 2.14% | 3.36% | 2.54% | 2.32% | 2.22% | 2.33% | 2.57% | 2.36% | 2.32% | 2.44% | 2.21% | 2.22% | 2.11% | 2.41% | 2.23% | 2.02% |
| 2024.5 | 2.20% | 3.42% | 2.60% | 2.38% | 2.28% | 2.39% | 2.63% | 2.42% | 2.38% | 2.50% | 2.27% | 2.28% | 2.17% | 2.47% | 2.29% | 2.08% |
| 2025 | 2.26% | 3.48% | 2.66% | 2.44% | 2.34% | 2.45% | 2.69% | 2.48% | 2.44% | 2.56% | 2.33% | 2.34% | 2.23% | 2.53% | 2.35% | 2.14% |
| 2025.5 | 2.33% | 3.55% | 2.73% | 2.51% | 2.41% | 2.52% | 2.76% | 2.55% | 2.51% | 2.63% | 2.40% | 2.41% | 2.30% | 2.60% | 2.42% | 2.21% |
| 2026 | 2.40% | 3.62% | 2.80% | 2.58% | 2.48% | 2.59% | 2.83% | 2.62% | 2.58% | 2.70% | 2.47% | 2.48% | 2.37% | 2.67% | 2.49% | 2.28% |
| 2026.5 | 2.48% | 3.70% | 2.88% | 2.66% | 2.56% | 2.67% | 2.91% | 2.70% | 2.66% | 2.78% | 2.55% | 2.56% | 2.45% | 2.75% | 2.57% | 2.36% |
| 2027 | 2.56% | 3.78% | 2.96% | 2.74% | 2.64% | 2.75% | 2.99% | 2.78% | 2.74% | 2.86% | 2.63% | 2.64% | 2.53% | 2.83% | 2.65% | 2.44% |
| 2027.5 | 2.64% | 3.86% | 3.04% | 2.82% | 2.72% | 2.83% | 3.07% | 2.86% | 2.82% | 2.94% | 2.71% | 2.72% | 2.61% | 2.91% | 2.73% | 2.52% |
| 2028 | 2.72% | 3.94% | 3.12% | 2.90% | 2.80% | 2.91% | 3.15% | 2.94% | 2.90% | 3.02% | 2.79% | 2.80% | 2.69% | 2.99% | 2.81% | 2.60% |
| 2028.5 | 2.79% | 4.01% | 3.19% | 2.97% | 2.87% | 2.98% | 3.22% | 3.01% | 2.97% | 3.09% | 2.86% | 2.87% | 2.76% | 3.06% | 2.88% | 2.67% |
| 2029 | 2.86% | 4.08% | 3.26% | 3.04% | 2.94% | 3.05% | 3.29% | 3.08% | 3.04% | 3.16% | 2.93% | 2.94% | 2.83% | 3.13% | 2.95% | 2.74% |
| 2029.5 | 2.92% | 4.14% | 3.32% | 3.10% | 3.00% | 3.11% | 3.35% | 3.14% | 3.10% | 3.22% | 2.99% | 3.00% | 2.89% | 3.19% | 3.01% | 2.80% |
| 2030 | 2.98% | 4.20% | 3.38% | 3.16% | 3.06% | 3.17% | 3.41% | 3.20% | 3.16% | 3.28% | 3.05% | 3.06% | 2.95% | 3.25% | 3.07% | 2.86% |
| 2030.5 | 3.04% | 4.26% | 3.44% | 3.22% | 3.12% | 3.23% | 3.47% | 3.26% | 3.22% | 3.34% | 3.11% | 3.12% | 3.01% | 3.31% | 3.13% | 2.92% |
| 2031 | 3.09% | 4.31% | 3.49% | 3.27% | 3.17% | 3.28% | 3.52% | 3.31% | 3.27% | 3.39% | 3.16% | 3.17% | 3.06% | 3.36% | 3.18% | 2.97% |
| 2031.5 | 3.13% | 4.35% | 3.53% | 3.31% | 3.21% | 3.32% | 3.56% | 3.35% | 3.31% | 3.43% | 3.20% | 3.21% | 3.10% | 3.40% | 3.22% | 3.01% |
| 2032 | 3.18% | 4.40% | 3.58% | 3.36% | 3.26% | 3.37% | 3.61% | 3.40% | 3.36% | 3.48% | 3.25% | 3.26% | 3.15% | 3.45% | 3.27% | 3.06% |
| 2032.5 | 3.21% | 4.43% | 3.61% | 3.39% | 3.29% | 3.40% | 3.64% | 3.43% | 3.39% | 3.51% | 3.28% | 3.29% | 3.18% | 3.48% | 3.30% | 3.09% |
| 2033 | 3.25% | 4.47% | 3.65% | 3.43% | 3.33% | 3.44% | 3.68% | 3.47% | 3.43% | 3.55% | 3.32% | 3.33% | 3.22% | 3.52% | 3.34% | 3.13% |
| 2033.5 | 3.28% | 4.50% | 3.68% | 3.46% | 3.36% | 3.47% | 3.71% | 3.50% | 3.46% | 3.58% | 3.35% | 3.36% | 3.25% | 3.55% | 3.37% | 3.16% |
| 2034 | 3.30% | 4.52% | 3.70% | 3.48% | 3.38% | 3.49% | 3.73% | 3.52% | 3.48% | 3.60% | 3.37% | 3.38% | 3.27% | 3.57% | 3.39% | 3.18% |
| 2034.5 | 3.32% | 4.54% | 3.72% | 3.50% | 3.40% | 3.51% | 3.75% | 3.54% | 3.50% | 3.62% | 3.39% | 3.40% | 3.29% | 3.59% | 3.41% | 3.20% |
| 2035 | 3.34% | 4.56% | 3.74% | 3.52% | 3.42% | 3.53% | 3.77% | 3.56% | 3.52% | 3.64% | 3.41% | 3.42% | 3.31% | 3.61% | 3.43% | 3.22% |
| 2035.5 | 3.36% | 4.58% | 3.76% | 3.54% | 3.44% | 3.55% | 3.79% | 3.58% | 3.54% | 3.66% | 3.43% | 3.44% | 3.33% | 3.63% | 3.45% | 3.24% |
| 2036 | 3.38% | 4.60% | 3.78% | 3.56% | 3.46% | 3.57% | 3.81% | 3.60% | 3.56% | 3.68% | 3.45% | 3.46% | 3.35% | 3.65% | 3.47% | 3.26% |
| 2036.5 | 3.39% | 4.61% | 3.79% | 3.57% | 3.47% | 3.58% | 3.82% | 3.61% | 3.57% | 3.69% | 3.46% | 3.47% | 3.36% | 3.66% | 3.48% | 3.27% |
| 2037 | 3.40% | 4.62% | 3.80% | 3.58% | 3.48% | 3.59% | 3.83% | 3.62% | 3.58% | 3.70% | 3.47% | 3.48% | 3.37% | 3.67% | 3.49% | 3.28% |
| 2037.5 | 3.41% | 4.63% | 3.81% | 3.59% | 3.49% | 3.60% | 3.84% | 3.63% | 3.59% | 3.71% | 3.48% | 3.49% | 3.38% | 3.68% | 3.50% | 3.29% |
| 2038 | 3.42% | 4.64% | 3.82% | 3.60% | 3.50% | 3.61% | 3.85% | 3.64% | 3.60% | 3.72% | 3.49% | 3.50% | 3.39% | 3.69% | 3.51% | 3.30% |
| 2038.5 | 3.43% | 4.65% | 3.83% | 3.61% | 3.51% | 3.62% | 3.86% | 3.65% | 3.61% | 3.73% | 3.50% | 3.51% | 3.40% | 3.70% | 3.52% | 3.31% |
| 2039 | 3.44% | 4.66% | 3.84% | 3.62% | 3.52% | 3.63% | 3.87% | 3.66% | 3.62% | 3.74% | 3.51% | 3.52% | 3.41% | 3.71% | 3.53% | 3.32% |
| 2039.5 | 3.45% | 4.67% | 3.85% | 3.63% | 3.53% | 3.64% | 3.88% | 3.67% | 3.63% | 3.75% | 3.52% | 3.53% | 3.42% | 3.72% | 3.54% | 3.33% |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2040 | 3.46% | 4.68% | 3.86% | 3.64% | 3.54% | 3.65% | 3.89% | 3.68% | 3.64% | 3.76% | 3.53% | 3.54% | 3.43% | 3.73% | 3.55% | 3.34% |
| 2040.5 | 3.46% | 4.68% | 3.86% | 3.64% | 3.54% | 3.65% | 3.89% | 3.68% | 3.64% | 3.76% | 3.53% | 3.54% | 3.43% | 3.73% | 3.55% | 3.34% |
| 2041 | 3.47% | 4.69% | 3.87% | 3.65% | 3.55% | 3.66% | 3.90% | 3.69% | 3.65% | 3.77% | 3.54% | 3.55% | 3.44% | 3.74% | 3.56% | 3.35% |
| 2041.5 | 3.48% | 4.70% | 3.88% | 3.66% | 3.56% | 3.67% | 3.91% | 3.70% | 3.66% | 3.78% | 3.55% | 3.56% | 3.45% | 3.75% | 3.57% | 3.36% |
| 2042 | 3.48% | 4.70% | 3.88% | 3.66% | 3.56% | 3.67% | 3.91% | 3.70% | 3.66% | 3.78% | 3.55% | 3.56% | 3.45% | 3.75% | 3.57% | 3.36% |
| 2042.5 | 3.49% | 4.71% | 3.89% | 3.67% | 3.57% | 3.68% | 3.92% | 3.71% | 3.67% | 3.79% | 3.56% | 3.57% | 3.46% | 3.76% | 3.58% | 3.37% |
| 2043 | 3.49% | 4.71% | 3.89% | 3.67% | 3.57% | 3.68% | 3.92% | 3.71% | 3.67% | 3.79% | 3.56% | 3.57% | 3.46% | 3.76% | 3.58% | 3.37% |
| 2043.5 | 3.50% | 4.72% | 3.90% | 3.68% | 3.58% | 3.69% | 3.93% | 3.72% | 3.68% | 3.80% | 3.57% | 3.58% | 3.47% | 3.77% | 3.59% | 3.38% |
| 2044 | 3.50% | 4.72% | 3.90% | 3.68% | 3.58% | 3.69% | 3.93% | 3.72% | 3.68% | 3.80% | 3.57% | 3.58% | 3.47% | 3.77% | 3.59% | 3.38% |
| 2044.5 | 3.51% | 4.73% | 3.91% | 3.69% | 3.59% | 3.70% | 3.94% | 3.73% | 3.69% | 3.81% | 3.58% | 3.59% | 3.48% | 3.78% | 3.60% | 3.39% |
| 2045 | 3.51% | 4.73% | 3.91% | 3.69% | 3.59% | 3.70% | 3.94% | 3.73% | 3.69% | 3.81% | 3.58% | 3.59% | 3.48% | 3.78% | 3.60% | 3.39% |
| 2045.5 | 3.52% | 4.74% | 3.92% | 3.70% | 3.60% | 3.71% | 3.95% | 3.74% | 3.70% | 3.82% | 3.59% | 3.60% | 3.49% | 3.79% | 3.61% | 3.40% |
| 2046 | 3.52% | 4.74% | 3.92% | 3.70% | 3.60% | 3.71% | 3.95% | 3.74% | 3.70% | 3.82% | 3.59% | 3.60% | 3.49% | 3.79% | 3.61% | 3.40% |
| 2046.5 | 3.52% | 4.74% | 3.92% | 3.70% | 3.60% | 3.71% | 3.95% | 3.74% | 3.70% | 3.82% | 3.59% | 3.60% | 3.49% | 3.79% | 3.61% | 3.40% |
| 2047 | 3.53% | 4.75% | 3.93% | 3.71% | 3.61% | 3.72% | 3.96% | 3.75% | 3.71% | 3.83% | 3.60% | 3.61% | 3.50% | 3.80% | 3.62% | 3.41% |
| 2047.5 | 3.53% | 4.75% | 3.93% | 3.71% | 3.61% | 3.72% | 3.96% | 3.75% | 3.71% | 3.83% | 3.60% | 3.61% | 3.50% | 3.80% | 3.62% | 3.41% |
| 2048 | 3.54% | 4.76% | 3.94% | 3.72% | 3.62% | 3.73% | 3.97% | 3.76% | 3.72% | 3.84% | 3.61% | 3.62% | 3.51% | 3.81% | 3.63% | 3.42% |
| 2048.5 | 3.54% | 4.76% | 3.94% | 3.72% | 3.62% | 3.73% | 3.97% | 3.76% | 3.72% | 3.84% | 3.61% | 3.62% | 3.51% | 3.81% | 3.63% | 3.42% |
| **2049** | 3.54% | **4.76%** | **3.94%** | **3.72%** | **3.62%** | **3.73%** | **3.97%** | **3.76%** | **3.72%** | **3.84%** | **3.61%** | **3.62%** | **3.51%** | **3.81%** | **3.63%** | **3.42%** |
| 2049.5 | 3.55% | 4.77% | 3.95% | 3.73% | 3.63% | 3.74% | 3.98% | 3.77% | 3.73% | 3.85% | 3.62% | 3.63% | 3.52% | 3.82% | 3.64% | 3.43% |
| 2050 | 3.55% | 4.77% | 3.95% | 3.73% | 3.63% | 3.74% | 3.98% | 3.77% | 3.73% | 3.85% | 3.62% | 3.63% | 3.52% | 3.82% | 3.64% | 3.43% |
| 2050.5 | 3.56% | 4.78% | 3.96% | 3.74% | 3.64% | 3.75% | 3.99% | 3.78% | 3.74% | 3.86% | 3.63% | 3.64% | 3.53% | 3.83% | 3.65% | 3.44% |
| 2051 | 3.56% | 4.78% | 3.96% | 3.74% | 3.64% | 3.75% | 3.99% | 3.78% | 3.74% | 3.86% | 3.63% | 3.64% | 3.53% | 3.83% | 3.65% | 3.44% |
| 2051.5 | 3.56% | 4.78% | 3.96% | 3.74% | 3.64% | 3.75% | 3.99% | 3.78% | 3.74% | 3.86% | 3.63% | 3.64% | 3.53% | 3.83% | 3.65% | 3.44% |
| 2052 | 3.57% | 4.79% | 3.97% | 3.75% | 3.65% | 3.76% | 4.00% | 3.79% | 3.75% | 3.87% | 3.64% | 3.65% | 3.54% | 3.84% | 3.66% | 3.45% |
| 2052.5 | 3.57% | 4.79% | 3.97% | 3.75% | 3.65% | 3.76% | 4.00% | 3.79% | 3.75% | 3.87% | 3.64% | 3.65% | 3.54% | 3.84% | 3.66% | 3.45% |
| 2053 | 3.57% | 4.79% | 3.97% | 3.75% | 3.65% | 3.76% | 4.00% | 3.79% | 3.75% | 3.87% | 3.64% | 3.65% | 3.54% | 3.84% | 3.66% | 3.45% |
| 2053.5 | 3.57% | 4.79% | 3.97% | 3.75% | 3.65% | 3.76% | 4.00% | 3.79% | 3.75% | 3.87% | 3.64% | 3.65% | 3.54% | 3.84% | 3.66% | 3.45% |
| 2054 | 3.58% | 4.80% | 3.98% | 3.76% | 3.66% | 3.77% | 4.01% | 3.80% | 3.76% | 3.88% | 3.65% | 3.66% | 3.55% | 3.85% | 3.67% | 3.46% |
| 2054.5 | 3.58% | 4.80% | 3.98% | 3.76% | 3.66% | 3.77% | 4.01% | 3.80% | 3.76% | 3.88% | 3.65% | 3.66% | 3.55% | 3.85% | 3.67% | 3.46% |
| 2055 | 3.58% | 4.80% | 3.98% | 3.76% | 3.66% | 3.77% | 4.01% | 3.80% | 3.76% | 3.88% | 3.65% | 3.66% | 3.55% | 3.85% | 3.67% | 3.46% |
| 2055.5 | 3.59% | 4.81% | 3.99% | 3.77% | 3.67% | 3.78% | 4.02% | 3.81% | 3.77% | 3.89% | 3.66% | 3.67% | 3.56% | 3.86% | 3.68% | 3.47% |
| 2056 | 3.59% | 4.81% | 3.99% | 3.77% | 3.67% | 3.78% | 4.02% | 3.81% | 3.77% | 3.89% | 3.66% | 3.67% | 3.56% | 3.86% | 3.68% | 3.47% |
| 2056.5 | 3.59% | 4.81% | 3.99% | 3.77% | 3.67% | 3.78% | 4.02% | 3.81% | 3.77% | 3.89% | 3.66% | 3.67% | 3.56% | 3.86% | 3.68% | 3.47% |
| 2057 | 3.59% | 4.81% | 3.99% | 3.77% | 3.67% | 3.78% | 4.02% | 3.81% | 3.77% | 3.89% | 3.66% | 3.67% | 3.56% | 3.86% | 3.68% | 3.47% |
| 2057.5 | 3.60% | 4.82% | 4.00% | 3.78% | 3.68% | 3.79% | 4.03% | 3.82% | 3.78% | 3.90% | 3.67% | 3.68% | 3.57% | 3.87% | 3.69% | 3.48% |
| 2058 | 3.60% | 4.82% | 4.00% | 3.78% | 3.68% | 3.79% | 4.03% | 3.82% | 3.78% | 3.90% | 3.67% | 3.68% | 3.57% | 3.87% | 3.69% | 3.48% |
| 2058.5 | 3.60% | 4.82% | 4.00% | 3.78% | 3.68% | 3.79% | 4.03% | 3.82% | 3.78% | 3.90% | 3.67% | 3.68% | 3.57% | 3.87% | 3.69% | 3.48% |
| 2059 | 3.60% | 4.82% | 4.00% | 3.78% | 3.68% | 3.79% | 4.03% | 3.82% | 3.78% | 3.90% | 3.67% | 3.68% | 3.57% | 3.87% | 3.69% | 3.48% |

**Notes:**

On March 1, 2019, ALLETE issued and sold the following First Mortgage Bonds (the Bonds):

| Maturity Date | Principal Amount | Interest Rate |
|---|---|---|
| 3/1/2029 | $70 Million | 4.08% |
| 3/1/2049 | $30 Million | 4.47% |

In November 2019, MGE Energy issued $50 million of new long-term unsecured debt at 2.94%, due 2029.

On September 12, 2019, OTP [Otter Tail Power] entered into a Note Purchase Agreement with the purchasers, pursuant to which OTP agreed to issue to the purchasers, in a private placement transaction, $175 million aggregate principle amount of OTP's senior unsecured notes consisting of:

| Maturity Date | Principal Amount | Interest Rate |
|---|---|---|
| 10/10/2029 | $10 Million | 3.07% |
| 10/10/2039 | $26 Million | 3.52% |
| 10/10/2049 | $64 Million | 3.82% |
| 2/25/2030 | $10 Million | 3.22% |
| 8/20/2030 | $40 Million | 3.22% |
| 2/25/2040 | $10 Million | 3.62% |
| 2/25/2050 | $15 Million | 3.92% |

# Indicated Rate of Equity

| Model | Rate |
|---|---|
| CAPM - Ex Post | 6.69% |
| CAPM - Supply Side | 6.09% |
| CAPM - Three Stage Ex Ante | 5.45% |
| CAPM - Damodaran | 5.50% |
| CAPM - Duff & Phelps | 6.05% |
| CAPM - Graham and Harvey | 5.37% |
| CAPM - Fernandez, Pershin, and Acin | 5.75% |
| Empirical CAPM - Ex Post | 7.39% |
| Empirical CAPM - Supply Side | 6.70% |
| Empirical CAPM - Three Stage Ex Ante | 5.95% |
| Empirical CAPM - Damodaran | 6.01% |
| Empirical CAPM - Duff & Phelps | 6.54% |
| Empirical CAPM - Graham and Harvey | 5.86% |
| Empirical CAPM - Fernandez, Pershin, and Acin | 6.29% |
| DGM - Dividend Growth | 8.26% |
| DGM - Earnings Growth | 8.35% |
| Multi-Stage DGM | 7.74% |
| **Indicated Rate of Equity** | **7.74%** |

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the majority reliance on the Dividend Growth Model - Earnings Growth and secondary reliance on the Capital Asset Pricing Model using the Ex Post equity risk premium.

# Direct Rate and Growth

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Debt Component** | 34.00% | 3.78% | 1.29% |
| **Equity Component** | 66.00% | 4.48% | 2.96% |
| **Direct Rate** | | | **4.25%** |

| | |
|---|---|
| **Direct Rate** | **4.25%** |

| | |
|---|---|
| Yield Rate | 6.40% |
| Direct Rate | 4.25% |
| **Implied Industry Growth Rate** | **2.15%** |

# Capital Asset Pricing Model (CAPM)

(ERP x β) + RFR = Indicated Equity Rate

| | Equity Risk Premium (ERP) | x Industry Beta (β) | = Industry Risk Premium | + Risk-Free Rate[1] (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 0.61 | 4.36% | 2.33% | 6.69% |
| Supply Side[3] | 6.17% | 0.61 | 3.76% | 2.33% | 6.09% |
| Three Stage Ex Ante[4] | 5.12% | 0.61 | 3.12% | 2.33% | 5.45% |
| Dr. Damodaran ERP[5] | 5.20% | 0.61 | 3.17% | 2.33% | 5.50% |
| Duff & Phelps[6] | 5.00% | 0.61 | 3.05% | 3.00% | 6.05% |
| Duke CFO Global Business Outlook[7] | 4.99% | 0.61 | 3.04% | 2.33% | 5.37% |
| Fernandez, Martinez and Acin[8] | 5.60% | 0.61 | 3.42% | 2.33% | 5.75% |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Empirical Capital Asset Pricing Model (ECAPM)

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

| Model | Equity Risk Premium (ERP) | Industry Beta (β) | Weighted Industry Risk Premium (weighted at 75%) | Weighted Equity Risk Premium (weighted at 25%) | Risk-Free Rate (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 0.61 | 3.27% | 1.79% | 2.33% | **7.39%** |
| Supply Side[3] | 6.17% | 0.61 | 2.82% | 1.54% | 2.33% | **6.70%** |
| Three Stage Ex Ante[4] | 5.12% | 0.61 | 2.34% | 1.28% | 2.33% | **5.95%** |
| Dr. Damodaran ERP[5] | 5.20% | 0.61 | 2.38% | 1.30% | 2.33% | **6.01%** |
| Duff & Phelps[6] | 5.00% | 0.61 | 2.29% | 1.25% | 3.00% | **6.54%** |
| Duke CFO Global Business Outlook[7] | 4.99% | 0.61 | 2.28% | 1.25% | 2.33% | **5.86%** |
| Fernandez, Martinez and Acin[8] | 5.60% | 0.61 | 2.56% | 1.40% | 2.33% | **6.29%** |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2019, February). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Dividend Growth Model

| Company | Current Dividend Yield (DY) | Projected Short-term EPS Growth Rate (EG) | Projected Short-term Dividend Growth Rate (DG) | Cost of Equity Earnings Growth DY + EG | Cost of Equity Dividend Growth DY + DG |
|---|---|---|---|---|---|
| ALLETE Inc. | 3.10% | 5.00% | 5.00% | 8.10% | 8.10% |
| Alliant Energy Corp | 2.70% | 6.50% | 5.50% | 9.20% | 8.20% |
| Ameren Corp | 2.70% | 6.50% | 4.50% | 9.20% | 7.20% |
| American Electric Power Compan | 3.10% | 4.00% | 5.50% | 7.10% | 8.60% |
| Black Hills Corp | 2.80% | 5.00% | 6.50% | 7.80% | 9.30% |
| CenterPoint Energy Inc. | 4.90% | 10.50% | 2.50% | 15.40% | 7.40% |
| CMS Energy Corp | 2.70% | 7.00% | 7.00% | 9.70% | 9.70% |
| DTE Energy Company | 3.30% | 4.50% | 7.00% | 7.80% | 10.30% |
| Entergy Corp | 3.20% | 2.00% | 3.50% | 5.20% | 6.70% |
| MGE Energy Inc. | 1.90% | 6.00% | 5.00% | 7.90% | 6.90% |
| Northwestern Corp | 3.20% | 3.00% | 4.50% | 6.20% | 7.70% |
| OGE Energy Corp | 3.80% | 6.50% | 6.50% | 10.30% | 10.30% |
| Otter Tail Corp | 3.00% | 5.00% | 4.00% | 8.00% | 7.00% |
| WEC Energy Group | 2.80% | 6.00% | 6.00% | 8.80% | 8.80% |
| Xcel Energy Inc. | 2.70% | 5.50% | 6.00% | 8.20% | 8.70% |
| Mean | 3.06% | 5.53% | 5.27% | 8.59% | 8.33% |
| Median | 3.00% | 5.50% | 5.50% | 8.10% | 8.20% |

| | |
|---|---|
| **DGM - Dividend Growth, Indicated Rate** | **8.26%** |
| **DGM - Earnings Growth, Indicated Rate** | **8.35%** |

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

**Notes:**

Dividend Yield and growth rates provided by Value Line

# Multi-Stage Dividend Growth Model

$K_E$ = (DY x (1+ 0.5(G))) + 0.67(G1) +0.33(g)

**$K_E$** Cost of Equity
**DY** Dividend Yield
**$G_1$** Short-term Growth Estimate
**g** Stable Growth
**G** Average Growth Rate

| **Company** | **DY** Dividend Yield | **G1** Short-term Growth Estimate | **g** Stable Growth | **G** Average Growth Rate | **$K_E$** Cost of Equity |
|---|---|---|---|---|---|
| ALLETE Inc. | 3.10% | 5.00% | 3.90% | 4.45% | 7.81% |
| Alliant Energy Corp | 2.70% | 6.50% | 3.90% | 5.20% | 8.41% |
| Ameren Corp | 2.70% | 6.50% | 3.90% | 5.20% | 8.41% |
| American Electric Power Company In | 3.10% | 4.00% | 3.90% | 3.95% | 7.13% |
| Black Hills Corp | 2.80% | 5.00% | 3.90% | 4.45% | 7.50% |
| CenterPoint Energy Inc. | 4.90% | 10.50% | 3.90% | 7.20% | 13.40% |
| CMS Energy Corp | 2.70% | 7.00% | 3.90% | 5.45% | 8.75% |
| DTE Energy Company | 3.30% | 4.50% | 3.90% | 4.20% | 7.67% |
| Entergy Corp | 3.20% | 2.00% | 3.90% | 2.95% | 5.87% |
| MGE Energy Inc. | 1.90% | 6.00% | 3.90% | 4.95% | 7.25% |
| Northwestern Corp | 3.20% | 3.00% | 3.90% | 3.45% | 6.55% |
| OGE Energy Corp | 3.80% | 6.50% | 3.90% | 5.20% | 9.54% |
| Otter Tail Corp | 3.00% | 5.00% | 3.90% | 4.45% | 7.70% |
| WEC Energy Group | 2.80% | 6.00% | 3.90% | 4.95% | 8.18% |
| Xcel Energy Inc. | 2.70% | 5.50% | 3.90% | 4.70% | 7.74% |

| | |
|---|---|
| Mean | 8.13% |
| Median | 7.74% |
| **Multi-Stage DGM, Indicated Rate** | **7.74%** |

We placed more reliance on the median when selecting 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 1.9% plus the expected inflation rate of 2.0%).

The average cost of equity, without considering CenterPoint Energy Inc. is 7.75%.

# Equity Component of the Direct Rate

| Company | Value Line P/E Ratio |
|---|---|
| ALLETE Inc. | 23.7 |
| Alliant Energy Corp | 22.0 |
| Ameren Corp | 22.4 |
| American Electric Power Company Inc. | 21.8 |
| Black Hills Corp | 22.6 |
| CenterPoint Energy Inc. | 15.1 |
| CMS Energy Corp | 22.1 |
| DTE Energy Company | 19.6 |
| Entergy Corp | 24.8 |
| MGE Energy Inc. | 28.8 |
| Northwestern Corp | 21.2 |
| OGE Energy Corp | 17.8 |
| Otter Tail Corp | 22.3 |
| WEC Energy Group | 24.8 |
| Xcel Energy Inc. | 24.1 |
| | |
| Mean | 22.2 |
| Median | 22.3 |
| Selected Price to Earnings (P/E) Ratio | 22.3 |
| | |
| **Indicated Equity Component of the Direct Rate** | **4.48%** |

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. | 0.65 |
| Alliant Energy Corp | 0.60 |
| Ameren Corp | 0.55 |
| American Electric Power Company Inc. | 0.55 |
| Black Hills Corp | 0.70 |
| CenterPoint Energy Inc. | 0.80 |
| CMS Energy Corp | 0.50 |
| DTE Energy Company | 0.55 |
| Entergy Corp | 0.60 |
| MGE Energy Inc. | 0.55 |
| Northwestern Corp | 0.60 |
| OGE Energy Corp | 0.75 |
| Otter Tail Corp | 0.70 |
| WEC Energy Group | 0.50 |
| Xcel Energy Inc. | 0.50 |
| | |
| Beta Mean | 0.61 |
| Beta Median | 0.60 |
| Unlevered and Relevered Mean* | 0.60 |
| | |
| **Indicated Beta** | **0.61** |

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 | | | | | |
|---|---|---|---|---|---|
| **Company** | *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. | NMF | 25.36% | 74.64% | 0.65 | --- |
| Alliant Energy Corp | 11.00% | 29.76% | 68.09% | 0.60 | 0.43 |
| Ameren Corp | 17.50% | 32.10% | 67.38% | 0.55 | 0.39 |
| American Electric Power Company I | 2.00% | 35.36% | 64.64% | 0.55 | 0.36 |
| Black Hills Corp | 13.50% | 39.29% | 60.71% | 0.70 | 0.45 |
| CenterPoint Energy Inc. | 12.50% | 49.97% | 43.69% | 0.80 | 0.4 |
| CMS Energy Corp | 17.00% | 41.08% | 58.80% | 0.50 | 0.32 |
| DTE Energy Company | 12.00% | 37.86% | 62.14% | 0.55 | 0.36 |
| Entergy Corp | 8.00% | 41.89% | 57.57% | 0.60 | 0.36 |
| MGE Energy Inc. | 19.00% | 15.56% | 84.44% | 0.55 | 0.48 |
| Northwestern Corp | 2.50% | 37.05% | 62.95% | 0.60 | 0.38 |
| OGE Energy Corp | 6.00% | 28.52% | 71.48% | 0.75 | 0.55 |
| Otter Tail Corp | 18.00% | 23.19% | 76.81% | 0.70 | 0.56 |
| WEC Energy Group | 11.00% | 28.11% | 71.82% | 0.50 | 0.37 |
| Xcel Energy Inc. | 8.00% | 32.97% | 67.03% | 0.50 | 0.34 |
| | | | **Average** | **0.61** | |

| Relevering of Betas | | | | |
|---|---|---|---|---|
| **Company** | *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. | 11.29% | 34.00% | 66.00% | --- |
| Alliant Energy Corp | 11.29% | 34.00% | 66.00% | 0.63 |
| Ameren Corp | 11.29% | 34.00% | 66.00% | 0.57 |
| American Electric Power Company I | 11.29% | 34.00% | 66.00% | 0.52 |
| Black Hills Corp | 11.29% | 34.00% | 66.00% | 0.66 |
| CenterPoint Energy Inc. | 11.29% | 34.00% | 66.00% | 0.58 |
| CMS Energy Corp | 11.29% | 34.00% | 66.00% | 0.47 |
| DTE Energy Company | 11.29% | 34.00% | 66.00% | 0.52 |
| Entergy Corp | 11.29% | 34.00% | 66.00% | 0.52 |
| MGE Energy Inc. | 11.29% | 34.00% | 66.00% | 0.70 |
| Northwestern Corp | 11.29% | 34.00% | 66.00% | 0.55 |
| OGE Energy Corp | 11.29% | 34.00% | 66.00% | 0.80 |
| Otter Tail Corp | 11.29% | 34.00% | 66.00% | 0.82 |
| WEC Energy Group | 11.29% | 34.00% | 66.00% | 0.54 |
| Xcel Energy Inc. | 11.29% | 34.00% | 66.00% | 0.50 |
| | | | **Average** | **0.60** |

**Notes:**

Uses the Hamada Formula

Unlevered Beta = Levered Beta / [1 + ( 1 - Tax Rate) x (Debt/Equity))], using company-specific components

Relevered Beta = Unlevered Beta [1 + (1 - Tax Rate) x (Debt/Equity)], Using industry components for Tax Rate, Debt, and Equity

# Calculation of Market to Book Ratios for the Electric Market Segment

- December 31, 2019 calendar year information for the January 2, 2020 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. | 4,135,510,482 | 2,231,900,000 | 1.85 | ALLETE, Inc. 2019 10-K, p. 66 |
| Alliant Energy Corp | 12,666,073,412 | 5,205,100,000 | 2.43 | Alliant Energy Corp. 2019 10-K, p. 43 |
| Ameren Corp | 18,159,458,948 | 8,059,000,000 | 2.25 | Ameren Corp. 2019 10-K, p. 75 |
| American Electric Power Company Inc. | 44,890,340,675 | 19,632,200,000 | 2.29 | American Electric Power Co. 2019 10-K, p. S-5 |
| Black Hills Corp | 4,712,860,091 | 2,362,123,000 | 2.00 | Black Hills Corp. 2019 10-K, p. 80 |
| CenterPoint Energy Inc. | 12,254,698,041 | 8,359,000,000 | 1.47 | CenterPoint Energy Inc. 2019 10-K, p. 109 |
| CMS Energy Corp | 17,351,290,680 | 5,018,000,000 | 3.46 | CMS Energy Corp. 2019 10-K, p. 91 |
| DTE Energy Company | 22,743,001,205 | 11,836,000,000 | 1.92 | DTE Energy Co. 2019 10-K, p. 63 |
| Entergy Corp | 23,279,015,544 | 10,223,675,000 | 2.28 | Entergy Corp. 2019 10-K, p. 47 |
| MGE Energy Inc. | 2,660,104,030 | 855,676,000 | 3.11 | MGE Energy Inc. 2019 10-K, p. 56 |
| Northwestern Corp | 3,699,484,633 | 2,039,094,000 | 1.81 | NorthWestern Corp. 2019 10-K, p. F-7 |
| OGE Energy Corp | 8,429,420,414 | 4,139,500,000 | 2.04 | OGE Energy Corp. 2019 10-K, p. 68 |
| Otter Tail Corp | 1,954,555,095 | 781,482,000 | 2.50 | Otter Tail Corp. 2019 10-K, p. 64 |
| WEC Energy Group | 27,843,499,971 | 10,113,400,000 | 2.75 | WEC Energy Group. 2019 10-K, p. 73 |
| Xcel Energy Inc. | 32,522,924,631 | 13,239,000,000 | 2.46 | Xcel Energy Inc. 2019 10-K, p. 47 |
| | | **Average** | **2.31** | |

## Market to Book Ratio for Debt

| Company | Market Value of Long-Term Debt from 10-K | Book Value of Long-Term Debt from 10-K | Market to Book Ratio | Source |
|---|---|---|---|---|
| ALLETE Inc. | 1,791,800,000 | 1,622,600,000 | 1.10 | ALLETE, Inc. 2019 10-K, p. 93 |
| Alliant Energy Corp | 6,919,900,000 | 6,190,200,000 | 1.12 | Alliant Energy Corp. 2019 10-K, p. 87 |
| Ameren Corp | 10,441,000,000 | 9,357,000,000 | 1.12 | Ameren Corp. 2019 10-K, p. 114 |
| American Electric Power Company Inc. | 54,813,900,000 | 48,249,000,000 | 1.14 | American Elec Power Co. 2019 10-K, p. 260 |
| Black Hills Corp | 3,479,367,000 | 3,145,839,000 | 1.11 | Black Hills Corp. 2019 10-K, p. 112 |
| CenterPoint Energy Inc. | 16,067,000,000 | 15,093,000,000 | 1.06 | CenterPoint Energy Inc. 2019 10-K, p. 168 |
| CMS Energy Corp | 14,185,000,000 | 13,062,000,000 | 1.09 | CMS Energy Corp. 2019 10-K, p. 128 |
| DTE Energy Company | 18,031,000,000 | 16,606,000,000 | 1.09 | DTE Energy Co. 2019 10-K, p. 108 |
| Entergy Corp | 19,059,950,000 | 17,078,643,000 | 1.12 | Entergy Corp. 2019 10-K, p. 125 |
| MGE Energy Inc. | 611,909,000 | 547,879,000 | 1.12 | MGE Energy Inc. 2019 10-K, p. 99 |
| Northwestern Corp | 2,416,814,000 | 2,233,281,000 | 1.08 | NorthWestern Corp. 2019 10-K, p. F-23 |
| OGE Energy Corp | 3,645,800,000 | 3,195,200,000 | 1.14 | OGE Energy Corp. 2019 10-K, p. 87 |
| Otter Tail Corp | 742,279,000 | 689,764,000 | 1.08 | Otter Tail Corp. 2019 10-K, p. 64 |
| WEC Energy Group | 13,035,900,000 | 11,858,300,000 | 1.10 | WEC Energy Group. 2019 10-K, p. 112 |
| Xcel Energy Inc. | 20,227,000,000 | 18,109,000,000 | 1.12 | Xcel Energy Inc. 2019 10-K, p. 65 |
| | | **Average** | **1.11** | |

## Application of Capital Structure as determined in the Capitalization Rate Study

| | Capital Structure | Market to Book | Composite |
|---|---|---|---|
| Common Equity | 66.00% | 2.31 | 1.52 |
| Long-term Debt | 34.00% | 1.11 | 0.38 |
| | | | **1.90** |

# Appendix B - Gas Distribution

## Yield Rate

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Long-Term Debt** | 34.00% | 3.94% | 1.34% |
| **Common Equity** | 66.00% | 8.68% | 5.73% |
| **Yield Rate** | | | **7.07%** |

| | |
|---|---|
| **Gas Distribution Yield Rate** | **7.07%** |

# 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 | 3,529,100,000 | None | 12,841,322,853 | 16,370,422,853 | 21.56% | 0.00% | 78.44% |
| Black Hills Corp | 3,049,700,000 | None | 4,712,860,091 | 7,762,560,091 | 39.29% | 0.00% | 60.71% |
| CenterPoint Energy Inc. | 14,014,000,000 | 1,778,000,000 | 12,254,698,041 | 28,046,698,041 | 49.97% | 6.34% | 43.69% |
| CMS Energy Corp | 12,121,000,000 | 37,000,000 | 17,351,290,680 | 29,509,290,680 | 41.08% | 0.13% | 58.80% |
| MGE Energy Inc. | 490,200,000 | None | 2,660,104,030 | 3,150,304,030 | 15.56% | 0.00% | 84.44% |
| New Jersey Resources Corp | 1,211,800,000 | None | 3,867,358,022 | 5,079,158,022 | 23.86% | 0.00% | 76.14% |
| NiSource Inc. | 7,853,800,000 | 880,000,000 | 9,727,050,840 | 18,460,850,840 | 42.54% | 4.77% | 52.69% |
| ONE Gas Inc | 1,285,900,000 | None | 4,636,678,626 | 5,922,578,626 | 21.71% | 0.00% | 78.29% |
| South Jersey Industries | 2,022,800,000 | None | 2,799,504,143 | 4,822,304,143 | 41.95% | 0.00% | 58.05% |
| Southwest Gas Holdings Inc. | 2,462,100,000 | None | 4,194,748,970 | 6,656,848,970 | 36.99% | 0.00% | 63.01% |
| Spire Inc / Laclede Group Inc. | 2,042,300,000 | 242,000,000 | 3,810,707,775 | 6,095,007,775 | 33.51% | 3.97% | 62.52% |
| WEC Energy Group | 10,897,000,000 | 30,400,000 | 27,843,499,971 | 38,770,899,971 | 28.11% | 0.08% | 71.82% |
| | | | | **Mean** | 33.01% | 1.27% | 65.72% |
| | | | | **Median** | 35.25% | 0.00% | 62.77% |

| | | | |
|---|---|---|---|
| **Indicated Industry Capital Structure** | **34.00%** | **0%** | **66.00%** |

We placed equal reliance on the mean and median when selecting the indicated capital structure for the market segment.

**Note:**

Almost all guideline companies from the previous year increaded the amount of debt in their capital structure.

Without the newly added guideline companies from the Electric Value Line segment (that have more than 50% gas customers) the capital structure would be 34% debt, 64% equity.

# Indexed Rate of Debt

| Company | Debt Rating | Long-Term Debt Rate |
|---|---|---|
| Atmos Energy Corp | A1 | 3.40% |
| Black Hills Corp | Baa2 | 3.73% |
| CenterPoint Energy Inc. | Baa2 | 3.73% |
| CMS Energy Corp | Baa1 | 3.73% |
| MGE Energy Inc. | A1 | 3.40% |
| New Jersey Resources Corp | Aa3 | 3.22% |
| NiSource Inc. | Baa2 | 3.73% |
| ONE Gas Inc | A2 | 3.40% |
| South Jersey Industries | A3 | 3.40% |
| Southwest Gas Holdings Inc. | A3 | 3.40% |
| Spire Inc / Laclede Group Inc. | Baa2 | 3.73% |
| WEC Energy Group | Baa1 | 3.73% |

| | |
|---|---|
| **Mean** | 3.55% |
| **Median** | 3.57% |
| **Mode** | 3.73% |

**Public Utility Bond Yield Averages from Mergent Bond Record, January 2020 Edition**

Public Utility Bond Averages, December 2019

| Mergent | S&P | Dec. Yield Avg. |
|---|---|---|
| Aaa, Aa1, Aa2 Aa3 | AAA, AA+, AA, AA- | 3.22% |
| A1, A2, A3 | A+, A, A- | 3.40% |
| Baa1, Baa2, Baa3 | BBB+, BBB, BBB- | 3.73% |

# Current Actual Cost of Debt

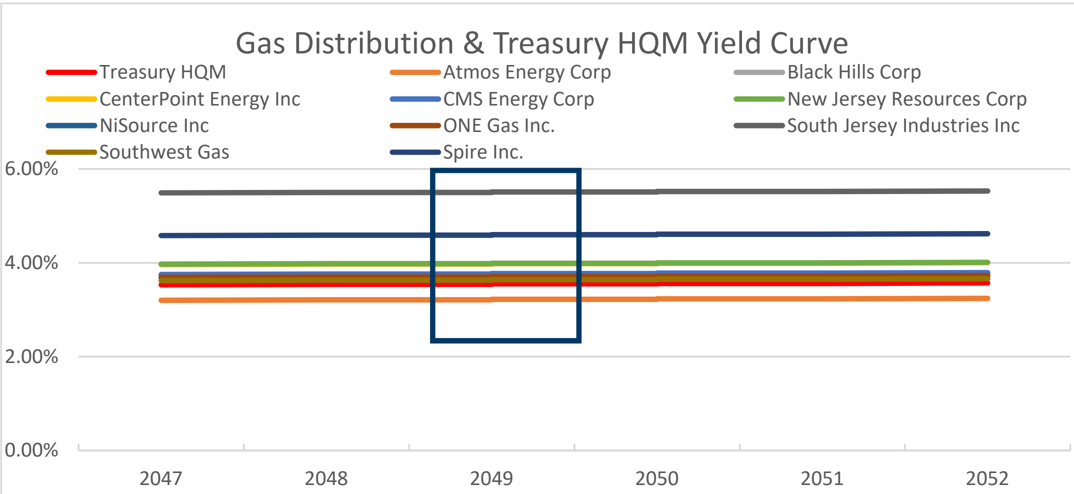
$$p = \sum_{i=1}^{n} d(t_i)c_i + \sum_{j=1}^{m} b_j x_j + e$$

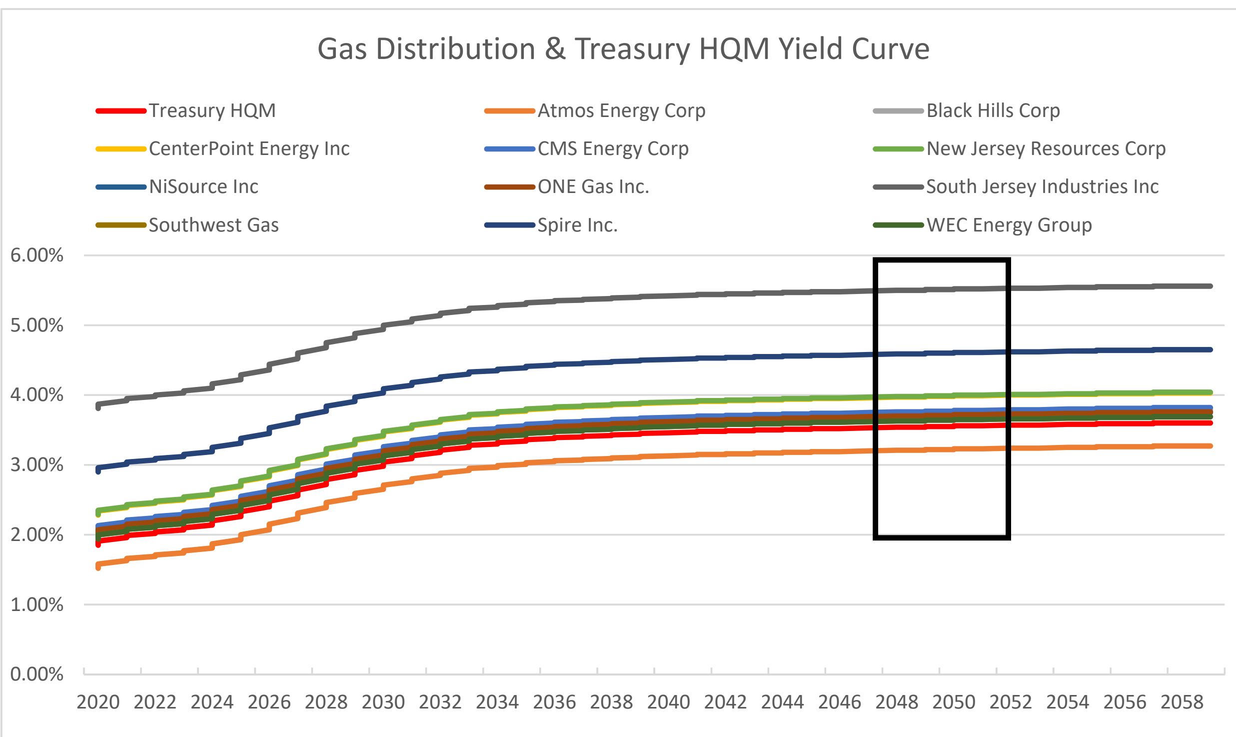
Yield-to-Maturities (YTMs) are based on year-end filings of Form N-Q, NPORT EX or 10-K with the SEC.

30-year YTMs are based on an observed spread to the Treasury Quality Market Corporate Bond Spot rate curve (equation to the left) and followed out to 30 years.

| Indicated Rate of Debt | 3.94% |
|---|---|

Average YTM at 2049 in below graph.
See Appendix G for more information about debt issuances.



| | Treasury HQM | Atmos Energy Corp | Black Hills Corp | CenterPoint Energy Inc | CMS Energy Corp | New Jersey Resources Corp | NiSource Inc | ONE Gas Inc. | South Jersey Industries Inc | Southwest Gas | Spire Inc. | WEC Energy Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2020 | 1.85% | 1.52% | 2.04% | 2.28% | 2.07% | 2.29% | 2.00% | 2.01% | 3.81% | 1.94% | 2.90% | 1.94% |
| 2020.5 | 1.91% | 1.58% | 2.10% | 2.34% | 2.13% | 2.35% | 2.06% | 2.07% | 3.87% | 2.00% | 2.96% | 2.00% |
| 2021 | 1.96% | 1.63% | 2.15% | 2.39% | 2.18% | 2.40% | 2.11% | 2.12% | 3.92% | 2.05% | 3.01% | 2.05% |
| 2021.5 | 1.99% | 1.66% | 2.18% | 2.42% | 2.21% | 2.43% | 2.14% | 2.15% | 3.95% | 2.08% | 3.04% | 2.08% |
| 2022 | 2.02% | 1.69% | 2.21% | 2.45% | 2.24% | 2.46% | 2.17% | 2.18% | 3.98% | 2.11% | 3.07% | 2.11% |
| 2022.5 | 2.04% | 1.71% | 2.23% | 2.47% | 2.26% | 2.48% | 2.19% | 2.20% | 4.00% | 2.13% | 3.09% | 2.13% |
| 2023 | 2.07% | 1.74% | 2.26% | 2.50% | 2.29% | 2.51% | 2.22% | 2.23% | 4.03% | 2.16% | 3.12% | 2.16% |
| 2023.5 | 2.10% | 1.77% | 2.29% | 2.53% | 2.32% | 2.54% | 2.25% | 2.26% | 4.06% | 2.19% | 3.15% | 2.19% |
| 2024 | 2.14% | 1.81% | 2.33% | 2.57% | 2.36% | 2.58% | 2.29% | 2.30% | 4.10% | 2.23% | 3.19% | 2.23% |
| 2024.5 | 2.20% | 1.87% | 2.39% | 2.63% | 2.42% | 2.64% | 2.35% | 2.36% | 4.16% | 2.29% | 3.25% | 2.29% |
| 2025 | 2.26% | 1.93% | 2.45% | 2.69% | 2.48% | 2.70% | 2.41% | 2.42% | 4.22% | 2.35% | 3.31% | 2.35% |
| 2025.5 | 2.33% | 2.00% | 2.52% | 2.76% | 2.55% | 2.77% | 2.48% | 2.49% | 4.29% | 2.42% | 3.38% | 2.42% |
| 2026 | 2.40% | 2.07% | 2.59% | 2.83% | 2.62% | 2.84% | 2.55% | 2.56% | 4.36% | 2.49% | 3.45% | 2.49% |
| 2026.5 | 2.48% | 2.15% | 2.67% | 2.91% | 2.70% | 2.92% | 2.63% | 2.64% | 4.44% | 2.57% | 3.53% | 2.57% |
| 2027 | 2.56% | 2.23% | 2.75% | 2.99% | 2.78% | 3.00% | 2.71% | 2.72% | 4.52% | 2.65% | 3.61% | 2.65% |
| 2027.5 | 2.64% | 2.31% | 2.83% | 3.07% | 2.86% | 3.08% | 2.79% | 2.80% | 4.60% | 2.73% | 3.69% | 2.73% |
| 2028 | 2.72% | 2.39% | 2.91% | 3.15% | 2.94% | 3.16% | 2.87% | 2.88% | 4.68% | 2.81% | 3.77% | 2.81% |
| 2028.5 | 2.79% | 2.46% | 2.98% | 3.22% | 3.01% | 3.23% | 2.94% | 2.95% | 4.75% | 2.88% | 3.84% | 2.88% |
| 2029 | 2.86% | 2.53% | 3.05% | 3.29% | 3.08% | 3.30% | 3.01% | 3.02% | 4.82% | 2.95% | 3.91% | 2.95% |
| 2029.5 | 2.92% | 2.59% | 3.11% | 3.35% | 3.14% | 3.36% | 3.07% | 3.08% | 4.88% | 3.01% | 3.97% | 3.01% |
| 2030 | 2.98% | 2.65% | 3.17% | 3.41% | 3.20% | 3.42% | 3.13% | 3.14% | 4.94% | 3.07% | 4.03% | 3.07% |
| 2030.5 | 3.04% | 2.71% | 3.23% | 3.47% | 3.26% | 3.48% | 3.19% | 3.20% | 5.00% | 3.13% | 4.09% | 3.13% |
| 2031 | 3.09% | 2.76% | 3.28% | 3.52% | 3.31% | 3.53% | 3.24% | 3.25% | 5.05% | 3.18% | 4.14% | 3.18% |
| 2031.5 | 3.13% | 2.80% | 3.32% | 3.56% | 3.35% | 3.57% | 3.28% | 3.29% | 5.09% | 3.22% | 4.18% | 3.22% |
| 2032 | 3.18% | 2.85% | 3.37% | 3.61% | 3.40% | 3.62% | 3.33% | 3.34% | 5.14% | 3.27% | 4.23% | 3.27% |
| 2032.5 | 3.21% | 2.88% | 3.40% | 3.64% | 3.43% | 3.65% | 3.36% | 3.37% | 5.17% | 3.30% | 4.26% | 3.30% |
| 2033 | 3.25% | 2.92% | 3.44% | 3.68% | 3.47% | 3.69% | 3.40% | 3.41% | 5.21% | 3.34% | 4.30% | 3.34% |
| 2033.5 | 3.28% | 2.95% | 3.47% | 3.71% | 3.50% | 3.72% | 3.43% | 3.44% | 5.24% | 3.37% | 4.33% | 3.37% |
| 2034 | 3.30% | 2.97% | 3.49% | 3.73% | 3.52% | 3.74% | 3.45% | 3.46% | 5.26% | 3.39% | 4.35% | 3.39% |
| 2034.5 | 3.32% | 2.99% | 3.51% | 3.75% | 3.54% | 3.76% | 3.47% | 3.48% | 5.28% | 3.41% | 4.37% | 3.41% |
| 2035 | 3.34% | 3.01% | 3.53% | 3.77% | 3.56% | 3.78% | 3.49% | 3.50% | 5.30% | 3.43% | 4.39% | 3.43% |
| 2035.5 | 3.36% | 3.03% | 3.55% | 3.79% | 3.58% | 3.80% | 3.51% | 3.52% | 5.32% | 3.45% | 4.41% | 3.45% |
| 2036 | 3.38% | 3.05% | 3.57% | 3.81% | 3.60% | 3.82% | 3.53% | 3.54% | 5.34% | 3.47% | 4.43% | 3.47% |
| 2036.5 | 3.39% | 3.06% | 3.58% | 3.82% | 3.61% | 3.83% | 3.54% | 3.55% | 5.35% | 3.48% | 4.44% | 3.48% |
| 2037 | 3.40% | 3.07% | 3.59% | 3.83% | 3.62% | 3.84% | 3.55% | 3.56% | 5.36% | 3.49% | 4.45% | 3.49% |
| 2037.5 | 3.41% | 3.08% | 3.60% | 3.84% | 3.63% | 3.85% | 3.56% | 3.57% | 5.37% | 3.50% | 4.46% | 3.50% |
| 2038 | 3.42% | 3.09% | 3.61% | 3.85% | 3.64% | 3.86% | 3.57% | 3.58% | 5.38% | 3.51% | 4.47% | 3.51% |
| 2038.5 | 3.43% | 3.10% | 3.62% | 3.86% | 3.65% | 3.87% | 3.58% | 3.59% | 5.39% | 3.52% | 4.48% | 3.52% |
| 2039 | 3.44% | 3.11% | 3.63% | 3.87% | 3.66% | 3.88% | 3.59% | 3.60% | 5.40% | 3.53% | 4.49% | 3.53% |
| 2039.5 | 3.45% | 3.12% | 3.64% | 3.88% | 3.67% | 3.89% | 3.60% | 3.61% | 5.41% | 3.54% | 4.50% | 3.54% |
| 2040 | 3.46% | 3.13% | 3.65% | 3.89% | 3.68% | 3.90% | 3.61% | 3.62% | 5.42% | 3.55% | 4.51% | 3.55% |
| 2040.5 | 3.46% | 3.13% | 3.65% | 3.89% | 3.68% | 3.90% | 3.61% | 3.62% | 5.42% | 3.55% | 4.51% | 3.55% |
| 2041 | 3.47% | 3.14% | 3.66% | 3.90% | 3.69% | 3.91% | 3.62% | 3.63% | 5.43% | 3.56% | 4.52% | 3.56% |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2041.5 | 3.48% | 3.15% | 3.67% | 3.91% | 3.70% | 3.92% | 3.63% | 3.64% | 5.44% | 3.57% | 4.53% | 3.57% |
| 2042 | 3.48% | 3.15% | 3.67% | 3.91% | 3.70% | 3.92% | 3.63% | 3.64% | 5.44% | 3.57% | 4.53% | 3.57% |
| 2042.5 | 3.49% | 3.16% | 3.68% | 3.92% | 3.71% | 3.93% | 3.64% | 3.65% | 5.45% | 3.58% | 4.54% | 3.58% |
| 2043 | 3.49% | 3.16% | 3.68% | 3.92% | 3.71% | 3.93% | 3.64% | 3.65% | 5.45% | 3.58% | 4.54% | 3.58% |
| 2043.5 | 3.50% | 3.17% | 3.69% | 3.93% | 3.72% | 3.94% | 3.65% | 3.66% | 5.46% | 3.59% | 4.55% | 3.59% |
| 2044 | 3.50% | 3.17% | 3.69% | 3.93% | 3.72% | 3.94% | 3.65% | 3.66% | 5.46% | 3.59% | 4.55% | 3.59% |
| 2044.5 | 3.51% | 3.18% | 3.70% | 3.94% | 3.73% | 3.95% | 3.66% | 3.67% | 5.47% | 3.60% | 4.56% | 3.60% |
| 2045 | 3.51% | 3.18% | 3.70% | 3.94% | 3.73% | 3.95% | 3.66% | 3.67% | 5.47% | 3.60% | 4.56% | 3.60% |
| 2045.5 | 3.52% | 3.19% | 3.71% | 3.95% | 3.74% | 3.96% | 3.67% | 3.68% | 5.48% | 3.61% | 4.57% | 3.61% |
| 2046 | 3.52% | 3.19% | 3.71% | 3.95% | 3.74% | 3.96% | 3.67% | 3.68% | 5.48% | 3.61% | 4.57% | 3.61% |
| 2046.5 | 3.52% | 3.19% | 3.71% | 3.95% | 3.74% | 3.96% | 3.67% | 3.68% | 5.48% | 3.61% | 4.57% | 3.61% |
| 2047 | 3.53% | 3.20% | 3.72% | 3.96% | 3.75% | 3.97% | 3.68% | 3.69% | 5.49% | 3.62% | 4.58% | 3.62% |
| 2047.5 | 3.53% | 3.20% | 3.72% | 3.96% | 3.75% | 3.97% | 3.68% | 3.69% | 5.49% | 3.62% | 4.58% | 3.62% |
| 2048 | 3.54% | 3.21% | 3.73% | 3.97% | 3.76% | 3.98% | 3.69% | 3.70% | 5.50% | 3.63% | 4.59% | 3.63% |
| 2048.5 | 3.54% | 3.21% | 3.73% | 3.97% | 3.76% | 3.98% | 3.69% | 3.70% | 5.50% | 3.63% | 4.59% | 3.63% |
| **2049** | **3.54%** | **3.21%** | **3.73%** | **3.97%** | **3.76%** | **3.98%** | **3.69%** | **3.70%** | **5.50%** | **3.63%** | **4.59%** | **3.63%** |
| 2049.5 | 3.55% | 3.22% | 3.74% | 3.98% | 3.77% | 3.99% | 3.70% | 3.71% | 5.51% | 3.64% | 4.60% | 3.64% |
| 2050 | 3.55% | 3.22% | 3.74% | 3.98% | 3.77% | 3.99% | 3.70% | 3.71% | 5.51% | 3.64% | 4.60% | 3.64% |
| 2050.5 | 3.56% | 3.23% | 3.75% | 3.99% | 3.78% | 4.00% | 3.71% | 3.72% | 5.52% | 3.65% | 4.61% | 3.65% |
| 2051 | 3.56% | 3.23% | 3.75% | 3.99% | 3.78% | 4.00% | 3.71% | 3.72% | 5.52% | 3.65% | 4.61% | 3.65% |
| 2051.5 | 3.56% | 3.23% | 3.75% | 3.99% | 3.78% | 4.00% | 3.71% | 3.72% | 5.52% | 3.65% | 4.61% | 3.65% |
| 2052 | 3.57% | 3.24% | 3.76% | 4.00% | 3.79% | 4.01% | 3.72% | 3.73% | 5.53% | 3.66% | 4.62% | 3.66% |
| 2052.5 | 3.57% | 3.24% | 3.76% | 4.00% | 3.79% | 4.01% | 3.72% | 3.73% | 5.53% | 3.66% | 4.62% | 3.66% |
| 2053 | 3.57% | 3.24% | 3.76% | 4.00% | 3.79% | 4.01% | 3.72% | 3.73% | 5.53% | 3.66% | 4.62% | 3.66% |
| 2053.5 | 3.57% | 3.24% | 3.76% | 4.00% | 3.79% | 4.01% | 3.72% | 3.73% | 5.53% | 3.66% | 4.62% | 3.66% |
| 2054 | 3.58% | 3.25% | 3.77% | 4.01% | 3.80% | 4.02% | 3.73% | 3.74% | 5.54% | 3.67% | 4.63% | 3.67% |
| 2054.5 | 3.58% | 3.25% | 3.77% | 4.01% | 3.80% | 4.02% | 3.73% | 3.74% | 5.54% | 3.67% | 4.63% | 3.67% |
| 2055 | 3.58% | 3.25% | 3.77% | 4.01% | 3.80% | 4.02% | 3.73% | 3.74% | 5.54% | 3.67% | 4.63% | 3.67% |
| 2055.5 | 3.59% | 3.26% | 3.78% | 4.02% | 3.81% | 4.03% | 3.74% | 3.75% | 5.55% | 3.68% | 4.64% | 3.68% |
| 2056 | 3.59% | 3.26% | 3.78% | 4.02% | 3.81% | 4.03% | 3.74% | 3.75% | 5.55% | 3.68% | 4.64% | 3.68% |
| 2056.5 | 3.59% | 3.26% | 3.78% | 4.02% | 3.81% | 4.03% | 3.74% | 3.75% | 5.55% | 3.68% | 4.64% | 3.68% |
| 2057 | 3.59% | 3.26% | 3.78% | 4.02% | 3.81% | 4.03% | 3.74% | 3.75% | 5.55% | 3.68% | 4.64% | 3.68% |
| 2057.5 | 3.60% | 3.27% | 3.79% | 4.03% | 3.82% | 4.04% | 3.75% | 3.76% | 5.56% | 3.69% | 4.65% | 3.69% |
| 2058 | 3.60% | 3.27% | 3.79% | 4.03% | 3.82% | 4.04% | 3.75% | 3.76% | 5.56% | 3.69% | 4.65% | 3.69% |
| 2058.5 | 3.60% | 3.27% | 3.79% | 4.03% | 3.82% | 4.04% | 3.75% | 3.76% | 5.56% | 3.69% | 4.65% | 3.69% |
| 2059 | 3.60% | 3.27% | 3.79% | 4.03% | 3.82% | 4.04% | 3.75% | 3.76% | 5.56% | 3.69% | 4.65% | 3.69% |

**Notes:**
Spire Inc - Spire Alabama

South Jersey Industries offered and sold $200.0 million aggregate principal amount of the Company's 5.62% Junior Subordinated Notes due 2019. The total net cash proceeds, inclusive of a debt discount of $5.3 million, were $194.7 million.

On December 2, 2019, Spire Alabama issued and sold to certain institutional investors in a private placement of $100.0 of 2.88% Series 2019B Senior Notes due December 1, 2029. Interest is payable semi-annually. he notes are senior unsecured obligations of Spire Alabama and rank equal in right to payment with all its other senior unsecured indebtedness. Spire Alabama used the proceeds to repay short-term debt and for general corporate purposes.

New Jersey Industries newly issued debt at 3.29% due 7/1/2029 at $100.0.

# Indicated Rate of Equity

| Model | Rate |
|---|---|
| CAPM - Ex Post | 6.98% |
| CAPM - Supply Side | 6.34% |
| CAPM - Three Stage Ex Ante | 5.66% |
| CAPM - Damodaran | 5.71% |
| CAPM - Duff & Phelps | 6.25% |
| CAPM - Graham and Harvey | 5.57% |
| CAPM - Fernandez, Pershin, and Acin | 5.97% |
| Empirical CAPM - Ex Post | 7.60% |
| Empirical CAPM - Supply Side | 6.88% |
| Empirical CAPM - Three Stage Ex Ante | 6.11% |
| Empirical CAPM - Damodaran | 6.17% |
| Empirical CAPM - Duff & Phelps | 6.69% |
| Empirical CAPM - Graham and Harvey | 6.01% |
| Empirical CAPM - Fernandez, Pershin, and Acin | 6.46% |
| DGM - Dividend Growth | 8.89% |
| DGM - Earnings Growth | 10.08% |
| Multi-Stage DGM | 8.61% |
| **Indicated Rate of Equity** | **8.68%** |

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the majority reliance on the Dividend Growth Model - Earnings Growth and secondary reliance on the Capital Asset Pricing Model using the Ex Post equity risk premium.

## Direct Rate and Growth

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Debt Component** | 34.00% | 3.94% | 1.34% |
| **Equity Component** | 66.00% | 4.55% | 3.00% |
| **Direct Rate** | | | **4.34%** |

| | |
|---|---|
| **Direct Rate** | **4.34%** |

| | |
|---|---|
| Yield Rate | 7.07% |
| Direct Rate | 4.34% |
| **Implied Industry Growth Rate** | **2.73%** |

# Capital Asset Pricing Model (CAPM)

(ERP x β) + RFR = Indicated Equity Rate

| | Equity Risk Premium (ERP) | x Industry Beta (β) | = Industry Risk Premium | + Risk-Free Rate[1] (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 0.65 | 4.65% | 2.33% | 6.98% |
| Supply Side[3] | 6.17% | 0.65 | 4.01% | 2.33% | 6.34% |
| Three Stage Ex Ante[4] | 5.12% | 0.65 | 3.33% | 2.33% | 5.66% |
| Dr. Damodaran ERP[5] | 5.20% | 0.65 | 3.38% | 2.33% | 5.71% |
| Duff & Phelps[6] | 5.00% | 0.65 | 3.25% | 3.00% | 6.25% |
| Duke CFO Global Business Outlook[7] | 4.99% | 0.65 | 3.24% | 2.33% | 5.57% |
| Fernandez, Martinez and Acin[8] | 5.60% | 0.65 | 3.64% | 2.33% | 5.97% |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Empirical Capital Asset Pricing Model (ECAPM)

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

| Model | Equity Risk Premium (ERP) | Industry Beta (β) | Weighted Industry Risk Premium (weighted at 75%) | Weighted Equity Risk Premium (weighted at 25%) | Risk-Free Rate (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 0.65 | 3.49% | 1.79% | 2.33% | **7.60%** |
| Supply Side[3] | 6.17% | 0.65 | 3.01% | 1.54% | 2.33% | **6.88%** |
| Three Stage Ex Ante[4] | 5.12% | 0.65 | 2.50% | 1.28% | 2.33% | **6.11%** |
| Dr. Damodaran ERP[5] | 5.20% | 0.65 | 2.54% | 1.30% | 2.33% | **6.17%** |
| Duff & Phelps[6] | 5.00% | 0.65 | 2.44% | 1.25% | 3.00% | **6.69%** |
| Duke CFO Global Business Outlook[7] | 4.99% | 0.65 | 2.43% | 1.25% | 2.33% | **6.01%** |
| Fernandez, Martinez and Acin[8] | 5.60% | 0.65 | 2.73% | 1.40% | 2.33% | **6.46%** |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2019, February). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Dividend Growth Model

| Company | Current Dividend Yield (DY) | Projected Short-term EPS Growth Rate (EG) | Projected Short-term Dividend Growth Rate (DG) | Cost of Equity Earnings Growth DY + EG | Cost of Equity Dividend Growth DY + DG |
|---|---|---|---|---|---|
| Atmos Energy Corp | 2.10% | 7.50% | 7.50% | 9.60% | 9.60% |
| Black Hills Corp | 2.80% | 5.00% | 6.50% | 7.80% | 9.30% |
| CenterPoint Energy Inc. | 4.90% | 10.50% | 2.50% | 15.40% | 7.40% |
| CMS Energy Corp | 2.70% | 7.00% | 7.00% | 9.70% | 9.70% |
| MGE Energy Inc. | 1.90% | 6.00% | 5.00% | 7.90% | 6.90% |
| New Jersey Resources Corp | 2.90% | 2.50% | 6.00% | 5.40% | 8.90% |
| NiSource Inc. | 3.10% | 12.50% | 9.00% | 15.60% | 12.10% |
| ONE Gas Inc | 2.50% | 8.00% | 8.50% | 10.50% | 11.00% |
| South Jersey Industries | 4.10% | 10.50% | 4.00% | 14.60% | 8.10% |
| Southwest Gas Holdings Inc. | 3.00% | 9.00% | 5.00% | 12.00% | 8.00% |
| Spire Inc / Laclede Group Inc. | 3.30% | 5.50% | 4.00% | 8.80% | 7.30% |
| WEC Energy Group | 2.80% | 6.00% | 6.00% | 8.80% | 8.80% |
| Mean | 3.01% | 7.50% | 5.92% | 10.51% | 8.93% |
| Median | 2.85% | 7.25% | 6.00% | 9.65% | 8.85% |

| | |
|---|---|
| **DGM - Dividend Growth, Indicated Rate** | **8.89%** |
| **DGM - Earnings Growth, Indicated Rate** | **10.08%** |

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 and growth rates provided by Value Line

Without the newly added guideline companies from the Electric Value Line segment (that have more than 50% gas customers) the median DGM-earnings is 10.50% and the median DGM-dividends is 8.90%.

# Multi-Stage Dividend Growth Model

$K_E$ = (DY x (1+ 0.5(G))) + 0.67(G1) +0.33(g)

**$K_E$** Cost of Equity
**DY** Dividend Yield
**$G_1$** Short-term Growth Estimate
**g** Stable Growth
**G** Average Growth Rate

| **Company** | **DY** Dividend Yield | **G1** Short-term Growth Estimate | **g** Stable Growth | **G** Average Growth Rate | **$K_E$** Cost of Equity |
|---|---|---|---|---|---|
| Atmos Energy Corp | 2.10% | 7.50% | 3.90% | 5.70% | 8.47% |
| Black Hills Corp | 2.80% | 5.00% | 3.90% | 4.45% | 7.50% |
| CenterPoint Energy Inc. | 4.90% | 10.50% | 3.90% | 7.20% | 13.40% |
| CMS Energy Corp | 2.70% | 7.00% | 3.90% | 5.45% | 8.75% |
| MGE Energy Inc. | 1.90% | 6.00% | 3.90% | 4.95% | 7.25% |
| New Jersey Resources Corp | 2.90% | 2.50% | 3.90% | 3.20% | 5.91% |
| NiSource Inc. | 3.10% | 12.50% | 3.90% | 8.20% | 12.89% |
| ONE Gas Inc | 2.50% | 8.00% | 3.90% | 5.95% | 9.22% |
| South Jersey Industries | 4.10% | 10.50% | 3.90% | 7.20% | 12.57% |
| Southwest Gas Holdings Inc. | 3.00% | 9.00% | 3.90% | 6.45% | 10.41% |
| Spire Inc / Laclede Group Inc. | 3.30% | 5.50% | 3.90% | 4.70% | 8.35% |
| WEC Energy Group | 2.80% | 6.00% | 3.90% | 4.95% | 8.18% |

| | |
|---|---|
| Mean | 9.41% |
| Median | 8.61% |

| | |
|---|---|
| **Multi-Stage DGM, Indicated Rate** | **8.61%** |

We placed more reliance on the median when selecting 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 1.9% plus the expected inflation rate of 2.0%).

Without the newly added guideline companies from the Electric Value Line segment (that have more than 50% gas customers), median is 9.22%.

# Equity Component of the Direct Rate

| Company | Value Line P/E Ratio |
|---|---|
| Atmos Energy Corp | 23.9 |
| Black Hills Corp | 22.6 |
| CenterPoint Energy Inc. | 15.1 |
| CMS Energy Corp | 22.1 |
| MGE Energy Inc. | 28.8 |
| New Jersey Resources Corp | 19.9 |
| NiSource Inc. | 19.6 |
| ONE Gas Inc | 24.8 |
| South Jersey Industries | 21.8 |
| Southwest Gas Holdings Inc. | 19.1 |
| Spire Inc / Laclede Group Inc. | 19.3 |
| WEC Energy Group | 24.8 |
| | |
| Mean | 21.8 |
| Median | 22.0 |
| Selected Price to Earnings (P/E) Ratio | 22.0 |
| | |
| **Indicated Equity Component of the Direct Rate** | **4.55%** |

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

**Notes:**

The Price/Earnings Ratio was downloaded from Value Line.
Without the newly added guideline companies from the Electric Value Line segment (that have more than 50% gas customers), mean P/E ratio is 21.2

# Beta Analysis

| Company | Beta |
|---|---|
| Atmos Energy Corp | 0.60 |
| Black Hills Corp | 0.70 |
| CenterPoint Energy Inc. | 0.80 |
| CMS Energy Corp | 0.50 |
| MGE Energy Inc. | 0.55 |
| New Jersey Resources Corp | 0.70 |
| NiSource Inc. | 0.55 |
| ONE Gas Inc | 0.65 |
| South Jersey Industries | 0.80 |
| Southwest Gas Holdings Inc. | 0.70 |
| Spire Inc / Laclede Group Inc. | 0.65 |
| WEC Energy Group | 0.50 |
| | |
| Beta Mean | 0.64 |
| Beta Median | 0.65 |
| Unlevered and Relevered Mean* | 0.64 |
| | |
| **Indicated Beta** | **0.65** |

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

**Notes:**

*See the Unlevering Relevering Beta page for the calculation

Without the newly added guideline companies from the Electric Value Line segment (that have more than 50% gas customers), median beta is 0.65.

# Unlevering/Relevering Betas

| Unlevering of Betas | | | | | |
|---|---|---|---|---|---|
| **Company** | *Value Line*<br>**Actual Income Tax Rate** | *From Capital Structure Page*<br>**Actual Debt in Capital Structure** | *From Capital Structure Page*<br>**Actual Equity in Capital Structure** | *Value Line*<br>**Levered Beta (Published)** | *Formula*<br>**Unlevered Beta** |
| Atmos Energy Corp | 21.40% | 21.56% | 78.44% | 0.60 | 0.49 |
| Black Hills Corp | 13.50% | 39.29% | 60.71% | 0.70 | 0.45 |
| CenterPoint Energy Inc. | 12.50% | 49.97% | 43.69% | 0.80 | 0.4 |
| CMS Energy Corp | 17.00% | 41.08% | 58.80% | 0.50 | 0.32 |
| MGE Energy Inc. | 19.00% | 15.56% | 84.44% | 0.55 | 0.48 |
| New Jersey Resources Corp | 15.00% | 23.86% | 76.14% | 0.70 | 0.55 |
| NiSource Inc. | 21.00% | 42.54% | 52.69% | 0.55 | 0.34 |
| ONE Gas Inc | 18.00% | 21.71% | 78.29% | 0.65 | 0.53 |
| South Jersey Industries | 22.00% | 41.95% | 58.05% | 0.80 | 0.51 |
| Southwest Gas Holdings Inc. | 21.00% | 36.99% | 63.01% | 0.70 | 0.48 |
| Spire Inc / Laclede Group Inc. | 23.50% | 33.51% | 62.52% | 0.65 | 0.46 |
| WEC Energy Group | 11.00% | 28.11% | 71.82% | 0.50 | 0.37 |
| | | | **Average** | **0.64** | |

| Relevering of Betas | | | | |
|---|---|---|---|---|
| **Company** | *Formula*<br>**Composite Income Tax Rate** | *From Capital Structure Page*<br>**Industry Debt in Capital Structure** | *From Capital Structure Page*<br>**Industry Equity in Capital Structure** | *Formula*<br>**Levered Beta** |
| Atmos Energy Corp | 17.91% | 34.00% | 66.00% | 0.70 |
| Black Hills Corp | 17.91% | 34.00% | 66.00% | 0.64 |
| CenterPoint Energy Inc. | 17.91% | 34.00% | 66.00% | 0.57 |
| CMS Energy Corp | 17.91% | 34.00% | 66.00% | 0.46 |
| MGE Energy Inc. | 17.91% | 34.00% | 66.00% | 0.68 |
| New Jersey Resources Corp | 17.91% | 34.00% | 66.00% | 0.78 |
| NiSource Inc. | 17.91% | 34.00% | 66.00% | 0.48 |
| ONE Gas Inc | 17.91% | 34.00% | 66.00% | 0.75 |
| South Jersey Industries | 17.91% | 34.00% | 66.00% | 0.73 |
| Southwest Gas Holdings Inc. | 17.91% | 34.00% | 66.00% | 0.68 |
| Spire Inc / Laclede Group Inc. | 17.91% | 34.00% | 66.00% | 0.65 |
| WEC Energy Group | 17.91% | 34.00% | 66.00% | 0.53 |
| | | | **Average** | **0.64** |

**Notes:**

Uses the Hamada Formula

Unlevered Beta = Levered Beta / [1 + ( 1 - Tax Rate) x (Debt/Equity))], using company-specific components

Relevered Beta = Unlevered Beta [1 + (1 - Tax Rate) x (Debt/Equity)], Using industry components for Tax Rate, Debt, and Equity

# Calculation of Market to Book Ratios for the Electric Market Segment

- December 31, 2019 calendar year information for the January 2, 2020 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 | Fiscal Year End |
|---|---|---|---|---|---|
| Atmos Energy Corp | 12,841,322,853 | 5,750,223,000 | 2.23 | Atmos Energy Corp. 2019 10-K, p. 39 | 9/30/2019 |
| Black Hills Corp | 4,712,860,091 | 2,362,123,000 | 2.00 | Black Hills Corp. 2019 10-K, p. 80 | |
| CenterPoint Energy Inc. | 12,254,698,041 | 8,359,000,000 | 1.47 | CenterPoint Energy Inc. 2019 10-K, p. 109 | |
| CMS Energy Corp | 17,351,290,680 | 5,018,000,000 | 3.46 | CMS Energy Corp. 2019 10-K, p. 91 | |
| MGE Energy Inc. | 2,660,104,030 | 855,676,000 | 3.11 | MGE Energy Inc. 2019 10-K, p. 56 | |
| New Jersey Resources Corp | 3,867,358,022 | 1,551,717,000 | 2.49 | New Jersey Resources. 2019 10-K, p. 73 | 9/30/2019 |
| NiSource Inc. | 9,727,050,840 | 5,986,700,000 | 1.62 | NiSource Inc. 2019 10-K, p. 57 | |
| ONE Gas Inc | 4,636,678,626 | 2,129,390,000 | 2.18 | One Gas Inc. 2019 10-K, p. 51 | |
| South Jersey Industries | 2,799,504,143 | 1,423,785,000 | 1.97 | South Jersey Industries 2019 10-K, p. 69 | |
| Southwest Gas Holdings Inc. | 4,194,748,970 | 2,505,914,000 | 1.67 | Southwest Gas Holdings 2019 10-K, p. 23 | |
| Spire Inc / Laclede Group Inc. | 3,810,707,775 | 2,543,000,000 | 1.50 | Spire Inc. 2019 10-K, p. 62 | |
| WEC Energy Group | 27,843,499,971 | 10,113,400,000 | 2.75 | WEC Energy Group. 2019 10-K, p. 73 | 9/30/2019 |
| | | **Average** | **2.20** | | |

## Market to Book Ratio for Debt

| Company | Market Value of Long-Term Debt from 10-K | Book Value of Long-Term Debt from 10-K | Market to Book Ratio | Source |
|---|---|---|---|---|
| Atmos Energy Corp | 4,216,249,000 | 3,560,000,000 | 1.18 | Atmos Energy Corp. 2019 10-K, p. 81 |
| Black Hills Corp | 3,479,367,000 | 3,145,839,000 | 1.11 | Black Hills Corp. 2019 10-K, p. 112 |
| CenterPoint Energy Inc. | 16,067,000,000 | 15,093,000,000 | 1.06 | CenterPoint Energy Inc. 2019 10-K, p. 168 |
| CMS Energy Corp | 14,185,000,000 | 13,062,000,000 | 1.09 | CMS Energy Corp. 2019 10-K, p. 128 |
| MGE Energy Inc. | 611,909,000 | 547,879,000 | 1.12 | MGE Energy Inc. 2019 10-K, p. 99 |
| New Jersey Resources Corp | 1,568,864,000 | 1,442,845,000 | 1.09 | New Jersey Resources. 2019 10-K, p. 102 |
| NiSource Inc. | 8,764,400,000 | 7,869,600,000 | 1.11 | NiSource Inc. 2019 10-K, p. 109 |
| ONE Gas Inc | 1,500,000,000 | 1,300,000,000 | 1.15 | One Gas Inc. 2019 10-K, p. 67 |
| South Jersey Industries | 2,730,000,000 | 2,540,000,000 | 1.07 | South Jersey Industries 2019 10-K, p. 101 |
| Southwest Gas Holdings Inc. | 2,672,077,000 | 2,300,482,000 | 1.16 | Southwest Gas Holdings 2019 10-K, p. 55 |
| Spire Inc / Laclede Group Inc. | 2,373,400,000 | 2,122,600,000 | 1.12 | Spire Inc. 2019 10-K, p. 95 |
| WEC Energy Group | 13,035,900,000 | 11,858,300,000 | 1.10 | WEC Energy Group. 2019 10-K, p. 112 |
| | | **Average** | **1.11** | |

## Application of Capital Structure as determined in the Capitalization Rate Study

| | Capital Structure | Market to Book | Composite |
|---|---|---|---|
| Common Equity | 66.00% | 2.20 | 1.45 |
| Long-term Debt | 34.00% | 1.11 | 0.38 |
| | | | **1.83** |

# Appendix C - Gas Transmission Pipeline

## Yield Rate

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Long-Term Debt** | 39.00% | 3.99% | 1.56% |
| **Common Equity** | 61.00% | 17.30% | 10.55% |
| **Yield Rate** | | | **12.11%** |

| | |
|---|---|
| **Gas Transmission Pipeline Yield Rate** | **12.11%** |

# 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 |
|---|---|---|---|---|---|---|---|
| Enbridge Inc. | 60,879,000,000 | 7,747,000,000 | 101,074,801,316 | 169,700,801,316 | 35.87% | 4.57% | 59.56% |
| Kinder Morgan Inc. | 32,100,000,000 | None | 45,321,958,394 | 77,421,958,394 | 41.46% | 0.00% | 58.54% |
| ONEOK Inc. | 12,479,500,000 | None | 28,816,785,184 | 41,296,285,184 | 30.22% | 0.00% | 69.78% |
| TC Energy Corp (FKA Trans( | 27,655,600,000 | 3,025,000,000,000 | 47,858,160,000 | 3,100,513,760,000 | 0.89% | 97.56% | 1.54% |
| Williams Companies Inc. | 20,719,000,000 | None | 26,834,761,229 | 47,553,761,229 | 43.57% | 0.00% | 56.43% |
| | | | | **Mean** | 37.78% | 1.14% | 61.08% |
| | | | | **Median** | 38.67% | 0.00% | 59.05% |
| | | | | **Indicated Industry Capital Structure** | **39.00%** | **0%** | **61.00%** |

We placed more reliance on the median when selecting the indicated capital structure for the industry.

**Note:** Did not include TC Energy Corporation in the capital structure analysis as it is a signficant outlier.

# Indexed Rate of Debt

| Company | Debt Rating | Long-Term Debt Rate |
|---|---|---|
| Enbridge Inc. | Baa2 | 4.03% |
| Kinder Morgan Inc. | Baa2 | 4.03% |
| ONEOK Inc. | Baa3 | 4.03% |
| TC Energy Corp (FKA TransCanada Cor | Baa2 | 4.03% |
| Williams Companies Inc. | Baa3 | 4.03% |

| | |
|---|---|
| **Mean** | 4.03% |
| **Median** | 4.03% |
| **Mode** | 4.03% |

**Corporate Bond Yield Averages from Mergent Bond Record, January 2020 Edition**

Corporate Bond Averages, December 2019

| Mergent | S&P | Dec. Yield Avg. |
|---|---|---|
| Aaa | AAA | 3.01% |
| Aa1, Aa2 Aa3 | AA+, AA, AA- | 3.00% |
| A1, A2, A3 | A+, A, A- | 3.32% |
| Baa1, Baa2, Baa3 | BBB+, BBB, BBB- | 4.03% |

## Current Actual Cost of Debt

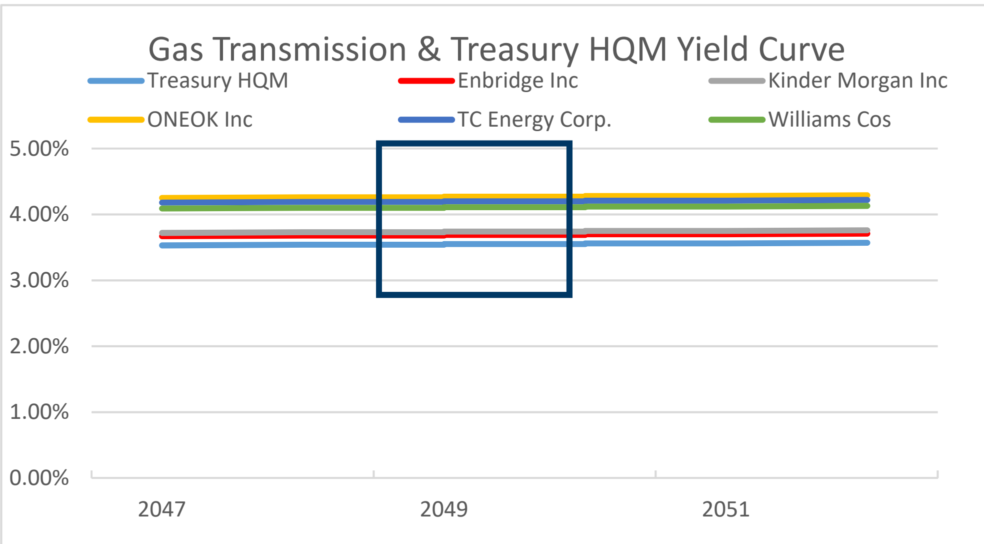
Yield-to-Maturities (YTMs) are based on year-end filings of Form N-Q, NPORT EX or 10-K with the SEC.

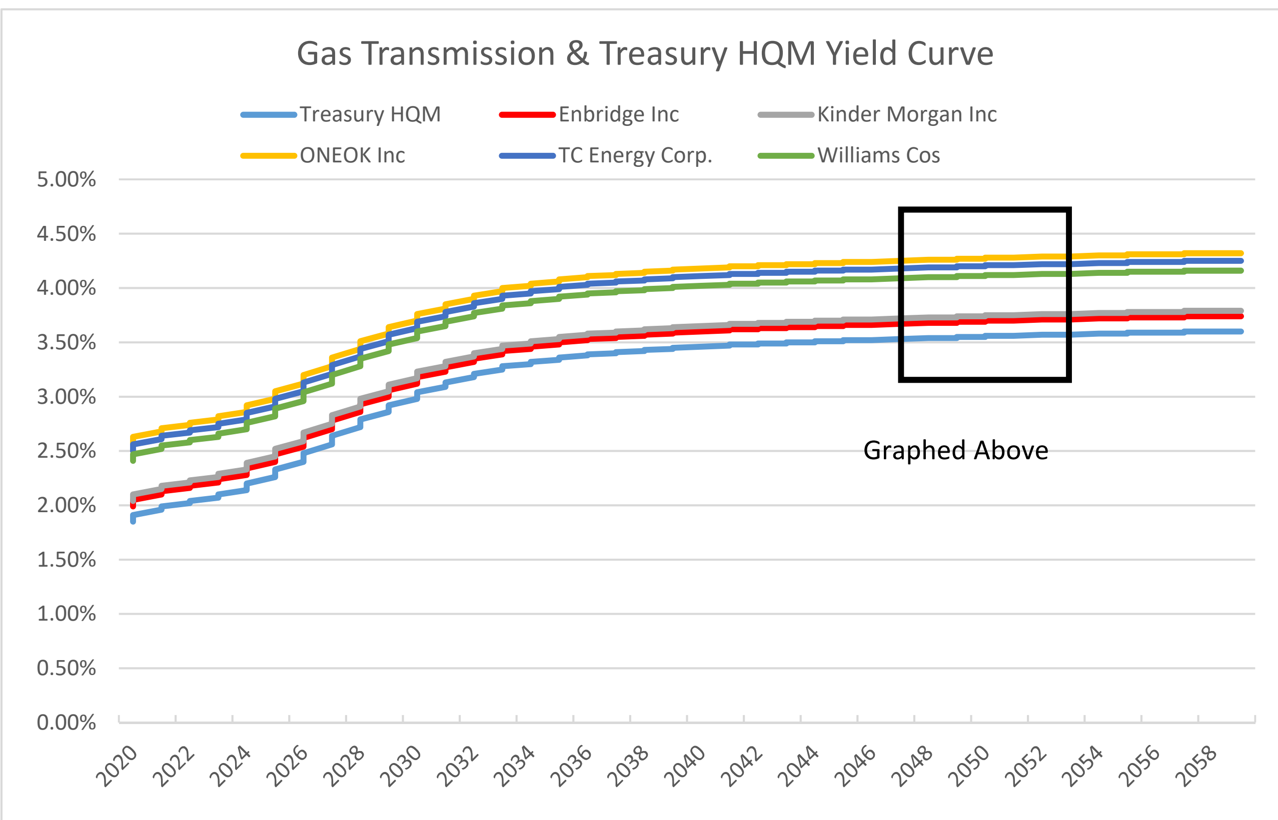
$$p = \sum_{i=1}^{n} d(t_i)c_i + \sum_{j=1}^{m} b_j x_j + e$$

30-year YTMs are based on an observed spread to the Treasury Quality Market Corporate Bond Spot rate curve (equation to the left) and followed out to 30 years.

| Indicated Rate of Debt | 3.99% |
|---|---|

Average YTM at 2049 in below graph.
See Appendix G for more information about debt issuances.



| | Treasury HQM | Enbridge Inc | Kinder Morgan Inc | ONEOK Inc | TC Energy Corp. | Williams Cos |
|---|---|---|---|---|---|---|
| 2020 | 1.85% | 1.99% | 2.04% | 2.57% | 2.50% | 2.41% |
| 2020.5 | 1.91% | 2.05% | 2.10% | 2.63% | 2.56% | 2.47% |
| 2021 | 1.96% | 2.10% | 2.15% | 2.68% | 2.61% | 2.52% |
| 2021.5 | 1.99% | 2.13% | 2.18% | 2.71% | 2.64% | 2.55% |
| 2022 | 2.02% | 2.16% | 2.21% | 2.74% | 2.67% | 2.58% |
| 2022.5 | 2.04% | 2.18% | 2.23% | 2.76% | 2.69% | 2.60% |
| 2023 | 2.07% | 2.21% | 2.26% | 2.79% | 2.72% | 2.63% |
| 2023.5 | 2.10% | 2.24% | 2.29% | 2.82% | 2.75% | 2.66% |
| 2024 | 2.14% | 2.28% | 2.33% | 2.86% | 2.79% | 2.70% |
| 2024.5 | 2.20% | 2.34% | 2.39% | 2.92% | 2.85% | 2.76% |
| 2025 | 2.26% | 2.40% | 2.45% | 2.98% | 2.91% | 2.82% |
| 2025.5 | 2.33% | 2.47% | 2.52% | 3.05% | 2.98% | 2.89% |
| 2026 | 2.40% | 2.54% | 2.59% | 3.12% | 3.05% | 2.96% |
| 2026.5 | 2.48% | 2.62% | 2.67% | 3.20% | 3.13% | 3.04% |
| 2027 | 2.56% | 2.70% | 2.75% | 3.28% | 3.21% | 3.12% |
| 2027.5 | 2.64% | 2.78% | 2.83% | 3.36% | 3.29% | 3.20% |
| 2028 | 2.72% | 2.86% | 2.91% | 3.44% | 3.37% | 3.28% |
| 2028.5 | 2.79% | 2.93% | 2.98% | 3.51% | 3.44% | 3.35% |
| 2029 | 2.86% | 3.00% | 3.05% | 3.58% | 3.51% | 3.42% |
| 2029.5 | 2.92% | 3.06% | 3.11% | 3.64% | 3.57% | 3.48% |
| 2030 | 2.98% | 3.12% | 3.17% | 3.70% | 3.63% | 3.54% |
| 2030.5 | 3.04% | 3.18% | 3.23% | 3.76% | 3.69% | 3.60% |
| 2031 | 3.09% | 3.23% | 3.28% | 3.81% | 3.74% | 3.65% |
| 2031.5 | 3.13% | 3.27% | 3.32% | 3.85% | 3.78% | 3.69% |
| 2032 | 3.18% | 3.32% | 3.37% | 3.90% | 3.83% | 3.74% |
| 2032.5 | 3.21% | 3.35% | 3.40% | 3.93% | 3.86% | 3.77% |
| 2033 | 3.25% | 3.39% | 3.44% | 3.97% | 3.90% | 3.81% |
| 2033.5 | 3.28% | 3.42% | 3.47% | 4.00% | 3.93% | 3.84% |
| 2034 | 3.30% | 3.44% | 3.49% | 4.02% | 3.95% | 3.86% |
| 2034.5 | 3.32% | 3.46% | 3.51% | 4.04% | 3.97% | 3.88% |
| 2035 | 3.34% | 3.48% | 3.53% | 4.06% | 3.99% | 3.90% |
| 2035.5 | 3.36% | 3.50% | 3.55% | 4.08% | 4.01% | 3.92% |
| 2036 | 3.38% | 3.52% | 3.57% | 4.10% | 4.03% | 3.94% |
| 2036.5 | 3.39% | 3.53% | 3.58% | 4.11% | 4.04% | 3.95% |
| 2037 | 3.40% | 3.54% | 3.59% | 4.12% | 4.05% | 3.96% |
| 2037.5 | 3.41% | 3.55% | 3.60% | 4.13% | 4.06% | 3.97% |
| 2038 | 3.42% | 3.56% | 3.61% | 4.14% | 4.07% | 3.98% |
| 2038.5 | 3.43% | 3.57% | 3.62% | 4.15% | 4.08% | 3.99% |
| 2039 | 3.44% | 3.58% | 3.63% | 4.16% | 4.09% | 4.00% |
| 2039.5 | 3.45% | 3.59% | 3.64% | 4.17% | 4.10% | 4.01% |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2040 | 3.46% | 3.60% | 3.65% | 4.18% | 4.11% | 4.02% |
| 2040.5 | 3.46% | 3.60% | 3.65% | 4.18% | 4.11% | 4.02% |
| 2041 | 3.47% | 3.61% | 3.66% | 4.19% | 4.12% | 4.03% |
| 2041.5 | 3.48% | 3.62% | 3.67% | 4.20% | 4.13% | 4.04% |
| 2042 | 3.48% | 3.62% | 3.67% | 4.20% | 4.13% | 4.04% |
| 2042.5 | 3.49% | 3.63% | 3.68% | 4.21% | 4.14% | 4.05% |
| 2043 | 3.49% | 3.63% | 3.68% | 4.21% | 4.14% | 4.05% |
| 2043.5 | 3.50% | 3.64% | 3.69% | 4.22% | 4.15% | 4.06% |
| 2044 | 3.50% | 3.64% | 3.69% | 4.22% | 4.15% | 4.06% |
| 2044.5 | 3.51% | 3.65% | 3.70% | 4.23% | 4.16% | 4.07% |
| 2045 | 3.51% | 3.65% | 3.70% | 4.23% | 4.16% | 4.07% |
| 2045.5 | 3.52% | 3.66% | 3.71% | 4.24% | 4.17% | 4.08% |
| 2046 | 3.52% | 3.66% | 3.71% | 4.24% | 4.17% | 4.08% |
| 2046.5 | 3.52% | 3.66% | 3.71% | 4.24% | 4.17% | 4.08% |
| 2047 | 3.53% | 3.67% | 3.72% | 4.25% | 4.18% | 4.09% |
| 2047.5 | 3.53% | 3.67% | 3.72% | 4.25% | 4.18% | 4.09% |
| 2048 | 3.54% | 3.68% | 3.73% | 4.26% | 4.19% | 4.10% |
| 2048.5 | 3.54% | 3.68% | 3.73% | 4.26% | 4.19% | 4.10% |
| **2049** | **3.54%** | **3.68%** | **3.73%** | **4.26%** | **4.19%** | **4.10%** |
| 2049.5 | 3.55% | 3.69% | 3.74% | 4.27% | 4.20% | 4.11% |
| 2050 | 3.55% | 3.69% | 3.74% | 4.27% | 4.20% | 4.11% |
| 2050.5 | 3.56% | 3.70% | 3.75% | 4.28% | 4.21% | 4.12% |
| 2051 | 3.56% | 3.70% | 3.75% | 4.28% | 4.21% | 4.12% |
| 2051.5 | 3.56% | 3.70% | 3.75% | 4.28% | 4.21% | 4.12% |
| 2052 | 3.57% | 3.71% | 3.76% | 4.29% | 4.22% | 4.13% |
| 2052.5 | 3.57% | 3.71% | 3.76% | 4.29% | 4.22% | 4.13% |
| 2053 | 3.57% | 3.71% | 3.76% | 4.29% | 4.22% | 4.13% |
| 2053.5 | 3.57% | 3.71% | 3.76% | 4.29% | 4.22% | 4.13% |
| 2054 | 3.58% | 3.72% | 3.77% | 4.30% | 4.23% | 4.14% |
| 2054.5 | 3.58% | 3.72% | 3.77% | 4.30% | 4.23% | 4.14% |
| 2055 | 3.58% | 3.72% | 3.77% | 4.30% | 4.23% | 4.14% |
| 2055.5 | 3.59% | 3.73% | 3.78% | 4.31% | 4.24% | 4.15% |
| 2056 | 3.59% | 3.73% | 3.78% | 4.31% | 4.24% | 4.15% |
| 2056.5 | 3.59% | 3.73% | 3.78% | 4.31% | 4.24% | 4.15% |
| 2057 | 3.59% | 3.73% | 3.78% | 4.31% | 4.24% | 4.15% |
| 2057.5 | 3.60% | 3.74% | 3.79% | 4.32% | 4.25% | 4.16% |
| 2058 | 3.60% | 3.74% | 3.79% | 4.32% | 4.25% | 4.16% |
| 2058.5 | 3.60% | 3.74% | 3.79% | 4.32% | 4.25% | 4.16% |
| 2059 | 3.60% | 3.74% | 3.79% | 4.32% | 4.25% | 4.16% |

## Indicated Rate of Equity

| Model | Rate |
|---|---|
| CAPM - Ex Post | 11.98% |
| CAPM - Supply Side | 10.66% |
| CAPM - Three Stage Ex Ante | 9.24% |
| CAPM - Damodaran | 9.35% |
| CAPM - Duff & Phelps | 9.75% |
| CAPM - Graham and Harvey | 9.07% |
| CAPM - Fernandez, Pershin, and Acin | 9.89% |
| Empirical CAPM - Ex Post | 11.36% |
| Empirical CAPM - Supply Side | 10.12% |
| Empirical CAPM - Three Stage Ex Ante | 8.79% |
| Empirical CAPM - Damodaran | 8.90% |
| Empirical CAPM - Duff & Phelps | 9.31% |
| Empirical CAPM - Graham and Harvey | 8.63% |
| Empirical CAPM - Fernandez, Pershin, and Acin | 9.40% |
| DGM - Dividend Growth | 12.90% |
| DGM - Earnings Growth | 22.90% |
| Multi-Stage DGM | 18.89% |
| **Indicated Rate of Equity** | **17.30%** |

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the majority reliance on the Dividend Growth Model - Earnings Growth, secondary reliance on the Dividend Growth Model - Dividend Growth, and tertiary reliance on the Capital Asset Pricing Model using the Ex Post equity risk premium.

## Direct Rate and Growth

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Debt Component** | 39.00% | 3.99% | 1.56% |
| **Equity Component** | 61.00% | 5.15% | 3.14% |
| **Direct Rate** | | | **4.70%** |

| | |
|---|---|
| **Direct Rate** | **4.70%** |

| | |
|---|---|
| Yield Rate | 12.11% |
| Direct Rate | 4.70% |
| **Implied Industry Growth Rate** | **7.41%** |

# Capital Asset Pricing Model (CAPM)

(ERP x β) + RFR = Indicated Equity Rate

| | Equity Risk Premium (ERP) | x Industry Beta (β) | = Industry Risk Premium | + Risk-Free Rate[1] (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 1.35 | 9.65% | 2.33% | 11.98% |
| Supply Side[3] | 6.17% | 1.35 | 8.33% | 2.33% | 10.66% |
| Three Stage Ex Ante[4] | 5.12% | 1.35 | 6.91% | 2.33% | 9.24% |
| Dr. Damodaran ERP[5] | 5.20% | 1.35 | 7.02% | 2.33% | 9.35% |
| Duff & Phelps[6] | 5.00% | 1.35 | 6.75% | 3.00% | 9.75% |
| Duke CFO Global Business Outlook[7] | 4.99% | 1.35 | 6.74% | 2.33% | 9.07% |
| Fernandez, Martinez and Acin[8] | 5.60% | 1.35 | 7.56% | 2.33% | 9.89% |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Empirical Capital Asset Pricing Model (ECAPM)

$(ERP \times \beta \times .75) + (ERP \times .25) + RFR =$ Indicated Equity Rate

| Model | Equity Risk Premium (ERP) | Industry Beta (β) | Weighted Industry Risk Premium (weighted at 75%) | Weighted Equity Risk Premium (weighted at 25%) | Risk-Free Rate (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 1.35 | 7.24% | 1.79% | 2.33% | **11.36%** |
| Supply Side[3] | 6.17% | 1.35 | 6.25% | 1.54% | 2.33% | **10.12%** |
| Three Stage Ex Ante[4] | 5.12% | 1.35 | 5.18% | 1.28% | 2.33% | **8.79%** |
| Dr. Damodaran ERP[5] | 5.20% | 1.35 | 5.27% | 1.30% | 2.33% | **8.90%** |
| Duff & Phelps[6] | 5.00% | 1.35 | 5.06% | 1.25% | 3.00% | **9.31%** |
| Duke CFO Global Business Outlook[7] | 4.99% | 1.35 | 5.05% | 1.25% | 2.33% | **8.63%** |
| Fernandez, Martinez and Acin[8] | 5.60% | 1.35 | 5.67% | 1.40% | 2.33% | **9.40%** |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2019, February). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Dividend Growth Model

| Company | Current Dividend Yield (DY) | Projected Short-term EPS Growth Rate (EG) | Projected Short-term Dividend Growth Rate (DG) | Cost of Equity Earnings Growth DY + EG | Cost of Equity Dividend Growth DY + DG |
|---|---|---|---|---|---|
| Enbridge Inc. | 5.90% | 6.50% | 4.50% | 12.40% | 10.40% |
| Kinder Morgan Inc. | 5.00% | 35.50% | 17.50% | 40.50% | 22.50% |
| ONEOK Inc. | 5.40% | 17.00% | 10.00% | 22.40% | 15.40% |
| TC Energy Corp (FKA TransCanada | 5.90% | 17.00% | 5.50% | 22.90% | 11.40% |
| Williams Companies Inc. | 6.90% | 20.00% | 6.00% | 26.90% | 12.90% |
| Mean | 5.82% | 19.20% | 8.70% | 25.02% | 14.52% |
| Median | 5.90% | 17.00% | 6.00% | 22.90% | 12.90% |

| | |
|---|---|
| **DGM - Dividend Growth, Indicated Rate** | **12.90%** |
| **DGM - Earnings Growth, Indicated Rate** | **22.90%** |

We placed more reliance on the median to select the indicated rate.

**Notes:**

Dividend Yield and projected growth rates provided by Value Line.

DGM - earnings average is 21.15% and median is 22.65% without Kinder Morgan Inc.

DGM - dividends average is 12.53% and median is 12.15% without Kinder Morgan Inc.

Comparing dividend yields and earnings per share growth estimates from Value Line for the 2019 and 2018 calendar years

| | Dividend Yields | | EPS Growth Estimates | | % Change in |
|---|---|---|---|---|---|
| **Company** | **2019 CY** | **2018 CY** | **2019 CY** | **2018 CY** | Growth Est. |
| Enbridge Inc. | 5.90% | 6.10% | 6.50% | 4.50% | 44.44% |
| Kinder Morgan Inc. | 5.00% | 4.60% | 35.50% | NMF | --- |
| ONEOK Inc. | 5.40% | 5.60% | 17.00% | 20.50% | -17.07% |
| TC Energy Corp (FKA TransCanada ( | 5.90% | 5.40% | 17.00% | 56.50% | -69.91% |
| Williams Companies Inc. | 6.90% | 5.40% | 20.00% | 22.50% | -11.11% |

According to Value Line, Kinder Morgan's estimated earnings per share growth rate to 2022 - 2024 is 35.5%. The past five years growth rate was negative 18%. The summary provided by Value Line included that Kinder Morgan recorded weak third-quarter results and that revenues fell. A few new pipeline projects were placed into service. The company benefited from lower administrative expenses and reduced debt load caused interest costs to decline. The company's bottom line should increase at a strong rate over the combine 12 months related to 10 liquefaction units in service by this time next year and reduction of debt due to sale of some assets. John E. Seibert III, November 29, 2019.

# Multi-Stage Dividend Growth Model

$K_E = (DY \times (1+0.5(G))) + 0.67(G1) + 0.33(g)$

**$K_E$** Cost of Equity
**DY** Dividend Yield
**$G_1$** Short-term Growth Estimate
**g** Stable Growth
**G** Average Growth Rate

| **Company** | **DY** Dividend Yield | **G1** Short-term Growth Estimate | **g** Stable Growth | **G** Average Growth Rate | **$K_E$** Cost of Equity |
|---|---|---|---|---|---|
| Enbridge Inc. | 5.90% | 6.50% | 3.90% | 5.20% | 11.70% |
| Kinder Morgan Inc. | 5.00% | 35.50% | 3.90% | 19.70% | 30.56% |
| ONEOK Inc. | 5.40% | 17.00% | 3.90% | 10.45% | 18.36% |
| TC Energy Corp (FKA TransCanada Co | 5.90% | 17.00% | 3.90% | 10.45% | 18.89% |
| Williams Companies Inc. | 6.90% | 20.00% | 3.90% | 11.95% | 22.00% |

| | |
|---|---|
| Mean | 20.30% |
| Median | 18.89% |
| **Multi-Stage DGM, Indicated Rate** | **18.89%** |

We placed more reliance on the median when selecting 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 1.9% plus the expected inflation rate of 2.0%).

Average without Kinder Morgan Inc. is 17.73%. Median without Kinder Mogan is 18.62%.

# Equity Component of the Direct Rate

| Company | Value Line P/E Ratio |
|---|---|
| Enbridge Inc. | 17.0 |
| Kinder Morgan Inc. | 19.4 |
| ONEOK Inc. | 20.6 |
| TC Energy Corp (FKA TransCanada Corporation) | 16.7 |
| Williams Companies Inc. | 20.7 |
| | |
| Mean | 18.9 |
| Median | 19.4 |
| Selected Price to Earnings (P/E) Ratio | 19.4 |
| | |
| **Indicated Equity Component of the Direct Rate** | **5.15%** |

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

**Notes:**

The Price/Earnings Ratio was downloaded from Value Line.

# Beta Analysis

| Company | Beta |
|---|---|
| Enbridge Inc. | 1.00 |
| Kinder Morgan Inc. | 1.35 |
| ONEOK Inc. | 1.50 |
| TC Energy Corp (FKA TransCanada Corporation) | 1.05 |
| Williams Companies Inc. | 1.90 |
| | |
| Beta Mean | 1.36 |
| Beta Median | 1.35 |
| Unlevered and Relevered Mean* | 1.38 |
| | |
| **Indicated Beta** | **1.35** |

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

**Notes:**

*See the Unlevering Relevering Beta page for the calculation

Without including Wiliams Companies Inc. the average beta would be 1.23 and the median would be 1.20.

Comparing betas from Value Line for the 2019 and 2018 calendar years

| | Betas | |
|---|---|---|
| **Company** | **2019 CY** | **2018 CY** |
| Enbridge Inc. | 1.00 | 1.00 |
| Kinder Morgan Inc. | 1.35 | 1.45 |
| ONEOK Inc. | 1.50 | 1.55 |
| TC Energy Corp (FKA TransCanada Corporation) | 1.05 | 1.10 |
| Williams Companies Inc. | 1.90 | 1.95 |

# Unlevering/Relevering Betas

| Unlevering of Betas | | | | | |
|---|---|---|---|---|---|
| **Company** | *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** |
| Enbridge Inc. | 7.00% | 35.87% | 59.56% | 1.00 | 0.64 |
| Kinder Morgan Inc. | 21.00% | 41.46% | 58.54% | 1.35 | 0.87 |
| ONEOK Inc. | 22.00% | 30.22% | 69.78% | 1.50 | 1.12 |
| TC Energy Corp (FKA TransCan | 25.00% | 0.89% | 1.54% | 1.05 | 0.73 |
| Williams Companies Inc. | 23.00% | 43.57% | 56.43% | 1.90 | 1.19 |
| | | | **Average** | **1.36** | |

| Relevering of Betas | | | | |
|---|---|---|---|---|
| **Company** | *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** |
| Enbridge Inc. | 19.60% | 39.00% | 61.00% | 0.97 |
| Kinder Morgan Inc. | 19.60% | 39.00% | 61.00% | 1.32 |
| ONEOK Inc. | 19.60% | 39.00% | 61.00% | 1.70 |
| TC Energy Corp (FKA TransCan | 19.60% | 39.00% | 61.00% | 1.11 |
| Williams Companies Inc. | 19.60% | 39.00% | 61.00% | 1.80 |
| | | | **Average** | **1.38** |

**Notes:**
Uses the Hamada Formula

Unlevered Beta = Levered Beta / [1 + ( 1 - Tax Rate) x (Debt/Equity))], using company-specific components
Using company-specific components

Relevered Beta = Unlevered Beta [1 + (1 - Tax Rate) x (Debt/Equity)]
Using industry components for Tax Rate, Debt, and Equity

# Calculation of Market to Book Ratios for the Electric Market Segment

- December 31, 2019 calendar year information for the January 2, 2020 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 |
|---|---|---|---|---|
| Enbridge Inc. | 101,074,801,316 | 69,407,000,000 | 1.46 | Enbridge Inc. 2019 10-K, p. 99 (both in CAD) |
| Kinder Morgan Inc. | 45,321,958,394 | 34,086,000,000 | 1.33 | Kinder Morgan Inc. 2019 10-K, p. 73 |
| ONEOK Inc. | 28,816,785,184 | 6,225,951,000 | 4.63 | ONEOK Inc. 2019 10-K, p. 59 |
| TC Energy Corp.* | 47,858,160,000 | 24,942,450,300 | 1.92 | TC Energy Corp Annual Report 2019, p. 114 |
| Williams Companies Inc. | 26,834,761,229 | 13,363,000,000 | 2.01 | Williams Companies 2019 10-K, p. 78 |
| | | **Average** | **2.27** | |

## Market to Book Ratio for Debt

| Company | Market Value of Long-Term Debt from 10-K | Book Value of Long-Term Debt from 10-K | Market to Book Ratio | Source |
|---|---|---|---|---|
| Enbridge Inc. | 70,500,000,000 | 64,400,000,000 | 1.09 | Enbridge Inc. 2019 10-K, p. 167 (both in CAD) |
| Kinder Morgan Inc. | 31,915,000,000 | 30,883,000,000 | 1.03 | Kinder Morgan Inc. 2019 10-K, p. 73 |
| ONEOK Inc. | 13,800,000,000 | 12,500,000,000 | 1.10 | ONEOK Inc. 2019 10-K, p. 74 |
| TC Energy Corp. | 43,187,000,000 | 36,985,000,000 | 1.17 | TC Energy Annual Report 2019, p. 173 (both in CAD) |
| Williams Companies Inc. | 25,319,000,000 | 22,288,000,000 | 1.14 | Williams Companies 2019 10-K, p. 132 |
| | | **Average** | **1.11** | |

## Application of Capital Structure as determined in the Capitalization Rate Study

| | Capital Structure | Market to Book | Composite |
|---|---|---|---|
| Common Equity | 61.00% | 2.27 | 1.38 |
| Long-term Debt | 39.00% | 1.11 | 0.43 |
| | | | **1.81** |

*Convert TC Energy Corp's Book Value of Common Equity from Canadian Dollars to U.S. Dollars. TC Energy Corp's Annual Report is in CAD. The Value Line tear sheet is in USD.

| | |
|---|---|
| 32,397,000,000 | CAD |
| 0.7699 | Exchange Rate |
| 24,942,450,300 | USD |

# Appendix D - Fluid Transportation Pipeline

## Yield Rate

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Long-Term Debt** | 38.00% | 4.80% | 1.82% |
| **Common Equity** | 62.00% | 14.60% | 9.05% |
| **Yield Rate** | | | **10.87%** |

| | |
|---|---|
| **Fluid Transportation Pipeline Yield Rate** | **10.87%** |

## 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 |
|---|---|---|---|---|---|---|---|
| Holly Energy Partners LP | 1,431,900,000 | None | 2,363,969,306 | 3,795,869,306 | 37.72% | 0.00% | 62.28% |
| Magellan Midstream Partners LP | 4,705,800,000 | None | 13,505,494,698 | 18,211,294,698 | 25.84% | 0.00% | 74.16% |
| NuStar Energy LP | 2,898,000,000 | None | 3,019,074,600 | 5,917,074,600 | 48.98% | 0.00% | 51.02% |
| Phillips 66 Partners LP | 3,490,000,000 | None | 12,361,824,677 | 15,851,824,677 | 22.02% | 0.00% | 77.98% |
| Plains All American Pipeline | 9,173,000,000 | 1,505,000,000 | 12,354,644,935 | 23,032,644,935 | 39.83% | 6.53% | 53.64% |
| | | | | **Mean** | 34.88% | 1.31% | 63.82% |
| | | | | **Median** | 37.72% | 0.00% | 62.28% |

| | | | |
|---|---|---|---|
| **Indicated Industry Capital Structure** | **38.00%** | **0%** | **62.00%** |

We placed more reliance on the median when selecting the indicated capital structure for the industry.

## Indexed Rate of Debt

| Company | Debt Rating | Long-Term Debt Rate |
|---|---|---|
| Holly Energy Partners LP | Ba2 | 7.74% |
| Magellan Midstream Partners LP | Baa1 | 4.03% |
| NuStar Energy LP | Ba2 | 7.74% |
| Phillips 66 Partners LP | Baa3 | 4.03% |
| Plains All American Pipeline | Ba1 | 7.66% |

| | |
|---|---|
| **Mean** | 6.24% |
| **Median** | 7.66% |
| **Mode** | 7.74% |

**Corporate Bond Yield Averages from Mergent Bond Record, January 2020 Edition**

Corporate Bond Averages, December 2019

| Mergent | S&P | Dec. Yield Avg. |
|---|---|---|
| Aaa | AAA | 3.01% |
| Aa1, Aa2 Aa3 | AA+, AA, AA- | 3.00% |
| A1, A2, A3 | A+, A, A- | 3.32% |
| Baa1, Baa2, Baa3 | BBB+, BBB, BBB- | 4.03% |

** These companies are rated below the Mergent Bond Record Bond Yield Averages. We analyzed the Mergent Bond Record, January 2020 issue, for U.S. Corporate Bonds with the same debt rating. We determined the average Ba1 yield to maturity is 7.66% and the average Ba2 yield to maturity is 7.74%.

## Current Actual Cost of Debt

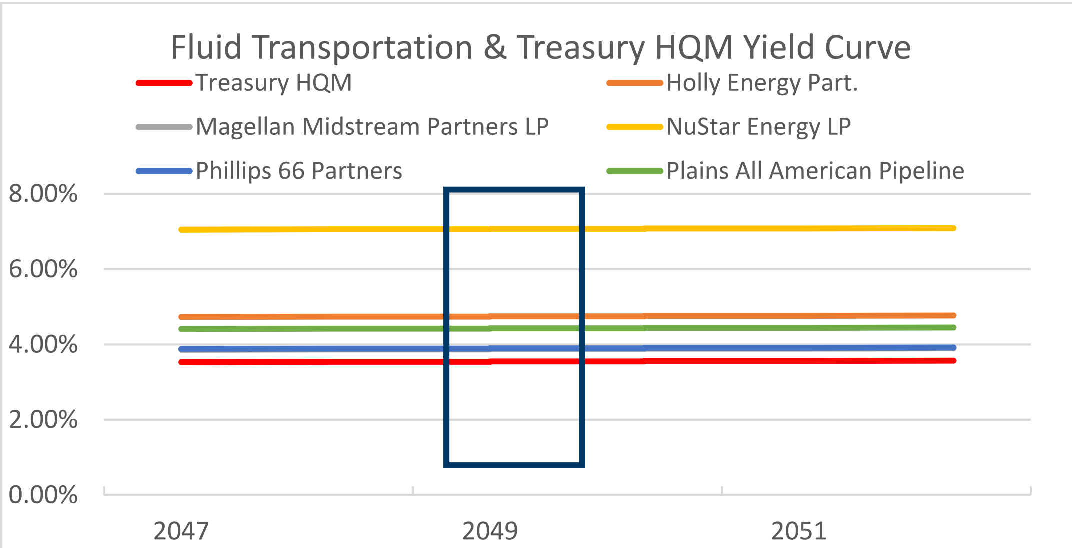
Yield-to-Maturities (YTMs) are based on year-end filings of Form N-Q, NPORT EX or 10-K with the SEC.

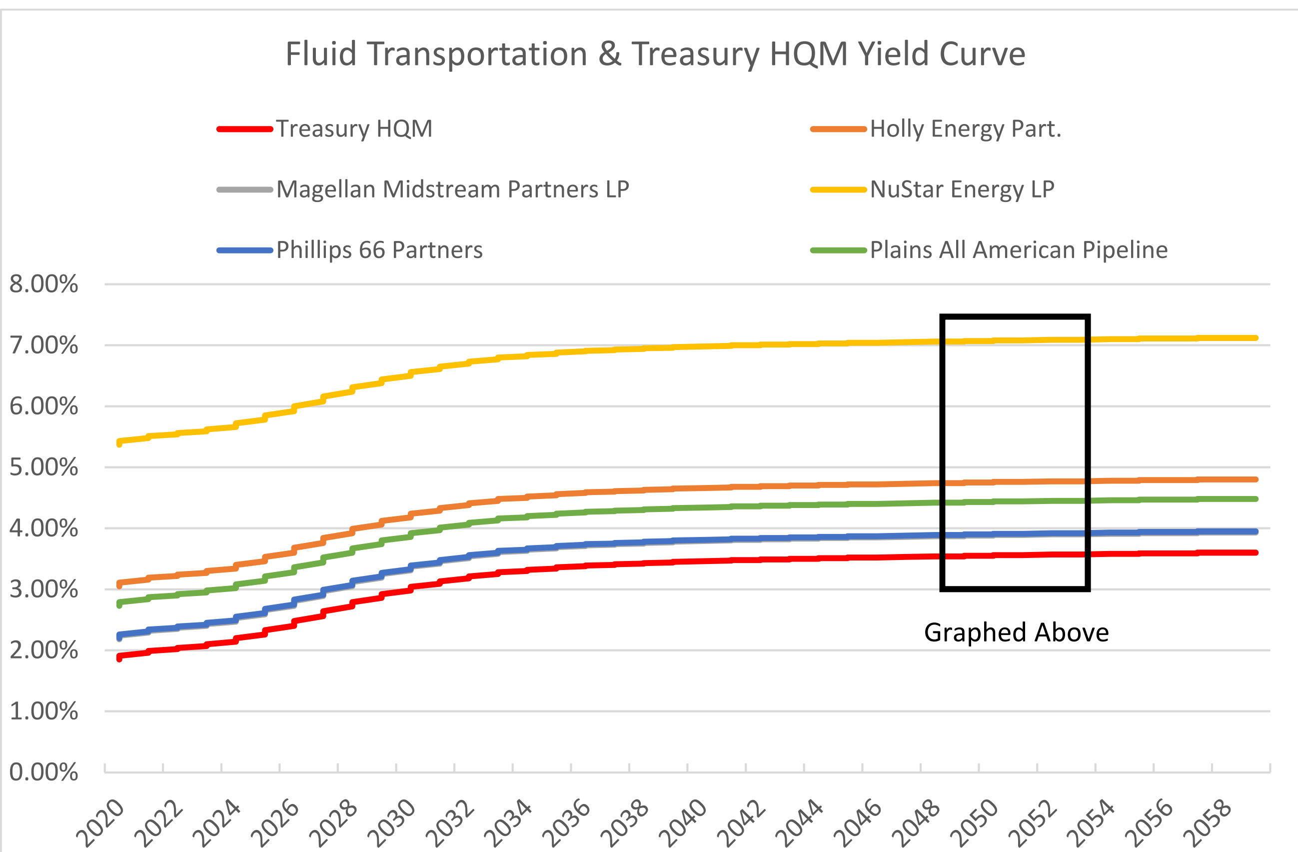
$$p = \sum_{i=1}^{n} d(t_i)c_i + \sum_{j=1}^{m} b_j x_j + e$$

30-year YTMs are based on an observed spread to the Treasury Quality Market Corporate Bond Spot rate curve (equation below) and followed out to 30 years.

| Indicated Rate of Debt | 4.80% |
|---|---|

Average YTM at 2049 in below graph.
See Appendix G for more information about debt issuances.



| | Treasury HQM | Holly Energy Part. | Magellan Midstream Partners LP | NuStar Energy LP | Phillips 66 Partners | Plains All American Pipeline |
|---|---|---|---|---|---|---|
| 2020 | 1.85% | 3.05% | 2.18% | 5.37% | 2.20% | 2.73% |
| 2020.5 | 1.91% | 3.11% | 2.24% | 5.43% | 2.26% | 2.79% |
| 2021 | 1.96% | 3.16% | 2.29% | 5.48% | 2.31% | 2.84% |
| 2021.5 | 1.99% | 3.19% | 2.32% | 5.51% | 2.34% | 2.87% |
| 2022 | 2.02% | 3.22% | 2.35% | 5.54% | 2.37% | 2.90% |
| 2022.5 | 2.04% | 3.24% | 2.37% | 5.56% | 2.39% | 2.92% |
| 2023 | 2.07% | 3.27% | 2.40% | 5.59% | 2.42% | 2.95% |
| 2023.5 | 2.10% | 3.30% | 2.43% | 5.62% | 2.45% | 2.98% |
| 2024 | 2.14% | 3.34% | 2.47% | 5.66% | 2.49% | 3.02% |
| 2024.5 | 2.20% | 3.40% | 2.53% | 5.72% | 2.55% | 3.08% |
| 2025 | 2.26% | 3.46% | 2.59% | 5.78% | 2.61% | 3.14% |
| 2025.5 | 2.33% | 3.53% | 2.66% | 5.85% | 2.68% | 3.21% |
| 2026 | 2.40% | 3.60% | 2.73% | 5.92% | 2.75% | 3.28% |
| 2026.5 | 2.48% | 3.68% | 2.81% | 6.00% | 2.83% | 3.36% |
| 2027 | 2.56% | 3.76% | 2.89% | 6.08% | 2.91% | 3.44% |
| 2027.5 | 2.64% | 3.84% | 2.97% | 6.16% | 2.99% | 3.52% |
| 2028 | 2.72% | 3.92% | 3.05% | 6.24% | 3.07% | 3.60% |
| 2028.5 | 2.79% | 3.99% | 3.12% | 6.31% | 3.14% | 3.67% |
| 2029 | 2.86% | 4.06% | 3.19% | 6.38% | 3.21% | 3.74% |
| 2029.5 | 2.92% | 4.12% | 3.25% | 6.44% | 3.27% | 3.80% |
| 2030 | 2.98% | 4.18% | 3.31% | 6.50% | 3.33% | 3.86% |
| 2030.5 | 3.04% | 4.24% | 3.37% | 6.56% | 3.39% | 3.92% |
| 2031 | 3.09% | 4.29% | 3.42% | 6.61% | 3.44% | 3.97% |
| 2031.5 | 3.13% | 4.33% | 3.46% | 6.65% | 3.48% | 4.01% |
| 2032 | 3.18% | 4.38% | 3.51% | 6.70% | 3.53% | 4.06% |
| 2032.5 | 3.21% | 4.41% | 3.54% | 6.73% | 3.56% | 4.09% |
| 2033 | 3.25% | 4.45% | 3.58% | 6.77% | 3.60% | 4.13% |
| 2033.5 | 3.28% | 4.48% | 3.61% | 6.80% | 3.63% | 4.16% |
| 2034 | 3.30% | 4.50% | 3.63% | 6.82% | 3.65% | 4.18% |
| 2034.5 | 3.32% | 4.52% | 3.65% | 6.84% | 3.67% | 4.20% |
| 2035 | 3.34% | 4.54% | 3.67% | 6.86% | 3.69% | 4.22% |
| 2035.5 | 3.36% | 4.56% | 3.69% | 6.88% | 3.71% | 4.24% |
| 2036 | 3.38% | 4.58% | 3.71% | 6.90% | 3.73% | 4.26% |
| 2036.5 | 3.39% | 4.59% | 3.72% | 6.91% | 3.74% | 4.27% |
| 2037 | 3.40% | 4.60% | 3.73% | 6.92% | 3.75% | 4.28% |
| 2037.5 | 3.41% | 4.61% | 3.74% | 6.93% | 3.76% | 4.29% |
| 2038 | 3.42% | 4.62% | 3.75% | 6.94% | 3.77% | 4.30% |
| 2038.5 | 3.43% | 4.63% | 3.76% | 6.95% | 3.78% | 4.31% |
| 2039 | 3.44% | 4.64% | 3.77% | 6.96% | 3.79% | 4.32% |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2039.5 | 3.45% | 4.65% | 3.78% | 6.97% | 3.80% | 4.33% |
| 2040 | 3.46% | 4.66% | 3.79% | 6.98% | 3.81% | 4.34% |
| 2040.5 | 3.46% | 4.66% | 3.79% | 6.98% | 3.81% | 4.34% |
| 2041 | 3.47% | 4.67% | 3.80% | 6.99% | 3.82% | 4.35% |
| 2041.5 | 3.48% | 4.68% | 3.81% | 7.00% | 3.83% | 4.36% |
| 2042 | 3.48% | 4.68% | 3.81% | 7.00% | 3.83% | 4.36% |
| 2042.5 | 3.49% | 4.69% | 3.82% | 7.01% | 3.84% | 4.37% |
| 2043 | 3.49% | 4.69% | 3.82% | 7.01% | 3.84% | 4.37% |
| 2043.5 | 3.50% | 4.70% | 3.83% | 7.02% | 3.85% | 4.38% |
| 2044 | 3.50% | 4.70% | 3.83% | 7.02% | 3.85% | 4.38% |
| 2044.5 | 3.51% | 4.71% | 3.84% | 7.03% | 3.86% | 4.39% |
| 2045 | 3.51% | 4.71% | 3.84% | 7.03% | 3.86% | 4.39% |
| 2045.5 | 3.52% | 4.72% | 3.85% | 7.04% | 3.87% | 4.40% |
| 2046 | 3.52% | 4.72% | 3.85% | 7.04% | 3.87% | 4.40% |
| 2046.5 | 3.52% | 4.72% | 3.85% | 7.04% | 3.87% | 4.40% |
| 2047 | 3.53% | 4.73% | 3.86% | 7.05% | 3.88% | 4.41% |
| 2047.5 | 3.53% | 4.73% | 3.86% | 7.05% | 3.88% | 4.41% |
| 2048 | 3.54% | 4.74% | 3.87% | 7.06% | 3.89% | 4.42% |
| 2048.5 | 3.54% | 4.74% | 3.87% | 7.06% | 3.89% | 4.42% |
| **2049** | **3.54%** | **4.74%** | **3.87%** | **7.06%** | **3.89%** | **4.42%** |
| 2049.5 | 3.55% | 4.75% | 3.88% | 7.07% | 3.90% | 4.43% |
| 2050 | 3.55% | 4.75% | 3.88% | 7.07% | 3.90% | 4.43% |
| 2050.5 | 3.56% | 4.76% | 3.89% | 7.08% | 3.91% | 4.44% |
| 2051 | 3.56% | 4.76% | 3.89% | 7.08% | 3.91% | 4.44% |
| 2051.5 | 3.56% | 4.76% | 3.89% | 7.08% | 3.91% | 4.44% |
| 2052 | 3.57% | 4.77% | 3.90% | 7.09% | 3.92% | 4.45% |
| 2052.5 | 3.57% | 4.77% | 3.90% | 7.09% | 3.92% | 4.45% |
| 2053 | 3.57% | 4.77% | 3.90% | 7.09% | 3.92% | 4.45% |
| 2053.5 | 3.57% | 4.77% | 3.90% | 7.09% | 3.92% | 4.45% |
| 2054 | 3.58% | 4.78% | 3.91% | 7.10% | 3.93% | 4.46% |
| 2054.5 | 3.58% | 4.78% | 3.91% | 7.10% | 3.93% | 4.46% |
| 2055 | 3.58% | 4.78% | 3.91% | 7.10% | 3.93% | 4.46% |
| 2055.5 | 3.59% | 4.79% | 3.92% | 7.11% | 3.94% | 4.47% |
| 2056 | 3.59% | 4.79% | 3.92% | 7.11% | 3.94% | 4.47% |
| 2056.5 | 3.59% | 4.79% | 3.92% | 7.11% | 3.94% | 4.47% |
| 2057 | 3.59% | 4.79% | 3.92% | 7.11% | 3.94% | 4.47% |
| 2057.5 | 3.60% | 4.80% | 3.93% | 7.12% | 3.95% | 4.48% |
| 2058 | 3.60% | 4.80% | 3.93% | 7.12% | 3.95% | 4.48% |
| 2058.5 | 3.60% | 4.80% | 3.93% | 7.12% | 3.95% | 4.48% |
| 2059 | 3.60% | 4.80% | 3.93% | 7.12% | 3.95% | 4.48% |

**Notes:**

On May 22, 2019, NuStar Logistics issued $500 million of 6.0% senior notes due June 1, 2026.

# Indicated Rate of Equity

| Model | Rate |
|---|---|
| CAPM - Ex Post | 10.70% |
| CAPM - Supply Side | 9.55% |
| CAPM - Three Stage Ex Ante | 8.32% |
| CAPM - Damodaran | 8.41% |
| CAPM - Duff & Phelps | 8.85% |
| CAPM - Graham and Harvey | 8.17% |
| CAPM - Fernandez, Pershin, and Acin | 8.88% |
| Empirical CAPM - Ex Post | 10.39% |
| Empirical CAPM - Supply Side | 9.29% |
| Empirical CAPM - Three Stage Ex Ante | 8.10% |
| Empirical CAPM - Damodaran | 8.19% |
| Empirical CAPM - Duff & Phelps | 8.64% |
| Empirical CAPM - Graham and Harvey | 7.96% |
| Empirical CAPM - Fernandez, Pershin, and Acin | 8.64% |
| DGM - Dividend Growth | 16.43% |
| DGM - Earnings Growth | 17.80% |
| Multi-Stage DGM | 16.54% |
| **Indicated Rate of Equity** | **14.60%** |

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the majority reliance on the Dividend Growth Model - Earnings Growth and secondary reliance on the Capital Asset Pricing Model using the Ex Post equity risk premium.

# Direct Rate and Growth

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Debt Component** | 38.00% | 4.80% | 1.82% |
| **Equity Component** | 62.00% | 8.13% | 5.04% |
| **Direct Rate** | | | **6.86%** |

| | |
|---|---|
| **Direct Rate** | **6.86%** |

| | |
|---|---|
| Yield Rate | 10.87% |
| Direct Rate | 6.86% |
| **Implied Industry Growth Rate** | **4.01%** |

# Capital Asset Pricing Model (CAPM)

(ERP x β) + RFR = Indicated Equity Rate

| | Equity Risk Premium (ERP) | x Industry Beta (β) | = Industry Risk Premium | + Risk-Free Rate[1] (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 1.17 | 8.37% | 2.33% | 10.70% |
| Supply Side[3] | 6.17% | 1.17 | 7.22% | 2.33% | 9.55% |
| Three Stage Ex Ante[4] | 5.12% | 1.17 | 5.99% | 2.33% | 8.32% |
| Dr. Damodaran ERP[5] | 5.20% | 1.17 | 6.08% | 2.33% | 8.41% |
| Duff & Phelps[6] | 5.00% | 1.17 | 5.85% | 3.00% | 8.85% |
| Duke CFO Global Business Outlook[7] | 4.99% | 1.17 | 5.84% | 2.33% | 8.17% |
| Fernandez, Martinez and Acin[8] | 5.60% | 1.17 | 6.55% | 2.33% | 8.88% |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Empirical Capital Asset Pricing Model (ECAPM)

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

| Model | Equity Risk Premium (ERP) | Industry Beta (β) | Weighted Industry Risk Premium (weighted at 75%) | Weighted Equity Risk Premium (weighted at 25%) | Risk-Free Rate (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 1.17 | 6.27% | 1.79% | 2.33% | **10.39%** |
| Supply Side[3] | 6.17% | 1.17 | 5.41% | 1.54% | 2.33% | **9.29%** |
| Three Stage Ex Ante[4] | 5.12% | 1.17 | 4.49% | 1.28% | 2.33% | **8.10%** |
| Dr. Damodaran ERP[5] | 5.20% | 1.17 | 4.56% | 1.30% | 2.33% | **8.19%** |
| Duff & Phelps[6] | 5.00% | 1.17 | 4.39% | 1.25% | 3.00% | **8.64%** |
| Duke CFO Global Business Outlook[7] | 4.99% | 1.17 | 4.38% | 1.25% | 2.33% | **7.96%** |
| Fernandez, Martinez and Acin[8] | 5.60% | 1.17 | 4.91% | 1.40% | 2.33% | **8.64%** |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2019, February). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Dividend Growth Model

| Company | Current Dividend Yield (DY) | Projected Short-term EPS Growth Rate (EG) | Projected Short-term Dividend Growth Rate (DG) | Cost of Equity Earnings Growth DY + EG | Cost of Equity Dividend Growth DY + DG |
|---|---|---|---|---|---|
| Holly Energy Partners LP | 12.00% | 2.50% | 2.50% | 14.50% | 14.50% |
| Magellan Midstream Partners LP | 7.40% | 6.00% | 9.50% | 13.40% | 16.90% |
| NuStar Energy LP | 8.60% | 9.50% | -6.50% | 18.10% | --- |
| Phillips 66 Partners LP | 6.40% | 14.00% | 16.00% | 20.40% | 22.40% |
| Plains All American Pipeline | 9.10% | 12.00% | 5.50% | 21.10% | 14.60% |
| Mean | 8.70% | 8.80% | 5.40% | 17.50% | 17.10% |
| Median | 8.60% | 9.50% | 5.50% | 18.10% | 15.75% |

| | |
|---|---|
| **DGM - Dividend Growth, Indicated Rate** | **16.43%** |
| **DGM - Earnings Growth, Indicated Rate** | **17.80%** |

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

**Notes:**

Dividend Yield and growth rates provided by Value Line

Did not NuStar Energy LP in the DGM - Dividend estimate.

# Multi-Stage Dividend Growth Model

$K_E$ = (DY x (1+ 0.5(G))) + 0.67(G1) +0.33(g)

**$K_E$** Cost of Equity
**DY** Dividend Yield
**$G_1$** Short-term Growth Estimate
**g** Stable Growth
**G** Average Growth Rate

| Company | **DY** Dividend Yield | **G1** Short-term Growth Estimate | **g** Stable Growth | **G** Average Growth Rate | **$K_E$** Cost of Equity |
|---|---|---|---|---|---|
| Holly Energy Partners LP | 12.00% | 2.50% | 3.90% | 3.20% | 15.15% |
| Magellan Midstream Partners LP | 7.40% | 6.00% | 3.90% | 4.95% | 12.89% |
| NuStar Energy LP | 8.60% | 9.50% | 3.90% | 6.70% | 16.54% |
| Phillips 66 Partners LP | 6.40% | 14.00% | 3.90% | 8.95% | 17.35% |
| Plains All American Pipeline | 9.10% | 12.00% | 3.90% | 7.95% | 18.79% |

| | |
|---|---|
| Mean | 16.15% |
| Median | 16.54% |

| | |
|---|---|
| **Multi-Stage DGM, Indicated Rate** | **16.54%** |

We placed more reliance on the median to select 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 1.9% plus the expected inflation rate of 2.0%).

# Equity Component of the Direct Rate

| Company | Value Line P/E Ratio |
|---|---|
| Holly Energy Partners LP | 12.3 |
| Magellan Midstream Partners LP | 13.1 |
| NuStar Energy LP | 33.7 |
| Phillips 66 Partners LP | 12.0 |
| Plains All American Pipeline | 9.1 |
| | |
| Mean | 16.04 |
| Median | 12.30 |
| Selected Price to Earnings (P/E) Ratio | 12.30 |
| | |
| **Indicated Equity Component of the Direct Rate** | **8.13%** |

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

**Notes:**

The Price/Earnings Ratio was downloaded from Value Line.

Average without NuStar Energy LP is 11.6.

# Beta Analysis

| Company | Beta |
|---|---|
| Holly Energy Partners LP | 0.95 |
| Magellan Midstream Partners LP | 1.05 |
| NuStar Energy LP | 1.45 |
| Phillips 66 Partners LP | 0.95 |
| Plains All American Pipeline | 1.45 |
| | |
| Beta Mean | 1.17 |
| Beta Median | 1.05 |
| Unlevered and Relevered Mean* | 1.19 |
| | |
| **Indicated Beta** | **1.17** |

We considered the mean, median, and unlevered/relevered mean. We placed more reliance on the mean when selecting the indicated beta. We placed the least amount of reliance on the unlevered and relevered mean given the minimal tax rate applicable to the guideline companies. The Hamada formula used to unlever and relever betas relies on an income tax component, which these guideline companies do not have.

**Notes:**

*See the Unlevering Relevering Beta page for the calculation

# Unlevering/Relevering Betas

| Unlevering of Betas | | | | | |
|---|---|---|---|---|---|
| Company | *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** |
| Holly Energy Partners LP | 0.10% | 37.72% | 62.28% | 0.95 | 0.59 |
| Magellan Midstream Partners | 0.50% | 25.84% | 74.16% | 1.05 | 0.78 |
| NuStar Energy LP | 2.50% | 48.98% | 51.02% | 1.45 | 0.75 |
| Phillips 66 Partners LP | Nil | 22.02% | 77.98% | 0.95 | --- |
| Plains All American Pipeline | 4.00% | 39.83% | 53.64% | 1.45 | 0.85 |
| | | | **Average** | **1.17** | |

| Relevering of Betas | | | | |
|---|---|---|---|---|
| Company | *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** |
| Holly Energy Partners LP | 1.78% | 38.00% | 62.00% | 0.95 |
| Magellan Midstream Partners | 1.78% | 38.00% | 62.00% | 1.25 |
| NuStar Energy LP | 1.78% | 38.00% | 62.00% | 1.20 |
| Phillips 66 Partners LP | 1.78% | 38.00% | 62.00% | --- |
| Plains All American Pipeline | 1.78% | 38.00% | 62.00% | 1.36 |
| | | | **Average** | **1.19** |

**Notes:**

Uses the Hamada Formula

Unlevered Beta = Levered Beta / [1 + ( 1 - Tax Rate) x (Debt/Equity))], using company-specific components
Using company-specific components

Relevered Beta = Unlevered Beta [1 + (1 - Tax Rate) x (Debt/Equity)]
Using industry components for Tax Rate, Debt, and Equity

# Calculation of Market to Book Ratios for the Electric Market Segment

- December 31, 2019 calendar year information for the January 2, 2020 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 |
|---|---|---|---|---|
| Holly Energy Partners LP | 2,363,969,306 | 381,103,000 | 6.20 | Holly Energy Partners LP 2019 10-K, p. 69 |
| Magellan Midstream Partners LP | 13,505,494,698 | 2,643,434,000 | 5.11 | Magellan Midstream Partners LP 2019 10-K, p. 67 |
| NuStar Energy LP | 3,019,074,600 | 1,776,210,000 | 1.70 | NuStar Energy LP 2019 10-K, p. 63 |
| Phillips 66 Partners LP | 12,361,824,677 | 2,834,000,000 | 4.36 | Phillips 66 Partners LP 2019 10-K, p. 67 |
| Plains All American Pipeline | 12,354,644,935 | 13,062,000,000 | 0.95 | Plains All American Pipeline LP 2019 10-K, p. F-6 |
| | | **Average** | **3.66** | |

## Market to Book Ratio for Debt

| Company | Market Value of Long-Term Debt from 10-K | Book Value of Long-Term Debt from 10-K | Market to Book Ratio | Source |
|---|---|---|---|---|
| Holly Energy Partners LP | 522,045,000 | 496,531,000 | 1.05 | Holly Energy Partners LP 2019 10-K, p. 86 |
| Magellan Midstream Partners LP | 5,192,685,000 | 4,706,075,000 | 1.10 | Magellan Midstream Partners LP 2019 10-K, p. 107 |
| NuStar Energy LP | 3,442,001,000 | 3,331,839,000 | 1.03 | NuStar Energy LP 2019 10-K, p. 93 |
| Phillips 66 Partners LP | 3,725,000,000 | 3,491,000,000 | 1.07 | Phillips 66 Partners LP 2019 10-K, p. 87 |
| Plains All American Pipeline | 9,300,000,000 | 9,000,000,000 | 1.03 | Plains All American Pipeline LP 2019 10-K, p. F-35 |
| | | **Average** | **1.06** | |

## Application of Capital Structure as determined in the Capitalization Rate Study

| | Capital Structure | Market to Book | Composite |
|---|---|---|---|
| Common Equity | 62.00% | 3.66 | 2.27 |
| Long-term Debt | 38.00% | 1.06 | 0.40 |
| | | | **2.67** |

# Appendix E - Class I Railroads and Other Railroads

## Yield Rate

### Class I Railroads

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Long-Term Debt** | 17.00% | 3.45% | 0.59% |
| **Common Equity** | 83.00% | 12.70% | 10.54% |
| **Yield Rate** | | | **11.13%** |

| | |
|---|---|
| **Class I Railroads Yield Rate** | **11.13%** |

### Other Railroads

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Long-Term Debt** | 25.00% | 4.75% | 1.19% |
| **Common Equity** | 75.00% | 13.34% | 10.01% |
| **Yield Rate** | | | **11.19%** |

| | |
|---|---|
| **Other Railroads Yield Rate** | **11.19%** |

## 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 | 8,806,000,000 | None | 67,137,417,000 | 75,943,417,000 | 11.60% | 0.00% | 88.40% |
| Canadian Pacific Railway | 6,315,000,000 | None | 32,254,348,000 | 38,569,348,000 | 16.37% | 0.00% | 83.63% |
| CSX Corporation | 15,992,000,000 | None | 56,914,983,722 | 72,906,983,722 | 21.93% | 0.00% | 78.07% |
| Genesee & Wyoming Inc. | 2,176,600,000 | None | 6,528,769,785 | 8,705,369,785 | 25.00% | 0.00% | 75.00% |
| Kansas City Southern | 2,394,800,000 | 6,100,000 | 15,116,731,416 | 17,517,631,416 | 13.67% | 0.03% | 86.29% |
| Norfolk Southern Corp | 11,085,000,000 | None | 50,326,713,426 | 61,411,713,426 | 18.05% | 0.00% | 81.95% |
| Union Pacific Corp | 24,314,000,000 | None | 121,811,253,821 | 146,125,253,821 | 16.64% | 0.00% | 83.36% |

| | % Long-Term Debt | % Preferred Equity | % Common Equity |
|---|---|---|---|
| **Mean** | 17.61% | 0.00% | 82.39% |
| **Median** | 16.64% | 0.00% | 83.36% |
| **Mean Class I*** | 16.38% | 0.01% | 83.62% |
| **Median Class I*** | 16.51% | 0.00% | 83.49% |
| **Mean Other Railroads^** | 25.00% | 0.00% | 75.00% |
| **Median Other Railroads^** | 25.00% | 0.00% | 75.00% |
| **Indicated Capital Structure, Class I Railroads** | **17.00%** | **0%** | **83.00%** |
| **Indicated Capital Structure, Other Railroads** | **25.00%** | **0%** | **75.00%** |

We placed more reliance on the median capital structure when selecting the indicated capital structure for Class I Railroads, rounding to 17% debt, 83% equity.
We selected the median and mean capital structure as the indicated capital structure for Other Railroads, 25% debt, 75% 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 | A2 | 3.32% | |
| Canadian Pacific Railway | Baa1 | 4.03% | |
| CSX Corporation | Baa1 | 4.03% | |
| Genesee & Wyoming Inc. | Ba2 | 7.74% | ** |
| Kansas City Southern | Baa2 | 4.03% | |
| Norfolk Southern Corp | Baa1 | 4.03% | |
| Union Pacific Corp | Baa1 | 4.03% | |

| | |
|---|---|
| **Mean Class I Railroads** | 3.91% |
| **Median Class I Railroads** | 4.03% |
| **Mode Class I Railroads** | 4.03% |
| **Other Railroads^** | 7.74% |

**Corporate Bond Yield Averages from Mergent Bond Record, January 2020 Edition**

Corporate Bond Averages, December 2019

| Mergent | S&P | Dec. Yield Avg. |
|---|---|---|
| Aaa | AAA | 3.01% |
| Aa1, Aa2 Aa3 | AA+, AA, AA- | 3.00% |
| A1, A2, A3 | A+, A, A- | 3.32% |
| Baa1, Baa2, Baa3 | BBB+, BBB, BBB- | 4.03% |

**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 2020 issue, for U.S. Corporate Bonds with the same debt rating. We determined the average Ba2 yield to maturity is 7.74%.

## Current Actual Cost of Debt

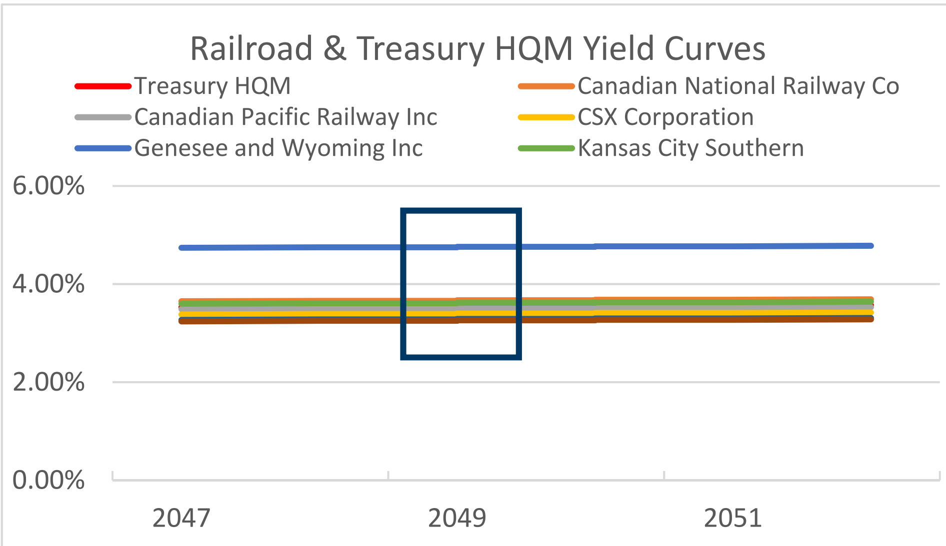
Yield-to-Maturities (YTMs) are based on year-end filings of Form N-Q, NPORT EX or 10-K with the SEC.

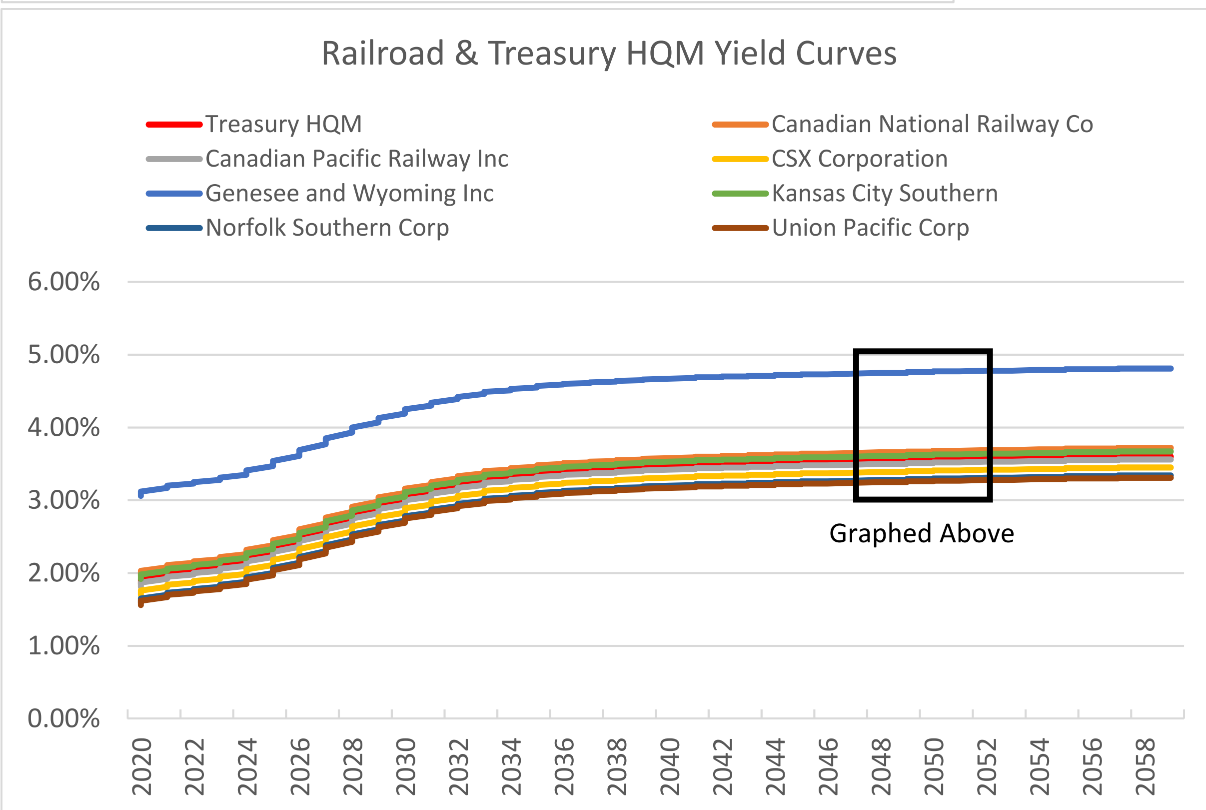
$$p = \sum_{i=1}^{n} d(t_i)c_i + \sum_{j=1}^{m} b_j x_j + e$$

30-year YTMs are based on an observed spread to the Treasury Quality Market Corporate Bond Spot rate curve (equation to the left) and followed out to 30 years.

| | | |
|---|---|---|
| **Indicated Rate of Debt Class I Railroads** | **3.45%** | Average YTM at 2049 in below graph for all Class I Railroads |
| **Indicated Rate of Debt Other Railroads** | **4.75%** | Average YTM at 2049 in below graph for Genesee & Wyoming |

See Appendix G for more information about debt issuances.



| | Treasury HQM | Canadian National Railway Co | Canadian Pacific Railway Inc | CSX Corporation | Genesee and Wyoming Inc | Kansas City Southern | Norfolk Southern Corp | Union Pacific Corp |
|---|---|---|---|---|---|---|---|---|
| 2020 | 1.85% | 1.97% | 1.81% | 1.70% | 3.06% | 1.92% | 1.59% | 1.56% |
| 2020.5 | 1.91% | 2.03% | 1.87% | 1.76% | 3.12% | 1.98% | 1.65% | 1.62% |
| 2021 | 1.96% | 2.08% | 1.92% | 1.81% | 3.17% | 2.03% | 1.70% | 1.67% |
| 2021.5 | 1.99% | 2.11% | 1.95% | 1.84% | 3.20% | 2.06% | 1.73% | 1.70% |
| 2022 | 2.02% | 2.14% | 1.98% | 1.87% | 3.23% | 2.09% | 1.76% | 1.73% |
| 2022.5 | 2.04% | 2.16% | 2.00% | 1.89% | 3.25% | 2.11% | 1.78% | 1.75% |
| 2023 | 2.07% | 2.19% | 2.03% | 1.92% | 3.28% | 2.14% | 1.81% | 1.78% |
| 2023.5 | 2.10% | 2.22% | 2.06% | 1.95% | 3.31% | 2.17% | 1.84% | 1.81% |
| 2024 | 2.14% | 2.26% | 2.10% | 1.99% | 3.35% | 2.21% | 1.88% | 1.85% |
| 2024.5 | 2.20% | 2.32% | 2.16% | 2.05% | 3.41% | 2.27% | 1.94% | 1.91% |
| 2025 | 2.26% | 2.38% | 2.22% | 2.11% | 3.47% | 2.33% | 2.00% | 1.97% |
| 2025.5 | 2.33% | 2.45% | 2.29% | 2.18% | 3.54% | 2.40% | 2.07% | 2.04% |
| 2026 | 2.40% | 2.52% | 2.36% | 2.25% | 3.61% | 2.47% | 2.14% | 2.11% |
| 2026.5 | 2.48% | 2.60% | 2.44% | 2.33% | 3.69% | 2.55% | 2.22% | 2.19% |
| 2027 | 2.56% | 2.68% | 2.52% | 2.41% | 3.77% | 2.63% | 2.30% | 2.27% |
| 2027.5 | 2.64% | 2.76% | 2.60% | 2.49% | 3.85% | 2.71% | 2.38% | 2.35% |
| 2028 | 2.72% | 2.84% | 2.68% | 2.57% | 3.93% | 2.79% | 2.46% | 2.43% |
| 2028.5 | 2.79% | 2.91% | 2.75% | 2.64% | 4.00% | 2.86% | 2.53% | 2.50% |
| 2029 | 2.86% | 2.98% | 2.82% | 2.71% | 4.07% | 2.93% | 2.60% | 2.57% |
| 2029.5 | 2.92% | 3.04% | 2.88% | 2.77% | 4.13% | 2.99% | 2.66% | 2.63% |
| 2030 | 2.98% | 3.10% | 2.94% | 2.83% | 4.19% | 3.05% | 2.72% | 2.69% |
| 2030.5 | 3.04% | 3.16% | 3.00% | 2.89% | 4.25% | 3.11% | 2.78% | 2.75% |
| 2031 | 3.09% | 3.21% | 3.05% | 2.94% | 4.30% | 3.16% | 2.83% | 2.80% |
| 2031.5 | 3.13% | 3.25% | 3.09% | 2.98% | 4.34% | 3.20% | 2.87% | 2.84% |
| 2032 | 3.18% | 3.30% | 3.14% | 3.03% | 4.39% | 3.25% | 2.92% | 2.89% |
| 2032.5 | 3.21% | 3.33% | 3.17% | 3.06% | 4.42% | 3.28% | 2.95% | 2.92% |
| 2033 | 3.25% | 3.37% | 3.21% | 3.10% | 4.46% | 3.32% | 2.99% | 2.96% |
| 2033.5 | 3.28% | 3.40% | 3.24% | 3.13% | 4.49% | 3.35% | 3.02% | 2.99% |
| 2034 | 3.30% | 3.42% | 3.26% | 3.15% | 4.51% | 3.37% | 3.04% | 3.01% |
| 2034.5 | 3.32% | 3.44% | 3.28% | 3.17% | 4.53% | 3.39% | 3.06% | 3.03% |
| 2035 | 3.34% | 3.46% | 3.30% | 3.19% | 4.55% | 3.41% | 3.08% | 3.05% |
| 2035.5 | 3.36% | 3.48% | 3.32% | 3.21% | 4.57% | 3.43% | 3.10% | 3.07% |
| 2036 | 3.38% | 3.50% | 3.34% | 3.23% | 4.59% | 3.45% | 3.12% | 3.09% |
| 2036.5 | 3.39% | 3.51% | 3.35% | 3.24% | 4.60% | 3.46% | 3.13% | 3.10% |
| 2037 | 3.40% | 3.52% | 3.36% | 3.25% | 4.61% | 3.47% | 3.14% | 3.11% |
| 2037.5 | 3.41% | 3.53% | 3.37% | 3.26% | 4.62% | 3.48% | 3.15% | 3.12% |
| 2038 | 3.42% | 3.54% | 3.38% | 3.27% | 4.63% | 3.49% | 3.16% | 3.13% |
| 2038.5 | 3.43% | 3.55% | 3.39% | 3.28% | 4.64% | 3.50% | 3.17% | 3.14% |
| 2039 | 3.44% | 3.56% | 3.40% | 3.29% | 4.65% | 3.51% | 3.18% | 3.15% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2039.5 | 3.45% | 3.57% | 3.41% | 3.30% | 4.66% | 3.52% | 3.19% | 3.16% |
| 2040 | 3.46% | 3.58% | 3.42% | 3.31% | 4.67% | 3.53% | 3.20% | 3.17% |
| 2040.5 | 3.46% | 3.58% | 3.42% | 3.31% | 4.67% | 3.53% | 3.20% | 3.17% |
| 2041 | 3.47% | 3.59% | 3.43% | 3.32% | 4.68% | 3.54% | 3.21% | 3.18% |
| 2041.5 | 3.48% | 3.60% | 3.44% | 3.33% | 4.69% | 3.55% | 3.22% | 3.19% |
| 2042 | 3.48% | 3.60% | 3.44% | 3.33% | 4.69% | 3.55% | 3.22% | 3.19% |
| 2042.5 | 3.49% | 3.61% | 3.45% | 3.34% | 4.70% | 3.56% | 3.23% | 3.20% |
| 2043 | 3.49% | 3.61% | 3.45% | 3.34% | 4.70% | 3.56% | 3.23% | 3.20% |
| 2043.5 | 3.50% | 3.62% | 3.46% | 3.35% | 4.71% | 3.57% | 3.24% | 3.21% |
| 2044 | 3.50% | 3.62% | 3.46% | 3.35% | 4.71% | 3.57% | 3.24% | 3.21% |
| 2044.5 | 3.51% | 3.63% | 3.47% | 3.36% | 4.72% | 3.58% | 3.25% | 3.22% |
| 2045 | 3.51% | 3.63% | 3.47% | 3.36% | 4.72% | 3.58% | 3.25% | 3.22% |
| 2045.5 | 3.52% | 3.64% | 3.48% | 3.37% | 4.73% | 3.59% | 3.26% | 3.23% |
| 2046 | 3.52% | 3.64% | 3.48% | 3.37% | 4.73% | 3.59% | 3.26% | 3.23% |
| 2046.5 | 3.52% | 3.64% | 3.48% | 3.37% | 4.73% | 3.59% | 3.26% | 3.23% |
| 2047 | 3.53% | 3.65% | 3.49% | 3.38% | 4.74% | 3.60% | 3.27% | 3.24% |
| 2047.5 | 3.53% | 3.65% | 3.49% | 3.38% | 4.74% | 3.60% | 3.27% | 3.24% |
| 2048 | 3.54% | 3.66% | 3.50% | 3.39% | 4.75% | 3.61% | 3.28% | 3.25% |
| 2048.5 | 3.54% | 3.66% | 3.50% | 3.39% | 4.75% | 3.61% | 3.28% | 3.25% |
| **2049** | **3.54%** | **3.66%** | **3.50%** | **3.39%** | **4.75%** | **3.61%** | **3.28%** | **3.25%** |
| 2049.5 | 3.55% | 3.67% | 3.51% | 3.40% | 4.76% | 3.62% | 3.29% | 3.26% |
| 2050 | 3.55% | 3.67% | 3.51% | 3.40% | 4.76% | 3.62% | 3.29% | 3.26% |
| 2050.5 | 3.56% | 3.68% | 3.52% | 3.41% | 4.77% | 3.63% | 3.30% | 3.27% |
| 2051 | 3.56% | 3.68% | 3.52% | 3.41% | 4.77% | 3.63% | 3.30% | 3.27% |
| 2051.5 | 3.56% | 3.68% | 3.52% | 3.41% | 4.77% | 3.63% | 3.30% | 3.27% |
| 2052 | 3.57% | 3.69% | 3.53% | 3.42% | 4.78% | 3.64% | 3.31% | 3.28% |
| 2052.5 | 3.57% | 3.69% | 3.53% | 3.42% | 4.78% | 3.64% | 3.31% | 3.28% |
| 2053 | 3.57% | 3.69% | 3.53% | 3.42% | 4.78% | 3.64% | 3.31% | 3.28% |
| 2053.5 | 3.57% | 3.69% | 3.53% | 3.42% | 4.78% | 3.64% | 3.31% | 3.28% |
| 2054 | 3.58% | 3.70% | 3.54% | 3.43% | 4.79% | 3.65% | 3.32% | 3.29% |
| 2054.5 | 3.58% | 3.70% | 3.54% | 3.43% | 4.79% | 3.65% | 3.32% | 3.29% |
| 2055 | 3.58% | 3.70% | 3.54% | 3.43% | 4.79% | 3.65% | 3.32% | 3.29% |
| 2055.5 | 3.59% | 3.71% | 3.55% | 3.44% | 4.80% | 3.66% | 3.33% | 3.30% |
| 2056 | 3.59% | 3.71% | 3.55% | 3.44% | 4.80% | 3.66% | 3.33% | 3.30% |
| 2056.5 | 3.59% | 3.71% | 3.55% | 3.44% | 4.80% | 3.66% | 3.33% | 3.30% |
| 2057 | 3.59% | 3.71% | 3.55% | 3.44% | 4.80% | 3.66% | 3.33% | 3.30% |
| 2057.5 | 3.60% | 3.72% | 3.56% | 3.45% | 4.81% | 3.67% | 3.34% | 3.31% |
| 2058 | 3.60% | 3.72% | 3.56% | 3.45% | 4.81% | 3.67% | 3.34% | 3.31% |
| 2058.5 | 3.60% | 3.72% | 3.56% | 3.45% | 4.81% | 3.67% | 3.34% | 3.31% |
| 2059 | 3.60% | 3.72% | 3.56% | 3.45% | 4.81% | 3.67% | 3.34% | 3.31% |

**Notes:**

The cost of debt calculation for the short-line railroad Genesee & Wyoming Inc presented a unique challenge for this year's railroad cost of debt calculation. The company was purchased outright in a joint effort by asset management firms Brookfield Infrastructure and GIC. To become more attractive to the eventual possibility of this buy-out, Genesee and Wyoming did not issue any debt, publically traded or privately placed. This ran in stark contrast to prior years. In fact, the company worked hard on paying down debt throughout 2019, again, in an effort to become more attractive to the buy-out. As a result, with no new issues to utilize, the DOR took a slightly different approach to arriving at their cost of debt.

As reported on their most recent 10-K filing with the Securities & Exchange Commission, Genesee & Wyoming arrived and reported, at a historical cost, a carrying value for their remaining United States term loan of $1,261,983. At the same time, they also calculated and reported a fair value of $1,258.527 for that same debt. According to Genesee & Wyoming, this is how they arrived at those values:

"Financial Instruments Carried at Historical Cost: Since the Company's long-term debt is not actively traded, fair value was estimated using a discounted cash flow analysis based on Level 2 valuation inputs, including borrowing rates the Company believes are currently available to it for loans with similar terms and maturities."
https://www.sec.gov/ix?doc=/Archives/edgar/data/1012620/000101262019000031/gwr0930201910-q.htm

Trusting in their calculations, the department divided the fair value by the historical cost to arrive at a hypothetical market price of $99.73 for the United States debt. We then applied that market price, $99.73, to last year's debt offering of 4.78% due 1/15/2048 to arrive at a yield to maturity of 4.80 percent. We then used the 4.80 YTM with the 2048 maturity date as the representative yield for Genesee & Wyoming in the railroad cost of debt calculation.

# Indicated Rate of Equity

## Class I Railroads

| Model | Rate |
|---|---|
| CAPM - Ex Post | 10.55% |
| CAPM - Supply Side | 9.43% |
| CAPM - Three Stage Ex Ante | 8.22% |
| CAPM - Damodaran | 8.31% |
| CAPM - Duff & Phelps | 8.75% |
| CAPM - Graham and Harvey | 8.07% |
| CAPM - Fernandez, Pershin, and Acin | 8.77% |
| Empirical CAPM - Ex Post | 10.28% |
| Empirical CAPM - Supply Side | 9.19% |
| Empirical CAPM - Three Stage Ex Ante | 8.03% |
| Empirical CAPM - Damodaran | 8.12% |
| Empirical CAPM - Duff & Phelps | 8.56% |
| Empirical CAPM - Graham and Harvey | 7.88% |
| Empirical CAPM - Fernandez, Pershin, and Acin | 8.56% |
| DGM - Dividend Growth | 11.75% |
| DGM - Earnings Growth | 14.45% |
| Multi-Stage DGM | 11.42% |
| **Indicated Rate of Equity** | **12.70%** |

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the majority reliance on the Dividend Growth Model - Earnings Growth and secondary reliance on the Capital Asset Pricing Model using the Ex Post equity risk premium.

# Indicated Rate of Equity

## Other Railroads

| Model | Rate |
|---|---|
| CAPM - Ex Post | 11.98% |
| CAPM - Supply Side | 10.66% |
| CAPM - Three Stage Ex Ante | 9.24% |
| CAPM - Damodaran | 9.35% |
| CAPM - Duff & Phelps | 9.75% |
| CAPM - Graham and Harvey | 9.07% |
| CAPM - Fernandez, Pershin, and Acin | 9.89% |
| Empirical CAPM - Ex Post | 11.36% |
| Empirical CAPM - Supply Side | 10.12% |
| Empirical CAPM - Three Stage Ex Ante | 8.79% |
| Empirical CAPM - Damodaran | 8.90% |
| Empirical CAPM - Duff & Phelps | 9.31% |
| Empirical CAPM - Graham and Harvey | 8.63% |
| Empirical CAPM - Fernandez, Pershin, and Acin | 9.40% |
| DGM - Dividend Growth | 11.75% |
| DGM - Earnings Growth | 14.45% |
| Multi-Stage DGM | 11.42% |
| **Indicated Rate of Equity** | **13.34%** |

We established a range of acceptability for the cost of equity with all available models. We considered all of the data and placed the majority reliance on the Dividend Growth Model - Earnings Growth and secondary reliance on the Capital Asset Pricing Model using the Ex Post equity risk premium.

# Direct Rate and Growth

## Class I Railroads

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Debt Component** | 17.00% | 3.45% | 0.59% |
| **Equity Component** | 83.00% | 5.24% | 4.35% |
| **Direct Rate** | | | **4.94%** |

| | |
|---|---|
| **Direct Rate** | **4.94%** |

| | |
|---|---|
| Yield Rate | 11.13% |
| Direct Rate | 4.94% |
| **Implied Industry Growth Rate** | **6.19%** |

## Other Railroads

| | Capital Structure | Rate | Composite |
|---|---|---|---|
| **Debt Component** | 25.00% | 4.75% | 1.19% |
| **Equity Component** | 75.00% | 4.12% | 3.09% |
| **Direct Rate** | | | **4.28%** |

| | |
|---|---|
| **Direct Rate** | **4.28%** |

| | |
|---|---|
| Yield Rate | 11.19% |
| Direct Rate | 4.28% |
| **Implied Industry Growth Rate** | **6.91%** |

# Class I Railroads
# Capital Asset Pricing Model (CAPM)

(ERP x β) + RFR = Indicated Equity Rate

| | Equity Risk Premium (ERP) | x Industry Beta (β) | = Industry Risk Premium | + Risk-Free Rate[1] (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 1.15 | 8.22% | 2.33% | 10.55% |
| Supply Side[3] | 6.17% | 1.15 | 7.10% | 2.33% | 9.43% |
| Three Stage Ex Ante[4] | 5.12% | 1.15 | 5.89% | 2.33% | 8.22% |
| Dr. Damodaran ERP[5] | 5.20% | 1.15 | 5.98% | 2.33% | 8.31% |
| Duff & Phelps[6] | 5.00% | 1.15 | 5.75% | 3.00% | 8.75% |
| Duke CFO Global Business Outlook[7] | 4.99% | 1.15 | 5.74% | 2.33% | 8.07% |
| Fernandez, Martinez and Acin[8] | 5.60% | 1.15 | 6.44% | 2.33% | 8.77% |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Other Railroads
# Capital Asset Pricing Model (CAPM)

(ERP x β) + RFR = Indicated Equity Rate

| | Equity Risk Premium (ERP) | x Industry Beta (β) | = Industry Risk Premium | + Risk-Free Rate[1] (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 1.35 | 9.65% | 2.33% | 11.98% |
| Supply Side[3] | 6.17% | 1.35 | 8.33% | 2.33% | 10.66% |
| Three Stage Ex Ante[4] | 5.12% | 1.35 | 6.91% | 2.33% | 9.24% |
| Dr. Damodaran ERP[5] | 5.20% | 1.35 | 7.02% | 2.33% | 9.35% |
| Duff & Phelps[6] | 5.00% | 1.35 | 6.75% | 3.00% | 9.75% |
| Duke CFO Global Business Outlook[7] | 4.99% | 1.35 | 6.74% | 2.33% | 9.07% |
| Fernandez, Martinez and Acin[8] | 5.60% | 1.35 | 7.56% | 2.33% | 9.89% |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Class I Railroads
## Empirical Capital Asset Pricing Model (ECAPM)

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

| Model | Equity Risk Premium (ERP) | Industry Beta (β) | Weighted Industry Risk Premium (weighted at 75%) | Weighted Equity Risk Premium (weighted at 25%) | Risk-Free Rate (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 1.15 | 6.17% | 1.79% | 2.33% | **10.28%** |
| Supply Side[3] | 6.17% | 1.15 | 5.32% | 1.54% | 2.33% | **9.19%** |
| Three Stage Ex Ante[4] | 5.12% | 1.15 | 4.42% | 1.28% | 2.33% | **8.03%** |
| Dr. Damodaran ERP[5] | 5.20% | 1.15 | 4.49% | 1.30% | 2.33% | **8.12%** |
| Duff & Phelps[6] | 5.00% | 1.15 | 4.31% | 1.25% | 3.00% | **8.56%** |
| Duke CFO Global Business Outlook[7] | 4.99% | 1.15 | 4.30% | 1.25% | 2.33% | **7.88%** |
| Fernandez, Martinez and Acin[8] | 5.60% | 1.15 | 4.83% | 1.40% | 2.33% | **8.56%** |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2019, February). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Other Railroads
## Empirical Capital Asset Pricing Model (ECAPM)

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

| Model | Equity Risk Premium (ERP) | Industry Beta (β) | Weighted Industry Risk Premium (weighted at 75%) | Weighted Equity Risk Premium (weighted at 25%) | Risk-Free Rate (RFR) | Indicated Equity Rate |
|---|---|---|---|---|---|---|
| Ex Post[2] | 7.15% | 1.35 | 7.24% | 1.79% | 2.33% | **11.36%** |
| Supply Side[3] | 6.17% | 1.35 | 6.25% | 1.54% | 2.33% | **10.12%** |
| Three Stage Ex Ante[4] | 5.12% | 1.35 | 5.18% | 1.28% | 2.33% | **8.79%** |
| Dr. Damodaran ERP[5] | 5.20% | 1.35 | 5.27% | 1.30% | 2.33% | **8.90%** |
| Duff & Phelps[6] | 5.00% | 1.35 | 5.06% | 1.25% | 3.00% | **9.31%** |
| Duke CFO Global Business Outlook[7] | 4.99% | 1.35 | 5.05% | 1.25% | 2.33% | **8.63%** |
| Fernandez, Martinez and Acin[8] | 5.60% | 1.35 | 5.67% | 1.40% | 2.33% | **9.40%** |

**Notes:**

1 U.S. Treasury on January 2, 2020 - 30-year Coupon Bond Yield, Daily Observations, Retrieved from www.federalreserve.gov

2 Historical Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2019, February). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

3 Supply Side Long-Term (1926 - Present) Equity Risk Premium. Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved March 2, 2020 from https://costofcapital.duffandphelps.com/

4 Three Stage Dividend Growth Model, S&P 500. See Appendix F, Three Stage Ex Ante Calculation

5 Implied Equity Risk Premium on January 1, 2020 as determined by Dr. Aswath Damodaran; http://pages.stern.nyu.edu/~adamodar/

6 Duff & Phelps recommended equity risk premium (conditional) Duff & Phelps. (2020). Cost of Capital Navigator. Retrieved February 6, 2019, from https://costofcapital.duffandphelps.com/

7 Duke CFO Global Business Outlook (2020). Survey Results December 2019. Cross-Tab Table, Average Annual S&P 500 Return. https://www.cfosurvey.org/

8 Fernandez, P., Martinez, M., & Acin, I. F. (2019). Market Risk Premium and Risk-Free Rate used for 69 Countries in 2019: A Survey. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3358901

# Dividend Growth Model

| Company | Current Dividend Yield (DY) | Projected Short-term EPS Growth Rate (EG) | Projected Short-term Dividend Growth Rate (DG) | Cost of Equity Earnings Growth DY + EG | Cost of Equity Dividend Growth DY + DG |
|---|---|---|---|---|---|
| Canadian National Railway | 2.30% | 10.00% | 8.00% | 12.30% | 10.30% |
| Canadian Pacific Railway | 1.10% | 12.00% | 15.00% | 13.10% | 16.10% |
| CSX Corporation | 1.30% | 14.50% | 10.00% | 15.80% | 11.30% |
| Kansas City Southern | 1.00% | 12.00% | 8.00% | 13.00% | 9.00% |
| Norfolk Southern Corp | 1.90% | 15.00% | 10.50% | 16.90% | 12.40% |
| Union Pacific Corp | 2.20% | 14.50% | 10.00% | 16.70% | 12.20% |
| Mean | 1.63% | 13.00% | 10.25% | 14.63% | 11.88% |
| Median | 1.60% | 13.25% | 10.00% | 14.45% | 11.75% |

| | |
|---|---|
| **DGM - Dividend Growth, Indicated Rate** | **11.75%** |
| **DGM - Earnings Growth, Indicated Rate** | **14.45%** |

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 Genesee & Wyoming because they do not pay dividends.

| Company | Current Dividend Yield | Projected Short-term EPS Growth Rate | Projected Short-term Dividend Growth Rate |
|---|---|---|---|
| Genesee & Wyoming Inc. | Nil | 13.50% | Nil |

# Multi-Stage Dividend Growth Model

$K_E$ = (DY x (1+ 0.5(G))) + 0.67(G1) +0.33(g)

**$K_E$** Cost of Equity | **$G_1$** Short-term Growth Estimate
**DY** Dividend Yield | **g** Stable Growth | **G** Average Growth Rate

| Company | **DY** Dividend Yield | **G1** Short-term Growth Estimate | **g** Stable Growth | **G** Average Growth Rate | **$K_E$** Cost of Equity |
|---|---|---|---|---|---|
| Canadian National Railway | 2.30% | 10.00% | 3.90% | 6.95% | 10.37% |
| Canadian Pacific Railway | 1.10% | 12.00% | 3.90% | 7.95% | 10.47% |
| CSX Corporation | 1.30% | 14.50% | 3.90% | 9.20% | 12.36% |
| Genesee & Wyoming Inc. | Nil | 13.50% | 3.90% | 8.70% | --- |
| Kansas City Southern | 1.00% | 12.00% | 3.90% | 7.95% | 10.37% |
| Norfolk Southern Corp | 1.90% | 15.00% | 3.90% | 9.45% | 13.33% |
| Union Pacific Corp | 2.20% | 14.50% | 3.90% | 9.20% | 13.30% |

| | |
|---|---|
| Mean | 11.70% |
| Median | 11.42% |
| **Multi-Stage DGM, Indicated Rate** | **11.42%** |

We placed more reliance on the median to select 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 real growth rate of the U.S. economy of 1.9% plus the expected inflation rate of 2.0%).

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

# Equity Component of the Direct Rate

| Company | Value Line P/E Ratio |
|---|---|
| Canadian National Railway | 19.6 |
| Canadian Pacific Railway | 17.7 |
| CSX Corporation | 17.1 |
| Genesee & Wyoming Inc. | 24.3 |
| Kansas City Southern | 20.8 |
| Norfolk Southern Corp | 18.6 |
| Union Pacific Corp | 20.4 |

| **Railroads** | |
|---|---|
| Mean | 19.79 |
| Median | 19.60 |

| **Class I Railroads*** | |
|---|---|
| Mean | 19.03 |
| Median | 19.10 |
| Selected Price to Earnings (P/E) Ratio | 19.10 |
| **Indicated Equity Component of the Direct Rate** | **5.24%** |

| **Other Railroads^** | |
|---|---|
| Mean | 24.30 |
| Median | 24.30 |
| Selected Price to Earnings (P/E) Ratio | 24.30 |
| **Indicated Equity Component of the Direct Rate** | **4.12%** |

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

**Notes:**

The Price/Earnings Ratio was downloaded from Value Line.

*Does not include Genesee & Wyoming

^Genesee & Wyoming only.

# Beta Analysis

| Company | Beta |
|---|---|
| Canadian National Railway | 1.05 |
| Canadian Pacific Railway | 1.15 |
| CSX Corporation | 1.25 |
| Genesee & Wyoming Inc. | 1.35 |
| Kansas City Southern | 1.10 |
| Norfolk Southern Corp | 1.20 |
| Union Pacific Corp | 1.15 |

| Railroads | Beta |
|---|---|
| Beta Mean | 1.18 |
| Beta Median | 1.15 |

| Class I Railroads* | Beta |
|---|---|
| Beta Mean | 1.15 |
| Beta Median | 1.15 |
| Unlevered Relevered Beta Mean^ | 1.18 |
| **Indicated Class I Beta** | **1.15** |

| Other Railroads^^ | Beta |
|---|---|
| Beta Mean | 1.35 |
| Beta Median | 1.35 |
| **Indicated Other Railroads Beta** | **1.35** |

We considered the mean, median, and unlevered/relevered mean for the Class I Railroads. We placed equal reliance on the mean and median when selecting the indicated beta. We considered the beta for Genesee & Wyoming for the Other Railroads beta.

**Notes:**

*Does not include Genesee & Wyoming

^See the Unlevering Relevering Beta page for the calculation

^^Genesee & Wyoming only.

We did not rely on the unlevered and relevered the beta for Other Railroads the group only includes one guideline company, Genesee & Wyoming.

# Unlevering/Relevering Betas for Class I Railroads

| Unlevering of Betas | | | | | |
|---|---|---|---|---|---|
| **Company** | *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 | 25.00% | 11.60% | 88.40% | 1.05 | 0.96 |
| Canadian Pacific Railway | 26.00% | 16.37% | 83.63% | 1.15 | 1.00 |
| CSX Corporation | 25.00% | 21.93% | 78.07% | 1.25 | 1.03 |
| Genesee & Wyoming Inc. | 27.00% | 25.00% | 75.00% | 1.35 | 1.09 |
| Kansas City Southern | 29.00% | 13.67% | 86.29% | 1.10 | 0.99 |
| Norfolk Southern Corp | 24.00% | 18.05% | 81.95% | 1.20 | 1.03 |
| Union Pacific Corp | 24.00% | 16.64% | 83.36% | 1.15 | 1.00 |
| | | | **Average** | **1.18** | |

| Relevering of Betas | | | | |
|---|---|---|---|---|
| **Company** | *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** |
| Canadian National Railway | 26.00% | 17.00% | 83.00% | 1.11 |
| Canadian Pacific Railway | 26.00% | 17.00% | 83.00% | 1.15 |
| CSX Corporation | 26.00% | 17.00% | 83.00% | 1.19 |
| Genesee & Wyoming Inc. | 26.00% | 25.00% | 75.00% | 1.36 |
| Kansas City Southern | 26.00% | 17.00% | 83.00% | 1.14 |
| Norfolk Southern Corp | 26.00% | 17.00% | 83.00% | 1.19 |
| Union Pacific Corp | 26.00% | 17.00% | 83.00% | 1.15 |
| | | | **Average** | **1.18** |

**Notes:**
Uses the Hamada Formula

Unlevered Beta = Levered Beta / [1 + ( 1 - Tax Rate) x (Debt/Equity))], using company-specific components
Using company-specific components

Relevered Beta = Unlevered Beta [1 + (1 - Tax Rate) x (Debt/Equity)]
Using industry components for Tax Rate, Debt, and Equity

# Calculation of Market to Book Ratios for the Railroad Market Segment

- December 31, 2019 calendar year information for the January 2, 2020 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 |
|---|---|---|---|---|
| Canadian National Railway* | 67,137,417,000 | 13,889,765,900 | 4.83 | Canadian National Railway. 2019 Annual Report, p. 59 |
| Canadian Pacific Railway** | 32,254,348,000 | 5,442,423,100 | 5.93 | Canadian Pacific Railway. 2019 Annual Report, p. 98 |
| CSX Corporation | 56,914,983,722 | 11,863,000,000 | 4.80 | CSX Corporation. 2019 10-K, p. 49 |
| Genesee & Wyoming Inc. | 6,528,769,785 | 3,657,280,000 | 1.79 | Genesee & Wyoming Inc March 2019 10-Q, p. 4 |
| Kansas City Southern | 15,116,731,416 | 4,422,500,000 | 3.42 | Kansas City Southern. 2019 10-K, p. 23 |
| Norfolk Southern Corp | 50,326,713,426 | 15,184,000,000 | 3.31 | Norfolk Southern. 2019 10-K, p. K38 |
| Union Pacific Corp | 121,811,253,821 | 18,128,000,000 | 6.72 | Union Pacific Corporation. 2019 10-K, p. 48 |
| | | **Class I Average** | **4.84** | |
| | | **Other Railroads Average** | **1.79** | |

## Market to Book Ratio for Debt

| Company | Market Value of Long-Term Debt from 10-K | Book Value of Long-Term Debt from 10-K | Market to Book Ratio | Source |
|---|---|---|---|---|
| Canadian National Railway | 15,667,000,000 | 13,662,000,000 | 1.15 | Canadian National Railway. 2019 Annual Report, p. 103 |
| Canadian Pacific Railway | 10,149,000,000 | 8,757,000,000 | 1.16 | Canadian Pacific Railway. 2019 Annual Report, p. 119 |
| CSX Corporation | 18,503,000,000 | 16,238,000,000 | 1.14 | CSX Corporation. 2019 10-K, p. 95 |
| Genesee & Wyoming Inc. | 2,354,950,000 | 2,347,477,000 | 1.00 | Genesee & Wyoming Inc March 2019 10-Q, p. 18 |
| Kansas City Southern | 3,246,000,000 | 3,535,700,000 | 0.92 | Kansas City Southern. 2019 10-K, p. 41 |
| Norfolk Southern Corp | 14,806,000,000 | 12,196,000,000 | 1.21 | Norfolk Southern. 2019 10-K, p. K48 |
| Union Pacific Corp | 27,200,000,000 | 25,200,000,000 | 1.08 | Union Pacific Corporation. 2019 10-K, p. 72 |
| | | **Class I Average** | **1.11** | |
| | | **Other Railroads Average** | **1.00** | |

## Class I Railroads

**Application of Capital Structure as determined in the Capitalization Rate Study**

| | Capital Structure | Market to Book | Composite |
|---|---|---|---|
| Common Equity | 83.00% | 4.84 | 4.02 |
| Long-term Debt | 17.00% | 1.11 | 0.19 |
| | | | **4.21** |

## Other Railroads

**Application of Capital Structure as determined in the Capitalization Rate Study**

| | Capital Structure | Market to Book | Composite |
|---|---|---|---|
| Common Equity | 25.00% | 1.79 | 0.45 |
| Long-term Debt | 75.00% | 1.00 | 0.75 |
| | | | **1.20** |

**Note:**

*Convert CanadianNational Railway's Book Value of Common Equity from Canadian Dollars to U.S. Dollars. Canadian National Railway's Annual Report is in CAD. The Value Line tear sheet is in

| | |
|---|---|
| 18,041,000,000 | CAD |
| 0.7699 | Exchange Rate |
| 13,889,765,900 | USD |

**Convert Canadian Pacific Railway's Book Value of Common Equity from Canadian Dollars to U.S. Dollars. Canadian Pacific Railway's Annual Report is in CAD. The Value Line tear sheet is in

| | |
|---|---|
| 7,069,000,000 | CAD |
| 0.7699 | Exchange Rate |
| 5,442,423,100 | USD |

# Appendix F - Three Stage Ex Ante Calculation

**Three Stage Ex Ante Equity Risk Premium Calculation**

| | | | |
|---|---|---|---|
| **Implied Market Rate Range =** | **6.57%** | **to** | **7.45%** |
| Mean | 7.01% | | |
| Median | 7.01% | | |
| **Market Rate Used** | **7.45%** | | |
| (Less) Risk-Free Rate | 2.33% | | |
| **Equals Equity Risk Premium** | **5.12%** | | |

***Assumptions:***

| **Stages** | **Years** | | **Growth** | **Model 1** | | | | | **Model 2** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1st Stage** | 1-5 years | | Constant @: | 11.23% | | | * | | 11.31% | | | * |
| | | | | | | | | | | | | *Linear* |
| **2nd Stage** | 6-15 years | | Linear from: | 10.62% | to | 4.52% | | OR | 10.62% | to | 3.30% | *from* |
| | | | | Real Growth** | | | | | Inflation^ | | | *1st* |
| **3rd Stage** | 15 years -perpetuity | GDP Growth: | Real and Inflation | 1.50% | | 2.65% | | + | 1.80% | to | 1.87% | *Stage* |
| | | | | | | | | | | | | *to 3rd* |
| | | GDP Growth^^: | Real + Inflation | 4.52% | | | | TO | 3.30% | | | *Stage* |

| | Model 1 | Model 2 |
|---|---|---|
| Implied Market Return | 7.45% | 6.57% |

| **Year** | **Model 1** | | | **Model 2** | | |
|---|---|---|---|---|---|---|
| | Starting Industry | | S & P 500 | Starting Industry | | S & P 500 |
| 2017 | Start Price† | | $ (3,257.85) | Start Price† | | $ (3,257.85) |
| 2018 | Expected Dividends†† | | $ 60.88 | Expected Dividends†† | | $ 60.88 |
| 2019 | 1st Stage Growth Rates | 11.23% | $ 67.72 | 1st Stage Growth Rates | 11.31% | $ 67.77 |
| 2020 | | 11.23% | $ 75.32 | | 11.31% | $ 75.43 |
| 2021 | | 11.23% | $ 83.78 | | 11.31% | $ 83.96 |
| 2022 | | 11.23% | $ 93.19 | | 11.31% | $ 93.46 |
| 2023 | 2nd Stage Growth Rates | 10.62% | $ 103.09 | 2nd Stage Growth Rates | 10.62% | $ 103.38 |
| 2024 | | 10.01% | $ 113.40 | | 9.89% | $ 113.60 |
| 2025 | | 9.40% | $ 124.06 | | 9.16% | $ 124.01 |
| 2026 | | 8.79% | $ 134.97 | | 8.42% | $ 134.45 |
| 2027 | | 8.18% | $ 146.01 | | 7.69% | $ 144.79 |
| 2028 | | 7.57% | $ 157.06 | | 6.96% | $ 154.87 |
| 2029 | | 6.96% | $ 167.99 | | 6.23% | $ 164.52 |
| 2030 | | 6.35% | $ 178.66 | | 5.50% | $ 173.56 |
| 2031 | | 5.74% | $ 188.92 | | 4.76% | $ 181.83 |
| 2032 | | 5.13% | $ 198.61 | | 4.03% | $ 189.16 |
| 2033 | | 4.52% | $ 207.59 | | 3.30% | $ 195.40 |
| 2034 | | 4.52% | $ 216.97 | | 3.30% | $ 201.85 |
| 2035 | | 4.52% | $ 226.78 | | 3.30% | $ 208.51 |
| 2036 | | 4.52% | $ 237.03 | | 3.30% | $ 215.39 |
| 2037 | | 4.52% | $ 247.74 | | 3.30% | $ 222.50 |
| 2038 | | 4.52% | $ 258.94 | | 3.30% | $ 229.84 |
| 2039 | | 4.52% | $ 270.64 | | 3.30% | $ 237.43 |
| 2040 | | 4.52% | $ 282.87 | | 3.30% | $ 245.26 |
| 2041 | | 4.52% | $ 295.66 | | 3.30% | $ 253.36 |
| 2042 | | 4.52% | $ 309.02 | | 3.30% | $ 261.72 |
| 2043 | | 4.52% | $ 322.99 | | 3.30% | $ 270.35 |
| 2044 | | 4.52% | $ 337.59 | | 3.30% | $ 279.27 |
| 2045 | | 4.52% | $ 352.85 | | 3.30% | $ 288.49 |
| 2046 | | 4.52% | $ 368.80 | | 3.30% | $ 298.01 |
| 2047 | | 4.52% | $ 385.47 | | 3.30% | $ 307.84 |
| 2048 | | 4.52% | $ 402.89 | | 3.30% | $ 318.00 |
| 2049 | | 4.52% | $ 421.10 | | 3.30% | $ 328.50 |
| 2050 | | 4.52% | $ 440.14 | | 3.30% | $ 339.34 |
| 2051 | | 4.52% | $ 460.03 | | 3.30% | $ 350.54 |
| 2052 | | 4.52% | $ 480.82 | | 3.30% | $ 362.10 |
| 2053 | | 4.52% | $ 502.56 | | 3.30% | $ 374.05 |
| 2054 | | 4.52% | $ 525.27 | | 3.30% | $ 386.40 |
| 2055 | | 4.52% | $ 549.01 | | 3.30% | $ 399.15 |
| 2056 | | 4.52% | $ 573.83 | | 3.30% | $ 412.32 |
| 2057 | | 4.52% | $ 599.77 | | 3.30% | $ 425.93 |
| 2058 | | 4.52% | $ 626.88 | | 3.30% | $ 439.98 |
| 2059 | | 4.52% | $ 655.21 | | 3.30% | $ 454.50 |
| 2060 | | 4.52% | $ 684.83 | | 3.30% | $ 469.50 |
| 2061 | | 4.52% | $ 715.78 | | 3.30% | $ 484.99 |
| 2062 | | 4.52% | $ 748.13 | | 3.30% | $ 501.00 |
| 2063 | | 4.52% | $ 781.95 | | 3.30% | $ 517.53 |
| 2064 | | 4.52% | $ 817.29 | | 3.30% | $ 534.61 |
| 2065 | | 4.52% | $ 854.24 | | 3.30% | $ 552.25 |
| 2066 | | 4.52% | $ 892.85 | | 3.30% | $ 570.48 |
| 2067 | | 4.52% | $ 933.20 | | 3.30% | $ 589.30 |
| 2068 | | 4.52% | $ 975.38 | | 3.30% | $ 608.75 |
| 2069 | | 4.52% | $ 1,019.47 | | 3.30% | $ 628.84 |
| 2070 | | 4.52% | $ 1,065.55 | | 3.30% | $ 649.59 |
| 2071 | | 4.52% | $ 1,113.72 | | 3.30% | $ 671.03 |
| 2072 | | 4.52% | $ 1,164.06 | | 3.30% | $ 693.17 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2073 | | 4.52% | $ | 1,216.67 | | 3.30% | $ | 716.05 |
| 2074 | | 4.52% | $ | 1,271.66 | | 3.30% | $ | 739.67 |
| 2075 | | 4.52% | $ | 1,329.14 | | 3.30% | $ | 764.08 |
| 2076 | | 4.52% | $ | 1,389.22 | | 3.30% | $ | 789.30 |
| 2077 | | 4.52% | $ | 1,452.01 | | 3.30% | $ | 815.35 |
| 2078 | | 4.52% | $ | 1,517.64 | | 3.30% | $ | 842.25 |
| 2079 | | 4.52% | $ | 1,586.24 | | 3.30% | $ | 870.05 |
| 2080 | | 4.52% | $ | 1,657.94 | | 3.30% | $ | 898.76 |
| 2081 | | 4.52% | $ | 1,732.88 | 3rd Stage Growth Rates | 3.30% | $ | 928.42 |
| 2082 | 3rd Stage Growth Rates | 4.52% | $ | 1,811.20 | | 3.30% | $ | 959.05 |
| 2083 | | 4.52% | $ | 1,893.07 | | 3.30% | $ | 990.70 |
| 2084 | | 4.52% | $ | 1,978.64 | | 3.30% | $ | 1,023.40 |
| 2085 | | 4.52% | $ | 2,068.07 | | 3.30% | $ | 1,057.17 |
| 2086 | | 4.52% | $ | 2,161.55 | | 3.30% | $ | 1,092.06 |
| 2087 | | 4.52% | $ | 2,259.25 | | 3.30% | $ | 1,128.09 |
| 2088 | | 4.52% | $ | 2,361.37 | | 3.30% | $ | 1,165.32 |
| 2089 | | 4.52% | $ | 2,468.10 | | 3.30% | $ | 1,203.78 |
| 2090 | | 4.52% | $ | 2,579.66 | | 3.30% | $ | 1,243.50 |
| 2091 | | 4.52% | $ | 2,696.26 | | 3.30% | $ | 1,284.54 |
| 2092 | | 4.52% | $ | 2,818.13 | | 3.30% | $ | 1,326.93 |
| 2093 | | 4.52% | $ | 2,945.51 | | 3.30% | $ | 1,370.71 |
| 2094 | | 4.52% | $ | 3,078.65 | | 3.30% | $ | 1,415.95 |
| 2095 | | 4.52% | $ | 3,217.81 | | 3.30% | $ | 1,462.67 |
| 2096 | | 4.52% | $ | 3,363.25 | | 3.30% | $ | 1,510.94 |
| 2097 | | 4.52% | $ | 3,515.27 | | 3.30% | $ | 1,560.80 |
| 2098 | | 4.52% | $ | 3,674.16 | | 3.30% | $ | 1,612.31 |
| 2099 | | 4.52% | $ | 3,840.23 | | 3.30% | $ | 1,665.52 |
| 2100 | | 4.52% | $ | 4,013.81 | | 3.30% | $ | 1,720.48 |
| 2101 | | 4.52% | $ | 4,195.23 | | 3.30% | $ | 1,777.25 |
| 2102 | | 4.52% | $ | 4,384.86 | | 3.30% | $ | 1,835.90 |
| 2103 | | 4.52% | $ | 4,583.05 | | 3.30% | $ | 1,896.49 |
| 2104 | | 4.52% | $ | 4,790.21 | | 3.30% | $ | 1,959.07 |
| 2105 | | 4.52% | $ | 5,006.73 | | 3.30% | $ | 2,023.72 |
| 2106 | | 4.52% | $ | 5,233.03 | | 3.30% | $ | 2,090.50 |
| 2107 | | 4.52% | $ | 5,469.56 | | 3.30% | $ | 2,159.49 |
| 2108 | | 4.52% | $ | 5,716.79 | | 3.30% | $ | 2,230.75 |
| 2109 | | 4.52% | $ | 5,975.19 | | 3.30% | $ | 2,304.37 |
| 2110 | | 4.52% | $ | 6,245.26 | | 3.30% | $ | 2,380.41 |
| 2111 | | 4.52% | $ | 6,527.55 | | 3.30% | $ | 2,458.97 |
| 2112 | | 4.52% | $ | 6,822.60 | | 3.30% | $ | 2,540.11 |
| 2113 | | 4.52% | $ | 7,130.98 | | 3.30% | $ | 2,623.94 |
| 2114 | | 4.52% | $ | 7,453.30 | | 3.30% | $ | 2,710.53 |
| 2115 | | 4.52% | $ | 7,790.19 | | 3.30% | $ | 2,799.97 |
| 2116 | | 4.52% | $ | 8,142.30 | | 3.30% | $ | 2,892.37 |
| 2117 | | 4.52% | $ | 8,510.33 | | 3.30% | $ | 2,987.82 |
| 2118 | | 4.52% | $ | 8,895.00 | | 3.30% | $ | 3,086.42 |
| 2119 | | 4.52% | $ | 9,297.06 | | 3.30% | $ | 3,188.27 |
| 2120 | | 4.52% | $ | 9,717.28 | | 3.30% | $ | 3,293.48 |
| 2121 | | 4.52% | $ | 10,156.50 | | 3.30% | $ | 3,402.17 |
| 2122 | | 4.52% | $ | 10,615.58 | | 3.30% | $ | 3,514.44 |
| 2123 | | 4.52% | $ | 11,095.40 | | 3.30% | $ | 3,630.42 |
| 2124 | | 4.52% | $ | 11,596.91 | | 3.30% | $ | 3,750.22 |
| 2125 | | 4.52% | $ | 12,121.09 | | 3.30% | $ | 3,873.98 |
| 2126 | | 4.52% | $ | 12,668.97 | | 3.30% | $ | 4,001.82 |
| 2127 | | 4.52% | $ | 13,241.60 | | 3.30% | $ | 4,133.88 |
| 2128 | | 4.52% | $ | 13,840.13 | | 3.30% | $ | 4,270.30 |
| 2129 | | 4.52% | $ | 14,465.70 | | 3.30% | $ | 4,411.22 |
| 2130 | | 4.52% | $ | 15,119.55 | | 3.30% | $ | 4,556.79 |
| 2131 | | 4.52% | $ | 15,802.95 | | 3.30% | $ | 4,707.16 |
| 2132 | | 4.52% | $ | 16,517.25 | | 3.30% | $ | 4,862.50 |
| 2133 | | Reversion`` | $ | 69.91 | | Reversion`` | $ | 64.93 |
| | **Implied Market Return** | | | **7.45%** | **Implied Market Return** | | | **6.57%** |

*S&P 500 Earnings and Estimate Report dated 12/31/2019, http://us.spindices.com/indices/equity/sp-500
**First Quarter 2020 Survey of Professional Forecasters - Philadelphia Federal Reserve Release Date 2/14/2020
^Inflation Range = Federal Reserve, Treasuries Inflation - Indexed
^^GDP Growth = Real growth + Inflation
† Start Price is the S&P 500 Index adjusted close on 1/2/2020, downloaded from Yahoo! Finance
††Expected Dividends downloaded from http://www.cmegroup.com/trading/equity-index/us-index/sp-500-quarterly-dividend-index.html, 1/6/2020

``Reversion Calculation:

| | | | |
|---|---|---|---|
| **A.** | Last period's expected dividends, growth applied | 17,263.82 | 5,022.96 |
| **B.** | Implied Market Risk Premium Less Long-Term Growth | 5.12% | 4.24% |
| **C.** | A / B | 337,073.0 | 118,455.8 |
| **D.** | C / ((1 + Implied Market Risk Premium) ^ Last Period +1) | 69.91 | 64.93 |

# Appendix G - Debt Rate Analysis Data

## Electric

### Issued Debt by Company

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Alliant Energy Corp | 4.25% | 6/15/2028 | 100,000 | 107,791 | 107.79 | 3.19% |
| Ameren Corp | 2.70% | 11/15/2020 | 300,000 | 301,592 | 100.53 | 2.08% |
| Ameren Corp | 2.50% | 9/15/2024 | 160,000 | 161,880 | 101.18 | 2.23% |
| Ameren Corp | 2.50% | 9/15/2024 | 350,000 | 352,723 | 100.78 | 2.32% |
| Ameren Corp | 3.65% | 2/15/2026 | 395,000 | 419,032 | 106.08 | 2.57% |
| American Electric Power Company Inc. | 2.15% | 11/13/2020 | 475,000 | 475,905 | 100.19 | 1.92% |
| American Electric Power Company Inc. | 3.65% | 12/1/2021 | 225,000 | 232,825 | 103.48 | 1.79% |
| American Electric Power Company Inc. | 3.65% | 12/1/2021 | 300,000 | 309,427 | 103.14 | 1.97% |
| American Electric Power Company Inc. | 2.95% | 12/15/2022 | 90,000 | 91,838 | 102.04 | 2.23% |
| American Electric Power Company Inc. | 3.20% | 11/13/2027 | 50,000 | 51,811 | 103.62 | 2.69% |
| American Electric Power Company Inc. | 3.20% | 11/13/2027 | 350,000 | 360,750 | 103.07 | 2.76% |
| American Electric Power Company Inc. | 4.30% | 12/1/2028 | 225,000 | 251,225 | 111.66 | 2.81% |
| American Electric Power Company Inc. | 4.30% | 12/1/2028 | 700,000 | 778,067 | 111.15 | 2.87% |
| Black Hills Corp | 4.25% | 11/30/2023 | 140,000 | 148,924 | 106.37 | 2.53% |
| Black Hills Corp | 4.25% | 11/30/2023 | 200,000 | 211,890 | 105.95 | 2.64% |
| Black Hills Corp | 3.95% | 1/15/2026 | 225,000 | 241,047 | 107.13 | 2.66% |
| Black Hills Corp | 3.95% | 1/15/2026 | 100,000 | 105,208 | 105.21 | 3.00% |
| Black Hills Corp | 3.15% | 1/15/2027 | 30,000 | 30,796 | 102.65 | 2.73% |
| Black Hills Corp | 3.15% | 1/15/2027 | 100,000 | 101,095 | 101.09 | 2.98% |
| Black Hills Corp | 3.05% | 10/15/2029 | 210,000 | 210,815 | 100.39 | 3.00% |
| Black Hills Corp | 4.35% | 5/1/2033 | 579,000 | 646,953 | 111.74 | 3.26% |
| Black Hills Corp | 4.35% | 5/1/2033 | 300,000 | 332,434 | 110.81 | 3.34% |
| Black Hills Corp | 4.35% | 5/1/2033 | 1,372,000 | 1,503,095 | 109.56 | 3.45% |
| Black Hills Corp | 4.20% | 9/15/2046 | 200,000 | 211,902 | 105.95 | 3.84% |
| Black Hills Corp | 4.20% | 9/15/2046 | 200,000 | 208,797 | 104.40 | 3.93% |
| Black Hills Corp | 4.20% | 9/15/2046 | 589,000 | 612,672 | 104.02 | 3.95% |
| Black Hills Corp | 3.88% | 10/15/2049 | 250,000 | 252,206 | 100.88 | 3.83% |
| Black Hills Corp | 3.88% | 10/15/2049 | 500,000 | 499,630 | 99.93 | 3.88% |
| CenterPoint Energy Inc. | 2.50% | 9/1/2022 | 1,105,000 | 1,123,397 | 101.66 | 1.86% |
| CenterPoint Energy Inc. | 2.50% | 9/1/2022 | 300,000 | 302,343 | 100.78 | 2.20% |
| CenterPoint Energy Inc. | 3.85% | 2/1/2024 | 925,000 | 990,647 | 107.10 | 2.03% |
| CenterPoint Energy Inc. | 3.85% | 2/1/2024 | 425,000 | 448,017 | 105.42 | 2.45% |
| CenterPoint Energy Inc. | 2.50% | 9/1/2024 | 500,000 | 500,271 | 100.05 | 2.49% |
| CenterPoint Energy Inc. | 4.25% | 11/1/2028 | 571,000 | 624,115 | 109.30 | 3.04% |
| CenterPoint Energy Inc. | 4.25% | 11/1/2028 | 450,000 | 488,043 | 108.45 | 3.15% |
| CenterPoint Energy Inc. | 2.95% | 3/1/2030 | 650,000 | 648,183 | 99.72 | 2.98% |
| CenterPoint Energy Inc. | 2.95% | 3/1/2030 | 750,000 | 738,338 | 98.45 | 3.13% |
| CenterPoint Energy Inc. | 2.95% | 3/1/2030 | 750,000 | 737,460 | 98.33 | 3.14% |
| CenterPoint Energy Inc. | 3.70% | 9/1/2049 | 600,000 | 599,118 | 99.85 | 3.71% |
| CenterPoint Energy Inc. | 3.70% | 9/1/2049 | 500,000 | 490,579 | 98.12 | 3.81% |
| CenterPoint Energy Inc. | 3.70% | 9/1/2049 | 1,250,000 | 1,231,313 | 98.51 | 3.78% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| CMS Energy Corp | 3.88% | 3/1/2024 | 100,000 | 106,571 | 106.57 | 2.22% |
| CMS Energy Corp | 3.60% | 11/15/2025 | 55,000 | 58,341 | 106.07 | 2.48% |
| CMS Energy Corp | 3.00% | 5/15/2026 | 720,000 | 742,765 | 103.16 | 2.46% |
| CMS Energy Corp | 3.45% | 8/15/2027 | 790,000 | 825,820 | 104.53 | 2.78% |
| CMS Energy Corp | 4.70% | 3/31/2043 | 652,000 | 743,062 | 113.97 | 3.79% |
| CMS Energy Corp | 4.88% | 3/1/2044 | 647,000 | 783,297 | 121.07 | 3.57% |
| CMS Energy Corp | 4.88% | 3/1/2044 | 1,517,000 | 1,805,731 | 119.03 | 3.68% |
| DTE Energy Company | 3.30% | 6/15/2022 | 495,000 | 507,448 | 102.51 | 2.24% |
| DTE Energy Company | 2.60% | 6/15/2022 | 230,000 | 231,879 | 100.82 | 2.26% |
| DTE Energy Company | 2.60% | 6/15/2022 | 350,000 | 352,287 | 100.65 | 2.32% |
| DTE Energy Company | 3.30% | 6/15/2022 | 200,000 | 204,646 | 102.32 | 2.32% |
| DTE Energy Company | 2.25% | 11/1/2022 | 275,000 | 274,825 | 99.94 | 2.27% |
| DTE Energy Company | 3.70% | 8/1/2023 | 355,000 | 376,160 | 105.96 | 1.97% |
| DTE Energy Company | 3.70% | 8/1/2023 | 1,875,000 | 1,956,135 | 104.33 | 2.43% |
| DTE Energy Company | 3.85% | 12/1/2023 | 200,000 | 209,742 | 104.87 | 2.53% |
| DTE Energy Company | 3.50% | 6/1/2024 | 628,000 | 657,564 | 104.71 | 2.37% |
| DTE Energy Company | 3.50% | 6/1/2024 | 200,000 | 208,658 | 104.33 | 2.46% |
| DTE Energy Company | 2.53% | 10/1/2024 | 50,000 | 50,560 | 101.12 | 2.28% |
| DTE Energy Company | 2.53% | 10/1/2024 | 1,000,000 | 1,003,922 | 100.39 | 2.44% |
| DTE Energy Company | 2.85% | 10/1/2026 | 650,000 | 660,502 | 101.62 | 2.59% |
| DTE Energy Company | 3.80% | 3/15/2027 | 564,000 | 603,447 | 106.99 | 2.72% |
| DTE Energy Company | 3.40% | 6/15/2029 | 665,000 | 686,663 | 103.26 | 3.00% |
| DTE Energy Company | 3.40% | 6/15/2029 | 350,000 | 360,366 | 102.96 | 3.04% |
| DTE Energy Company | 2.95% | 3/1/2030 | 550,000 | 547,190 | 99.49 | 3.01% |
| DTE Energy Company | 2.95% | 3/1/2030 | 500,000 | 494,419 | 98.88 | 3.08% |
| DTE Energy Company | 6.38% | 4/15/2033 | 165,000 | 218,295 | 132.30 | 3.35% |
| DTE Energy Company | 6.38% | 4/15/2033 | 2,495,000 | 3,251,908 | 130.34 | 3.50% |
| Entergy Corp | 5.13% | 9/15/2020 | 200,000 | 202,731 | 101.37 | 3.14% |
| Entergy Corp | 4.00% | 7/15/2022 | 1,002,000 | 1,064,486 | 106.24 | 1.48% |
| Entergy Corp | 4.00% | 7/15/2022 | 200,000 | 208,688 | 104.34 | 2.23% |
| Entergy Corp | 2.95% | 9/1/2026 | 100,000 | 102,599 | 102.60 | 2.52% |
| Entergy Corp | 2.95% | 9/1/2026 | 1,300,000 | 1,319,637 | 101.51 | 2.70% |
| NorthWestern Corp | 4.18% | 11/15/2044 | 1,219,000 | 1,340,278 | 109.95 | 3.57% |
| OGE Energy Corp | 3.80% | 8/15/2028 | 600,000 | 660,378 | 110.06 | 2.49% |
| OGE Energy Corp | 3.80% | 8/15/2028 | 200,000 | 216,978 | 108.49 | 2.69% |
| OGE Energy Corp | 3.30% | 3/15/2030 | 365,000 | 388,258 | 106.37 | 2.59% |
| OGE Energy Corp | 3.30% | 3/15/2030 | 500,000 | 526,207 | 105.24 | 2.71% |
| OGE Energy Corp | 3.30% | 3/15/2030 | 335,000 | 351,000 | 104.78 | 2.76% |
| OGE Energy Corp | 5.85% | 6/1/2040 | 45,000 | 57,908 | 128.69 | 3.81% |
| OGE Energy Corp | 4.55% | 3/15/2044 | 25,000 | 28,662 | 114.65 | 3.63% |
| OGE Energy Corp | 4.15% | 4/1/2047 | 250,000 | 274,705 | 109.88 | 3.58% |
| OGE Energy Corp | 4.15% | 4/1/2047 | 200,000 | 217,019 | 108.51 | 3.65% |
| OGE Energy Corp | 4.15% | 4/1/2047 | 675,000 | 729,587 | 108.09 | 3.68% |
| OGE Energy Corp | 3.85% | 8/15/2047 | 200,000 | 206,900 | 103.45 | 3.65% |
| OGE Energy Corp | 3.85% | 8/15/2047 | 600,000 | 621,930 | 103.66 | 3.64% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| WEC Energy Group | 3.38% | 6/15/2021 | 875,000 | 892,473 | 102.00 | 1.98% |
| WEC Energy Group | 3.10% | 3/8/2022 | 335,000 | 345,435 | 103.11 | 1.64% |
| WEC Energy Group | 3.10% | 3/8/2022 | 500,000 | 510,467 | 102.09 | 2.11% |
| WEC Energy Group | 3.55% | 6/15/2025 | 1,520,000 | 1,612,416 | 106.08 | 2.35% |
| Xcel Energy Inc. | 2.40% | 3/15/2021 | 515,000 | 521,195 | 101.20 | 1.38% |
| Xcel Energy Inc. | 2.40% | 3/15/2021 | 300,000 | 301,137 | 100.38 | 2.08% |
| Xcel Energy Inc. | 2.60% | 3/15/2022 | 300,000 | 303,097 | 101.03 | 2.12% |
| Xcel Energy Inc. | 3.30% | 6/1/2025 | 160,000 | 167,538 | 104.71 | 2.37% |
| Xcel Energy Inc. | 3.35% | 12/1/2026 | 400,000 | 420,971 | 105.24 | 2.52% |
| Xcel Energy Inc. | 3.35% | 12/1/2026 | 750,000 | 786,419 | 104.86 | 2.58% |
| Xcel Energy Inc. | 4.00% | 6/15/2028 | 635,000 | 699,133 | 110.10 | 2.66% |
| Xcel Energy Inc. | 4.00% | 6/15/2028 | 900,000 | 988,088 | 109.79 | 2.70% |
| Xcel Energy Inc. | 2.60% | 12/1/2029 | 50,000 | 49,750 | 99.50 | 2.66% |
| Xcel Energy Inc. | 2.60% | 12/1/2029 | 325,000 | 321,206 | 98.83 | 2.74% |
| Xcel Energy Inc. | 6.50% | 7/1/2036 | 260,000 | 360,117 | 138.51 | 3.42% |
| Xcel Energy Inc. | 6.50% | 7/1/2036 | 575,000 | 783,754 | 136.31 | 3.57% |
| Xcel Energy Inc. | 4.80% | 9/15/2041 | 133,000 | 151,975 | 114.27 | 3.83% |
| Xcel Energy Inc. | 3.50% | 12/1/2049 | 500,000 | 510,978 | 102.20 | 3.38% |
| Xcel Energy Inc. | 3.50% | 12/1/2049 | 500,000 | 506,599 | 101.32 | 3.43% |
| Xcel Energy Inc. | 3.50% | 12/1/2049 | 1,200,000 | 1,221,240 | 101.77 | 3.41% |
| Ameren Illinois Co | 4.80% | 12/15/2043 | 525,000 | 627,589 | 119.54 | 3.58% |
| Ameren Illinois Co | 4.30% | 7/1/2044 | 453,000 | 526,460 | 116.22 | 3.33% |
| Ameren Illinois Co | 4.15% | 3/15/2046 | 350,000 | 407,197 | 116.34 | 3.22% |
| Ameren Illinois Co | 2.70% | 9/1/2022 | 390,000 | 400,488 | 102.69 | 1.66% |
| Ameren Illinois Co | 3.25% | 3/1/2025 | 235,000 | 248,867 | 105.90 | 2.04% |
| Ameren Illinois Co | 3.70% | 12/1/2047 | 160,000 | 172,303 | 107.69 | 3.28% |
| Ameren Illinois Company | 4.50% | 3/15/2049 | 550,000 | 677,464 | 123.18 | 3.26% |
| Ameren Illinois Company | 3.80% | 5/15/2028 | 75,000 | 82,144 | 109.52 | 2.53% |
| DTE Electric Co | 3.70% | 3/15/2045 | 505,000 | 550,728 | 109.06 | 3.18% |
| DTE Electric Co | 4.30% | 7/1/2044 | 380,000 | 448,422 | 118.01 | 3.23% |
| DTE Electric Co | 3.70% | 6/1/2046 | 225,000 | 244,085 | 108.48 | 3.22% |
| DTE Electric Company | 3.95% | 3/1/2049 | 505,000 | 584,671 | 115.78 | 3.12% |
| DTE Electric Company | 4.05% | 5/15/2048 | 385,000 | 448,994 | 116.62 | 3.16% |
| Entergy Arkansas Inc. | 3.75% | 2/15/2021 | 390,000 | 401,565 | 102.97 | 1.07% |
| Entergy Arkansas Inc. | 3.50% | 4/1/2026 | 376,000 | 399,956 | 106.37 | 2.39% |
| Entergy Arkansas LLC | 4.20% | 4/1/2049 | 370,000 | 434,566 | 117.45 | 3.27% |
| Entergy Gulf States Louisiana LLC | 5.59% | 10/1/2024 | 25,000 | 29,039 | 116.16 | 2.00% |
| Entergy Louisiana LLC | 2.40% | 10/1/2026 | 344,000 | 341,626 | 99.31 | 2.51% |
| Entergy Louisiana LLC | 4.20% | 4/1/2050 | 250,000 | 292,723 | 117.09 | 3.30% |
| Entergy Louisiana LLC | 4.95% | 1/15/2045 | 255,000 | 279,355 | 109.55 | 4.32% |
| Entergy Louisiana LLC | 4.00% | 3/15/2033 | 150,000 | 171,515 | 114.34 | 2.70% |
| Entergy Louisiana LLC | 5.40% | 11/1/2024 | 100,000 | 115,436 | 115.44 | 2.03% |
| Entergy Louisiana LLC | 3.25% | 4/1/2028 | 75,000 | 79,331 | 105.78 | 2.47% |
| Entergy Louisiana LLC | 3.05% | 6/1/2031 | 75,000 | 77,922 | 103.90 | 2.65% |
| Entergy Louisiana LLC | 4.20% | 9/1/2048 | 56,000 | 65,606 | 117.15 | 3.27% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Entergy Mississippi LLC | 3.85% | 6/1/2049 | 275,000 | 301,239 | 109.54 | 3.34% |
| Entergy Mississippi LLC | 2.85% | 6/1/2028 | 160,000 | 164,059 | 102.54 | 2.51% |
| Entergy Texas Inc. | 4.00% | 3/30/2029 | 670,000 | 745,488 | 111.27 | 2.62% |
| Entergy Texas Inc. | 3.55% | 9/30/2049 | 250,000 | 257,243 | 102.90 | 3.39% |
| Entergy Texas Inc. | 5.15% | 6/1/2045 | 80,000 | 86,358 | 107.95 | 4.62% |
| Northern States Power Co (MN) | 4.85% | 8/15/2040 | 500,000 | 602,085 | 120.42 | 3.46% |
| Northern States Power Company (MN) | 2.90% | 3/1/2050 | 670,000 | 646,083 | 96.43 | 3.08% |
| Northern States Power Company (MN) | 2.15% | 8/15/2022 | 477,000 | 484,244 | 101.52 | 1.56% |
| Northern States Power Company (MN) | 5.35% | 11/1/2039 | 300,000 | 397,113 | 132.37 | 3.14% |
| Northern States Power Company (MN) | 3.40% | 8/15/2042 | 195,000 | 206,677 | 105.99 | 3.03% |
| Northern States Power Company (MN) | 3.60% | 9/15/2047 | 140,000 | 151,389 | 108.14 | 3.16% |
| Northern States Power Company (MN) | 6.25% | 6/1/2036 | 45,000 | 62,548 | 139.00 | 3.18% |
| Northern States Power Company (MN) | 3.60% | 5/15/2046 | 50,000 | 53,717 | 107.43 | 3.18% |
| Northern States Power Company (MN) | 6.20% | 7/1/2037 | 10,000 | 14,253 | 142.53 | 3.05% |
| Northern States Power Company MINN | 4.13% | 5/15/2044 | 400,000 | 461,277 | 115.32 | 3.22% |
| NorthWestern Corporation | 4.18% | 11/15/2044 | 565,000 | 634,139 | 112.24 | 3.44% |

Notes:
Alliant Energy Corp - Alliant Energy Finance LLC 144A
OGE Energy Corp - Oklahoma Gas & Electric Co

## Gas Distribution

### Issued Debt by Company

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Atmos Energy Corp | 3.00% | 6/15/2027 | 550,000 | 568,406 | 103.35 | 2.50% |
| Atmos Energy Corp | 3.00% | 6/15/2027 | 650,000 | 670,114 | 103.09 | 2.54% |
| Atmos Energy Corp | 2.63% | 9/15/2029 | 210,000 | 213,392 | 101.62 | 2.44% |
| Atmos Energy Corp | 2.63% | 9/15/2029 | 500,000 | 504,082 | 100.82 | 2.53% |
| Atmos Energy Corp | 5.50% | 6/15/2041 | 160,000 | 207,077 | 129.42 | 3.53% |
| Atmos Energy Corp | 5.50% | 6/15/2041 | 100,000 | 128,866 | 128.87 | 3.56% |
| Atmos Energy Corp | 5.50% | 6/15/2041 | 590,000 | 758,711 | 128.60 | 3.58% |
| Atmos Energy Corp | 4.15% | 1/15/2043 | 172,000 | 196,347 | 114.16 | 3.27% |
| Atmos Energy Corp | 4.15% | 1/15/2043 | 125,000 | 139,918 | 111.93 | 3.40% |
| Atmos Energy Corp | 4.15% | 1/15/2043 | 1,347,000 | 1,507,697 | 111.93 | 3.40% |
| Atmos Energy Corp | 4.13% | 10/15/2044 | 224,000 | 254,366 | 113.56 | 3.32% |
| Atmos Energy Corp | 4.13% | 10/15/2044 | 600,000 | 674,100 | 112.35 | 3.39% |
| Atmos Energy Corp | 4.13% | 10/15/2044 | 2,383,000 | 2,671,700 | 112.11 | 3.40% |
| Atmos Energy Corp | 4.30% | 10/1/2048 | 100,000 | 118,278 | 118.28 | 3.31% |
| Atmos Energy Corp | 4.30% | 10/1/2048 | 500,000 | 584,152 | 116.83 | 3.38% |
| Atmos Energy Corp | 4.13% | 3/15/2049 | 640,000 | 743,305 | 116.14 | 3.27% |
| Atmos Energy Corp | 4.13% | 3/15/2049 | 300,000 | 343,660 | 114.55 | 3.35% |
| Atmos Energy Corp | 4.13% | 3/15/2049 | 2,085,000 | 2,395,811 | 114.91 | 3.32% |
| Atmos Energy Corp | 3.38% | 9/15/2049 | 645,000 | 660,399 | 102.39 | 3.25% |
| Atmos Energy Corp | 3.38% | 9/15/2049 | 500,000 | 505,995 | 101.20 | 3.32% |
| Atmos Energy Corp | 3.38% | 9/15/2049 | 1,725,000 | 1,741,181 | 100.94 | 3.32% |
| Black Hills Corp | 4.25% | 11/30/2023 | 140,000 | 148,924 | 106.37 | 2.53% |
| Black Hills Corp | 4.25% | 11/30/2023 | 200,000 | 211,890 | 105.95 | 2.64% |
| Black Hills Corp | 3.95% | 1/15/2026 | 225,000 | 241,047 | 107.13 | 2.66% |
| Black Hills Corp | 3.95% | 1/15/2026 | 100,000 | 105,208 | 105.21 | 3.00% |
| Black Hills Corp | 3.15% | 1/15/2027 | 30,000 | 30,796 | 102.65 | 2.73% |
| Black Hills Corp | 3.15% | 1/15/2027 | 100,000 | 101,095 | 101.09 | 2.98% |
| Black Hills Corp | 3.05% | 10/15/2029 | 210,000 | 210,815 | 100.39 | 3.00% |
| Black Hills Corp | 4.35% | 5/1/2033 | 579,000 | 646,953 | 111.74 | 3.26% |
| Black Hills Corp | 4.35% | 5/1/2033 | 300,000 | 332,434 | 110.81 | 3.34% |
| Black Hills Corp | 4.35% | 5/1/2033 | 1,372,000 | 1,503,095 | 109.56 | 3.45% |
| Black Hills Corp | 4.20% | 9/15/2046 | 200,000 | 211,902 | 105.95 | 3.84% |
| Black Hills Corp | 4.20% | 9/15/2046 | 200,000 | 208,797 | 104.40 | 3.93% |
| Black Hills Corp | 4.20% | 9/15/2046 | 589,000 | 612,672 | 104.02 | 3.95% |
| Black Hills Corp | 3.88% | 10/15/2049 | 250,000 | 252,206 | 100.88 | 3.83% |
| Black Hills Corp | 3.88% | 10/15/2049 | 500,000 | 499,630 | 99.93 | 3.88% |
| CenterPoint Energy Inc. | 2.50% | 9/1/2022 | 1,105,000 | 1,123,397 | 101.66 | 1.86% |
| CenterPoint Energy Inc. | 2.50% | 9/1/2022 | 300,000 | 302,343 | 100.78 | 2.20% |
| CenterPoint Energy Inc. | 3.85% | 2/1/2024 | 925,000 | 990,647 | 107.10 | 2.03% |
| CenterPoint Energy Inc. | 3.85% | 2/1/2024 | 425,000 | 448,017 | 105.42 | 2.45% |
| CenterPoint Energy Inc. | 2.50% | 9/1/2024 | 500,000 | 500,271 | 100.05 | 2.49% |
| CenterPoint Energy Inc. | 4.25% | 11/1/2028 | 571,000 | 624,115 | 109.30 | 3.04% |
| CenterPoint Energy Inc. | 4.25% | 11/1/2028 | 450,000 | 488,043 | 108.45 | 3.15% |

| | | | | | | |
|---|---|---|---|---|---|---|
| CenterPoint Energy Inc. | 2.95% | 3/1/2030 | 650,000 | 648,183 | 99.72 | 2.98% |
| CenterPoint Energy Inc. | 2.95% | 3/1/2030 | 750,000 | 738,338 | 98.45 | 3.13% |
| CenterPoint Energy Inc. | 2.95% | 3/1/2030 | 750,000 | 737,460 | 98.33 | 3.14% |
| CenterPoint Energy Inc. | 3.70% | 9/1/2049 | 600,000 | 599,118 | 99.85 | 3.71% |
| CenterPoint Energy Inc. | 3.70% | 9/1/2049 | 500,000 | 490,579 | 98.12 | 3.81% |
| CenterPoint Energy Inc. | 3.70% | 9/1/2049 | 1,250,000 | 1,231,313 | 98.51 | 3.78% |
| CMS Energy Corp | 3.88% | 3/1/2024 | 100,000 | 106,571 | 106.57 | 2.22% |
| CMS Energy Corp | 3.60% | 11/15/2025 | 55,000 | 58,341 | 106.07 | 2.48% |
| CMS Energy Corp | 3.00% | 5/15/2026 | 720,000 | 742,765 | 103.16 | 2.46% |
| CMS Energy Corp | 3.45% | 8/15/2027 | 790,000 | 825,820 | 104.53 | 2.78% |
| CMS Energy Corp | 4.70% | 3/31/2043 | 652,000 | 743,062 | 113.97 | 3.79% |
| CMS Energy Corp | 4.88% | 3/1/2044 | 647,000 | 783,297 | 121.07 | 3.57% |
| CMS Energy Corp | 4.88% | 3/1/2044 | 1,517,000 | 1,805,731 | 119.03 | 3.68% |
| NiSource Inc. | 2.65% | 11/17/2022 | 105,000 | 106,628 | 101.55 | 2.09% |
| NiSource Inc. | 2.65% | 11/17/2022 | 150,000 | 151,758 | 101.17 | 2.23% |
| NiSource Inc. | 3.65% | 6/15/2023 | 320,000 | 333,869 | 104.33 | 2.33% |
| NiSource Inc. | 3.65% | 6/15/2023 | 500,000 | 520,534 | 104.11 | 2.40% |
| NiSource Inc. | 3.49% | 5/15/2027 | 640,000 | 676,149 | 105.65 | 2.64% |
| NiSource Inc. | 3.49% | 5/15/2027 | 1,000,000 | 1,050,843 | 105.08 | 2.72% |
| NiSource Inc. | 2.95% | 9/1/2029 | 1,500,000 | 1,512,091 | 100.81 | 2.85% |
| NiSource Inc. | 2.95% | 9/1/2029 | 750,000 | 746,391 | 99.52 | 3.01% |
| NiSource Inc. | 5.95% | 6/15/2041 | 100,000 | 128,443 | 128.44 | 3.97% |
| NiSource Inc. | 5.95% | 6/15/2041 | 1,147,000 | 1,465,304 | 127.75 | 4.01% |
| NiSource Inc. | 5.95% | 6/15/2041 | 100,000 | 127,864 | 127.86 | 4.00% |
| NiSource Inc. | 5.80% | 2/1/2042 | 240,000 | 306,564 | 127.74 | 3.91% |
| NiSource Inc. | 5.25% | 2/15/2043 | 347,000 | 429,254 | 123.70 | 3.71% |
| NiSource Inc. | 5.25% | 2/15/2043 | 200,000 | 242,812 | 121.41 | 3.84% |
| NiSource Inc. | 5.25% | 2/15/2043 | 1,415,000 | 1,713,084 | 121.07 | 3.86% |
| NiSource Inc. | 4.80% | 2/15/2044 | 825,000 | 974,548 | 118.13 | 3.66% |
| NiSource Inc. | 4.80% | 2/15/2044 | 450,000 | 521,973 | 115.99 | 3.78% |
| NiSource Inc. | 4.80% | 2/15/2044 | 1,731,000 | 1,984,868 | 114.67 | 3.86% |
| NiSource Inc. | 5.65% | 2/1/2045 | 490,000 | 637,628 | 130.13 | 3.78% |
| NiSource Inc. | 5.65% | 2/1/2045 | 815,000 | 1,038,523 | 127.43 | 3.92% |
| NiSource Inc. | 5.65% | 2/1/2045 | 1,425,000 | 1,819,853 | 127.71 | 3.91% |
| NiSource Inc. | 4.38% | 5/15/2047 | 520,000 | 579,834 | 111.51 | 3.71% |
| NiSource Inc. | 4.38% | 5/15/2047 | 350,000 | 387,126 | 110.61 | 3.76% |
| NiSource Inc. | 4.38% | 5/15/2047 | 2,700,000 | 3,011,769 | 111.55 | 3.70% |
| NiSource Inc. | 3.95% | 3/30/2048 | 15,000 | 15,967 | 106.45 | 3.58% |
| NiSource Inc. | 3.95% | 3/30/2048 | 500,000 | 525,600 | 105.12 | 3.66% |
| NiSource Inc. | 3.95% | 3/30/2048 | 935,000 | 982,320 | 105.06 | 3.66% |
| ONE Gas Inc. | 3.61% | 2/1/2024 | 102,000 | 108,774 | 106.64 | 1.91% |
| ONE Gas Inc. | 3.61% | 2/1/2024 | 137,000 | 143,926 | 105.06 | 2.30% |
| ONE Gas Inc. | 4.66% | 2/1/2044 | 100,000 | 120,899 | 120.90 | 3.38% |
| ONE Gas Inc. | 4.66% | 2/1/2044 | 100,000 | 118,617 | 118.62 | 3.51% |
| ONE Gas Inc. | 4.66% | 2/1/2044 | 1,271,000 | 1,515,375 | 119.23 | 3.47% |
| ONE Gas Inc. | 4.50% | 11/1/2048 | 545,000 | 651,950 | 119.62 | 3.42% |
| ONE Gas Inc. | 4.50% | 11/1/2048 | 500,000 | 592,450 | 118.49 | 3.48% |

| | | | | | | |
|---|---|---|---|---|---|---|
| ONE Gas Inc. | 4.50% | 11/1/2048 | 1,375,000 | 1,637,625 | 119.10 | 3.45% |
| Southwest Gas Holdings Inc. | 3.70% | 4/1/2028 | 100,000 | 108,282 | 108.28 | 2.58% |
| Southwest Gas Holdings Inc. | 3.70% | 4/1/2028 | 150,000 | 160,835 | 107.22 | 2.72% |
| Southwest Gas Holdings Inc. | 3.80% | 9/29/2046 | 100,000 | 101,000 | 101.00 | 3.74% |
| Southwest Gas Holdings Inc. | 3.80% | 9/29/2046 | 550,000 | 562,997 | 102.36 | 3.66% |
| Southwest Gas Holdings Inc. | 4.15% | 6/1/2049 | 500,000 | 542,778 | 108.56 | 3.67% |
| Southwest Gas Holdings Inc. | 4.15% | 6/1/2049 | 800,000 | 874,968 | 109.37 | 3.63% |
| WEC Energy Group | 3.38% | 6/15/2021 | 875,000 | 892,473 | 102.00 | 1.98% |
| WEC Energy Group | 3.10% | 3/8/2022 | 335,000 | 345,435 | 103.11 | 1.64% |
| WEC Energy Group | 3.10% | 3/8/2022 | 500,000 | 510,467 | 102.09 | 2.11% |
| WEC Energy Group | 3.55% | 6/15/2025 | 1,520,000 | 1,612,416 | 106.08 | 2.35% |
| CenterPoint Energy Inc. | 4.50% | 4/1/2044 | 350,000 | 422,337 | 120.67 | 3.26% |
| CenterPoint Energy Inc. | 3.55% | 8/1/2042 | 200,000 | 213,280 | 106.64 | 3.14% |
| CenterPoint Energy Inc. | 4.25% | 2/1/2049 | 110,000 | 131,408 | 119.46 | 3.21% |
| CenterPoint Energy Inc. | 6.95% | 3/15/2033 | 80,000 | 114,482 | 143.10 | 2.98% |
| CenterPoint Energy Inc. | 3.00% | 2/1/2027 | 100,000 | 104,348 | 104.35 | 2.33% |
| CenterPoint Energy Inc. | 2.40% | 9/1/2026 | 50,000 | 50,199 | 100.40 | 2.33% |
| CenterPoint Energy Inc. | 4.50% | 1/15/2021 | 331,000 | 344,272 | 104.01 | 0.60% |
| CenterPoint Energy Inc. | 5.85% | 1/15/2041 | 50,000 | 65,100 | 130.20 | 3.76% |
| CenterPoint Energy Inc. | 3.55% | 4/1/2023 | 900,000 | 939,783 | 104.42 | 2.13% |
| CenterPoint Energy Inc. | 4.00% | 4/1/2028 | 584,000 | 630,873 | 108.03 | 2.90% |
| CenterPoint Energy Inc. | 4.10% | 9/1/2047 | 250,000 | 265,803 | 106.32 | 3.73% |
| Wisconsin Electric Power Co | 5.70% | 12/1/2036 | 350,000 | 462,923 | 132.26 | 3.21% |
| Wisconsin Electric Power Co | 2.95% | 9/15/2021 | 250,000 | 256,056 | 102.42 | 1.50% |
| Wisconsin Electric Power Co | 5.63% | 5/15/2033 | 57,000 | 73,714 | 129.32 | 2.96% |
| Wisconsin Electric Power Company | 4.30% | 10/15/2048 | 150,000 | 177,724 | 118.48 | 3.30% |
| Wisconsin Electric Power Company | 4.30% | 12/15/2045 | 50,000 | 57,105 | 114.21 | 3.47% |
| Wisconsin Energy Corporation | 3.55% | 6/15/2025 | 195,000 | 207,366 | 106.34 | 2.30% |
| Wisconsin Power and Light Co | 6.38% | 8/15/2037 | 285,000 | 397,269 | 139.39 | 3.39% |
| Wisconsin Power and Light Co | 4.10% | 10/15/2044 | 175,000 | 192,381 | 109.93 | 3.50% |
| Wisconsin Power and Light Company | 3.00% | 7/1/2029 | 350,000 | 366,855 | 104.82 | 2.43% |
| Wisconsin Power and Light Company | 3.05% | 10/15/2027 | 170,000 | 177,599 | 104.47 | 2.42% |

Notes:
Southwest Gas Holdings Inc. - Southwest Gas Corp

## Gas Transmission Pipeline

### Issued Debt by Company

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Enbridge, Inc. | 2.90% | 7/15/2022 | 565,000 | 583,158 | 103.21 | 1.60% |
| Enbridge, Inc. | 2.90% | 7/15/2022 | 800,000 | 814,800 | 101.85 | 2.15% |
| Enbridge, Inc. | 4.00% | 10/1/2023 | 725,000 | 773,298 | 106.66 | 2.14% |
| Enbridge, Inc. | 4.00% | 10/1/2023 | 300,000 | 316,770 | 105.59 | 2.43% |
| Enbridge, Inc. | 3.50% | 6/10/2024 | 554,000 | 578,879 | 104.49 | 2.43% |
| Enbridge, Inc. | 2.50% | 1/15/2025 | 400,000 | 403,431 | 100.86 | 2.32% |
| Enbridge, Inc. | 2.50% | 1/15/2025 | 250,000 | 251,472 | 100.59 | 2.38% |
| Enbridge, Inc. | 4.25% | 12/1/2026 | 465,000 | 513,947 | 110.53 | 2.58% |
| Enbridge, Inc. | 4.25% | 12/1/2026 | 100,000 | 110,015 | 110.02 | 2.65% |
| Enbridge, Inc. | 3.70% | 7/15/2027 | 558,000 | 600,579 | 107.63 | 2.58% |
| Enbridge, Inc. | 3.70% | 7/15/2027 | 100,000 | 105,804 | 105.80 | 2.84% |
| Enbridge, Inc. | 3.13% | 11/15/2029 | 150,000 | 152,464 | 101.64 | 2.94% |
| Enbridge, Inc. | 3.13% | 11/15/2029 | 500,000 | 505,471 | 101.09 | 3.00% |
| Enbridge, Inc. | 4.50% | 6/10/2044 | 270,000 | 298,432 | 110.53 | 3.83% |
| Enbridge, Inc. | 4.50% | 6/10/2044 | 300,000 | 330,875 | 110.29 | 3.85% |
| Enbridge, Inc. | 4.50% | 6/10/2044 | 1,500,000 | 1,645,605 | 109.71 | 3.88% |
| Enbridge, Inc. | 5.50% | 12/1/2046 | 640,000 | 825,434 | 128.97 | 3.78% |
| Enbridge, Inc. | 5.50% | 12/1/2046 | 925,000 | 1,185,336 | 128.14 | 3.82% |
| Enbridge, Inc. | 5.50% | 12/1/2046 | 615,000 | 778,184 | 126.53 | 3.90% |
| Enbridge, Inc. | 4.00% | 11/15/2049 | 1,000,000 | 1,038,303 | 103.83 | 3.78% |
| Enbridge, Inc. | 4.00% | 11/15/2049 | 1,200,000 | 1,249,416 | 104.12 | 3.77% |
| Enbridge, Inc. | 5.50% | 7/15/2077 | 300,000 | 317,121 | 105.71 | 5.19% |
| Enbridge, Inc. | 6.25% | 3/1/2078 | 500,000 | 542,295 | 108.46 | 5.74% |
| Kinder Morgan Inc. | 3.15% | 1/15/2023 | 288,000 | 298,725 | 103.72 | 1.88% |
| Kinder Morgan Inc. | 3.15% | 1/15/2023 | 3,600,000 | 3,684,796 | 102.36 | 2.34% |
| Kinder Morgan Inc. | 5.63% | 11/15/2023 | 640,000 | 712,185 | 111.28 | 2.55% |
| Kinder Morgan Inc. | 4.30% | 6/1/2025 | 35,000 | 38,100 | 108.86 | 2.54% |
| Kinder Morgan Inc. | 4.30% | 6/1/2025 | 2,525,000 | 2,737,220 | 108.40 | 2.62% |
| Kinder Morgan Inc. | 4.30% | 3/1/2028 | 945,000 | 1,043,989 | 110.48 | 2.85% |
| Kinder Morgan Inc. | 4.30% | 3/1/2028 | 2,825,000 | 3,078,433 | 108.97 | 3.05% |
| Kinder Morgan Inc. | 7.80% | 8/1/2031 | 725,000 | 991,343 | 136.74 | 3.84% |
| Kinder Morgan Inc. | 7.75% | 1/15/2032 | 300,000 | 412,265 | 137.42 | 3.84% |
| Kinder Morgan Inc. | 7.75% | 1/15/2032 | 2,900,000 | 3,974,218 | 137.04 | 3.87% |
| Kinder Morgan Inc. | 5.30% | 12/1/2034 | 491,000 | 580,626 | 118.25 | 3.70% |
| Kinder Morgan Inc. | 5.30% | 12/1/2034 | 3,300,000 | 3,880,581 | 117.59 | 3.75% |
| Kinder Morgan Inc. | 5.30% | 12/1/2034 | 3,870,000 | 4,561,105 | 117.86 | 3.73% |
| Kinder Morgan Inc. | 5.55% | 6/1/2045 | 844,000 | 1,008,335 | 119.47 | 4.28% |
| Kinder Morgan Inc. | 5.55% | 6/1/2045 | 1,600,000 | 1,912,644 | 119.54 | 4.28% |
| Kinder Morgan Inc. | 5.55% | 6/1/2045 | 4,993,000 | 5,974,274 | 119.65 | 4.27% |
| Kinder Morgan Inc. | 5.05% | 2/15/2046 | 635,000 | 724,707 | 114.13 | 4.16% |
| Kinder Morgan Inc. | 5.05% | 2/15/2046 | 740,000 | 827,690 | 111.85 | 4.29% |
| Kinder Morgan Inc. | 5.20% | 3/1/2048 | 400,000 | 471,433 | 117.86 | 4.12% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Kinder Morgan Inc. | 5.20% | 3/1/2048 | 2,325,000 | 2,692,014 | 115.79 | 4.23% |
| Kinder Morgan Inc. | 5.20% | 3/1/2048 | 800,000 | 921,640 | 115.21 | 4.27% |
| ONEOK Inc. | 4.25% | 2/1/2022 | 150,000 | 158,316 | 105.54 | 1.53% |
| ONEOK Inc. | 7.50% | 9/1/2023 | 1,250,000 | 1,490,444 | 119.24 | 2.02% |
| ONEOK Inc. | 2.75% | 9/1/2024 | 110,000 | 112,188 | 101.99 | 2.30% |
| ONEOK Inc. | 4.00% | 7/13/2027 | 335,000 | 363,052 | 108.37 | 2.76% |
| ONEOK Inc. | 4.55% | 7/15/2028 | 410,000 | 459,655 | 112.11 | 2.94% |
| ONEOK Inc. | 4.35% | 3/15/2029 | 630,000 | 690,477 | 109.60 | 3.14% |
| ONEOK Inc. | 3.40% | 9/1/2029 | 400,000 | 411,592 | 102.90 | 3.05% |
| ONEOK Inc. | 4.95% | 7/13/2047 | 75,000 | 84,446 | 112.59 | 4.18% |
| ONEOK Inc. | 5.20% | 7/15/2048 | 775,000 | 898,133 | 115.89 | 4.24% |
| ONEOK Inc. | 4.45% | 9/1/2049 | 875,000 | 922,325 | 105.41 | 4.13% |
| ONEOK Inc. | 2.75% | 9/1/2024 | 175,000 | 176,509 | 100.86 | 2.55% |
| ONEOK Inc. | 4.00% | 7/13/2027 | 1,300,000 | 1,382,945 | 106.38 | 3.05% |
| ONEOK Inc. | 4.55% | 7/15/2028 | 725,000 | 796,576 | 109.87 | 3.22% |
| ONEOK Inc. | 4.35% | 3/15/2029 | 325,000 | 351,568 | 108.17 | 3.31% |
| ONEOK Inc. | 3.40% | 9/1/2029 | 500,000 | 507,343 | 101.47 | 3.22% |
| ONEOK Inc. | 6.00% | 6/15/2035 | 697,000 | 811,740 | 116.46 | 4.51% |
| ONEOK Inc. | 4.95% | 7/13/2047 | 675,000 | 742,180 | 109.95 | 4.33% |
| ONEOK Inc. | 4.95% | 7/13/2047 | 1,425,000 | 1,559,264 | 109.42 | 4.36% |
| ONEOK Inc. | 5.20% | 7/15/2048 | 1,350,000 | 1,527,657 | 113.16 | 4.39% |
| ONEOK Inc. | 5.20% | 7/15/2048 | 4,335,000 | 4,909,561 | 113.25 | 4.38% |
| ONEOK Inc. | 4.45% | 9/1/2049 | 500,000 | 517,031 | 103.41 | 4.25% |
| ONEOK Inc. | 4.45% | 9/1/2049 | 1,245,000 | 1,278,154 | 102.66 | 4.29% |
| TC Energy Corp | 3.80% | 10/1/2020 | 600,000 | 607,799 | 101.30 | 2.03% |
| TC Energy Corp | 2.50% | 8/1/2022 | 325,000 | 328,312 | 101.02 | 2.09% |
| TC Energy Corp | 2.50% | 8/1/2022 | 1,360,000 | 1,388,715 | 102.11 | 1.66% |
| TC Energy Corp | 3.75% | 10/16/2023 | 535,000 | 567,993 | 106.17 | 2.05% |
| TC Energy Corp | 4.38% | 3/13/2025 | 300,000 | 319,175 | 106.39 | 3.04% |
| TC Energy Corp | 4.88% | 1/15/2026 | 1,225,000 | 1,370,585 | 111.88 | 2.73% |
| TC Energy Corp | 4.88% | 1/15/2026 | 670,000 | 765,226 | 114.21 | 2.34% |
| TC Energy Corp | 3.90% | 5/25/2027 | 350,000 | 365,864 | 104.53 | 3.21% |
| TC Energy Corp | 4.25% | 5/15/2028 | 3,175,000 | 3,522,425 | 110.94 | 2.78% |
| TC Energy Corp | 4.25% | 5/15/2028 | 810,000 | 904,143 | 111.62 | 2.69% |
| TC Energy Corp | 4.63% | 3/1/2034 | 1,725,000 | 1,971,089 | 114.27 | 3.35% |
| TC Energy Corp | 4.63% | 3/1/2034 | 1,925,000 | 2,198,146 | 114.19 | 3.36% |
| TC Energy Corp | 4.63% | 3/1/2034 | 1,488,000 | 1,720,271 | 115.61 | 3.25% |
| TC Energy Corp | 5.60% | 3/31/2034 | 50,000 | 62,654 | 125.31 | 3.35% |
| TC Energy Corp | 5.85% | 3/15/2036 | 1,660,000 | 2,010,360 | 121.11 | 4.06% |
| TC Energy Corp | 5.85% | 3/15/2036 | 185,000 | 231,995 | 125.40 | 3.74% |
| TC Energy Corp | 6.20% | 10/15/2037 | 3,205,000 | 4,154,097 | 129.61 | 3.88% |
| TC Energy Corp | 6.20% | 10/15/2037 | 100,000 | 130,298 | 130.30 | 3.83% |
| TC Energy Corp | 6.20% | 10/15/2037 | 794,000 | 1,046,502 | 131.80 | 3.74% |
| TC Energy Corp | 4.75% | 5/15/2038 | 1,805,000 | 2,060,877 | 114.18 | 3.68% |
| TC Energy Corp | 4.75% | 5/15/2038 | 500,000 | 570,205 | 114.04 | 3.69% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| TC Energy Corp | 4.75% | 5/15/2038 | 750,000 | 861,412 | 114.85 | 3.63% |
| TC Energy Corp | 7.25% | 8/15/2038 | 2,137,000 | 3,021,803 | 141.40 | 4.06% |
| TC Energy Corp | 7.25% | 8/15/2038 | 200,000 | 294,669 | 147.33 | 3.71% |
| TC Energy Corp | 7.63% | 1/15/2039 | 3,250,000 | 4,826,770 | 148.52 | 3.97% |
| TC Energy Corp | 7.63% | 1/15/2039 | 200,000 | 299,454 | 149.73 | 3.90% |
| TC Energy Corp | 7.63% | 1/15/2039 | 721,000 | 1,107,266 | 153.57 | 3.69% |
| TC Energy Corp | 6.10% | 6/1/2040 | 1,068,000 | 1,386,072 | 129.78 | 3.96% |
| TC Energy Corp | 6.10% | 6/1/2040 | 125,000 | 165,081 | 132.06 | 3.82% |
| TC Energy Corp | 6.10% | 6/1/2040 | 555,000 | 737,627 | 132.91 | 3.77% |
| TC Energy Corp | 5.00% | 10/16/2043 | 1,505,000 | 1,744,927 | 115.94 | 3.96% |
| TC Energy Corp | 5.00% | 10/16/2043 | 1,200,000 | 1,386,243 | 115.52 | 3.98% |
| TC Energy Corp | 5.00% | 10/16/2043 | 455,000 | 532,318 | 116.99 | 3.90% |
| TC Energy Corp | 4.88% | 5/15/2048 | 2,610,000 | 3,065,863 | 117.47 | 3.86% |
| TC Energy Corp | 4.88% | 5/15/2048 | 750,000 | 883,942 | 117.86 | 3.84% |
| TC Energy Corp | 4.88% | 5/15/2048 | 405,000 | 481,595 | 118.91 | 3.79% |
| TC Energy Corp | 5.10% | 3/15/2049 | 3,090,000 | 3,739,425 | 121.02 | 3.89% |
| TC Energy Corp | 5.10% | 3/15/2049 | 1,025,000 | 1,247,180 | 121.68 | 3.86% |
| TC Energy Corp | 5.10% | 3/15/2049 | 480,000 | 593,050 | 123.55 | 3.76% |
| TC Energy Corp | 5.63% | 5/20/2075 | 200,000 | 209,781 | 104.89 | 5.35% |
| TC Energy Corp | 5.88% | 8/15/2076 | 400,000 | 439,398 | 109.85 | 5.33% |
| TC Energy Corp | 5.30% | 3/15/2077 | 755,000 | 787,359 | 104.29 | 5.07% |
| TC Energy Corp | 5.50% | 9/15/2079 | 250,000 | 266,538 | 106.62 | 5.14% |
| Williams Companies | 7.88% | 9/1/2021 | 500,000 | 558,428 | 111.69 | 0.78% |
| Williams Companies | 4.00% | 11/15/2021 | 194,000 | 200,450 | 103.32 | 2.17% |
| Williams Companies | 4.00% | 11/15/2021 | 600,000 | 616,662 | 102.78 | 2.47% |
| Williams Companies | 3.60% | 3/15/2022 | 425,000 | 441,513 | 103.89 | 1.79% |
| Williams Companies | 3.60% | 3/15/2022 | 1,000,000 | 1,027,847 | 102.78 | 2.29% |
| Williams Companies | 3.35% | 8/15/2022 | 305,000 | 316,372 | 103.73 | 1.88% |
| Williams Companies | 3.35% | 8/15/2022 | 2,375,000 | 2,432,261 | 102.41 | 2.39% |
| Williams Companies | 3.70% | 1/15/2023 | 740,000 | 779,087 | 105.28 | 1.90% |
| Williams Companies | 4.50% | 11/15/2023 | 367,000 | 395,153 | 107.67 | 2.41% |
| Williams Companies | 4.50% | 11/15/2023 | 300,000 | 321,051 | 107.02 | 2.58% |
| Williams Companies | 4.30% | 3/4/2024 | 60,000 | 64,876 | 108.13 | 2.25% |
| Williams Companies | 4.30% | 3/4/2024 | 300,000 | 319,931 | 106.64 | 2.61% |
| Williams Companies | 3.90% | 1/15/2025 | 740,000 | 792,623 | 107.11 | 2.39% |
| Williams Companies | 3.90% | 1/15/2025 | 150,000 | 157,819 | 105.21 | 2.78% |
| Williams Companies | 4.00% | 9/15/2025 | 793,000 | 850,748 | 107.28 | 2.62% |
| Williams Companies | 4.00% | 9/15/2025 | 925,000 | 980,570 | 106.01 | 2.85% |
| Williams Companies | 3.75% | 6/15/2027 | 730,000 | 762,650 | 104.47 | 3.07% |
| Williams Companies | 3.75% | 6/15/2027 | 1,300,000 | 1,354,456 | 104.19 | 3.12% |
| Williams Companies | 7.50% | 1/15/2031 | 95,000 | 127,272 | 133.97 | 3.72% |
| Williams Companies | 7.50% | 1/15/2031 | 463,000 | 609,584 | 131.66 | 3.93% |
| Williams Companies | 7.75% | 6/15/2031 | 500,000 | 668,590 | 133.72 | 4.04% |
| Williams Companies | 8.75% | 3/15/2032 | 275,000 | 402,652 | 146.42 | 3.92% |
| Williams Companies | 8.75% | 3/15/2032 | 155,000 | 221,418 | 142.85 | 4.22% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Williams Companies | 6.30% | 4/15/2040 | 452,000 | 566,811 | 125.40 | 4.39% |
| Williams Companies | 6.30% | 4/15/2040 | 300,000 | 371,348 | 123.78 | 4.50% |
| Williams Companies | 6.30% | 4/15/2040 | 3,297,000 | 4,086,335 | 123.94 | 4.49% |
| Williams Companies | 5.80% | 11/15/2043 | 365,000 | 437,423 | 119.84 | 4.44% |
| Williams Companies | 5.80% | 11/15/2043 | 300,000 | 356,409 | 118.80 | 4.51% |
| Williams Companies | 5.80% | 11/15/2043 | 1,026,000 | 1,221,874 | 119.09 | 4.49% |
| Williams Companies | 5.40% | 3/4/2044 | 183,000 | 209,506 | 114.48 | 4.42% |
| Williams Companies | 5.40% | 3/4/2044 | 300,000 | 337,303 | 112.43 | 4.55% |
| Williams Companies | 5.40% | 3/4/2044 | 2,004,000 | 2,247,266 | 112.14 | 4.57% |
| Williams Companies | 5.75% | 6/24/2044 | 365,000 | 432,986 | 118.63 | 4.49% |
| Williams Companies | 5.75% | 6/24/2044 | 1,700,000 | 2,004,215 | 117.90 | 4.53% |
| Williams Companies | 4.90% | 1/15/2045 | 410,000 | 451,953 | 110.23 | 4.23% |
| Williams Companies | 4.90% | 1/15/2045 | 1,000,000 | 1,076,768 | 107.68 | 4.39% |
| Williams Companies | 4.90% | 1/15/2045 | 1,926,000 | 2,077,191 | 107.85 | 4.38% |
| Williams Companies | 5.10% | 9/15/2045 | 707,000 | 799,204 | 113.04 | 4.26% |
| Williams Companies | 5.10% | 9/15/2045 | 225,000 | 250,207 | 111.20 | 4.37% |
| Williams Companies | 5.10% | 9/15/2045 | 2,214,000 | 2,461,569 | 111.18 | 4.37% |
| Williams Companies | 4.85% | 3/1/2048 | 438,000 | 486,595 | 111.09 | 4.18% |
| Williams Companies | 4.85% | 3/1/2048 | 1,700,000 | 1,855,633 | 109.15 | 4.29% |
| Williams Companies | 4.85% | 3/1/2048 | 2,255,000 | 2,473,126 | 109.67 | 4.26% |
| Enbridge Energy Partners LP | 7.38% | 10/15/2045 | 610,000 | 920,819 | 150.95 | 4.14% |
| Enbridge Energy Partners LP | 5.50% | 9/15/2040 | 520,000 | 627,006 | 120.58 | 4.03% |
| Enbridge Energy Partners LP | 5.88% | 10/15/2025 | 250,000 | 294,717 | 117.89 | 2.53% |
| Enbridge Energy Partners LP | 4.20% | 9/15/2021 | 180,000 | 187,731 | 104.29 | 1.63% |
| Kinder Morgan Energy Partners LP | 3.50% | 9/1/2023 | 928,000 | 972,602 | 104.81 | 2.13% |
| Kinder Morgan Energy Partners LP | 7.50% | 11/15/2040 | 639,000 | 886,873 | 138.79 | 4.59% |
| Kinder Morgan Energy Partners LP | 6.95% | 1/15/2038 | 600,000 | 814,155 | 135.69 | 4.12% |
| Kinder Morgan Energy Partners LP | 6.55% | 9/15/2040 | 585,000 | 755,588 | 129.16 | 4.39% |
| Kinder Morgan Energy Partners LP | 5.40% | 9/1/2044 | 635,000 | 743,113 | 117.03 | 4.28% |
| Kinder Morgan Energy Partners LP | 5.50% | 3/1/2044 | 572,000 | 676,573 | 118.28 | 4.28% |
| Kinder Morgan Energy Partners LP | 7.75% | 3/15/2032 | 485,000 | 673,162 | 138.80 | 3.76% |
| Kinder Morgan Energy Partners LP | 5.00% | 8/15/2042 | 605,000 | 671,396 | 110.97 | 4.24% |
| Kinder Morgan Energy Partners LP | 4.25% | 9/1/2024 | 604,000 | 655,481 | 108.52 | 2.31% |
| Kinder Morgan Energy Partners LP | 3.95% | 9/1/2022 | 570,000 | 601,607 | 105.55 | 1.81% |
| Kinder Morgan Energy Partners LP | 3.45% | 2/15/2023 | 530,000 | 552,858 | 104.31 | 2.01% |
| Kinder Morgan Energy Partners LP | 4.15% | 2/1/2024 | 465,000 | 501,200 | 107.78 | 2.15% |
| Kinder Morgan Energy Partners LP | 5.00% | 10/1/2021 | 420,000 | 443,057 | 105.49 | 1.79% |
| Kinder Morgan Energy Partners LP | 7.30% | 8/15/2033 | 270,000 | 369,196 | 136.74 | 3.82% |
| Kinder Morgan Energy Partners LP | 4.30% | 5/1/2024 | 335,000 | 360,450 | 107.60 | 2.44% |
| Kinder Morgan Energy Partners LP | 6.50% | 9/1/2039 | 240,000 | 309,015 | 128.76 | 4.31% |
| Kinder Morgan Energy Partners LP | 3.50% | 3/1/2021 | 300,000 | 307,330 | 102.44 | 1.37% |
| Kinder Morgan Energy Partners LP | 5.80% | 3/15/2035 | 200,000 | 245,560 | 122.78 | 3.81% |
| Kinder Morgan Energy Partners LP | 4.15% | 3/1/2022 | 226,000 | 237,546 | 105.11 | 1.73% |
| Kinder Morgan Energy Partners LP | 4.70% | 11/1/2042 | 200,000 | 215,250 | 107.63 | 4.18% |
| Kinder Morgan Energy Partners LP | 5.00% | 3/1/2043 | 180,000 | 200,472 | 111.37 | 4.22% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Kinder Morgan Energy Partners LP | 6.50% | 2/1/2037 | 119,000 | 151,659 | 127.44 | 4.23% |
| Kinder Morgan Energy Partners LP | 6.38% | 3/1/2041 | 115,000 | 146,869 | 127.71 | 4.36% |
| Kinder Morgan Energy Partners LP | 5.80% | 3/1/2021 | 75,000 | 79,527 | 106.04 | 0.58% |
| Kinder Morgan Energy Partners LP | 7.40% | 3/15/2031 | 25,000 | 33,312 | 133.25 | 3.74% |
| ONEOK Partners LP | 4.90% | 3/15/2025 | 618,000 | 689,597 | 111.59 | 2.51% |
| ONEOK Partners LP | 3.38% | 10/1/2022 | 625,000 | 648,520 | 103.76 | 1.96% |
| ONEOK Partners LP | 6.20% | 9/15/2043 | 492,000 | 632,066 | 128.47 | 4.28% |
| ONEOK Partners LP | 6.13% | 2/1/2041 | 450,000 | 553,346 | 122.97 | 4.44% |
| ONEOK Partners LP | 5.00% | 9/15/2023 | 360,000 | 395,916 | 109.98 | 2.18% |
| ONEOK Partners LP | 6.65% | 10/1/2036 | 125,000 | 161,632 | 129.31 | 4.20% |

Notes:

TC Energy Corp - TC PipeLines LP

## Fluid Transportation Pipeline

### Issued Debt by Company

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Holly Energy Partners LP | 5.88% | 4/1/2026 | 505,000 | 577,124 | 114.28 | 3.33% |
| Holly Energy Partners LP | 5.88% | 4/1/2026 | 200,000 | 225,282 | 112.64 | 3.60% |
| Magellan Midstream Partners LP | 4.25% | 2/1/2021 | 180,000 | 187,623 | 104.24 | 0.31% |
| Magellan Midstream Partners LP | 4.25% | 2/1/2021 | 125,000 | 128,016 | 102.41 | 1.98% |
| Magellan Midstream Partners LP | 5.00% | 3/1/2026 | 470,000 | 538,497 | 114.57 | 2.44% |
| Magellan Midstream Partners LP | 5.00% | 3/1/2026 | 900,000 | 1,015,352 | 112.82 | 2.73% |
| Magellan Midstream Partners LP | 6.40% | 5/1/2037 | 11,000 | 14,104 | 128.21 | 4.11% |
| Magellan Midstream Partners LP | 4.20% | 12/1/2042 | 36,000 | 36,888 | 102.47 | 4.03% |
| Magellan Midstream Partners LP | 5.15% | 10/15/2043 | 445,000 | 525,958 | 118.19 | 3.96% |
| Magellan Midstream Partners LP | 5.15% | 10/15/2043 | 1,660,000 | 1,932,539 | 116.42 | 4.07% |
| Magellan Midstream Partners LP | 4.20% | 3/15/2045 | 235,000 | 240,851 | 102.49 | 4.04% |
| Magellan Midstream Partners LP | 4.25% | 9/15/2046 | 225,000 | 239,447 | 106.42 | 3.86% |
| Magellan Midstream Partners LP | 4.25% | 9/15/2046 | 898,000 | 950,641 | 105.86 | 3.89% |
| Magellan Midstream Partners LP | 4.20% | 10/3/2047 | 170,000 | 183,214 | 107.77 | 3.75% |
| Magellan Midstream Partners LP | 4.20% | 10/3/2047 | 425,000 | 452,236 | 106.41 | 3.82% |
| Magellan Midstream Partners LP | 4.20% | 10/3/2047 | 1,370,000 | 1,441,829 | 105.24 | 3.89% |
| Magellan Midstream Partners LP | 4.85% | 2/1/2049 | 560,000 | 661,585 | 118.14 | 3.81% |
| Magellan Midstream Partners LP | 4.85% | 2/1/2049 | 525,000 | 607,753 | 115.76 | 3.93% |
| Magellan Midstream Partners LP | 4.85% | 2/1/2049 | 515,000 | 593,100 | 115.17 | 3.97% |
| Magellan Midstream Partners LP | 3.95% | 3/1/2050 | 825,000 | 860,481 | 104.30 | 3.71% |
| Magellan Midstream Partners LP | 3.95% | 3/1/2050 | 500,000 | 512,566 | 102.51 | 3.81% |
| Magellan Midstream Partners LP | 3.95% | 3/1/2050 | 1,425,000 | 1,461,323 | 102.55 | 3.81% |
| Phillips 66 Partners LP | 2.45% | 12/15/2024 | 255,000 | 257,214 | 100.87 | 2.26% |
| Phillips 66 Partners LP | 2.45% | 12/15/2024 | 500,000 | 499,940 | 99.99 | 2.45% |
| Phillips 66 Partners LP | 3.55% | 10/1/2026 | 350,000 | 370,028 | 105.72 | 2.62% |
| Phillips 66 Partners LP | 3.55% | 10/1/2026 | 100,000 | 104,656 | 104.66 | 2.79% |
| Phillips 66 Partners LP | 3.75% | 3/1/2028 | 706,000 | 744,231 | 105.42 | 3.00% |
| Phillips 66 Partners LP | 3.75% | 3/1/2028 | 675,000 | 702,241 | 104.04 | 3.18% |
| Phillips 66 Partners LP | 3.15% | 12/15/2029 | 685,000 | 689,497 | 100.66 | 3.07% |
| Phillips 66 Partners LP | 3.15% | 12/15/2029 | 500,000 | 497,496 | 99.50 | 3.21% |
| Phillips 66 Partners LP | 4.68% | 2/15/2045 | 145,000 | 159,964 | 110.32 | 4.02% |
| Phillips 66 Partners LP | 4.68% | 2/15/2045 | 425,000 | 460,098 | 108.26 | 4.15% |
| Phillips 66 Partners LP | 4.68% | 2/15/2045 | 1,202,000 | 1,294,205 | 107.67 | 4.18% |
| Phillips 66 Partners LP | 4.90% | 10/1/2046 | 637,000 | 731,581 | 114.85 | 3.99% |
| Phillips 66 Partners LP | 4.90% | 10/1/2046 | 350,000 | 396,572 | 113.31 | 4.08% |
| Phillips 66 Partners LP | 4.90% | 10/1/2046 | 1,000,000 | 1,117,720 | 111.77 | 4.17% |
| Plains All American Pipeline | 5.00% | 2/1/2021 | 250,000 | 260,940 | 104.38 | 0.91% |
| Plains All American Pipeline | 5.00% | 2/1/2021 | 700,000 | 716,045 | 102.29 | 2.82% |
| Plains All American Pipeline | 3.65% | 6/1/2022 | 1,175,000 | 1,209,127 | 102.90 | 2.40% |
| Plains All American Pipeline | 2.85% | 1/31/2023 | 600,000 | 613,114 | 102.19 | 2.11% |
| Plains All American Pipeline | 2.85% | 1/31/2023 | 200,000 | 201,912 | 100.96 | 2.52% |
| Plains All American Pipeline | 3.85% | 10/15/2023 | 254,000 | 265,118 | 104.38 | 2.63% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Plains All American Pipeline | 3.85% | 10/15/2023 | 400,000 | 413,974 | 103.49 | 2.87% |
| Plains All American Pipeline | 3.60% | 11/1/2024 | 625,000 | 647,021 | 103.52 | 2.81% |
| Plains All American Pipeline | 3.60% | 11/1/2024 | 575,000 | 591,234 | 102.82 | 2.97% |
| Plains All American Pipeline | 4.65% | 10/15/2025 | 590,000 | 637,987 | 108.13 | 3.10% |
| Plains All American Pipeline | 4.65% | 10/15/2025 | 1,025,000 | 1,097,190 | 107.04 | 3.30% |
| Plains All American Pipeline | 4.50% | 12/15/2026 | 460,000 | 491,133 | 106.77 | 3.40% |
| Plains All American Pipeline | 4.50% | 12/15/2026 | 2,075,000 | 2,207,836 | 106.40 | 3.46% |
| Plains All American Pipeline | 3.55% | 12/15/2029 | 1,450,000 | 1,427,171 | 98.43 | 3.74% |
| Plains All American Pipeline | 6.65% | 1/15/2037 | 240,000 | 290,987 | 121.24 | 4.81% |
| Plains All American Pipeline | 6.65% | 1/15/2037 | 100,000 | 117,910 | 117.91 | 5.07% |
| Plains All American Pipeline | 6.65% | 1/15/2037 | 1,970,000 | 2,317,508 | 117.64 | 5.09% |
| Plains All American Pipeline | 5.15% | 6/1/2042 | 554,000 | 561,372 | 101.33 | 5.05% |
| Plains All American Pipeline | 5.15% | 6/1/2042 | 250,000 | 251,634 | 100.65 | 5.10% |
| Plains All American Pipeline | 5.15% | 6/1/2042 | 1,300,000 | 1,300,988 | 100.08 | 5.14% |
| Plains All American Pipeline | 4.30% | 1/31/2043 | 1,000,000 | 911,340 | 91.13 | 4.95% |
| Plains All American Pipeline | 4.70% | 6/15/2044 | 310,000 | 302,119 | 97.46 | 4.88% |
| Plains All American Pipeline | 4.70% | 6/15/2044 | 300,000 | 290,979 | 96.99 | 4.91% |
| Plains All American Pipeline | 4.70% | 6/15/2044 | 1,100,000 | 1,068,562 | 97.14 | 4.90% |
| Plains All American Pipeline | 4.90% | 2/15/2045 | 685,000 | 695,499 | 101.53 | 4.79% |
| Plains All American Pipeline | 4.90% | 2/15/2045 | 300,000 | 298,158 | 99.39 | 4.94% |
| Plains All American Pipeline | 4.90% | 2/15/2045 | 1,710,000 | 1,696,166 | 99.19 | 4.96% |
| Phillips 66 | 4.88% | 11/15/2044 | 1,346,000 | 1,632,262 | 121.27 | 3.58% |
| Phillips 66 | 4.30% | 4/1/2022 | 1,043,000 | 1,106,097 | 106.05 | 1.55% |
| Phillips 66 | 3.90% | 3/15/2028 | 860,000 | 948,094 | 110.24 | 2.51% |
| Phillips 66 | 5.88% | 5/1/2042 | 633,000 | 861,501 | 136.10 | 3.53% |
| Phillips 66 | 4.65% | 11/15/2034 | 494,000 | 583,543 | 118.13 | 3.12% |

Notes:

Holly Energy Partners LP - HollyFrontier Corp

## Railroad (Class I and Other)

### Issued Debt by Company

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Canadian National Railway | 2.85% | 12/15/2021 | 35,000 | 35,558 | 101.59 | 2.01% |
| Canadian National Railway | 2.85% | 12/15/2021 | 100,000 | 101,439 | 101.44 | 2.09% |
| Canadian National Railway | 2.25% | 11/15/2022 | 80,000 | 80,870 | 101.09 | 1.86% |
| Canadian National Railway | 2.25% | 11/15/2022 | 300,000 | 302,247 | 100.75 | 1.98% |
| Canadian National Railway | 2.95% | 11/21/2024 | 500,000 | 518,049 | 103.61 | 2.17% |
| Canadian National Railway | 2.95% | 11/21/2024 | 200,000 | 206,379 | 103.19 | 2.26% |
| Canadian National Railway | 2.75% | 3/1/2026 | 35,000 | 36,179 | 103.37 | 2.16% |
| Canadian National Railway | 6.90% | 7/15/2028 | 200,000 | 265,330 | 132.66 | 2.61% |
| Canadian National Railway | 6.25% | 8/1/2034 | 156,000 | 221,948 | 142.27 | 2.72% |
| Canadian National Railway | 6.25% | 8/1/2034 | 200,000 | 278,806 | 139.40 | 2.91% |
| Canadian National Railway | 6.25% | 8/1/2034 | 1,643,000 | 2,267,636 | 138.02 | 3.01% |
| Canadian National Railway | 6.20% | 6/1/2036 | 955,000 | 1,318,693 | 138.08 | 3.20% |
| Canadian National Railway | 6.38% | 11/15/2037 | 305,000 | 441,940 | 144.90 | 3.09% |
| Canadian National Railway | 6.38% | 11/15/2037 | 845,000 | 1,205,173 | 142.62 | 3.22% |
| Canadian National Railway | 3.50% | 11/15/2042 | 250,000 | 259,790 | 103.92 | 3.26% |
| Canadian National Railway | 4.50% | 11/7/2043 | 50,000 | 58,908 | 117.82 | 3.40% |
| Canadian National Railway | 4.50% | 11/7/2043 | 100,000 | 116,810 | 116.81 | 3.46% |
| Canadian National Railway | 4.50% | 11/7/2043 | 200,000 | 233,258 | 116.63 | 3.47% |
| Canadian National Railway | 3.20% | 8/2/2046 | 65,000 | 67,230 | 103.43 | 3.01% |
| Canadian National Railway | 3.20% | 8/2/2046 | 650,000 | 661,489 | 101.77 | 3.10% |
| Canadian National Railway | 3.20% | 8/2/2046 | 850,000 | 863,923 | 101.64 | 3.11% |
| Canadian National Railway | 3.65% | 2/3/2048 | 550,000 | 615,542 | 111.92 | 3.02% |
| Canadian National Railway | 3.65% | 2/3/2048 | 725,000 | 795,910 | 109.78 | 3.12% |
| Canadian National Railway | 3.65% | 2/3/2048 | 695,000 | 758,224 | 109.10 | 3.16% |
| Canadian National Railway | 4.45% | 1/20/2049 | 1,100,000 | 1,395,694 | 126.88 | 3.05% |
| Canadian National Railway | 4.45% | 1/20/2049 | 325,000 | 404,577 | 124.49 | 3.16% |
| Canadian National Railway | 4.45% | 1/20/2049 | 2,295,000 | 2,832,650 | 123.43 | 3.20% |
| Canadian Pacific Railway | 4.50% | 1/15/2022 | 35,000 | 37,413 | 106.89 | 1.06% |
| Canadian Pacific Railway | 2.90% | 2/1/2025 | 800,000 | 831,373 | 103.92 | 2.08% |
| Canadian Pacific Railway | 2.90% | 2/1/2025 | 1,800,000 | 1,847,113 | 102.62 | 2.35% |
| Canadian Pacific Railway | 3.70% | 2/1/2026 | 55,000 | 59,428 | 108.05 | 2.27% |
| Canadian Pacific Railway | 4.00% | 6/1/2028 | 125,000 | 137,933 | 110.35 | 2.62% |
| Canadian Pacific Railway | 4.00% | 6/1/2028 | 300,000 | 329,626 | 109.88 | 2.68% |
| Canadian Pacific Railway | 7.13% | 10/15/2031 | 110,000 | 154,253 | 140.23 | 3.04% |
| Canadian Pacific Railway | 7.13% | 10/15/2031 | 200,000 | 277,013 | 138.51 | 3.18% |
| Canadian Pacific Railway | 4.80% | 9/15/2035 | 300,000 | 361,724 | 120.57 | 3.13% |
| Canadian Pacific Railway | 4.80% | 9/15/2035 | 1,102,000 | 1,312,361 | 119.09 | 3.24% |
| Canadian Pacific Railway | 5.95% | 5/15/2037 | 262,000 | 354,690 | 135.38 | 3.26% |
| Canadian Pacific Railway | 5.95% | 5/15/2037 | 250,000 | 335,802 | 134.32 | 3.33% |
| Canadian Pacific Railway | 5.95% | 5/15/2037 | 1,330,000 | 1,761,838 | 132.47 | 3.45% |
| Canadian Pacific Railway | 4.80% | 8/1/2045 | 250,000 | 315,264 | 126.11 | 3.28% |
| Canadian Pacific Railway | 4.80% | 8/1/2045 | 1,495,000 | 1,865,954 | 124.81 | 3.35% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Canadian Pacific Railway | 6.13% | 9/15/2115 | 815,000 | 1,211,782 | 148.68 | 4.09% |
| Canadian Pacific Railway | 6.13% | 9/15/2115 | 775,000 | 1,133,383 | 146.24 | 4.17% |
| CSX Corporation | 4.25% | 6/1/2021 | 130,000 | 133,860 | 102.97 | 2.10% |
| CSX Corporation | 3.70% | 11/1/2023 | 380,000 | 405,948 | 106.83 | 1.84% |
| CSX Corporation | 3.70% | 11/1/2023 | 125,000 | 132,655 | 106.12 | 2.03% |
| CSX Corporation | 3.40% | 8/1/2024 | 330,000 | 353,206 | 107.03 | 1.79% |
| CSX Corporation | 3.40% | 8/1/2024 | 300,000 | 316,550 | 105.52 | 2.13% |
| CSX Corporation | 3.35% | 11/1/2025 | 460,000 | 490,003 | 106.52 | 2.15% |
| CSX Corporation | 3.35% | 11/1/2025 | 200,000 | 211,704 | 105.85 | 2.27% |
| CSX Corporation | 2.60% | 11/1/2026 | 270,000 | 275,820 | 102.16 | 2.26% |
| CSX Corporation | 2.60% | 11/1/2026 | 1,200,000 | 1,219,204 | 101.60 | 2.34% |
| CSX Corporation | 3.25% | 6/1/2027 | 574,000 | 605,410 | 105.47 | 2.44% |
| CSX Corporation | 3.25% | 6/1/2027 | 1,150,000 | 1,207,602 | 105.01 | 2.51% |
| CSX Corporation | 3.80% | 3/1/2028 | 558,000 | 616,054 | 110.40 | 2.39% |
| CSX Corporation | 3.80% | 3/1/2028 | 1,000,000 | 1,090,016 | 109.00 | 2.57% |
| CSX Corporation | 4.25% | 3/15/2029 | 335,000 | 381,571 | 113.90 | 2.55% |
| CSX Corporation | 4.25% | 3/15/2029 | 825,000 | 928,119 | 112.50 | 2.71% |
| CSX Corporation | 2.40% | 2/15/2030 | 464,000 | 457,378 | 98.57 | 2.56% |
| CSX Corporation | 2.40% | 2/15/2030 | 600,000 | 586,282 | 97.71 | 2.66% |
| CSX Corporation | 2.40% | 2/15/2030 | 850,000 | 829,762 | 97.62 | 2.67% |
| CSX Corporation | 6.00% | 10/1/2036 | 325,000 | 428,207 | 131.76 | 3.48% |
| CSX Corporation | 6.00% | 10/1/2036 | 100,000 | 130,127 | 130.13 | 3.59% |
| CSX Corporation | 6.00% | 10/1/2036 | 368,000 | 478,227 | 129.95 | 3.60% |
| CSX Corporation | 6.15% | 5/1/2037 | 427,000 | 571,973 | 133.95 | 3.52% |
| CSX Corporation | 6.15% | 5/1/2037 | 200,000 | 265,596 | 132.80 | 3.59% |
| CSX Corporation | 6.15% | 5/1/2037 | 1,418,000 | 1,877,928 | 132.43 | 3.61% |
| CSX Corporation | 6.22% | 4/30/2040 | 492,000 | 672,723 | 136.73 | 3.65% |
| CSX Corporation | 5.50% | 4/15/2041 | 265,000 | 338,725 | 127.82 | 3.61% |
| CSX Corporation | 5.50% | 4/15/2041 | 400,000 | 506,002 | 126.50 | 3.69% |
| CSX Corporation | 5.50% | 4/15/2041 | 1,531,000 | 1,922,308 | 125.56 | 3.75% |
| CSX Corporation | 4.75% | 5/30/2042 | 400,000 | 473,157 | 118.29 | 3.56% |
| CSX Corporation | 4.75% | 5/30/2042 | 2,755,000 | 3,225,003 | 117.06 | 3.63% |
| CSX Corporation | 4.40% | 3/1/2043 | 300,000 | 341,256 | 113.75 | 3.53% |
| CSX Corporation | 4.40% | 3/1/2043 | 350,000 | 392,513 | 112.15 | 3.62% |
| CSX Corporation | 4.40% | 3/1/2043 | 730,000 | 814,154 | 111.53 | 3.66% |
| CSX Corporation | 4.10% | 3/15/2044 | 402,000 | 443,614 | 110.35 | 3.46% |
| CSX Corporation | 4.10% | 3/15/2044 | 600,000 | 653,940 | 108.99 | 3.54% |
| CSX Corporation | 4.10% | 3/15/2044 | 1,664,000 | 1,806,106 | 108.54 | 3.57% |
| CSX Corporation | 3.80% | 11/1/2046 | 490,000 | 516,399 | 105.39 | 3.49% |
| CSX Corporation | 3.80% | 11/1/2046 | 800,000 | 836,266 | 104.53 | 3.54% |
| CSX Corporation | 3.80% | 11/1/2046 | 1,661,000 | 1,721,710 | 103.66 | 3.59% |
| CSX Corporation | 4.30% | 3/1/2048 | 620,000 | 713,255 | 115.04 | 3.46% |
| CSX Corporation | 4.30% | 3/1/2048 | 1,050,000 | 1,189,839 | 113.32 | 3.55% |
| CSX Corporation | 4.30% | 3/1/2048 | 4,105,000 | 4,614,020 | 112.40 | 3.60% |
| CSX Corporation | 4.75% | 11/15/2048 | 344,000 | 419,542 | 121.96 | 3.53% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| CSX Corporation | 4.75% | 11/15/2048 | 850,000 | 1,028,255 | 120.97 | 3.58% |
| CSX Corporation | 4.75% | 11/15/2048 | 1,775,000 | 2,145,496 | 120.87 | 3.58% |
| CSX Corporation | 4.50% | 3/15/2049 | 435,000 | 515,601 | 118.53 | 3.48% |
| CSX Corporation | 4.50% | 3/15/2049 | 500,000 | 584,267 | 116.85 | 3.57% |
| CSX Corporation | 4.50% | 3/15/2049 | 1,450,000 | 1,680,144 | 115.87 | 3.62% |
| CSX Corporation | 3.35% | 9/15/2049 | 465,000 | 463,369 | 99.65 | 3.37% |
| CSX Corporation | 3.35% | 9/15/2049 | 600,000 | 589,740 | 98.29 | 3.44% |
| CSX Corporation | 3.35% | 9/15/2049 | 1,100,000 | 1,082,246 | 98.39 | 3.44% |
| CSX Corporation | 3.95% | 5/1/2050 | 457,000 | 497,053 | 108.76 | 3.48% |
| CSX Corporation | 3.95% | 5/1/2050 | 200,000 | 215,482 | 107.74 | 3.53% |
| CSX Corporation | 3.95% | 5/1/2050 | 1,150,000 | 1,240,804 | 107.90 | 3.52% |
| CSX Corporation | 4.50% | 8/1/2054 | 165,000 | 193,312 | 117.16 | 3.63% |
| CSX Corporation | 4.50% | 8/1/2054 | 300,000 | 344,594 | 114.86 | 3.73% |
| CSX Corporation | 4.50% | 8/1/2054 | 1,536,000 | 1,760,794 | 114.64 | 3.74% |
| CSX Corporation | 4.25% | 11/1/2066 | 270,000 | 290,761 | 107.69 | 3.89% |
| CSX Corporation | 4.25% | 11/1/2066 | 150,000 | 159,813 | 106.54 | 3.94% |
| CSX Corporation | 4.25% | 11/1/2066 | 1,659,000 | 1,772,957 | 106.87 | 3.93% |
| CSX Corporation | 4.65% | 3/1/2068 | 170,000 | 197,944 | 116.44 | 3.89% |
| CSX Corporation | 4.65% | 3/1/2068 | 300,000 | 343,262 | 114.42 | 3.98% |
| CSX Corporation | 4.65% | 3/1/2068 | 900,000 | 1,026,000 | 114.00 | 3.99% |
| Kansas City Southern | 3.00% | 5/15/2023 | 450,000 | 462,112 | 102.69 | 2.17% |
| Kansas City Southern | 3.00% | 5/15/2023 | 100,000 | 102,245 | 102.25 | 2.30% |
| Kansas City Southern | 3.13% | 6/1/2026 | 100,000 | 102,001 | 102.00 | 2.79% |
| Kansas City Southern | 2.88% | 11/15/2029 | 280,000 | 280,306 | 100.11 | 2.87% |
| Kansas City Southern | 2.88% | 11/15/2029 | 500,000 | 498,071 | 99.61 | 2.93% |
| Kansas City Southern | 4.30% | 5/15/2043 | 100,000 | 108,808 | 108.81 | 3.73% |
| Kansas City Southern | 4.30% | 5/15/2043 | 1,370,000 | 1,489,848 | 108.75 | 3.74% |
| Kansas City Southern | 4.95% | 8/15/2045 | 250,000 | 301,624 | 120.65 | 3.70% |
| Kansas City Southern | 4.95% | 8/15/2045 | 175,000 | 207,272 | 118.44 | 3.82% |
| Kansas City Southern | 4.95% | 8/15/2045 | 1,303,000 | 1,527,754 | 117.25 | 3.88% |
| Kansas City Southern | 4.70% | 5/1/2048 | 800,000 | 935,584 | 116.95 | 3.73% |
| Kansas City Southern | 4.70% | 5/1/2048 | 1,375,000 | 1,589,858 | 115.63 | 3.79% |
| Kansas City Southern | 4.20% | 11/15/2069 | 460,000 | 472,634 | 102.75 | 4.07% |
| Kansas City Southern | 4.20% | 11/15/2069 | 500,000 | 509,208 | 101.84 | 4.11% |
| Kansas City Southern | 4.20% | 11/15/2069 | 550,000 | 560,808 | 101.97 | 4.11% |
| Norfolk Southern Corp | 3.25% | 12/1/2021 | 1,430,000 | 1,464,660 | 102.42 | 1.95% |
| Norfolk Southern Corp | 3.25% | 12/1/2021 | 100,000 | 102,126 | 102.13 | 2.11% |
| Norfolk Southern Corp | 3.00% | 4/1/2022 | 455,000 | 467,885 | 102.83 | 1.71% |
| Norfolk Southern Corp | 3.00% | 4/1/2022 | 250,000 | 255,105 | 102.04 | 2.06% |
| Norfolk Southern Corp | 2.90% | 2/15/2023 | 260,000 | 269,366 | 103.60 | 1.71% |
| Norfolk Southern Corp | 2.90% | 2/15/2023 | 1,291,000 | 1,322,563 | 102.44 | 2.09% |
| Norfolk Southern Corp | 5.59% | 5/17/2025 | 365,000 | 427,334 | 117.08 | 2.20% |
| Norfolk Southern Corp | 3.65% | 8/1/2025 | 70,000 | 75,985 | 108.55 | 2.02% |
| Norfolk Southern Corp | 3.65% | 8/1/2025 | 500,000 | 534,597 | 106.92 | 2.32% |
| Norfolk Southern Corp | 2.90% | 6/15/2026 | 322,000 | 332,484 | 103.26 | 2.35% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Norfolk Southern Corp | 2.90% | 6/15/2026 | 350,000 | 360,554 | 103.02 | 2.39% |
| Norfolk Southern Corp | 3.15% | 6/1/2027 | 15,000 | 15,720 | 104.80 | 2.44% |
| Norfolk Southern Corp | 3.15% | 6/1/2027 | 300,000 | 313,256 | 104.42 | 2.49% |
| Norfolk Southern Corp | 3.80% | 8/1/2028 | 675,000 | 752,581 | 111.49 | 2.31% |
| Norfolk Southern Corp | 3.80% | 8/1/2028 | 700,000 | 768,386 | 109.77 | 2.53% |
| Norfolk Southern Corp | 2.55% | 11/1/2029 | 85,000 | 85,126 | 100.15 | 2.53% |
| Norfolk Southern Corp | 2.55% | 11/1/2029 | 500,000 | 497,954 | 99.59 | 2.60% |
| Norfolk Southern Corp | 2.55% | 11/1/2029 | 1,000 | 993 | 99.30 | 2.63% |
| Norfolk Southern Corp | 7.05% | 5/1/2037 | 255,000 | 356,663 | 139.87 | 3.87% |
| Norfolk Southern Corp | 4.84% | 10/1/2041 | 562,000 | 672,824 | 119.72 | 3.53% |
| Norfolk Southern Corp | 4.84% | 10/1/2041 | 16,000 | 18,914 | 118.21 | 3.62% |
| Norfolk Southern Corp | 4.84% | 10/1/2041 | 1,475,000 | 1,745,943 | 118.37 | 3.61% |
| Norfolk Southern Corp | 3.95% | 10/1/2042 | 250,000 | 269,411 | 107.76 | 3.45% |
| Norfolk Southern Corp | 3.95% | 10/1/2042 | 1,490,000 | 1,578,178 | 105.92 | 3.57% |
| Norfolk Southern Corp | 4.45% | 6/15/2045 | 280,000 | 323,758 | 115.63 | 3.52% |
| Norfolk Southern Corp | 4.45% | 6/15/2045 | 300,000 | 345,285 | 115.10 | 3.54% |
| Norfolk Southern Corp | 4.45% | 6/15/2045 | 2,028,000 | 2,324,311 | 114.61 | 3.57% |
| Norfolk Southern Corp | 4.65% | 1/15/2046 | 475,000 | 573,757 | 120.79 | 3.44% |
| Norfolk Southern Corp | 4.65% | 1/15/2046 | 200,000 | 236,601 | 118.30 | 3.57% |
| Norfolk Southern Corp | 4.65% | 1/15/2046 | 1,435,000 | 1,689,842 | 117.76 | 3.59% |
| Norfolk Southern Corp | 3.94% | 11/1/2047 | 618,000 | 670,147 | 108.44 | 3.46% |
| Norfolk Southern Corp | 3.94% | 11/1/2047 | 303,000 | 324,400 | 107.06 | 3.54% |
| Norfolk Southern Corp | 3.94% | 11/1/2047 | 1,675,000 | 1,794,126 | 107.11 | 3.54% |
| Norfolk Southern Corp | 4.15% | 2/28/2048 | 165,000 | 188,886 | 114.48 | 3.35% |
| Norfolk Southern Corp | 4.15% | 2/28/2048 | 1,450,000 | 1,634,084 | 112.70 | 3.44% |
| Norfolk Southern Corp | 4.15% | 2/28/2048 | 1,165,000 | 1,314,353 | 112.82 | 3.44% |
| Norfolk Southern Corp | 4.10% | 5/15/2049 | 335,000 | 372,005 | 111.05 | 3.50% |
| Norfolk Southern Corp | 4.10% | 5/15/2049 | 500,000 | 550,799 | 110.16 | 3.54% |
| Norfolk Southern Corp | 4.10% | 5/15/2049 | 1,325,000 | 1,455,844 | 109.88 | 3.56% |
| Norfolk Southern Corp | 3.40% | 11/1/2049 | 170,000 | 169,812 | 99.89 | 3.41% |
| Norfolk Southern Corp | 3.40% | 11/1/2049 | 500,000 | 495,020 | 99.00 | 3.45% |
| Norfolk Southern Corp | 3.40% | 11/1/2049 | 950,000 | 939,075 | 98.85 | 3.46% |
| Norfolk Southern Corp | 4.05% | 8/15/2052 | 460,000 | 513,465 | 111.62 | 3.45% |
| Norfolk Southern Corp | 4.05% | 8/15/2052 | 175,000 | 192,001 | 109.72 | 3.54% |
| Norfolk Southern Corp | 4.05% | 8/15/2052 | 990,000 | 1,086,188 | 109.72 | 3.54% |
| Norfolk Southern Corp | 5.10% | 8/1/2118 | 475,000 | 571,888 | 120.40 | 4.22% |
| Norfolk Southern Corp | 5.10% | 8/1/2118 | 850,000 | 1,001,037 | 117.77 | 4.32% |
| Norfolk Southern Corp | 5.10% | 8/1/2118 | 1,954,000 | 2,298,959 | 117.65 | 4.32% |
| Union Pacific Corp | 3.20% | 6/8/2021 | 300,000 | 305,682 | 101.89 | 1.85% |
| Union Pacific Corp | 2.95% | 3/1/2022 | 122,000 | 125,874 | 103.18 | 1.45% |
| Union Pacific Corp | 2.95% | 3/1/2022 | 300,000 | 306,448 | 102.15 | 1.93% |
| Union Pacific Corp | 4.16% | 7/15/2022 | 459,000 | 491,230 | 107.02 | 1.33% |
| Union Pacific Corp | 4.16% | 7/15/2022 | 506,000 | 531,583 | 105.06 | 2.10% |
| Union Pacific Corp | 2.95% | 1/15/2023 | 500,000 | 512,224 | 102.44 | 2.11% |
| Union Pacific Corp | 2.75% | 4/15/2023 | 250,000 | 256,193 | 102.48 | 1.97% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Union Pacific Corp | 3.50% | 6/8/2023 | 250,000 | 262,636 | 105.05 | 1.97% |
| Union Pacific Corp | 3.50% | 6/8/2023 | 300,000 | 314,293 | 104.76 | 2.05% |
| Union Pacific Corp | 3.65% | 2/15/2024 | 51,000 | 54,636 | 107.13 | 1.84% |
| Union Pacific Corp | 3.65% | 2/15/2024 | 277,000 | 292,714 | 105.67 | 2.20% |
| Union Pacific Corp | 3.15% | 3/1/2024 | 300,000 | 312,091 | 104.03 | 2.13% |
| Union Pacific Corp | 3.75% | 3/15/2024 | 125,000 | 134,006 | 107.20 | 1.95% |
| Union Pacific Corp | 3.75% | 3/15/2024 | 200,000 | 212,040 | 106.02 | 2.24% |
| Union Pacific Corp | 3.25% | 1/15/2025 | 800,000 | 850,332 | 106.29 | 1.93% |
| Union Pacific Corp | 3.25% | 1/15/2025 | 200,000 | 209,399 | 104.70 | 2.26% |
| Union Pacific Corp | 3.75% | 7/15/2025 | 25,000 | 27,239 | 108.95 | 2.03% |
| Union Pacific Corp | 3.75% | 7/15/2025 | 500,000 | 535,614 | 107.12 | 2.37% |
| Union Pacific Corp | 3.25% | 8/15/2025 | 470,000 | 501,303 | 106.66 | 1.99% |
| Union Pacific Corp | 3.25% | 8/15/2025 | 200,000 | 210,649 | 105.32 | 2.24% |
| Union Pacific Corp | 2.75% | 3/1/2026 | 880,000 | 910,113 | 103.42 | 2.15% |
| Union Pacific Corp | 2.75% | 3/1/2026 | 300,000 | 306,451 | 102.15 | 2.37% |
| Union Pacific Corp | 3.00% | 4/15/2027 | 315,000 | 332,696 | 105.62 | 2.16% |
| Union Pacific Corp | 3.00% | 4/15/2027 | 1,000,000 | 1,048,393 | 104.84 | 2.27% |
| Union Pacific Corp | 3.95% | 9/10/2028 | 981,000 | 1,095,963 | 111.72 | 2.44% |
| Union Pacific Corp | 3.95% | 9/10/2028 | 1,825,000 | 2,013,871 | 110.35 | 2.61% |
| Union Pacific Corp | 6.63% | 2/1/2029 | 25,000 | 33,330 | 133.32 | 2.50% |
| Union Pacific Corp | 3.70% | 3/1/2029 | 40,000 | 44,222 | 110.56 | 2.41% |
| Union Pacific Corp | 3.70% | 3/1/2029 | 700,000 | 764,219 | 109.17 | 2.57% |
| Union Pacific Corp | 3.38% | 2/1/2035 | 516,000 | 542,053 | 105.05 | 2.96% |
| Union Pacific Corp | 3.38% | 2/1/2035 | 100,000 | 103,420 | 103.42 | 3.09% |
| Union Pacific Corp | 3.38% | 2/1/2035 | 611,000 | 629,947 | 103.10 | 3.12% |
| Union Pacific Corp | 3.60% | 9/15/2037 | 230,000 | 242,402 | 105.39 | 3.20% |
| Union Pacific Corp | 3.60% | 9/15/2037 | 100,000 | 104,084 | 104.08 | 3.29% |
| Union Pacific Corp | 3.60% | 9/15/2037 | 1,607,000 | 1,674,446 | 104.20 | 3.29% |
| Union Pacific Corp | 4.38% | 9/10/2038 | 760,000 | 881,648 | 116.01 | 3.23% |
| Union Pacific Corp | 4.38% | 9/10/2038 | 925,000 | 1,058,056 | 114.38 | 3.34% |
| Union Pacific Corp | 4.38% | 9/10/2038 | 1,475,000 | 1,682,488 | 114.07 | 3.36% |
| Union Pacific Corp | 3.55% | 8/15/2039 | 180,000 | 189,646 | 105.36 | 3.18% |
| Union Pacific Corp | 3.55% | 8/15/2039 | 500,000 | 518,238 | 103.65 | 3.30% |
| Union Pacific Corp | 3.55% | 8/15/2039 | 100,000 | 103,863 | 103.86 | 3.28% |
| Union Pacific Corp | 4.30% | 6/15/2042 | 100,000 | 112,080 | 112.08 | 3.52% |
| Union Pacific Corp | 4.30% | 6/15/2042 | 755,000 | 840,640 | 111.34 | 3.56% |
| Union Pacific Corp | 4.25% | 4/15/2043 | 85,000 | 95,531 | 112.39 | 3.47% |
| Union Pacific Corp | 4.25% | 4/15/2043 | 150,000 | 166,745 | 111.16 | 3.54% |
| Union Pacific Corp | 4.25% | 4/15/2043 | 1,255,000 | 1,390,327 | 110.78 | 3.56% |
| Union Pacific Corp | 4.15% | 1/15/2045 | 945,000 | 1,035,455 | 109.57 | 3.57% |
| Union Pacific Corp | 4.05% | 11/15/2045 | 335,000 | 366,403 | 109.37 | 3.50% |
| Union Pacific Corp | 4.05% | 11/15/2045 | 200,000 | 217,071 | 108.54 | 3.54% |
| Union Pacific Corp | 4.05% | 11/15/2045 | 1,121,000 | 1,209,963 | 107.94 | 3.58% |
| Union Pacific Corp | 4.05% | 3/1/2046 | 1,000,000 | 1,088,860 | 108.89 | 3.53% |
| Union Pacific Corp | 3.35% | 8/15/2046 | 200,000 | 193,822 | 96.91 | 3.53% |

| Company | Coupon | Maturity | Face Amount | Market Value | Market Price | YTM |
|---|---|---|---|---|---|---|
| Union Pacific Corp | 3.35% | 8/15/2046 | 1,057,000 | 1,032,435 | 97.68 | 3.48% |
| Union Pacific Corp | 4.00% | 4/15/2047 | 925,000 | 1,025,029 | 110.81 | 3.39% |
| Union Pacific Corp | 4.00% | 4/15/2047 | 300,000 | 328,896 | 109.63 | 3.45% |
| Union Pacific Corp | 4.00% | 4/15/2047 | 1,201,000 | 1,310,351 | 109.10 | 3.48% |
| Union Pacific Corp | 4.50% | 9/10/2048 | 735,000 | 878,412 | 119.51 | 3.43% |
| Union Pacific Corp | 4.30% | 3/1/2049 | 602,000 | 704,276 | 116.99 | 3.38% |
| Union Pacific Corp | 4.30% | 3/1/2049 | 1,775,000 | 2,044,452 | 115.18 | 3.47% |
| Union Pacific Corp | 4.30% | 3/1/2049 | 1,955,000 | 2,236,481 | 114.40 | 3.51% |
| Union Pacific Corp | 3.80% | 10/1/2051 | 700,000 | 750,316 | 107.19 | 3.43% |
| Union Pacific Corp | 3.80% | 10/1/2051 | 1,070,000 | 1,136,946 | 106.26 | 3.47% |
| Union Pacific Corp | 3.80% | 10/1/2051 | 3,431,000 | 3,638,884 | 106.06 | 3.48% |
| Union Pacific Corp | 3.88% | 2/1/2055 | 645,000 | 686,722 | 106.47 | 3.56% |
| Union Pacific Corp | 3.88% | 2/1/2055 | 200,000 | 208,975 | 104.49 | 3.65% |
| Union Pacific Corp | 3.95% | 8/15/2059 | 337,000 | 358,819 | 106.47 | 3.64% |
| Union Pacific Corp | 3.95% | 8/15/2059 | 300,000 | 313,467 | 104.49 | 3.73% |
| Union Pacific Corp | 3.84% | 3/20/2060 | 265,000 | 270,034 | 101.90 | 3.75% |
| Union Pacific Corp | 3.84% | 3/20/2060 | 1,925,000 | 1,945,625 | 101.07 | 3.79% |
| Union Pacific Corp | 4.38% | 11/15/2065 | 380,000 | 420,432 | 110.64 | 3.88% |
| Union Pacific Corp | 4.38% | 11/15/2065 | 300,000 | 329,009 | 109.67 | 3.92% |
| Union Pacific Corp | 4.10% | 9/15/2067 | 105,000 | 107,846 | 102.71 | 3.97% |
| Union Pacific Corp | 4.10% | 9/15/2067 | 200,000 | 202,207 | 101.10 | 4.05% |
| Union Pacific Corp | 4.15% | 1/15/2045 | 580,000 | 647,689 | 111.67 | 3.45% |

# Appendix H – Guideline Company Selection

## 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 (ACE) owns renewable energy projects. Acq'd U.S. Water Services 2/15; sold it 3/19. Generating sources: coal & lignite, 43%; wind, 10%; other, 4%; purchased, 43%. Fuel costs: 27% of revs. '18 deprec. rate: 3.6%. Has 1,900 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 and Power in Superior, Wisconsin; and ALLETE Renewable Resources, which operates and maintains wind generation facilities in North Dakota.[1]

ALLETE Inc. (NYSE:ALE) announced today it has closed on the $270 million sale of U.S. Water Services Inc. to Kurita Water Industries Ltd., a leading international water-management company headquartered in Tokyo, Japan. Based in St. Michael, Minnesota, U.S. Water, an integrated water-solutions company, serves a diverse mix of about 5,000 customers to optimize system performance, reduce water and energy use, and improve efficiency. It was acquired by ALLETE in 2015. Today's sale supports ALLETE's long-term diversification strategy that includes expanding investments in clean-energy opportunities with an average annual earnings growth objective of 5 percent to 7 percent.[2]

*Why was the company included?*

ALLETE Inc. is the parent company of Minnesota Power, which supplies electricity to customers. 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, 41%; IA, 58%; MN, 1%. Elect. rev.: residential, 37%; commercial, 25%; industrial, 26%; wholesale, 5%; other, 7%. Fuel sources, 2018:

[1] http://www.allete.com/OurBusinesses/, accessed 12/30/2019

[2] http://investor.allete.com/news-releases/news-release-details/allete-closes-270-million-sale-us-water-services-kurita, accessed 1/7/2020

coal, 37%; gas, 30%; other, 33%. Fuel costs: 45% of revs. 2018 depreciation rate: 5.9%. Estimated plant age: 16 years. Has approximately 3,885 employees.

*Additional Company Information from Website:*
To deliver the energy solutions and exceptional service that our customers and communities count on – safely, efficiently and responsibly. Operations at a glance: Number of electric customers, 965,514; Number of natural gas customers, 415,174; Number of employees, 3,885; Operating revenues (year-end 2018), $3.5 billion; Total assets (year-end 2018), $15.4 billion; Headquarters Madison, Wisconsin; Service area 54,369 square miles in Iowa and Wisconsin; Miles of electric lines 42,600; Miles of natural gas main 9,700; Electric generation 32 million megawatt-hours per year; Maximum summer peak hour demand 5,459 megawatts; Utility natural gas sold and transported 143,746 (thousands of dekatherms). All numbers are approximations.[3]

*Why was the company included?*
Alliant Energy Corp supplies electricity, gas and other services to customers. Electric customers represent 70% of customers and gas customers represent 30% of customers This company is similar to (and is one of) 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, 43%; commercial, 32%; industrial, 8%; other, 17%. Generating sources: coal, 68%; nuclear, 24%; hydro & other, 3%; purchased, 5%. Fuel costs: 27% of revs. '18 reported deprec. rates: 3%-4%. Has 8,800 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 Missouri in St. Louis. Ameren Transmission Company, also based in St. Louis, designs and builds regional transmission projects. 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 9,000 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.[4]

*Why was the company included?*
Ameren Corporation provides electric and gas to customers. Electric customers represent 72% of customers and gas customers represent 28% of customers. This company is similar to the Electric

[3] https://www.alliantenergy.com/AboutAlliantEnergy/OperationsValuesandCompliance, accessed 12/30/2019
[4] https://www.ameren.com/company/about-ameren, accessed 12/30/2019

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 million customers in Arkansas, Kentucky, Indiana, Louisiana, Michigan, Ohio, Oklahoma, Tennessee, Texas, Virginia, & West Virginia. Has a transmission subsidiary. Electric revenue breakdown: residential, 41%; commercial, 24%; industrial, 19%; wholesale, 8%; other, 8%. Sold Houston Pipeline '05; commercial barge operation in '15. Generating sources not available. Fuel costs: 36% of revenues. '18 reported depreciation rates (utility): 1.6%-9.8%. Has 17,600 employees.

*Additional Company Information from Website:*
As one of the largest electric energy companies in the U.S., we power millions of homes and businesses. We're working together with our customers and communities to create the future of energy. We're listening, going beyond customers' expectations and developing innovative solutions to build a future that is boundless for us all. We're continually energized by our team members, their passions, and their drive to make a difference in the communities we serve.[5]

*Why was the company included?*
American Electric Power Company Inc. provides electricity to customers. 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 212,000 electric customers in CO, SD, WY and MT, and 1.1 million gas customers in NE, IA, KS, CO, WY, and AR. Has coal mining sub. Acq'd Cheyenne Light 1/05; utility ops. from Aquila 7/08; SourceGas /16. Discont. telecom in '05; oil marketing in '06; gas marketing in '11; gas & oil E&P in '17. Electric rev. breakdown: res'l, 33%; comm'l, 37%; ind'l, 19%; other, 11%. Generating sources: coal, 32%; other, 10%; purch., 58%. Fuel costs: 36% of revs. '18 deprec. rate: 3.4%. Has 2,900 employees.

*Additional Company Information from Website:*
Black Hills Corporation, a South Dakota corporation (together with its subsidiaries, referred to herein as the "Company," "we," "us" or "our"), is a customer-focused, growth-oriented utility company headquartered in Rapid City, South Dakota. Our predecessor company, Black Hills Power and Light Company, was incorporated and began providing electric utility service in 1941. It was formed through the purchase and combination of several existing electric utilities and related assets, some of which had served customers in the Black Hills region since 1883. In 1956, with the purchase of the Wyodak coal mine, we began producing and selling energy through non-regulated businesses. We operate our business in the United States, reporting our operating results through our regulated Electric Utilities, regulated Gas Utilities, Power Generation and Mining segments. Certain unallocated corporate expenses that support our operating segments are presented as Corporate and Other. Our Electric Utilities segment generates, transmits and distributes electricity to approximately 212,000 electric customers in Colorado,

[5] https://www.aep.com/about/, accessed 12/30/2019

Montana, South Dakota and Wyoming. Our Electric Utilities own 939 MW of generation and 8,858 miles of electric transmission and distribution lines. Our Gas Utilities segment serves approximately 1,054,000 natural gas utility customers in Arkansas, Colorado, Iowa, Kansas, Nebraska, and Wyoming. Our Gas Utilities own and operate approximately 4,700 miles of intrastate gas transmission pipelines and 41,158 miles of gas distribution mains and service lines, seven natural gas storage sites, over 45,000 horsepower of compression and nearly 600 miles of gathering lines. Our Power Generation segment produces electric power from its wind, natural gas and coal generating plants and sells the electric capacity and energy primarily to our utilities under long-term contracts. Our Mining segment produces coal at our mine near Gillette, Wyoming, and sells the coal primarily under long-term contracts to mine-mouth electric generation facilities owned by our Electric Utilities and Power Generation businesses. Black Hills Corporation is a customer focused, growth-oriented utility company with a tradition of exemplary service and a vision to be the energy partner of choice. Based in Rapid City, South Dakota, the company serves over 1.25 million electric and natural gas utility customers in more than 800 communities in Arkansas, Colorado, Iowa, Kansas, Montana, Nebraska, South Dakota and Wyoming. Employees partner to produce results that improve life with energy. [6]

*Why was the company included?*
Black Hills Corporation provides electric and gas to customers. Electric customers represent 16% of customers and gas customers represent 84% of customers. 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.

Also using this company as a guideline company for the Gas Distribution Market Segment. Over 80% of this company's customers are gas distribution customers.

**CenterPoint Energy Inc.**
*Company Summary from Value Line:*
CenterPoint Energy Inc. is a holding company for Houston Electric, which serves 2.5 million customers in Houston and environs, and gas utilities with 4.4 million customers in Texas, Minnesota, Arkansas, Louisiana, Oklahoma, Indiana, and Ohio. Owns 53.7% of Enable Midstream Partners. Has nonutility operations. Discontinued Texas Genco Holdings in '04. Acquired Vectren 2/19. Electric revenue breakdown: residential, 52%; commercial, 31%; industrial, 15%; other, 2%. Gas costs: 55% of revenues. '18 depreciation rate: 6.3%. Has 14,000 employees.

*Additional Company Information from Website:*
**Company Overview** Our vision to lead the nation in delivering energy, service and value drives our strategy and performance. We have an unwavering commitment to safely and reliably deliver electricity and natural gas to millions of people. **Natural Gas** We sell and deliver natural gas to more than 4.5 million homes and businesses in eight states: Arkansas, Indiana, Louisiana, Minnesota (including Minneapolis), Mississippi, Ohio, Oklahoma and Texas (including greater Houston area). We are investing in modernizing our natural gas infrastructure and are committed to eliminating cast-iron pipe in all our territories. **Electric Transmission and Distribution and Power Generation**We maintain the wires, poles and electric infrastructure serving more than 2.5 million metered customers in the greater Houston area and in southwestern Indiana. We also own and operate nearly 1,300 megawatts of electric generation capacity in Indiana. We are committed to the reliable delivery of electricity generated from power plants and renewable

[6] http://ir.blackhillscorp.com/Cache/396796068.pdf, accessed on 12/30/2019

energy resources to homes and businesses. **Competitive Energy Businesses** Our competitive energy businesses include three areas: natural gas marketing and energy-related services; energy efficiency, sustainability and infrastructure modernization solutions; and construction and repair services for pipeline systems, primarily natural gas. Our competitive energy businesses' footprint spans nearly 40 states. **CenterPoint Energy Home Service Plus®** 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. **CenterPoint Energy and HomeServe** We are partnering with HomeServe, a trusted nationwide provider of emergency home repair programs, in our natural gas markets in Texas and in Houston to offer our customers service repair plans that reduce the stress and expense from the unexpected.[7]

CenterPoint Energy Inc. and Vectren Corporation announced on February 1, 2019 the successful completion of their merger. With the merger, CenterPoint Energy has assets totaling approximately $29 billion, an enterprise value of $27 billion and approximately 14,000 employees. Under the terms of the merger agreement, which was announced on April 23, 2018, Vectren shareholders will receive $72.00, along with a prorated dividend of $0.41145, in cash for each share of Vectren common stock owned as of the close of business on Feb. 1, 2019. Additionally, Vectren common stock, which previously traded under the ticker symbol "VVC," has ceased trading on and was delisted from the NYSE effective today.[8]

*Why was the company included?*
CenterPoint Energy Inc. provides electricity and gas to customers. Electric customers represent 36% of customers and gas customers represent 64% of customers. This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. Even though CenterPoint Energy, Inc. and Vectren Corporation recently completed a merger, we are including them as a guideline company as the merger was completed in early 2019.

Also using this company as a guideline company for the Gas Distribution Market Segment. Over 60% of this company's customers are gas distribution customers.

**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, 1.8 million gas customers. Has 1,034 megawatts of nonregulated generating capacity. Sold Palisades nuclear plant in '07. Electric revenue breakdown: residential, 45%; commercial, 34%; industrial, 15%; other, 6%. Generating sources: coal, 26%; gas, 14%; other, 3%; purchased, 57%. Fuel costs: 44% of revenues. '18 reported deprec. rates: 3.9% electric, 2.9% gas, 10.1% other. Has 8,000 full-time 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 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

[7] https://www.centerpointenergy.com/en-us/corporate/about-us/company-overview, accessed on 12/30/2019
[8] http://investors.centerpointenergy.com/news-releases/news-release-details/centerpoint-energy-and-vectren-complete-merger, accessed 1/7/2020

providing unsecured home improvement payment option programs for homeowners through nationwide dealer networks.[9]

*Why was the company included?*
CMS Energy Corporation provides electricity and gas to customers. Electric customers represent 50% of customers and gas customers represent 50% of customers. 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.

Also using this company as a guideline company for the Gas Distribution Market Segment. 50% of this company's customers are gas distribution customers.

**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: 2.2 mill. electric, 1.3 mill. gas. Has various nonutility operations. Electric revenue breakdown: residential, 47%; commercial, 34%; industrial, 13%; other, 6%. Generating sources: coal, 67%; nuclear, 17%; gas, 1%; purchased, 15%. Fuel costs: 61% of revenues. '18 reported deprec. rates: 3.7% electric, 2.7% gas. Has 10,600 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.[10]

*Why was the company included?*
DTE Energy Company provides electricity and gas to customers. Electric customers represent 63% of customers and gas customers represent 37% of customers. 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.

[9] https://www.cmsenergy.com/about-cms-energy/, accessed 12/30/2019

[10] https://newlook.dteenergy.com/wps/wcm/connect/dte-web/home/about-dte/common/about-dte/about-dte, accessed 12/30/2019

**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 200,000 customers in Louisiana. Has a nonutility subsidiary that owns six nuclear units (two no longer operating). Electric revenue breakdown: residential, 38%; commercial, 26%; industrial, 27%; other, 9%. Generating sources: gas, 39%; nuclear, 27%; coal, 9%; purchased, 25%. Fuel costs: 35% of revenues. ’18 reported depreciation rate: 2.8%. Has 13,700 employees.

*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 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 $11 billion and 13,500 employees.[11]

*Why was the company included?*

Entergy Corporation provides electricity and gas to customers. Electric customers represent 94% of customers and gas customers represent 6% of customers. 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, New Orleans, and Texas.

**MGE Energy Inc.**

*Company Summary from Value Line:*

MGE Energy Inc. is a holding company for Madison Gas and Electric Company (MGE), which provides electric service to 153,000 customers in Dane County and gas service to 161,000 customers in seven counties in Wisconsin. Electric revenue breakdown, ’18: residential, 35%; commercial, 51%; industrial, 3%; other, 11%. Generating sources, ’18: coal, 52%; gas, 14%; renewables, 11%; purchased power, 23%. Fuel costs: 34% of revenues. ’18 reported depreciation rates: electric, 2.9%; gas, 2.1%; nonregulated, 2.3%. Has 700 employees.

*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.

[11] http://entergy.com/about_entergy/, accessed 12/30/2019

- Central Wisconsin Development Corporation promotes business growth in MGE's service area.
- MGE Services, LLC provides construction and other services.[12]

*Why was the company included?*
MGE Energy Inc. provides electricity and gas to customers. Electric customers represent 49% of customers and gas customers represent 51% of customers. 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.

Also using this company as a guideline company for the Gas Distribution Market Segment. Over 50% of this company's customers are gas distribution customers.

**NorthWestern Corporation**
*Company Summary from Value Line:*
NorthWestern Corporation (doing business as NorthWestern Energy) supplies electricity & gas in the Upper Midwest and Northwest, serving 438,000 electric customers in Montana and South Dakota and 289,000 gas customers in Montana (85% of gross margin), South Dakota (14%), and Nebraska (1%). Electric revenue breakdown: residential, 39%; commercial, 46%; industrial, 5%; other, 10%. Generating sources: hydro, 35%; coal, 29%; wind, 6%; other, 4%; purchased, 26%. Fuel costs: 24% of revenues. '18 reported deprec. rate: 3.0%. Has 1,500 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.[13]

*Why was the company included?*
NorthWestern Corporation provides electricity and gas to customers. Electric customers represent 60% of customers and gas customers represent 40% of customers. This company is similar to the Electric Companies that the State Assessed Section is responsible for valuing. This company operates in the Midwest.

**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 856,000 customers in Oklahoma (84% of electric revenues) and western Arkansas (8%); wholesale is (8%). Owns 25.5% of Enable Midstream Partners. Electric revenue breakdown: residential, 40%; commercial, 26%; industrial, 9%; oilfield, 7%; other, 18%. Generating sources: coal, 28%; gas, 27%; wind, 4%; purchased, 41%. Fuel costs: 39% of revenues. '18 reported depreciation rate (utility): 2.7%. Has 2,300 employees.

[12] https://www.mgeenergy.com/en/about/about-mge-energy, accessed 12/30/2019
[13] http://www.northwesternenergy.com/our-company/about-us, accessed 12/30/2019

*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 25.6 percent limited partner interest and a 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 843,000 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.[14]

OG&E, a subsidiary of Oklahoma City-based OGE Energy Corp. (NYSE: OGE), announced August 30, 2019 that the company has completed the acquisition of the Oklahoma Cogeneration LLC facility in Oklahoma City and subsequently renamed it Frontier Power Plant. The acquisition follows the May purchase of the AES Shady Point plant near Poteau, Oklahoma, now known as River Valley Power Plant.[15]

*Why was the company included?*
OGE Energy Corporation provides electricity to customers. 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 132,000 customers in Minnesota (53% of retail electric revenues), North Dakota (38%), and South Dakota (9%). Electric rev. breakdown: residential, 32%; commercial & farms, 37%; industrial, 30%; other, 1%. Generating sources: coal, 53%; other, 10%; purchased, 37%. Fuel costs: 15% of revenues. Also has operations in manufacturing and plastics (34% of '18 income). '18 reported deprec. rate (utility): 2.8%. Has 2,300 employees.

*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

[14] https://www.oge.com/wps/portal/oge/about-us/companyOverview/!ut/p/z1/jZC9CoNAEISfxSfY9dREy9OLp16CXiHqNmIaEfwrQgJ5giSJiTGrXbhmx1mgKAEGpt71za3bhqbfrkrOtSulhgp27xI9ELkFjPTNMwseWRQrADDAGObJVKxE3IlhHYyYca-DbRHjz G4z79BkDb7wug1eKdAJNl5YErlPZ8CyPnE_gS8Z9JAtT203Xps_ChmtPnGR8wD3leYpcN2j BerUjFpg!!/dz/ d5/L2dBISEvZ0FBIS9nQSEh/, accessed 12/30/2019
[15] https://electricenergyonline.com/article/energy/category/mergers-acquisitions/58/786028/og-e-completes-acquisition-of-oklahoma-cogen-llc-changes-name-to-frontier-power-plant-.html, accessed 1/7/2020

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.[16]

*Why was the company included?*
Otter Tail Corporation provides electricity to customers. 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.

**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., 2.9 mill. gas. Acq'd Integrys Energy 6/15. Sold Point Beach nuclear plant in '07. Electric revenue breakdown: residential, 35%; small commercial & industrial, 31%; large commercial & industrial, 21%; other, 13%. Generating sources: coal, 45%; gas, 22%; renewables, 4%; purchased, 29%. Fuel costs: 38% of revenues. '18 reported deprec. rates (utility): 2.0%-3.2%. Has 7,900 employees.

*Additional Company Information from Website:*
We are one of the nation's largest electric generation and distribution and natural gas delivery holding companies, with the operational expertise and financial resources to serve the Midwest's energy needs safely, reliably and responsibly. Our subsidiaries focus on reliable service, customer satisfaction and shareholder value. Together, we provide energy services to more than 4.5 million customers in Wisconsin, Illinois, Michigan and Minnesota. Our combined assets allow operating efficiencies across 70,100 miles of electric distribution lines, 50,000 miles of natural gas distribution and transmission lines, and 7,300 megawatts of reliable power plant capacity. Our family of companies is committed to delivering world-class reliability and the very best customer care anywhere. Customers are the heart of our business, and we work every day to help grow and support communities where we provide vital energy services. As a Fortune 500 company, we value and develop our employees who are making a difference in a mission that matters.[17]

*Why was the company included?*
WEC Energy Group provides electricity and gas to customers. Electric customers represent 36% of customers and gas customers represent 64% of customers. 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.

[16] http://www.ottertail.com/corporate-profile, accessed 12/30/2019

[17] https://www.wecenergygroup.com/about/aboutus.htm, accessed 12/30/2019

Also using this company as a guideline company for the Gas Distribution Market Segment. Over 60% of this company's customers are gas distribution customers.

**Xcel Energy Inc.**

*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, 2.0 mill. gas. Elec. rev. breakdown: residential, 31%; sm. comm'l & ind'l, 36%; lg. comm'l & ind'l, 18%; other, 15%. Generating sources not available. Fuel costs: 41% of revs. '18 reported depr. rate: 3.1%. Has 11,100 employees.

*Additional Company Information from Website:*
Every day we power millions of homes and businesses across eight Western and Midwestern states. Our customers can count on us to be there 24/7 with safe, reliable energy. But, what we provide goes much deeper than that. Based in Minneapolis, 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 customers with energy options and alternatives to support their goals and objectives. Destination 2050 is all about delivering on our bold vision for a carbon-free future. We are the first major U.S. energy provider to announce an aspiration to serve customers with 100% carbon-free electricity by 2050. In a rapidly changing industry, we are taking a smart and thoughtful approach to how we produce and deliver energy, looking for better ways to serve our customers and anticipate their needs and expectations. Through our efforts, we are not just preparing for the future we are building it, today. [18]

*Why was the company included?*
Xcel Energy Inc. provides electricity and gas to customers. Electric customers represent 64% of customers and gas customers represent 36% of customers. 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.

## 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 that serves 2.2 million electric customers in New York, Connecticut, and Maine and 1 million gas customers in New York, Connecticut, Massachusetts and Maine. Has a nonregulated generating subsidiary focused on wind power, with 7.2 gigawatts of capacity. Revenue breakdown by customer class not available. Generating sources not available. Fuel costs: 26% of revenues. '18 depr. rate: 2.9%. Iberdrola owns 81.5% of stock. Has 6,400 employees.

[18] https://www.xcelenergy.com/company/corporate_responsibility_report/who_we_are, accessed 12/30/2019

*Additional Company Information from Website:*
AVANGRID Inc. (NYSE: AGR) is a leading, sustainable energy company with $32 billion in assets and operations in 24 U.S. states. AVANGRID has two primary lines of business: Avangrid Networks and Avangrid Renewables. Avangrid Networks owns eight electric and natural gas utilities, serving 3.2 million customers in New York and New England. Avangrid Renewables owns and operates 7.1 gigawatts of electricity capacity, primarily through wind power, with a presence in 22 states across the United States. AVANGRID employs approximately 6,500 people. AVANGRID supports the U.N.'s Sustainable Development Goals and was awarded Compliance Leader Verification by Ethisphere, a prestigious third party verification of its ethics and compliance program.[19]

AVANGRID has two head of business companies: Avangrid Networks combines the resources and expertise of eight electric and natural gas utilities with a rate base of $9.1 billion serving approximately 3.2 million customers in New York and New England. Avangrid Renewables owns and operates approximately 7.1 GW of generation capacity, primarily through wind and solar, in 22 states. It is one of the nation's largest producers of wind energy.[20]

Hydro One Limited ("Hydro One") (TSX: H) and Avista Corporation ("Avista") (NYSE: AVA) announced January 23, 2019 that the companies have mutually agreed to terminate their previously announced merger agreement. This decision follows the recent orders by the Washington Utilities and Transportation Commission and the Idaho Public Utilities Commission which denied approval of the merger. After careful consideration and analysis of the likelihood of achieving a timely reversal of those orders, the Boards of Directors of Hydro One and Avista each individually determined that termination of the merger agreement is the best course of action for the companies and their respective shareholders.[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. Avangrid Renewables has wind facilities in Minnesota, however, Avangrid Networks (electric and gas utilities) are located in New York and New England.

**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: 402,000 electric, 350,000 gas. Acq'd Alaska Electric Light and Power 7/14. Sold Ecova energy-management sub. 6/14. Electric rev. breakdown: residential, 38%; commercial, 32%; industrial, 11%; wholesale, 9%; other, 10%. Generating sources: hydro, 31%; gas & coal, 27%; purch., 42%. Fuel costs: 35% of revs. '18 reported depr. rate (Avista Utilities): 3.2%. Has 2,000 employees.

[19] https://www.avangrid.com/wps/portal/avangrid/aboutus, accessed on 12/30/2019
[20] https://www.avangrid.com/wps/portal/avangrid/aboutus/companyprofile/ourcompanies, accessed 12/30/2019
[21] https://www.prnewswire.com/news-releases/hydro-one-and-avista-mutually-agree-to-terminate-merger-agreement-300783284.html, accessed 1/7/2020

*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. We provide electricity to nearly 340,000 customers and natural gas to about 300,000 customers across 30,000 square miles and four northwestern states. 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. Avista's legacy of innovation is rooted in the renewable energy we've generated since our founding in 1889.[22]

*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 3.7 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: 24% of revenues. '18 reported depreciation rates: 2.9%-3.1%. Has 15,300 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.[23]

*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) is a holding company for Virginia Power, North Carolina Power, & South Carolina E&G, which serve 3.4 mill. customers in VA, SC, & NC. Serves 3.3 mill. gas customers in OH, WV, UT, SC, & NC. Other ops. incl. independent power production. Acq'd Questar 9/16; SCANA 1/19. Elec. rev. breakdown: residential, 46%; commercial, 32%; industrial, 7%;

[22] https://www.myavista.com/about-us/our-company, accessed 12/30/2019
[23] https://www.coned.com/en/about-us/company-information, accessed 12/30/2019

other, 15%. Generating sources: gas, 33%; nuclear, 29%; coal, 13%; other, 6%; purchased, 19%. Fuel costs: 27% of revs. '18 reported deprec. rates: 2.4%-4.6%. Has 21,300 empls.

*Additional Company Information from Website:*
We operate in 18 states, from Connecticut to Georgia to California, offering clean, safe, reliable, and affordable energy to nearly 7.5 million customers. Headquartered in Richmond, VA, we invest in the communities where we live and work, and protect our natural resources. [24]

Dominion Energy Inc. and SCANA Corporation announced on January 2, 2019 that they have completed their proposed merger.[25]

Dominion Energy Inc. (NYSE: D), and Dominion Energy Midstream Partners, LP (NYSE: DM), announced today that they have completed their proposed merger pursuant to the definitive merger agreement announced on Nov. 26, 2018. The merger resulted in Dominion Energy acquiring all the outstanding public common units of Dominion Energy Midstream Partners in exchange for Dominion Energy common shares and Dominion Energy Midstream Partners becoming an indirect, wholly owned subsidiary of Dominion Energy.[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.

**Duke Energy Corporation**
*Company Summary from Value Line:*
Duke Energy Corporation is a holding company for utilities with 7.6 mill. elec. customers in NC, FL, IN, SC, OH, & KY, and 1.6 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, 44%; commercial, 28%; industrial, 14%; other, 14%. Generating sources: gas, 26%; nuclear, 26%; coal, 24%; other, 2%; purchased, 22%. Fuel costs: 31% of revs. '18 reported deprec. rate: 3.0%. Has 30,100 employees.

*Additional Company Information from Website:*
We are one of the largest electric power holding companies in the United States, providing electricity to 7.7 million retail customers in six states. We have approximately 51,000 megawatts of electric generating capacity in the Carolinas, the Midwest and Florida – and natural gas distribution services serving more than 1.6 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. We are transforming our customers' experience, modernizing our

[24]https://www.dominionenergy.com/company, accessed 12/30/2019
[25] https://dominionenergy.mediaroom.com/2019-01-02-Dominion-Energy-Combines-With-SCANA-Corporation, accessed 2/20/2019
[26] https://investors.dominionenergy.com/news/press-release-details/2019/Dominion-Energy-Dominion-Energy-Midstream-Complete-Merger/default.aspx, accessed 1/7/2020

energy grid, generating cleaner energy and expanding our natural gas infrastructure to create a smarter energy future for our customers.[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.

**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. ’18 reported depr. rate: 3.7%. Has 12,500 empls.

*Additional Company Information from Website:*
At Edison International, our vision is to lead the transformation of the electric power industry toward a clean energy future. Through our subsidiaries, we generate and distribute electric power, as well as provide energy services and technologies, including renewable energy. With 130+ years of innovation in our history, our company is well-positioned and prepared for the work that lies ahead as we focus on opportunities in clean energy, efficient electrification, the grid of the future, and customer choice to strengthen and grow our business.[28]

*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 428,000 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: gas, 44%; nuclear, 41%; purchased, 15%. Fuel costs: 25% of revenues. ’18 reported depreciation rate: 2.3%. Has about 1,100 employees.

*Additional Company Information from Website:*
El Paso Electric is a regional electric utility providing generation, transmission and distribution service to approximately 424,000 retail and wholesale customers in a 10,000 square mile area of the Rio Grande

[27] https://www.duke-energy.com/our-company/about-us, accessed 12/30/2019
[28] https://www.edison.com/home/about-us/our-companies.html, accessed 12/30/2019

valley in west Texas and southern New Mexico. Its service territory extends from Hatch, New Mexico to Van Horn, Texas.[29]

El Paso Electric Company (EPE) announced September 29, 2019 that its shareholders approved the previously announced Agreement and Plan of Merger (the "Agreement") pursuant to which the Company will be purchased by the Infrastructure Investments Fund ("IIF"), a private investment vehicle advised by J.P. Morgan Investment Management Inc.[30]

*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.

**Evergy Inc.**
*Company Summary from Value Line:*
Evergy Inc. was formed through the merger of Great Plains Energy and Westar Energy in June of 2018. Through its subsidiaries (now doing business under the Evergy name), provides electric service to 1.6 million customers in Kansas and Missouri, including the greater Kansas City area. Electric revenue breakdown: residential, 37%; commercial, 32%; industrial, 12%; wholesale, 10%; other, 9%. Generating sources: coal, 54%; nuclear, 17%; purchased, 29%. Fuel costs: 25% of revenues. '18 reported deprec. rates: 2.9%-3.9%. Has 4,800 employees.

*Additional Company Information from Website:*
Evergy Inc. (NYSE: EVRG), through its operating subsidiaries Kansas City Power & Light Company (KPC&L) and Westar Energy, Inc., provides clean, safe, reliable energy to 1.6 million customers in Kansas and Missouri. By combining KCP&L and Westar Energy, Inc. in 2018, a leading energy company was created that provides value to shareholders and a stronger company for customers. As a combined company, our mission is to empower a better future. Today, half of the power supplied by Evergy comes from clean sources, creating more reliable energy with less impact to the environment. And as the industry evolves, we will continue to innovate and adopt new technologies that give our customers better ways to manage their energy use.[31]

Great Plains Energy Incorporated, which serves customers as KCP&L, and Westar Energy, Inc. announced on May 24, 2018 that they received final regulatory approval from the Kansas Corporation Commission and Missouri Public Service Commission to combine. The stock-for-stock merger of equals creates a holding company of approximately $15 billion equity value, which will be named Every, Inc. Its principal business will be conducted by the operating companies today known as Westar and KCP&L.[32]

[29] https://www.epelectric.com/company/about-epe, accessed 12/30/2019
[30] https://www.epelectric.com/company/news/el-paso-electric-company-shareholders-approve-agreement-to-be-purchased-by-the-infrastructure-investments-fund-an-investment-vehicle-advised-by-jp-morgan-investment-management-inc, accessed 1/7/2020
[31] http://www.evergyinc.com/about-evergy/company-information, accessed 12/30/2019
[32] http://www.evergyinc.com/news-releases/news-release-details/merger-great-plains-energy-and-westar-energy-approved-paving-way, accessed 2/20/2019

*Why was the company not included?*
This company is located in the Electric Utility (Central) Value Line Industry. This company was recently created through the merger of Great Plains Energy Incorporated and Westar Energy, Inc. The department will consider this company as a guideline company in the future, after several years of financials are available.

**Eversource Energy**
*Company Summary from Value Line:*
Eversource Energy (formerly Northeast Utilities) is the parent of utilities that have 3.1 mill. electric, 504,000 gas, 230,000 water customers. Supplies power to most of Connecticut and gas to part of Connecticut; supplies power to 3/4 of New Hampshire's population; supplies power to western Massachusetts and parts of eastern Massachusetts & gas to central & eastern Massachusetts; supplies water to CT, MA, & NH. Acq'd NSTAR 4/12; Aquarion 12/17. Electric rev. breakdown: residential, 54%; commercial, 37%; industrial, 5%; other, 4%. Fuel costs: 37% of revs. '18 reported deprec. rate: 2.9%. Has 8,000 empls.

*Additional Company Information from Website:*
The approximately 8,000 men and women of Eversource bring a strong commitment to providing safe, reliable and sustainable electric, gas and water service. Serving the neighborhoods where we live and work. Coming together in good weather and bad. Taking care of problems before they're problems. Heading out in the storm when others head home. Connecting you to solutions for savings. Working together for a better tomorrow. In 2012, Northeast Utilities and its operating companies Connecticut Light & Power, Public Service of New Hampshire, Western Massachusetts Electric and Yankee Gas merged with NSTAR Electric & Gas to better serve New England. On December 4, 2017, Eversource closed the deal on an acquisition of Aquarion Water Company, making Eversource the only electric company in the U.S. that also owns a water utility. Aquarion serves 230,000 water customers in Connecticut, Massachusetts and New Hampshire. Combined, we power the possible for New England.[33]

*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 8.9 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, 54%; small comm'l & ind'l, 16%; large comm'l & ind'l, 17%; other, 13%. Generating sources: nuclear, 68%; other, 10%; purch., 22%. Fuel costs: 46% of revs. '18 depr. rates: 2.7%-7.0% elec., 2.1% gas. Has 33,400 empls.

[33] https://www.eversource.com/content/general/about/about-us/about-us/welcome-to-eversource, accessed 12/30/2019

*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 2018 revenues of $35.9 billion. We employ approximately 33,400 people nationwide. Exelon's family of companies represents every stage of the energy value chain. Exelon's six utilities deliver electricity and natural gas to approximately 10 million customers in Delaware, the District of Columbia, Illinois, Maryland, New Jersey and Pennsylvania through its Atlantic City Electric, BGE, ComEd, Delmarva Power, PECO and Pepco subsidiaries. Exelon is one of the largest competitive U.S. power generators, with more than 31,000 megawatts of nuclear, gas, wind, solar and hydroelectric generating capacity comprising one of the nation's cleanest and lowest-cost power generation fleets. The company's Constellation business unit provides energy products and services to approximately 1.8 million residential, public sector and business customers, including more than two-thirds of the Fortune 100.[34]

*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: 32% of revenues. '18 reported deprec. rate: 2.6%. Has 12,500 employees.

*Additional Company Information from Website:*
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 24,500 miles of transmission lines that connect the Midwest and Mid-Atlantic regions, and a generating fleet with a total capacity of more than 5,000 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.[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.

---

[34] http://www.exeloncorp.com/company/about-exelon, accessed 12/30/2019

[35] https://www.firstenergycorp.com/about.html, accessed 12/30/2019

**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, 1.3 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: 30% of revenues. '18 reported deprec. rate: 2.5%. Has 8,800 employees.

*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 $52 billion and 2018 revenue of $8.4 billion. Our more than 8,800 employees serve utility customers in five Canadian provinces, nine U.S. states and three Caribbean countries.[36]

*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.

**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), and Pacific Current. HECO & its subs., Maui Electric Co. (MECO) & Hawaii Electric Light Co. (HELCO), supply electricity to 463,000 customers on O‘ahu, Maui, Molokai, Lanai, & Hawaii. Operating companies' systems are not interconnected. Elec. rev. breakdown: residential, 31%; commercial, 33%; lg. light & power, 35%; other, 1%. Generating sources: oil, 55%; purch., 45%. Fuel costs: 49% of revs. '18 reported depr. rate (util.): 3.2%. Has 3,900 employees.

*Additional Company Information from Website:*

For more than 125 years, the Hawaiian Electric Companies have provided the energy that has fueled our islands' growth and prosperity. Hawaiian Electric, Maui Electric, and Hawaii Electric Light serve 95 percent of Hawaii. With that great privilege comes great responsibility. We have a shared kuleana to serve our customers, care for our communities, and lead the way to a clean energy future for our islands. We are creating strong partnerships within our communities to achieve a 100 percent renewable energy future, the most ambitious clean energy goal in the nation. Today, we are providing cleaner, smarter and more reliable service for our customers. And we are committed to continuing our progress to meet our ambitious goals. In the end, we know the true measure of our success lies in the energy future we leave for generations to come.[37]

---

[36] https://www.fortisinc.com/about-us, accessed 12/30/2019

[37] http://www.hei.com/CustomPage/Index?keyGenPage=1073751873, accessed 12/30/2019

*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 565,000 customers throughout a 24,000-square-mile area in southern Idaho and eastern Oregon (population: 1.2 million). Most of the company's revenues are derived from the Idaho portion of its service area. Revenue breakdown: residential, 38%; commercial, 22%; industrial, 14%; irrigation, 11%; other, 15%. Generating sources: hydro, 46%; coal, 17%; gas, 8%; purchased, 29%. Fuel costs: 34% of revenues. '18 reported depreciation rate: 2.8%. 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 more than 560,000 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.[38]

*Why was the company not 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 (42% of '18 revs; 35% of '18 op. inc.), construction services (31%, 16%), natural gas distribution (18%, 18%); electric (7%, 16%) and pipeline and energy services (2%, 15%). Utilities sell gas & electricity in northwest and upper midwest U.S. Construction materials has 1.1 billion tons of construction reserves. Has 11,797 employees.

[38] http://www.idacorpinc.com/about-us/at-a-glance, accessed 12/30/2019

*Additional Company Information from Website:*
A strong infrastructure is the heart of our economy. It is the natural gas and electricity that power business, industry and our daily lives. Itis 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 two lines of business: regulated energy delivery and construction materials and services. 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 grew our company by developing businesses around our expertise. Today, MDU Resources is a multibillion-dollar corporation with operations, customers and employees across the country. We have more than 13,000 employees during peak construction season and are authorized to conduct business in 44 states. MDU Resources is the largest publicly traded company headquartered in North Dakota. Our stock has traded since 1948 under the symbol MDU on the New York Stock Exchange. We have paid dividends uninterrupted to our shareholders for 81 years. We have increased dividends 28 consecutive years, a feat accomplished by fewer than 90 of the U.S.-listed companies. Our commitment to paying dividends is reflected in our membership in the S&P High-Yield Dividend Aristocrats index.[39]

*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) and Gulf Power, which provide electricity to 5.5 million customers in eastern, southern, & northwestern Florida. NextEra Energy Resources is a nonregulated power generator with nuclear, gas, & renewable ownership. Has 79.9% stake in NextEra Energy Partners. Rev. breakdown: residential, 55%; commercial, 35%; industrial & other, 10%. Generating sources: gas, 73%; nuclear, 22%; other, 3%; purch., 2%. Fuel costs: 22% of revs. '18 reported depr. Rate (util.): 3.8%. Has 14,200 employees.

*Additional Company Information from Website:*
NextEra Energy Inc. (NYSE: NEE) is a leading clean energy company headquartered in Juno Beach, Florida. NextEra Energy owns two electric companies in Florida: Florida Power & Light Company, which serves more than five million customer accounts in Florida and is the largest rate-regulated electric utility in the United States as measured by retail electricity produced and sold; and Gulf Power Company, which serves more than 460,000 customers in eight counties throughout northwest Florida. NextEra Energy also owns a competitive energy business, NextEra Energy Resources, LLC, which, together with its affiliated entities, is the world's largest generator of renewable energy from the wind and sun and a world leader in battery storage. 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

[39] http://www.mdu.com/our-business-overview, accessed 12/31/2019

recognized often by third parties for its efforts in sustainability, corporate responsibility, ethics and compliance, and diversity. NextEra Energy is ranked No. 1 in the electric and gas utilities industry on Fortune's 2019 list of "World's Most Admired Companies" and ranked among the top 25 on Fortune's 2018 list of companies that "Change the World."[40]

NextEra Energy Inc. (NYSE: NEE) has completed its previously announced acquisition of Gulf Power Company from Southern Company (NYSE: SO) on January 1, 2019.[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. 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 (71% of 2018 revs.) develops, constructs, owns, and operates geothermal power plants that sell electricity. Under the product segment (about 29% of revs.), the company designs and manufactures power units for geothermal plants and power units for recovered generation. Employs 1,303.

*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 our renewable energy expertise, our core capabilities, and our global experience to supply and develop geothermal, recovered energy, and energy management and storage solutions.[42]

*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

---

[40] http://www.investor.nexteraenergy.com/company-overview, accessed 12/31/2019
[41] http://www.investor.nexteraenergy.com/news-and-events/news-releases/2019/01-01-2019-062635309, accessed 1/7/2020
[42] http://www.ormat.com/en/company/welcome/profile/, accessed 12/31/2019

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:*
Not available.

*Additional Company Information from Website:*
Pacific Gas and Electric Company, incorporated in California in 1905, is one of the largest combined natural gas and electric energy companies in the United States. Based in San Francisco, the company is a subsidiary of PG&E Corporation. There are approximately 24,000 employees who carry out Pacific Gas and Electric Company's primary business—the transmission and delivery of energy. The company provides natural gas and electric service to approximately 16 million people throughout a 70,000-square-mile service area in northern and central California. Pacific Gas and Electric Company and other energy companies in the state are regulated by the California Public Utilities Commission. The CPUC was created by the state Legislature in 1911. Fast Facts: Service area stretches from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east. 106,681 circuit miles of electric distribution lines and 18,466 circuit miles of interconnected transmission lines. 42,141 miles of natural gas distribution pipelines and 6,438 miles of transmission pipelines. 5.4 million electric customer accounts. 4.3 million natural gas customer accounts.[43]

PG&E Corporation and its primary operating subsidiary, Pacific Gas and Electric Company filed voluntary petitions under Chapter 111 of the U.S. Bankruptcy Code in the United States Bankruptcy Court for the Northern District of California on January 29, 2019.[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. Also, this company recently filed under Chapter 11.

**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 1.3 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, 51%; commercial, 39%; industrial, 5%; other, 5%. Generating sources: nuclear, 28%; gas & other, 26%; coal, 24%; purchased, 22%. Fuel costs: 29% of revenues. '18 reported deprec. rate: 2.8%. 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 about $18 billion. For over 125 years, Pinnacle West and our affiliates have provided energy and energy-related products to people and businesses

[43] https://www.pge.com/en_US/about-pge/company-information/profile/profile.page, accessed 12/31/2019
[44]https://www.pge.com/en/about/newsroom/newsdetails/index.page?title=20190129_pge_files_for_reorganization_under_chapter_11, accessed 2/20/2019

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-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.[45]

*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 528,000 customers in north central New Mexico, incl. Albuquerque and Santa Fe. Texas-New Mexico Power Company (TNMP) transmits and distributes power to 253,000 customers in Texas. Electric revenue breakdown: residential, 39%; commercial, 36%; industrial, 5%; other, 20%. Generating sources not available. Fuel costs: 28% of revenues. '18 reported deprec. rates: 2.4%-8.2%. Has 1,700 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 2,701 megawatts of generation capacity and serve electricity to more than 785,000 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 2018, consolidated operating revenues totaled $1.4 billion.[46]

*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 888,000 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, 32%; industrial, 11%; other, 10%. Generating sources: gas, 28%; coal, 15%; wind, 8%; hydro, 8%; purchased, 41%. Fuel costs: 29% of revenues. '18 reported depreciation rate: 3.6%. Has 3,000 employees.

[45] http://www.pinnaclewest.com/about-us/default.aspx, accessed 12/31/2019
[46] https://www.pnmresources.com/about-us.aspx, accessed 12/31/2019

*Additional Company Information from Website:*
For more than 130 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.[47]

*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 mill. customers) 11/10. Has electric distribution sub. in U.K. (7.8 mill. 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. '18 reported depr. rate: 2.8%. Has 12,400 empls.

*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 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 $15 billion through 2022 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 12,000 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.[48]

*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.

---

[47] https://www.portlandgeneral.com/our-company/pge-at-a-glance/quick-facts, 12/31/2019

[48] https://www.pplweb.com/who-we-are/about-us/, accessed 12/31/2019

**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 2.3 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: 33% of revenues. '18 reported depreciation rates (utility): 1.6%-2.5%. Has 13,100 employees.

*Additional Company Information from Website:*

The Public Service Corporation was formed in 1903, by amalgamating more than 400 gas, electric and transportation companies in New Jersey. Thomas McCarter was named the Corporation's first president and held the position until 1939. Internally, Public Service consolidated its gas and electric interests into Public Service Electric and Gas, and its transportation interests into Public Service Coordinated Transport (later Transport of New Jersey). Concerns about the concentration of economic power resulted in federal and state actions requiring the breakup of utilities. In 1943, Public Service once again became a stand-alone company, and was renamed Public Service Electric and Gas Company (PSE&G) in 1948.[49]

*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. Owns 80% of Oncor (acq'd 3/18), which distributes electricity in Texas. Customers: 4.9 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 nonutility subsidiaries. Sold commodities business in '10. Power costs: 34% of revs. '18 reported deprec. rates: 2.4%-6.4%. Has 20,000 employees.

*Additional Company Information from Website:*

Sempra Energy is an energy infrastructure company focused on connecting millions through the power of people, ideas and innovation. Our more than 20,000 employees pride themselves as leaders in the energy industry, serving approximately 40 million consumers worldwide. From our San Diego headquarters to our operations throughout North America, we are making great strides in developing forward-thinking energy solutions and positively impacting the communities we serve by delivering energy with purpose. Sempra Energy generated more than $11.6 billion in revenues in 2018 and total shareholder return of 246 percent over the past 10 years. With informed and impactful strategies in place and an inspiring mission to become North America's premier energy infrastructure company, our strong financial performance will keep us on the path for sustainable long-term growth.[50]

[49] https://corporate.pseg.com/aboutpseg/companyinformation, accessed 12/31/2019

[50] http://www.sempra.com/about-us, accessed 12/31/2019

*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:*
Southern Company Gas, 4.2 mill. customers in GA, NJ, IL, VA, & TN) 7/16. Sold Gulf Power 1/19. Electric rev. breakdown: residential, 37%; commercial, 31%; industrial, 18%; other, 14%. Retail revs. by state: GA, 56%; AL, 38%; MS, 6%. Generating sources: gas, 42%; coal, 27%; nuclear, 14%; other, 8%; purchased, 9%. Fuel costs: 34% of revs. '18 reported depr. rates (util.): 2.6%-4.1%. Has 29,200 empls.

*Additional Company Information from Website:*
Southern Company (NYSE: SO) is a leading energy company serving 9 million customers through our subsidiaries. We provide clean, safe, reliable and affordable energy through electric operating companies in three states, natural gas distribution companies in four states, a competitive generation company serving wholesale customers across America, a leading distributed energy infrastructure company, a fiber optics network and telecommunications services. Southern Company brands are known for excellent customer service, high reliability and affordable prices below the national average. For more than a century, we have been building the future of energy and developing the full portfolio of energy resources, including carbon-free nuclear, advanced carbon capture technologies, natural gas, renewables, energy efficiency and storage technology. Through an industry-leading commitment to innovation and a low-carbon future, Southern Company and its subsidiaries develop the customized energy solutions our customers and communities require to drive growth and prosperity. Our uncompromising values ensure we put the needs of those we serve at the center of everything we do and govern our business to the benefit of our world.[51]

NextEra Energy, Inc. (NYSE: NEE) has completed its previously announced acquisition of Gulf Power Company from Southern Company (NYSE: SO) on January 1, 2019.[52]

*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.

[51] https://www.southerncompany.com/about-us.html, accessed 12/31/2019
[52] http://www.investor.nexteraenergy.com/news-and-events/news-releases/2019/01-01-2019-062635309, accessed 1/7/2020

# 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 over 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 2018: 66%, residential; 28%, commercial; 5%, industrial; and 1% other. The company sold Atmos Energy Marketing, 1/17.

*Additional Company Information from Website:*
Atmos Energy Corporation is the nation's largest fully regulated, natural gas-only distributor of safe, clean, efficient and affordable energy. As part of our vision to be the safest provider of natural gas services, we are modernizing our business and our infrastructure while continuing to invest in safety, innovation, environmental sustainability and our communities. An S&P 500 company headquartered in Dallas, Atmos Energy serves more than 3 million distribution customers in over 1,400 communities across eight states and manages proprietary pipeline and storage assets, including one of the largest intrastate natural gas pipeline systems in Texas.[53]

*Why was the company included?*
Atmos Energy Corporation provides gas to customers. This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

**Black Hills Corporation**
*Company Summary from Value Line:*
Black Hills Corporation is a holding company for Black Hills Energy, which serves 212,000 electric customers in CO, SD, WY and MT, and 1.1 million gas customers in NE, IA, KS, CO, WY, and AR. Has coal mining sub. Acq'd Cheyenne Light 1/05; utility ops. from Aquila 7/08; SourceGas /16. Discont. telecom in '05; oil marketing in '06; gas marketing in '11; gas & oil E&P in '17. Electric rev. breakdown: res'l, 33%; comm'l, 37%; ind'l, 19%; other, 11%. Generating sources: coal, 32%; other, 10%; purch., 58%. Fuel costs: 36% of revs. '18 deprec. rate: 3.4%. Has 2,900 employees.

*Additional Company Information from Website:*
Black Hills Corporation, a South Dakota corporation (together with its subsidiaries, referred to herein as the "Company," "we," "us" or "our"), is a customer-focused, growth-oriented utility company headquartered in Rapid City, South Dakota. Our predecessor company, Black Hills Power and Light Company, was incorporated and began providing electric utility service in 1941. It was formed through the purchase and combination of several existing electric utilities and related assets, some of which had served customers in the Black Hills region since 1883. In 1956, with the purchase of the Wyodak coal mine, we began producing and selling energy through non-regulated businesses. We operate our business in the United States, reporting our operating results through our regulated Electric Utilities,

[53] https://www.atmosenergy.com/company/about-atmos-energy, accessed 12/31/2019

regulated Gas Utilities, Power Generation and Mining segments. Certain unallocated corporate expenses that support our operating segments are presented as Corporate and Other. Our Electric Utilities segment generates, transmits and distributes electricity to approximately 212,000 electric customers in Colorado, Montana, South Dakota and Wyoming. Our Electric Utilities own 939 MW of generation and 8,858 miles of electric transmission and distribution lines. Our Gas Utilities segment serves approximately 1,054,000 natural gas utility customers in Arkansas, Colorado, Iowa, Kansas, Nebraska, and Wyoming. Our Gas Utilities own and operate approximately 4,700 miles of intrastate gas transmission pipelines and 41,158 miles of gas distribution mains and service lines, seven natural gas storage sites, over 45,000 horsepower of compression and nearly 600 miles of gathering lines. Our Power Generation segment produces electric power from its wind, natural gas and coal generating plants and sells the electric capacity and energy primarily to our utilities under long-term contracts. Our Mining segment produces coal at our mine near Gillette, Wyoming, and sells the coal primarily under long-term contracts to mine-mouth electric generation facilities owned by our Electric Utilities and Power Generation businesses. Black Hills Corporation is a customer focused, growth-oriented utility company with a tradition of exemplary service and a vision to be the energy partner of choice. Based in Rapid City, South Dakota, the company serves over 1.25 million electric and natural gas utility customers in more than 800 communities in Arkansas, Colorado, Iowa, Kansas, Montana, Nebraska, South Dakota and Wyoming. Employees partner to produce results that improve life with energy. [54]

*Why was the company included?*
Black Hills Corporation provides electric and gas to customers. Electric customers represent 16% of customers and gas customers represent 84% of customers. This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing. The company engages in providing gas distribution services.

Also using this company as a guideline company for the Electric Market Segment.

**CenterPoint Energy Inc.**
*Company Summary from Value Line:*
CenterPoint Energy Inc. is a holding company for Houston Electric, which serves 2.5 million customers in Houston and environs, and gas utilities with 4.4 million customers in Texas, Minnesota, Arkansas, Louisiana, Oklahoma, Indiana, and Ohio. Owns 53.7% of Enable Midstream Partners. Has nonutility operations. Discontinued Texas Genco Holdings in '04. Acquired Vectren 2/19. Electric revenue breakdown: residential, 52%; commercial, 31%; industrial, 15%; other, 2%. Gas costs: 55% of revenues. '18 depreciation rate: 6.3%. Has 14,000 employees.

*Additional Company Information from Website:*
**Company Overview** Our vision to lead the nation in delivering energy, service and value drives our strategy and performance. We have an unwavering commitment to safely and reliably deliver electricity and natural gas to millions of people. **Natural Gas** We sell and deliver natural gas to more than 4.5 million homes and businesses in eight states: Arkansas, Indiana, Louisiana, Minnesota (including Minneapolis), Mississippi, Ohio, Oklahoma and Texas (including greater Houston area). We are investing in modernizing our natural gas infrastructure and are committed to eliminating cast-iron pipe in all our territories. **Electric Transmission and Distribution and Power Generation**We maintain the wires, poles and electric infrastructure serving more than 2.5 million metered customers in the greater Houston area and in

[54] http://ir.blackhillscorp.com/Cache/396796068.pdf, accessed on 12/30/2019

southwestern Indiana. We also own and operate nearly 1,300 megawatts of electric generation capacity in Indiana. We are committed to the reliable delivery of electricity generated from power plants and renewable energy resources to homes and businesses. **Competitive Energy Businesses** Our competitive energy businesses include three areas: natural gas marketing and energy-related services; energy efficiency, sustainability and infrastructure modernization solutions; and construction and repair services for pipeline systems, primarily natural gas. Our competitive energy businesses' footprint spans nearly 40 states. **CenterPoint Energy Home Service Plus®** 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. **CenterPoint Energy and HomeServe** We are partnering with HomeServe, a trusted nationwide provider of emergency home repair programs, in our natural gas markets in Texas and in Houston to offer our customers service repair plans that reduce the stress and expense from the unexpected.[55]

CenterPoint Energy Inc. and Vectren Corporation announced on February 1, 2019 the successful completion of their merger.[56]

*Why was the company included?*
CenterPoint Energy Inc. provides electricity and gas to customers. Electric customers represent 36% of customers and gas customers represent 64% of customers. This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing. The company engages in providing gas distribution services in Minnesota.

Even though CenterPoint Energy Inc. and Vectren Corporation recently completed a merger, we are including them as a guideline company as the merger was completed in early 2019.

Also using this company as a guideline company for the Electric Market Segment.

**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, 1.8 million gas customers. Has 1,034 megawatts of nonregulated generating capacity. Sold Palisades nuclear plant in '07. Electric revenue breakdown: residential, 45%; commercial, 34%; industrial, 15%; other, 6%. Generating sources: coal, 26%; gas, 14%; other, 3%; purchased, 57%. Fuel costs: 44% of revenues. '18 reported deprec. rates: 3.9% electric, 2.9% gas, 10.1% other. Has 8,000 full-time 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 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

[55] https://www.centerpointenergy.com/en-us/corporate/about-us/company-overview, accessed on 12/30/2019
[56] http://investors.centerpointenergy.com/news-releases/news-release-details/centerpoint-energy-and-vectren-complete-merger, accessed 2/20/2019

providing unsecured home improvement payment option programs for homeowners through nationwide dealer networks.[57]

*Why was the company included?*
CMS Energy Corporation provides electricity and gas to customers. Electric customers represent 50% of customers and gas customers represent 50% of customers. This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing. The company engages in providing gas distribution services.

Also using this company as a guideline company for the Electric Market Segment.

**MGE Energy Inc.**
*Company Summary from Value Line:*
MGE Energy Inc. is a holding company for Madison Gas and Electric Company (MGE), which provides electric service to 153,000 customers in Dane County and gas service to 161,000 customers in seven counties in Wisconsin. Electric revenue breakdown, '18: residential, 35%; commercial, 51%; industrial, 3%; other, 11%. Generating sources, '18: coal, 52%; gas, 14%; renewables, 11%; purchased power, 23%. Fuel costs: 34% of revenues. '18 reported depreciation rates: electric, 2.9%; gas, 2.1%; nonregulated, 2.3%. Has 700 employees.

*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.[58]

*Why was the company included?*
MGE Energy Inc. provides electricity and gas to customers. Electric customers represent 49% of customers and gas customers represent 51% of customers. This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing. The company engages in providing gas distribution services.

---

[57] https://www.cmsenergy.com/about-cms-energy/, accessed 12/30/2019
[58] https://www.mgeenergy.com/en/about/about-mge-energy, accessed 12/30/2019

Also using this company as a guideline company for the Electric Market Segment.

**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 NJ, and in states from the Gulf Coast to New England, and Canada. New Jersey Natural Gas had 547,600 cust. at 9/30/19. Fiscal 2019 volume: 232 bill. cu. ft. (17% interruptible, 17% res., 9% commercial & elec. utility, 40% capacity release programs). N.J. Natural Energy subsidiary provides unregulated retail/wholesale natural gas and related energy svcs. 2018 dep. rate: 2.7%. Has 1,068 empls.

*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®.[59]

*Why was the company included?*
New Jersey Resources Corporation provides energy and natural gas services to customers. 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: 472,000 electric in Indiana, 3.5 million gas in Indiana, Ohio, Pennsylvania, Kentucky, Virginia, Maryland, Massachusetts through its Columbia subsidiaries. Revenue breakdown, 2018: electrical, 33%; gas, 67%; other, less than 1%. Generating sources, 2018: coal, 69.4%; purchased & other, 30.6%. 2018 reported depreciation rates: 2.9% electric, 2.2% gas. Has 8,087 employees.

*Additional Company Information from Website:*
We're a leading natural gas and electric utility company. Our over 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. It's all about our customers. By investing at record levels, we're: Improving reliability and safety for our customers and our

[59] https://www.njresources.com/about/our-companies.aspx, accessed 12/30/2019

communities. Making it easier for customers to do business with us. Providing additional access to natural gas and electric service. Reducing emissions and preserving our natural resources.[60]

*Why was the company included?*
NiSource Inc. provides electricity and gas to customers. This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

**ONE Gas Inc.**
*Company Summary from Value Line:*
ONE Gas Inc. provides natural gas distribution services to over two million customers. It has three divisions: Oklahoma Natural Gas, Kansas Gas Service, and Texas Gas Service. The company purchased 180 Bcf of natural gas supply in 2018, compared to 137 Bcf in 2017. Total volumes delivered by customer (fiscal 2018): transportation, 56%; residential, 33%; commercial & industrial, 10%; wholesale & public authority, 1%.

*Additional Company Information from Website:*
ONE Gas Inc. (NYSE: OGS) is a 100-percent regulated natural gas utility, and trades on the New York Stock Exchange under the symbol "OGS." ONE Gas is included in the S&P MidCap 400 Index, and is one of the largest natural gas utilities in the United States. ONE Gas provides natural gas distribution services to more than 2 million customers in Oklahoma, Kansas and Texas. ONE Gas is headquartered in Tulsa, Okla., and its divisions include Oklahoma Natural Gas, the largest natural gas distributor in Oklahoma; Kansas Gas Service, the largest in Kansas, and Texas Gas Service, the third largest in Texas, in terms of customers. Its largest natural gas distribution markets by customer count are Oklahoma City and Tulsa, Okla.; Kansas City, Wichita and Topeka, Kan.; and Austin and El Paso, Texas. ONE Gas serves residential, commercial, industrial, transportation and wholesale customers in all three states.[61]

*Why was the company included?*
ONE Gas Inc. provides natural gas to customers. 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. Dist. natural gas to approx. 685,000 customers in New Jersey and Maryland. South Jersey Gas rev. mix ’18: residential, 46%; commercial, 22%; cogen. and electric gen., 13%; industrial, 19%. Acq. Elizabethtown Gas and Elkton Gas, 7/18. Nonutil. operations include South Jersey Energy, South Jersey Resources Group, South Jersey Exploration, Marina Energy, South Jersey Energy Service Plus, and SJI Midstream. Has about 1,100 employees.

*Additional Company Information from Website:*
SJI (NYSE: SJI), is a customer-focused, energy services company providing expertise and resources that meet the diverse energy needs of our region's residents, businesses, schools, hospitals, and more. We do this through three primary subsidiaries: SJI Utilities – SJI's regulated natural gas utility business, delivers safe, reliable, affordable natural gas to approximately 690,000 South Jersey Gas, Elizabethtown Gas and Elkton Gas customers in New Jersey and Maryland. South Jersey Energy Solutions – promotes efficiency, clean energy technology and renewable energy by providing customized wholesale commodity marketing and fuel management services; and developing, owning and operating on-site

[60] https://www.nisource.com/company, accessed 12/31/2019
[61] http://www.onegas.com/en/About.aspx, accessed 12/31/2019

energy production facilities. SJI Midstream – houses the company's interest in the PennEast Pipeline Project.[62]

*Why was the company included?*
South Jersey Industries provides gas to customers. 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. 2018 margin mix: residential and small commercial, 85%; large commercial and industrial, 3%; transportation, 12%. Total throughput: 2.2 billion therms. Has 8,632 employees.

*Additional Company Information from Website:*
Southwest Gas Holdings Inc. is a holding company with business interests in two major business segments – Natural Gas Operations and Utility Infrastructure Services. Driven by the values of safety, service, and reliability, we pursue excellence and innovation to enhance our reputation as a trusted provider of natural gas and construction services. Southwest Gas Holdings, Inc. is comprised of the following two business segments: **Natural Gas Operations** Southwest Gas Corporation is engaged in the business of purchasing, distributing, and transporting natural gas in portions of Arizona, California, and Nevada, serving over 2 million customers. Southwest Gas is the largest distributor of natural gas in Arizona and Nevada, serving large metropolitan areas including Phoenix, Tucson, and Las Vegas. In addition, Southwest Gas serves customers in portions of California, including the Lake Tahoe area, and the high desert and mountain areas in San Bernardino County. Southwest Gas also owns Paiute Pipeline Company, which owns and operates an interstate pipeline system that extends from the Idaho-Nevada border to the California-Nevada state line near the north and south ends of Lake Tahoe. Paiute also operates a peak shaving LNG storage facility near Lovelock, Nevada. Southwest Gas Corporation is dedicated to building positive relationships with customers, regulators, and the general public. Further, Southwest Gas is committed to earning customers' trust by delivering natural gas safely and reliably. **Utility Services Enterprise** Centuri Group, Inc. is a comprehensive utility services enterprise dedicated to delivering a diverse array of solutions to North America's gas and electric providers. This growing network of well-established brands include NPL, NPL Canada, Neuco, Canyon Pipeline, Linetec Services, and National Powerline. Centuri Group, Inc. operates in major markets across the United States and Canada.[63]

*Why was the company included?*
Southwest Gas Holdings Inc. provides gas to customers and also has a construction services company. The gas distribution segment is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

[62] https://www.sjindustries.com/about-sji/company-history-(1), accessed 12/31/2019
[63] https://www.swgas.com/en/about-us, accessed 12/31/2019

**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, Alabama, and Mississippi. Has roughly 1.7 million customers. Acquired Missouri Gas 9/13, Alabama Gas Co 9/14. Utility therms sold and transported in fiscal 2018: 3.3 bill. Revenue mix for regulated operations: residential, 66%; commercial and industrial, 24%; transportation, 6%; other, 4%. Has about 3,366 employees.

*Additional Company Information from Website:*
We're dedicated to understanding our customers' needs and goals to better serve them today and tomorrow. Every day we serve more than 1.7 million customers making us the fifth largest publicly traded natural gas company in the country. We help families and business owners fuel their daily lives through our gas utilities serving Alabama, Mississippi and Missouri. Our natural gas-related businesses include Spire Marketing, Spire STL Pipeline and Spire Storage. We are committed to transforming our business and pursuing growth through 1) growing organically, 2) investing in infrastructure, 3) acquiring and integrating, 4) innovation and technology.[64]

*Why was the company included?*
Spire Inc. provides gas to customers. This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing.

**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., 2.9 mill. gas. Acq'd Integrys Energy 6/15. Sold Point Beach nuclear plant in '07. Electric revenue breakdown: residential, 35%; small commercial & industrial, 31%; large commercial & industrial, 21%; other, 13%. Generating sources: coal, 45%; gas, 22%; renewables, 4%; purchased, 29%. Fuel costs: 38% of revenues. '18 reported deprec. rates (utility): 2.0%-3.2%. Has 7,900 employees.

*Additional Company Information from Website:*
We are one of the nation's largest electric generation and distribution and natural gas delivery holding companies, with the operational expertise and financial resources to serve the Midwest's energy needs safely, reliably and responsibly. Our subsidiaries focus on reliable service, customer satisfaction and shareholder value. Together, we provide energy services to more than 4.5 million customers in Wisconsin, Illinois, Michigan and Minnesota. Our combined assets allow operating efficiencies across 70,100 miles of electric distribution lines, 50,000 miles of natural gas distribution and transmission lines, and 7,300 megawatts of reliable power plant capacity. Our family of companies is committed to delivering world-class reliability and the very best customer care anywhere. Customers are the heart of our business, and we work every day to help grow and support communities where we provide vital energy services. As a Fortune 500 company, we value and develop our employees who are making a difference in a mission that matters.[65]

[64] https://www.spireenergy.com/about-spire, accessed 12/31/2019
[65] https://www.wecenergygroup.com/about/aboutus.htm, accessed 12/30/2019

*Why was the company included?*
WEC Energy Group provides electricity and gas to customers. Electric customers represent 36% of customers and gas customers represent 64% of customers. This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing. The company engages in providing gas distribution services in Minnesota.

Also using this company as a guideline company for the Electric Market Segment.

## Companies Not Included in the Gas Distribution Market Segments

**Adams Resources and Energy Inc.**
*Company Summary from Value Line:*
Adams Resources & Energy Inc. is engaged in the business of crude oil marketing, transportation, and storage in various crude oil and natural gas basins through its subsidiaries (GulfMark Energy, Inc. and Service Transport Co.). GulfMark markets crude oil and performs transportation services for other customers. Activity is concentrated primarily onshore in Louisiana, Michigan, North Dakota, Oklahoma, and Texas. It operates over 260 tractor trailer rigs and maintains about 164 pipeline inventory locations and injection stations. Service Transport transports liquid and dry bulk chemicals throughout the continental US, Canada, and Mexico. It operates 300 tractors of which 250 are company owned and 50 are independent owner operator units. It also owns and operates 550 tank trailers. Service Transport operates truck terminals in Houston, Freeport, Corpus Christi, and Nederland, Texas as well as Baton Rouge (St. Gabriel), Louisiana, St. Rose, Louisiana, and Mobile (Saraland), Alabama. Has 703 employees.

*Additional Company Information from Website:*
Adams Resources & Energy Inc. (NYSE AMERICAN:AE) ("Adams" or "AE") is primarily engaged in the business of crude oil marketing, transportation and storage and tank truck transportation of liquid chemicals and dry bulk through its two wholly-owned subsidiaries GulfMark Energy, Inc. ("GulfMark") and Service Transport Company ("Service Transport"). GULFMARK ENERGY, INC. GulfMark markets crude oil and performs transportation services for other customers. Activity is concentrated primarily onshore in Texas, Oklahoma, North Dakota, Michigan and Louisiana. GulfMark operates over 260 tractor-trailer rigs and maintains approximately 164 pipeline inventory locations and injection stations. GulfMark has the ability to barge oil from four oil storage facilities along the intercoastal waterway of Texas and Louisiana and maintains 425,000 barrels of storage capacity at dock facilities to access waterborne markets for its products. SERVICE TRANSPORT Service Transport transports liquid and dry bulk chemicals throughout the continental United States, Canada and Mexico. Service Transport operates 300 tractors of which 250 are Company owned and 50 are independent owner-operator units. The Company also owns and operates 550 tank trailers. Service Transport operates truck terminals in Houston, Freeport, Corpus Christi, and Nederland, Texas as well as Baton Rouge (St. Gabriel), Louisiana, St. Rose, Louisiana and Mobile (Saraland), Alabama.[66]

*Why was the company not included?*
Adams Resources and Energy Inc. is primarily engaged in the business of crude oil marketing, transportation and storage and tank truck transportation of liquid chemicals and dry bulk. These business segments are different than the business segments of the companies that the State Assessed Section is responsible for valuing.

[66] https://www.adamsresources.com/about-us/, accessed 12/31/2019

**AltaGas Canada Inc.**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
AltaGas Canada owns and operates assets with low risk stable earnings and cash flow
- Regulated natural gas distribution utilities
- Long-term contracted renewable power assets

$886 million in rate base and 123 MW of net renewable generation.[67]

*Why was the company not included?*
Company's initial public offering was on 10/25/2018. Company's operations are located in Western Canada. Will consider this company as a guideline company after several years of established financials.

**Chesapeake Utilities Corporation**
*Company Summary from Value Line:*
Chesapeake Utilities Corporation consists of two units: Regulated Energy and Unregulated Energy. The Regulated Energy segment (45% of 2018 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 (55% of 2018 revenues) wholesales and distributes propane; markets natural gas; and provides other unregulated energy services, including midstream services in Ohio.

*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 propane distribution operations, and its propane wholesale marketing subsidiary.[68]

*Why was the company not included?*
This company consists of two units: Regulated Energy and Unregulated Energy. The Unregulated Energy Unit accounted for over 50% of the company's 2018 revenues. Unregulated business segments are different from the companies that the State Assessed Section is responsible for valuing.

**Northwest Natural Holding Company**
*Company Summary from Value Line:*
Northwest Natural Holding Co. distributes natural gas to 1000 communities, 750,000 customers, in Oregon (89% of customers) and in southwest Washington state. Principal cities served:
Portland and Eugene, OR; Vancouver, WA. Service area population: 3.7 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, 37%; commercial, 22%; industrial, gas transportation, 41%. Employs 1,167.

---

[67] https://altagascanada.ca/about-us.html, accessed 12/31/2019
[68] http://www.chpk.com/our-company/our-companies/, accessed 12/31/2019

*Additional Company Information from Website:*
NW Natural is a wholly-owned subsidiary of NW Natural Holdings, and is headquartered in Portland, Oregon. NW Natural also serves customers out of resource centers in Albany, Astoria, Coos Bay, Eugene, Lincoln City, Salem and The Dalles in Oregon, and Vancouver, Washington.[69]

NW Natural Water Company, LLC (NW Natural Water), a wholly owned subsidiary of Northwest Natural Holding Company (NYSE:NWN), has finalized acquisitions of Sunriver Water LLC and Sunriver Environmental LLC. The transactions closed following regulatory review and approval by the Public Utility Commission of Oregon and close cooperation with the seller and community stakeholders.[70]

*Why was the company not included?*
Northwest Natural Gas Company provides gas to customers. This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing. However, this company was involved in a recent acquisition, we will not include them as a guideline in the 2020 Capitalization Rate Study.

**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 60,900 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. The 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 110 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.[71]

*Why was the company not included?*
RGC Resources Inc. provides gas to customers. This company is similar to the Gas Distribution Companies that the State Assessed Section is responsible for valuing. However, the company is the only Gas Distribution Guideline company with limited analysts' estimates available.

---

[69] https://www.nwnatural.com/AboutNWNatural/TheCompany/Overview, accessed 1/6/2020

[70] https://www.globenewswire.com/news-release/2019/05/31/1861286/0/en/NW-Natural-Water-Completes-Acquisition-of-Water-Wastewater-Companies-in-Sunriver-Oregon.html, accessed 1/7/2020

[71] https://www.rgcresources.com/about/, accessed 1/6/2020

**Star Group L.P. (formerly Star Gas Partners, L.P.)**

*Company Summary from Value Line:*

Star Group L.P. is a full service provider specializing in the sale of home heating and air conditioning products and services to residential and commercial home heating oil and propane customers. The company's operations are conducted through Petro Holdings, Inc. and its subsidiaries. Petro is primarily a Northeast, Central, and Southeast region retail distributor of home heating oil and propane that at June 30, 2019 served approximately 466,500 residential and commercial home heating oil and propane customers. Petro also sells diesel fuel, gasoline, and home heating oil to approximately 81,000 customers on a delivery only basis. It installed, maintained, and repaired heating and air conditioning equipment and provided these services outside its heating oil and propane customer base, including about 17,000 service contracts for natural gas and other heating systems. Kestrel Heat, LLC is Star Group's general partner. Has 3403 employees.

*Additional Company Information from Website:*

Star Group L.P. is a full service energy provider specializing in the sale of home heating and air conditioning products and services to residential and commercial customers. The Company also services and sells heating and air conditioning equipment and for certain areas, provides 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, 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 Company, are listed and trade on the New York Stock Exchange ("NYSE") under the symbol "SGU."[72]

Star Group, L.P. (the "Partnership" or "Star") (NYSE:SGU), a home energy distributor and services provider, today announced the recent completion of its acquisition of the assets of a Maryland based business that expands its customer base in that area. The acquired business serves approximately 28,800 accounts with annual volume (heating oil, propane and motor fuel) of approximately 20.0 million gallons.[73]

*Why was the company not included?*

This company's business segments include sale of home heating products and services to residential and commercial customers. These business segments are different that the business segments of the companies that the State Assessed Section is responsible for valuing.

**UGI Corporation**

*Company Summary from Value Line:*

GI Corp. operates six business segments: AmeriGas Propane (accounted for 24.3% of net income in 2018), UGI International (19.3%), Gas Utility (20.7%), Midstream & Marketing (27.4%), and Corp. & Other (8.3%). UGI Utilities distributes natural gas and electricity to over 642,000 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

---

[72] http://www.star-gas.com/about-us, accessed 1/6/2020

[73] https://www.globenewswire.com/news-release/2019/05/30/1859338/0/en/Star-Group-L-P-Announces-Acquisition.html, accessed 1/7/2020

(1/12). Vanguard Group owns 10.3% of stock; Blackrock, 9.8%; Officers/ directors, 2.4% (12/18 proxy). Has 7,700 empls.

*Additional Company Information from Website:*
UGI Corporation is an international energy distribution and services company that provides superior service in delivering a range of energy products. By operating as a best-in-class service provider, offering a great place to work, serving our communities and delivering value to investors, we aim to positively impact the lives of our shareholders, employees, customers and communities. UGI Corporation (NYSE: UGI) is a holding company that distributes and markets energy products and services through our subsidiaries and the company's common stock is a balanced growth and income investment. UGI Corporation has paid common dividends for more than 134 consecutive years.[74]

UGI Corporation (NYSE:UGI; "UGI") and AmeriGas Partners, L.P. (NYSE: APU; "AmeriGas") successfully completed the merger transaction that was announced on April 2, 2019. UGI acquired the approximately 69.2 million public common units of AmeriGas it did not already own in completing the buy-in of AmeriGas, the nation's largest retail propane marketer.[75]

*Why was the company not included?*
This company's non-gas utility segments accounted for most of their net income in 2018. Their gas utility segment only accounted for 20.7% of their net income. Unregulated business segments are different from the companies that the State Assessed Section is responsible for valuing.

# Market Segment: Gas Transmission Pipeline and Fluid Transportation Pipeline

## Companies Included in the Gas Transmission Pipeline Market Segment

**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). Employs. 8,600.

*Additional Company Information from Website:*
Enbridge's vision is to be the leading energy delivery company in North America. We deliver the energy people need and want—to heat their homes, to keep their lights on, to keep them mobile and connected. We operate across North America, fueling the economy and people's quality of life. We move nearly

[74] http://www.ugicorp.com/about-us/, accessed 2/22/2019
[75] https://www.businesswire.com/news/home/20190821005724/en/UGI-AmeriGas-Partners-L.P.-Complete-Merger-Transaction, accessed 1/7/2020

two-thirds of Canada's crude oil exports to the U.S., we transport about 20% of the natural gas consumed in the U.S., and we operate North America's third-largest natural gas utility by consumer count. Enbridge was an early investor in renewable energy, and we have a growing offshore wind portfolio. We work collaboratively every day to provide safe, reliable energy. Enbridge connects energy supply with growing markets in North America through our three core businesses: Liquids pipelines; Natural gas pipelines; Utilities and power. Enbridge was named to the Thomson Reuters Top 100 Global Energy Leaders in 2018; we were selected to Bloomberg's 2019 Gender Equality Index; and we have been ranked among the Best 50 Corporate Citizens in Canada for 17 years running, through 2019. Enbridge Inc. is headquartered in Calgary, Canada. We have a workforce of about 13,600 people, primarily in Canada and the United States. Enbridge (ENB) is traded on the New York and Toronto stock exchanges.[76]

*Why was the company included?*
Enbridge Inc. transports 20% of the natural gas consumed in the U.S. This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing.

**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 11,000 individuals.

*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 146 terminals and have approximately 11,000 employees. Our pipelines transport natural gas, refined petroleum products, crude oil, carbon dioxide (CO2) and more. Our terminals store and handle petroleum products, chemicals and other products. We are a market leader in each of our businesses – Natural Gas Pipelines, Products Pipelines, CO2, and Terminals. We have an unparalleled, large footprint of diversified and strategically located assets that are core to North American energy infrastructure and help deliver needed energy products to high-demand markets.[77]

With approximately 70,000 miles of natural gas pipelines, Kinder Morgan owns an interest in or operates the largest natural gas network in North America. We serve the major consuming markets of the United States, and our pipelines transport approximately 40 percent of the natural gas consumed in the U.S. Our pipelines are connected to every important natural gas resource play and supply area, including the Eagle Ford, Marcellus, Bakken, Utica, Uinta Permian, Haynesville, Fayetteville and Barnett.[78]

Pembina Pipeline Corporation announced August 21, 2019 that it has entered into agreements pursuant to which it will acquire Kinder Morgan Canada Limited and the U.S. portion of the Cochin Pipeline

---

[76] https://www.enbridge.com/about-us accessed 1/6/2020
[77] https://www.kindermorgan.com/about_us, accessed 1/6/2020
[78] https://www.kindermorgan.com/pages/business/gas_pipelines, accessed 1/7/2020

system from Kinder Morgan Inc. for a total purchase price of approximately $4.35 billion. The transaction values Kinder Morgan Canada at approximately $2.3 billion, or $15.02 per share, based on an all-share exchange ratio of 0.3068 of a common share of Pembina per KML security and Pembina's 30-day volume weighted average price on the date hereof: and Cochin US at approximately $2.05 billion for cash consideration.[79]

*Why was the company included?*
Kinder Morgan Inc. owns an interest in or operates the largest natural gas network in North America, transporting 40 percent of the natural gas consumed in the U.S. This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing. The company is the parent company for one of the companies that the State Assessed Section is responsible for valuing.

**ONEOK Inc.**
*Company Summary from Value Line:*
ONEOK Inc. is a leading midstream service provider. It owns premier natural gas liquids systems connecting supply in the Mid-Continent, Permian, and Rocky Mountain regions with key market centers. 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 2,684 employees.

*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 integrated network of NGL and natural gas pipelines, processing plants, fractionators and storage facilities in the Mid-Continent, Williston, Permian and Rocky Mountain regions.[80]

*Why was the company included?*
ONEOK Inc.'s operations include a 38,000-mile integrated network of NGL and natural gas pipelines. This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing. The company is the parent company for one of the companies that the State Assessed Section is responsible for valuing.

**TC Energy Corporation (formerly known as TransCanada Corporation)**
*Company Summary from Value Line:*
TC Energy Corp, formerly known as TransCanada Corp., operates the most extensive natural gas pipeline system, serving more than 25% of clean burning natural gas consumed in North America, with more than 57,500 mi. of natural gas pipelines, and 3,000 mi. of liquids pipeline (Keystone). Its three major segments are natural gas pipelines (66% of '18 rev.), oil pipelines (19%), and energy (15%). It has interests in 6,600 mw of power generation assets, and has 118 bill. Bcf of regulated/nonregulated gas storage. Employs 7,000.

[79] https://www.prnewswire.com/news-releases/pembina-pipeline-corporation-to-acquire-kinder-morgan-canada-and-the-cochin-pipeline-for-4-35-billion-and-increase-dividend-300904977.html, accessed 1/6/2020
[80] http://www.oneok.com/en/about, accessed 2/22/2019

*Additional Company Information from Website:*
TC Energy was founded in 1951 to develop the TransCanada Pipeline (now the Canadian Mainline) to ship natural gas from Western Canada to markets in the east. Since then, we have built a rich history delivering energy safely and reliably from where it's produced to where it's needed. Today, we are still the company we were back then, but the role we've quietly played in fulfilling society's thirst for all forms of energy has grown significantly. We continue to deliver the energy that millions of people rely on every day – but our complete business now includes pipelines, power generation and energy storage operations, with our footprint extending across the continent.[81]

With one of North America's largest energy infrastructure portfolios, no one powers day-to-day life like TC Energy. We share technical, stakeholder and operating expertise across all of our operations. Natural Gas – Safe operation of 92,600 km (57,500 miles) of pipeline & more than 653 billion cubic feet (Bcf) of natural gas storage. Oil & Liquids - Safe operation of approximately 4,900 km (3,000 miles) of pipeline. Power - Approximately 6,600 megawatts of capacity - enough to power more than six million homes.[82]

We changed the name of our company from TransCanada to TC Energy, following the approval of our shareholders at our Annual and Special Meeting of Shareholders on May 3, 2019. Our new name TC Energy better reflects the scope of our operations and reinforces our position as a leading North American energy infrastructure company.[83]

UGI Corporation (NYSE: UGI) announced that its subsidiary, UGI Energy Services, LLC, has signed a definitive agreement to acquire the equity interests of Columbia Midstream Group LLC, ("CMG") from a subsidiary of TC Energy Corporation (NYSE: TRP) ("TC Energy") for approximately $1.275 billion, subject to customary adjustments at closing. CMG holds five gathering systems, with capacity of roughly 2,675,000 MMBtu/day and 240 miles of pipeline, located in the southwestern core of the Appalachian Basin. The acquisition significantly expands UGI's midstream portfolio and provides an opportunity to invest an additional $300 - $500 million over the next five years at attractive returns. The company expects the transaction to be EPS neutral in fiscal year 2020, and accretive beginning in fiscal year 2021 excluding transaction and integration costs.[84]

*Why was the company included?*
TC Energy Corp's assets include 57,500 miles of natural gas pipelines. This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing. The company is the parent company for one of the companies that the State Assessed Section is responsible for valuing.

---

[81] https://www.tcenergy.com/TC-Energy/, accessed 1/6/2020
[82] https://www.tcenergy.com/operations/, accessed 1/6/2020
[83] https://www.tcenergy.com/TC-Energy/, accessed 1/6/2020
[84] https://www.ugicorp.com/investors/press-releases/press-releases-details/2019/UGI-Subsidiary-to-Acquire-Columbia-Midstream-Group-LLC-From-a-Subsidiary-of-TC-Energy-Corporation/default.aspx, accessed 1/7/2020

**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 5,425 employees.

*Additional Company Information from Website:*
Williams handles 30% of the natural gas in the United States that is used every day to heat our homes, cook our food and generate our electricity. Williams works closely with customers to provide the necessary infrastructure to serve growing markets and safely deliver natural gas products to reliably fuel the clean energy economy. With interstate natural gas pipelines and gathering & processing operations throughout the country, we reliably deliver value to our employees, investors, customers and communities by running our business with authenticity and a safety-driven culture, leading our industry into the future. Williams common stock (WMB) is listed on the New York Stock Exchange.[85]

*Why was the company included?*
Williams Companies Inc. handles 30% of the natural gas in the United States. This company is similar to the Gas Transmission Pipeline Companies that the State Assessed Section is responsible for valuing.

## Companies Included in the Fluid Transportation Pipeline Market Segment

**Holly Energy Partners L.P.**
*Company Summary from Value Line:*
Holly Energy Partners L.P. is a publicly held master limited partnership (MLP) that owns and operates petroleum product and crude oil pipelines, terminal, tankage & loading, and refineries that support Holly Frontier's (HFC) operations in the midcontinent, southwest, and northwest US and Alon USA's refinery in TX. Has two segments: Pipelines and Terminals, which transports light refined products from HFC's Navajo refinery and Alon USA's TX refinery to customers; and Refinery Processing Unit, which supports HFC's daily refining operations. Offs./dir. own less than 1% of common; HFC, 56.6%; Tortoise Cap., 6.6%. Has 283 empls.

*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, Washington, Idaho, Oklahoma, Utah, Nevada, Wyoming and Kansas as well as refinery processing units in Kansas and Utah. Business Highlights: Our assets are located in attractive high-growth markets; Revenues are mainly fee based revenues with limited commodity risk; A substantial part of our business operates under long-term contracts with minimum volume commitments; Track

[85] https://co.williams.com/our-company/, accessed 2/22/2019

record of increasing the quarterly distribution every quarter since our initial public offering in 2004; Strategic relationship with HollyFrontier; Experienced management team with a proven track record[86]

*Why was the company included?*
Holly Energy Partners owns and operates petroleum product and crude oil pipelines, terminal, tankage & loading, and refineries. This company is similar to the Fluid Transportation Pipeline Companies that the State Assessed Section is responsible for valuing.

**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 (72% of 2018 Revs., 57% of operating income) has 9,700 miles of pipeline and 53 terminals; Crude oil (21%, 38%) has 2,200 miles of pipeline and storage capacity of 33 million barrels; Marine storage (7%, 5%) has storage capacity of 27 million barrels. Acq'd. Longhorn Pipeline, 7/09; storage and pipeline from BP, 9/10. Employs 1,868.

*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 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 25 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 33 million barrels, of which 21 million are used for leased storage. Approximately 1,000 miles of these pipelines, the condensate splitter and 28 million barrels of this storage capacity (including 19 million barrels used for contract storage) are wholly-owned, and the remainder is owned through joint ventures. We also operate six marine terminals located along coastal waterways with an aggregate storage capacity of approximately 27 million barrels. Five of these terminals and approximately 25 million barrels of this storage capacity are wholly-owned, and the remainder is owned through joint ventures.[87]

*Why was the company included?*
Magellan Pipeline is an oil pipeline, storage and transportation company. This company is similar to, and is one of, the Fluid Transportation Pipeline Companies that the State Assessed Section is responsible for valuing.

[86] http://www.hollyenergy.com/about-us/corporate-structure/default.aspx, accessed 1/6/2020
[87] https://www.magellanlp.com/AboutUs/Default.aspx, accessed 1/6/2020

**NuStar Energy L.P.**

*Company Summary from Value Line:*

NuStar Energy L.P., is engaged in the transportation of petroleum products and anhydrous ammonia, as well as the terminalling, storage, and marketing of petroleum products. On 12/31/18 assets included 9,800 miles of pipeline and 75 terminal and storage facilities, providing 88 million barrels of storage capacity. Three reportable segments: Pipelines (57% of segment operating income in 2018), Storage (38%), and Fuels Marketing (5%). Valero accounted for 30% of pipeline revenue in 2018. Has 1,517 employees.

*Additional Company Information from Website:*

NuStar Energy L.P., a publicly traded master limited partnership based in San Antonio, is one of the largest independent liquids terminal and pipeline operators in the nation. NuStar currently has approximately 9,800 miles of pipeline and 74 terminal and storage facilities that store and distribute crude oil, refined products and specialty liquids. The partnership's combined system has approximately 74 million barrels of storage capacity, and NuStar has operations in the United States, Canada and Mexico.[88] With an enterprise value of around $8 billion, NuStar Energy L.P. (NYSE: NS) is a master limited partnership based in San Antonio, TX. NuStar currently has approximately 9,800 miles of pipeline and 74 terminal and storage facilities that store and distribute crude oil, refined products and specialty liquids. The partnership's combined system has approximately 74 million barrels of storage capacity at its facilities around the world, and NuStar has operations in the United States, Canada and Mexico.[89]

*Why was the company included?*

NuStar Energy LP is engaged in the transportation of petroleum products and anhydrous ammonia, as well as the terminal ling, storage, and marketing of petroleum products. This company is similar to, and is one of, the Fluid Transportation Pipeline Companies that the State Assessed Section is responsible for valuing.

**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 12/31/18, it had interests in more than 6,445 miles of pipelines with a gross capacity of approximately 2,767 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:*

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. [90]

---

[88] http://www.nustarenergy.com/Business, accessed 1/6/2020

[89] http://investor.nustarenergy.com/phoenix.zhtml?c=123440&p=irol-irhome, accessed 1/6/2020

[90] https://www.phillips66partners.com/, accessed 1/6/2020

*Why was the company included?*
Phillips 66 Partners has interests in more than 6,445 miles of pipeline and owns more than 25 terminals and other storage assets. This company is similar to the Fluid Transportation Pipeline 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, terminating, and marketing of crude oil, refined products, and liquefied petroleum gas. As of December 31, 2018, the company owned or leased 17,965 miles of active pipelines and gathering systems. Storage capacity 31 million barrels of natural gas liquids (NGL) storage facilities; About 77 millions barrels of crude oil and refined product. Also owns 830 trailers (primarily in Canada); 50 transport storage barges and 20 tugs. Has 4,900 employees.

*Additional Company Information from Website:*
Plains All American Pipeline L.P. (NYSE: 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 and natural gas. 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 United States and Canada. Plains GP Holdings (NYSE: PAGP) is a publicly traded entity that owns a non-economic controlling general partner interest in PAA and an indirect limited partner interest in PAA, one of the largest energy infrastructure and logistics companies in North America. Both companies are headquartered in Houston, Texas.[91]

*Why was the company included?*
Plains All American Pipeline LP owns an extensive network of pipeline transportation, terminalling, storage, and gathering assets. This company is similar to the Fluid Transportation Pipeline Companies that the State Assessed Section is responsible for valuing.

## Companies Not Included in the Gas Transmission Pipeline or Fluid Transportation Pipeline Market Segments

**AmeriGas Partners L.P.**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
AmeriGas Partners L.P. is the nation's largest retail propane marketer, serving approximately 1.7 million customers in all 50 states from approximately 1,900 distribution locations. We conduct our business principally through our subsidiary AmeriGas Propane, L.P.[92]

[91] https://www.plainsallamerican.com, accessed 1/6/2020
[92] https://investors.amerigas.com/about-amerigas/investor-overview/default.aspx, accessed 1/6/2020

UGI Corporation (NYSE:UGI; "UGI") and AmeriGas Partners, L.P. (NYSE: APU; "AmeriGas") successfully completed the merger transaction that was announced on April 2, 2019. UGI acquired the approximately 69.2 million public common units of AmeriGas it did not already own in completing the buy-in of AmeriGas, the nation's largest retail propane marketer.[93]

*Why was the company not included?*
No longer publicly traded.

**Andeavor Logistics L.P. (formerly Tesoro Logistics L.P. )**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
On July 30, 2019, MPLX LP (NYSE: MPLX) acquired Andeavor Logistics LP, creating a leading, large-scale, diversified midstream company.[94]

*Why was the company not included?*
No longer publicly traded.

**Antero Midstream Corporation**
*Company Summary from Value Line:*
Antero Midstream Corporation was created in March of 2019 when majority owner Antero Resources merged Antero Midstream Partners with AMGP, which was the General Partner and holder of the MLP's incentive distribution rights. The new entity owns and operates an integrated system of natural gas gathering pipelines, compression stations, processing and fractionation plants in the Marcellus Shale and the Utica Shale. Also owns water handling and treatment infrastructure that deliver fresh water and wastewater handling services for well completion operations.

*Additional Company Information from Website:*
Antero Midstream Corporation was formed by Antero Resources Corporation to service its rapidly increasing natural gas and NGL production in the Appalachian Basin. Headquartered in Denver, Colorado, we are focused on creating value through developing midstream infrastructure in two of the premier North American Shale plays, the Marcellus and Utica Shales. Due to its market leading firm transportation portfolio and midstream ownership through Antero Midstream, Antero is the most integrated NGL and natural gas business in the U.S.[95]

Antero Midstream GP LP and Antero Midstream Partners LP announced October 9, 2018 that they have entered into a definitive agreement for Antero Midstream GP LP to acquire all outstanding Antero Midstream Partners LP common units, in a stock and cash transaction. Renamed Antero Midstream Corporation.[96]

---

[93] https://investors.amerigas.com/financial-reports-and-information/press-releases/press-release-details/2019/UGI-and-AmeriGas-Partners-LP-Complete-Merger-Transaction/default.aspx, accessed 1/6/2020

[94] http://www.andeavorlogistics.com/about/ accessed 1/6/2020

[95] https://www.anteromidstream.com/about-us, accessed 1/6/2020

[96] https://www.anteromidstream.com/investors/news-events/press-releases/detail/58/amgp-to-acquire-antero-midstream-partners-in-a, accessed 2/26/2019

*Why was the company not included?*
Created in March 2019. Will consider after established financials.

**Antero Midstream GP L.P.**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
Antero Midstream GP LP and Antero Midstream Partners LP announced October 9, 2018 that they have entered into a definitive agreement for Antero Midstream GP LP to acquire all outstanding Antero Midstream Partners LP common units, in a stock and cash transaction. Renamed Antero Midstream Corporation.[97]

*Why was the company not included?*
No longer publicly traded.

**Antero Midstream Partners L.P.**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
Antero Midstream is a master limited partnership formed by Antero Resources Corporation to service its rapidly increasing natural gas and NGL production in the Appalachian Basin. Headquartered in Denver, Colorado, we are focused on creating value through developing midstream infrastructure in two of the premier North American Shale plays, the Marcellus and Utica Shales. Due to its market leading firm transportation portfolio and midstream ownership through Antero Midstream, Antero is the most integrated NGL and natural gas business in the U.S.[98]

*Why was the company not included?*
No longer publicly traded.

**Antero Resources Corporation**
*Company Summary from Value Line:*
Antero Resources Corporation is an energy company engaged in the exploration and development of natural gas, NGLs, and oil properties in the Appalachian Basin. Holds 612,000 acres in parts of West Virginia, Ohio, and Pennsylvania. 2018 proved reserves: 10,389 bcfe consisting of 6,669 bcfe of natural gas, 600 mmbbl NGLs, and 20 mmbbl oil. Net daily production averaged 3,213 mmcfe per day in 2018. Employees: 623. Depreciation rate: 5.4%.

*Additional Company Information from Website:*
Antero Resources Corporation is an independent oil and natural gas company engaged in the exploration, development, and production of natural gas, NGLs, and oil properties located in the

[97] https://www.anteromidstream.com/investors/news-events/press-releases/detail/58/amgp-to-acquire-antero-midstream-partners-in-a, accessed 2/26/2019
[98] https://www.anteroresources.com/about-us, accessed 1/6/2020

Appalachian Basin. Headquartered in Denver, Colorado, we are focused on creating value through the development of our large portfolio of repeatable, low cost, liquids-rich drilling opportunities in two of the premier North American shale plays, the Marcellus and the Utica shales. Due to its market leading firm transportation portfolio and midstream ownership through Antero Midstream, Antero is the most integrated NGL and natural gas business in the U.S.[99]

*Why was the company not included?*
This company is involved in exploration and development, which is not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Blueknight Energy Partners L.P.**
*Company Summary from Value Line:*
In August 2019, Blueknight Energy Partners LP received a buyout offer from Ergon, Inc. The proposal calls for Ergon to acquire all the common units of Blueknight for $1.35 per share in cash. The proposal is subject to approval by Blueknight unitholders. We have suspended the company's ranks as a result of this development. Blueknight provides integrated terminalling, gathering, and transportation services for companies engaged in the production of liquid asphalt and crude oil. The company has four operating segments: asphalt terminalling services, crude oil terminalling services, crude oil pipeline services; and crude oil trucking services. Its portfolio of assets consist of: 8.8 million barrels of liquid asphalt storage located at 53 terminals; 6.9 million barrels of above-ground crude oil storage capacity, approximately 6.6 million barrels of which are located at the Cushing Interchange terminalling facility in Cushing, Oklahoma; 655 miles of crude oil pipeline and 65 crude oil transportation vehicles deployed. Has 285 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 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: Product terminalling: Liquid asphalt and crude oil. Crude oil logistics: Pipeline transportation and trucking. Our general partner, Blueknight Energy Partners G.P., L.L.C., is owned by affiliates of Ergon, Inc. based in Jackson, MS. Ergon is a privately held company formed in 1954 with over 2,500 employees globally. Ergon and its subsidiaries are engaged in a wide range of operations. Ergon is an exceptional company with a solid track record and a like-minded disciplined approach to management. We know the importance of optimizing commercial opportunities for our customers, starting with the consistent delivery of safe and reliable solutions. Our customers include independent oil and gas producers, petroleum product wholesalers and distributors, refiners and energy traders.[100]

*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). These

[99] https://www.anteromidstream.com/investors/news-events/press-releases/detail/58/amgp-to-acquire-antero-midstream-partners-in-a, accessed 2/26/2019
[100] http://www.bkep.com/about, accessed 1/6/2020

business segments are 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:*
BP Midstream Partners LP is a fee-based, growth-oriented master limited partnership recently formed by BP Pipelines, an indirect wholly owned subsidiary of BP, to own, operate, develop and acquire pipelines and other midstream assets. The company's 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. BP Midstream owns 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. Its onshore crude oil pipeline, BP2, indirectly links Canadian crude oil production with BP's Whiting Refinery.

*Additional Company Information from Website:*
We are a fee-based, growth-oriented master limited partnership 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 assets consist of interests in entities that own crude oil, natural gas, refined products and diluent pipelines, and refined products terminals, serving as key infrastructure for BP and its affiliates and other customers to transport onshore and offshore production to key refining markets and trading and distribution hubs.[101]

*Why was the company not included?*
This company's initial public offering was 10/16/2017.[102] Consider this company in the future after it has at least three to five years of financial data available. Consider the location of the assets and the type of assets before including as a guideline company.

**Buckeye Partners L.P.**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
IMF Investors Pty Ltd and Buckeye Partners LP announced November 1, 2019 completion of the acquisition of Buckeye by the entities affiliated with IFM, adding one of the largest diversified networks of integrated midstream assets to IFM's substantial investments in energy infrastructure across North America.[103]

*Why was the company not included?*
No longer publicly traded.

[101] https://www.bp.com/en/global/bp-midstream-partners.html, accessed 1/6/2020
[102] 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
[103] https://www.streetinsider.com/Corporate+News/IFM+Investors+Completes+Acquisition+of+Buckeye+Partners%2C+L.P.+%28BPL%29/16076509.html, accessed 1/6/2020

**Cabot Oil and Gas Corp**

*Company Summary from Value Line:*

Cabot Oil & Gas develops, exploits, and explores oil & gas properties, primarily in Appalachia, east and south Texas, and Oklahoma. In 2018, produced 729.1 Bcfe of natural gas, 14% more than 2017; Crude oil/condensate/NGL production of 0.8 MMbbls. The company had yearend 2018 proved reserves of approximately 11.6 Tcfe, of which approx. 99% were natural gas or NGLs (in '17: 9.7 Tcfe, 19% increase). Has 303 employees.

*Additional Company Information from Website:*

Cabot Oil & Gas Corporation is an independent oil and gas company engaged in the development, exploitation and exploration of oil and gas properties exclusively in the continental United States. As of December 31, 2018 the Company had approximately 11.6 Tcfe of total proved reserves. Cabot continues to refine its operating focus, narrowing its natural gas development effort to the Marcellus Shale in northeast Pennsylvania.[104]

*Why was the company not included?*

Company's development, exploitation, and exploration of oil and gas properties is not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**California Resources Corp**

*Company Summary from Value Line:*

California Resources Corp. (CRC) is an independent oil and natural gas exploration and production company operating properties exclusively within California. The company markets crude oil, natural gas, natural gas liquids and electricity. CRC is the largest oil and gas producer in California on a gross operated basis, with average net daily production of 132 thousand barrels of oil equivalent per day (MBoe/d) in 2018. As of December 31, 2018, the company had net proved reserves of 712.0 million barrels of oil equivalent. Has 1,500 employees.

*Additional Company Information from Website:*

California Resources Corporation (NYSE: CRC) is an oil and natural gas exploration and production company operating properties exclusively in the state of California. CRC explores for, produces, gathers, processes and markets crude oil, natural gas and natural gas liquids. CRC has a large portfolio of lower-risk conventional opportunities in each of California's four major oil and gas basins: San Joaquin, Los Angeles, Ventura and Sacramento. CRC is California's largest oil and natural gas producer on a gross-operated basis, with nearly 5,000 employees and contractors. The company specializes in applying advanced technology to increase production from our diverse portfolio of reserves. CRC is committed to ensuring safety and protecting the environment everywhere we operate.[105]

*Why was the company not included?*

Company's exploration and production of crude oil, natural gas, and natural gas liquids properties in California is not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

---

[104] http://www.cabotog.com/about-cabot/, accessed 1/6/2020

[105] https://crc.com/about-crc, accessed 1/6/2020

**Callon Petroleum Co.**

*Company Summary from Value Line:*

Callon Petroleum Co. is an independent oil and natural gas company focused on the acquisition and development of unconventional onshore, oil, and natural gas reserves in the Permian Basin. Oil sales comprised 90% of total revenue for 2018. Est'd net proved reserves totaled 238.5 million barrels of oil equivalent. Estimated pretax present value of reserves: $3.251 billion. Had 218 employees at 12/31/18.

*Additional Company Information from Website:*

Callon Petroleum Company is an independent energy company focused on the acquisition and development of unconventional onshore oil and natural gas reserves in the Permian Basin in West Texas.[106]

Callon Petroleum Company (NYSE: CPE) and Carrizo Oil & Gas, Inc. (NASDAQ: CRZO) announced November 14, 2019 an amendment to the existing terms of their agreement for Callon to acquire Carrizo in an all-stock transaction. Under the amended terms, Carrizo shareholders will receive 1.75 shares of Callon common stock for each share of Carrizo common stock they own. With the amended exchange ratio, Callon shareholders will own approximately 58% of the combined company and Carrizo shareholders will own approximately 42% on a fully diluted basis. Based on the closing prices of Callon and Carrizo common shares on the pre-announcement date of July 12, 2019, the amended exchange ratio represents a premium of 6.7% to Carrizo shareholders.[107]

*Why was the company not included?*

Company's development of unconventional onshore oil and natural gas reserves is not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Centennial Resource Development Inc.**

*Company Summary from Value Line:*

Centennial Resource Development, Inc. is an independent oil and natural gas company focused on the development of unconventional oil and natural gas reserves. The company operates in Reeves, Ward, and Pecos counties in the Delaware Basin of west Texas. As of December 31, 2018, Centennial had 184 horizontal wells. It leased or acquired 88,286 net acres, and operates about 85%. It has undeveloped reserves of 121,387 mboe. Employs about 130.

*Additional Company Information from Website:*

Centennial Resource Development is an independent oil producer with assets in the core of the Delaware Basin, a sub-basin of the Permian Basin in West Texas. With approximately 80,100 net acres and 2,400 drilling locations, we are pursuing a growth strategy grounded in technical leadership, strong well results, attractive investment returns and a conservative balance sheet. Centennial is headquartered in Denver, Colorado.[108]

[106] https://www.callon.com/about-callon, accessed 1/7/2020
[107] https://www.prnewswire.com/news-releases/callon-and-carrizo-announce-amended-merger-agreement-300958293.html, accessed 1/7/2020
[108] http://www.cdevinc.com/, accessed 1/6/2020

*Why was the company not included?*
Company's development of unconventional oil and gas reserves is not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**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 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. is an international energy company headquartered in Houston, Texas, and is the leading producer of liquefied natural gas in the United States. We provide clean, secure, and affordable energy to the world, while responsibly delivering a reliable, competitive, and integrated source of LNG, in a safe and rewarding work environment. Cheniere's operations, construction and development also support energy and economic development across the United States. Cheniere is the second largest LNG producer in the world. In February 2016, Cheniere became the first company to ship LNG from a commercial facility in the contiguous United States. Since startup, more than 850 cumulative cargoes of LNG originating from Cheniere have been delivered to 32 countries and regions worldwide. In support of that global reach, Cheniere has additional offices in London, Singapore, Washington, Beijing, and Tokyo. LNG is natural gas in liquid form. It is produced through a refrigeration process that drops the temperature of natural gas down to -260 degrees Fahrenheit, at which point it converts to liquid, and its volume shrinks by 600 times, enabling global transport in LNG carriers. LNG is non-toxic and non-flammable. When burned, natural gas emits less carbon than coal and oil, with significantly less traditional air pollutants. Additionally, all mercury is removed during the LNG process.[109]

*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.

**Cheniere Energy Partners L.P.**
*Company Summary from Value Line:*
Cheniere Energy Partners L.P., through its subsidiary, Sabine Pass Liquefaction LLC (SPL), is developing, constructing, and operating natural gas liquefaction (NGL) facilities at the Sabine Pass LNG terminal located in Cameron Parish, Louisiana. The company also owns a 94-mile pipeline that connects the Sabine Pass LNG terminal with a number of large interstate pipelines via its subsidiary, Cheniere Creole Trail Pipeline L.P. (CTPL). Finally, through the Sabine Pass LNG L.P. (SPLNG) subsidiary, Cheniere owns and operates regasification facilities at the Sabine Pass LNG terminal.

*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

[109] https://www.cheniere.com/about-us/, accessed 1/6/2020

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 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, Train 3 commenced operations in March 2017 and Train 4 in October of 2017, and Train 5 in February 2019. All regulatory approvals have been received to construct and operate Train 6, and FID was reached in June 2019.[110]

*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.

**Chesapeake Energy Corp**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
Chesapeake's portfolio includes high-quality unconventional oil and natural gas assets in top U.S. onshore plays. Our value-driven strategy focuses on continuously generating capital efficiencies and operating with low, industry-leading production and G&A costs, along with a disciplined approach to liquidity. The safety of our employees, contractors, the public and the environment is our number one priority and reflects our commitment to conducting our business responsibly and living our core values.[111]

Chesapeake Energy Corporation (NYSE:CHK) announced February 1, 2019 that it has completed its acquisition of WildHorse Resource Development Corporation (NYSE:WRD). The merger was previously approved by Chesapeake shareholders and WildHorse stockholders at special meetings held on January 31, 2019.[112]

Chesapeake Energy Corp, once the second-largest U.S. natural gas producer, warned on Tuesday about its ability to continue as a going concern as the debt-laden company struggles with falling prices for the commodity. Shares of Chesapeake fell 13% to $1.35 in early trading, with the company earlier in the day also having reported a marginally bigger than expected loss and a huge shortfall in production for the third quarter. Chesapeake has about $10 billion in debt, nearly four times its market valuation. Much of that is a result of big spending when energy prices were high and acquisitions aimed at expanding in the oil-heavy Powder River Basin to combat falling natural gas prices. The company said its ability to

[110] http://www.cheniere.com/about-us/cheniere-partners/, accessed 1/6/2020
[111] http://www.chk.com/about, accessed 1/6/2020
[112] http://investors.chk.com/2019-02-01-Chesapeake-Energy-Corporation-Completes-Acquisition-Of-WildHorse-Resource-Development-Corporation, accessed 1/7/2020

meet debt covenants in the next 12 months will be affected if oil and natural gas prices continue to remain low.[113]

*Why was the company not included?*
Company is an independent exploration company engaged in the acquisition and development of properties for the production of oil, natural gas, and natural gas liquids. These exploration and production business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Cimarex Energy Co**
*Company Summary from Value Line:*
Cimarex Energy Co. is an independent oil & gas exploration and production company. Its operations are mainly located in the Mid-Continent (Oklahoma, the Texas Panhandle, and Kansas), and the Permian Basin. 2018 production total 81,010 thousand barrels of oil equivalent (MBOE), including 205.8 mmcfe gas and 46.6 barrels of liquids. Proved oil and gas reserves totaled 591,195 barrels of oil equivalent. Acquired Resolute Energy, 3/19 2018 depreciation rate: 3.1%. Has about 955 employees.

*Additional Company Information from Website:*
Cimarex is an exploration and production company with operations in Oklahoma, Texas and New Mexico. The majority of our activity is currently in the Permian Basin and the Anadarko Basin in Western Oklahoma. We pride ourselves on a strong technical team. The cornerstone to the Cimarex approach is detailed pre- and post-drill economic evaluation of after-tax rate of return on invested capital for every well drilled. We continually strive to maximize cash flow from producing properties for reinvestment in drill-bit driven growth opportunities.[114]

Cimarex Energy Co. (NYSE: XEC) announced that it completed its acquisition of Resolute Energy Corporation (NYSE: REN) ("Resolute") on March 1, 2019.[115]

*Why was the company not included?*
Company is an exploration and production company. These exploration and production business segments are not similar to the main business segments of the companies 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.

---

[113] https://www.reuters.com/article/us-chesapeake-enrgy-results/chesapeake-energy-raises-going-concern-doubts-idUSKBN1XF1LA, accessed 1/7/2020
[114] https://www.cimarex.com/about-cimarex/about-cimarex-overview/default.aspx, accessed 1/6/2020
[115] https://www.cimarex.com/investor-relations/news-and-events/news-releases/press-release-details/2019/Cimarex-announces-closing-of-the-acquisition-of-Resolute-Energy/default.aspx, accessed 1/7/2020

*Additional Company Information from Website:*
Clean Energy is changing the way the world fuels its vehicles. Reducing pollution from the transportation industry is an important 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 happening. Natural gas is abundant and economically viable and is increasingly being adopted as transportation fuel by countries around the world.[116]

*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.

**CNX Midstream Partners L.P.**
*Company Summary from Value Line:*
CNX Midstream Partners LP (CNXM) is focused on the ownership, operation, development, and acquisition of natural gas gathering and other midstream energy assets to service its customers' production in the Marcellus Shale and Utica Shale in Pennsylvania and west Virginia. Its assets include natural gas gathering pipelines and compression and dehydration facilities, as well as condensate gathering, collection, separation, and stabilization facilities. CNXM's midstream operations currently consist of two operating segments: Anchor Systems, in which the partnership owns a 100% controlling interest in developed midstream systems, which includes its four primary midstream systems (the McQuay System, the Majorsville System, the Mamont System, and the ShirleyPenns System) and related assets; and Additional Systems, in which the partnership owns a 5% controlling interest, including several gathering systems. Has 110 employees.

*Additional Company Information from Website:*
CNX Midstream NYSE:CNXM is a growth-oriented master limited partnership that owns, operates, and develops gathering and other midstream energy assets to service natural gas production in the Marcellus Shale in Pennsylvania and West Virginia.[117]

*Why was the company not included?*
This company's main business segments are natural gas gathering pipelines, compression and dehydration facilities, and condensate gathering, collection, separation, and stabilization facilities. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**CNX Resources Corp**
*Company Summary from Value Line:*
CNX Resources Corp. is one of the largest independent natural gas exploration, development and production companies, with operations centered in the major shale formations of the Appalachian basin. It produced 507.1 bcfe of natural gas in 2018. Proved natural gas reserves: 7.9 trillion cubic feet at 12/31/18. Bought Dominion Resources' Appalachian gas operations, 4/10. Spun off CONSOL Energy 11/17. Has 564 employees.

---

[116] https://www.cleanenergyfuels.com/about-us/, accessed 1/6/2020
[117] http://www.cnxmidstream.com/, accessed 1/6/2020

*Additional Company Information from Website:*
Focused on the future and fueled by a proud pedigree of energy leadership that stretches back more than 150 years, CNX is a premiere independent oil and gas exploration and production company with operations centered in the Appalachian Basin. Embodying a renowned spirit of innovation, we're pioneering a new tomorrow through technological advancements in shale gas exploration and production in the most prolific natural gas basin in the world. Like few other companies can, we're drawing on our proud past while embracing fresh thinking and leveraging the ingenuity of our people to, once again, forge a new energy future for the Pittsburgh region and beyond.[118]

*Why was the company not included?*
Company is an exploration, development, and production company. These exploration and production business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Concho Resources Inc.**
*Company Summary from Value Line:*
Concho Resources Inc. engages in the acquisition, development, exploitation, and exploration of oil and natural gas properties. The company's principal operating areas are focused in the Permian Basin of southeast New Mexico and west Texas. As of 12/31/18, estimated proved reserves were 1,187 mmboe (apr. 63% oil and 37% natural gas). Has 1,503 employees.

*Additional Company Information from Website:*
Concho Resources Inc. is an independent exploration and production company engaged in the acquisition, development and exploration of oil and natural gas properties. Concho's operations are concentrated in the Permian Basin of Southeast New Mexico and West Texas.[119]

*Why was the company not included?*
Company engages exploration and production of oil and natural gas properties. These exploration and production business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**CONSOL Energy**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
CONSOL Energy, a publicly owned Canonsburg-based producer and exporter of high-BTU bituminous thermal coal, is one of the leading energy companies in the United States of America. We own and operate some of the most productive longwall mining operations in the nation and one of the largest export terminals on the Eastern seaboard. As we like to say, America's energy truly does start here. Since the origins of our company in 1860 and our first active mining operations in 1864, CONSOL has powered the nation with affordable, abundant, reliable domestic energy. Today, CONSOL's employees help generate the fuel that accounts for nearly one-third of the nation's power supply. Our energy

[118] https://www.cnx.com/about-us, accessed 1/6/2020
[119] https://www.concho.com/operations, accessed 1/6/2020

supports the American way of life by helping deliver electricity 24/7/365, creating family-sustaining jobs and keeping our nation competitive in the global marketplace. Our strong record on safety and environmental stewardship, as well as our commitment to the communities where we have lived and worked for generations, has helped enable us to become the accomplished energy company we are today. Our core values -- Safety, Compliance and Continuous Improvement -- are the foundational elements and guiding principles of our business model and distinguish us from our peers. CONSOL Energy's coal mines are highly technical operating environments that require specialized training. Pick axes and shovels have been replaced with technologically advanced processes such as longwall mining, enhanced safety protocols, digital technologies and sophisticated communications technologies. These advances have helped turn the mining process into a safer and more productive work environment. Built on our proud history, CONSOL Energy strives each and every day to be one of the safest and most respected energy producers in the world, now and into the future.[120]

*Why was the company not included?*
Company is a producer and exporter of coal. This is not a similar market segment 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 engaged in development, acquisition, ownership or control, and operation of primarily fee-based assets and operations within the energy midstream sector. Its portfolio of assets are located in the Marcellus Shale, Bakken Shale, Delaware Permian Basin, PRB Niobrara Shale, Barnett Shale, and Fayetteville Shale. Crestwood offers infrastructure solutions across the value chain to service premier liquids-rich natural gas and crude oil shale plays across the US. At December 31, 2018 year end, its assets portfolio included: natural gas facilities with approximately 2.9 Bcf/d of gathering capacity; NGL facilities with approximately 2.5 MMBbls of storage capacity; and crude oil facilities with approximately 125,000 Bbls/d of gathering capacity. The partnership is a holding company and all of its consolidated operating assets are owned through its subsidiary, Crestwood Midstream. Has 859 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 Bakken Shale, Delaware Basin, Powder River Basin, Marcellus 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; and gathering and disposal of produced water. Our goal is to create long-term value for our unitholders by delivering increasing distributable cash flow through organic expansion, development projects and acquisitions, while at the same time ensuring the ongoing stability of our business. We aim to provide the highest quality of customer service while maintaining focus on safety, compliance and the environment.[121]

[120] http://www.consolenergy.com/about, accessed 1/6/2020
[121] http://www.crestwoodlp.com/about-us/, accessed 1/6/2020

*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 segment is not similar to the main business segments of 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 subsidiary of CST Brands, Inc., one of the largest independent retailers of motor fuels and convenience merchandise in North America. The company's 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. In October 2019, the company closed on the previously announced agreement with Applegreen plc, the global roadside convenience retailer, to operate 46 company operated retail sites in the US Upper Midwest. Has 548 employees.

*Additional Company Information from Website:*
CrossAmerica Partners LP is a distributor of branded petroleum for motor vehicles in the United States. We distribute fuel to more than 1,300 locations and own or lease approximately 1,000 sites. Our geographic footprint covers 34 states.[122]

*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 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 49 plants and 57,000 miles of natural gas and natural gas liquids (NGLs) pipelines. It is the nation's largest NGL producer and natural gas processor. Has two primary segments: Gathering & Processing and Logistics & Marketing. Officers/directors own less than 1% of units; DCP Midstream LLC, 36.8%; three institutions combined, 14.6% ('18 10-K).

*Additional Company Information from Website:*
DCP Midstream is a Fortune 500 company and one of the largest producers of NGLs and one of the largest natural gas processing companies in the U.S. DCP is leveraging their strategic footprint to extend the value chain through integrated pipelines. 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

[122] http://www.crossamericapartners.com, accessed 1/6/2020

extend the value chain through our integrated NGL pipelines and other marketing and logistics infrastructure.[123]

*Why was the company not included?*
This company's main business segments are gathering, processing and logistics, and marketing. Natural gas liquids pipelines appear to be a smaller portion of business. NGL pipelines are in the Gulf Coast, Colorado, Kansas, Texas, Oklahoma, and New Mexico. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**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. Its pipelines and transportation segment consists of approximately 400 miles of crude oil pipelines, 16 miles of refined product pipelines, an approximately 600-mile crude oil gathering system, and associated crude oil storage tanks with an aggregate of approximately 1.4 million barrels of active shell capacity. In addition to these operating systems, Delek owns or leases 125 tractors and 166 trailers used to haul primarily crude oil and other products for related and third parties.

*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, Inc. (NYSE:DK) ("Delek") 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 Big Spring and Tyler, Texas and El Dorado, Arkansas. Learn more about our parent company at DelekUS.com. We operate in two business segments: our Pipelines and Transportation segment and our Wholesale Marketing and Terminalling segment.[124]

*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.

**Devon Energy Corp.**
*Company Summary from Value Line:*
Devon Energy Corp. is a North American oil, NGL, and gas exploration and production company. It has properties in the Delaware Basin, Eagle Ford, Rockies Oil, Heavy Oil (Canada) plays, and the STACK in the Anadarko Basin. 2018 production: 195 MMboe, including 401 Bcf gas and 89 Mbbls liquids.

[123] http://www.dcpmidstream.com/company, accessed 1/6/2020
[124] http://www.deleklogistics.com/investor-relations, accessed 2/27/2019

Proved reserves at 12/31/18: 1.48 mill. Bbls. of oil equiv., including 401 MMbls liquids and 4,331 bcf natural gas. Has about 2,900 emplys.

*Additional Company Information from Website:*
Devon Energy Corporation is a leading independent oil and natural gas exploration and production company. Devon's operations are focused onshore in the United States. The company's portfolio of oil and gas properties provides stable, environmentally responsible production and a platform for future growth. Currently, the company produces approximately 140,000 barrels of oil per day and has a deep inventory of development opportunities to deliver future growth. Devon also produces about 575 million cubic feet of natural gas a day and about 80,000 barrels of natural gas liquids per day.[125]

Devon Energy Corp. (NYSE: DVN) today announced it has entered into a definitive agreement to sell its assets in the Barnett Shale to Banpu Kalnin Ventures (BKV) for $770 million. This transaction is subject to customary terms and conditions and is expected to close in the second quarter of 2020. Devon expects no incremental cash taxes associated with the divestiture of these assets.[126]

*Why was the company not included?*
Company is a gas exploration and production company. These exploration and production 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:*
Not available.

*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.[127]

Emerge Energy Services LP (OTC: EMESZ) together with its subsidiaries and certain affiliates (the "Company") announced July 18, 2019 that the Company has voluntarily filed for relief under Chapter 11 of the Bankruptcy Code in the U.S. Bankruptcy Court for the District of Delaware on July 15, 2019.

[125] https://www.devonenergy.com/about-us, accessed 1/6/2020
[126] https://www.devonenergy.com/news/2019/Devon-Energy-Announces-Sale-of-Barnett-Shale-for-770-Million-Announces-New-1-Billion-Share-Repurchase-Program, accessed 1/7/2020
[127] http://ir.emergelp.com/profile, accessed 1/6/2020

The case is being jointly administered under Emerge Energy Services LP et al Case Number: 19-11563.[128]

*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. This company also filed for Chapter 11 Bankruptcy.

**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 13,900 miles of gathering pipelines, 15 major processing plants with 2.6 billion cubic feet per day of capacity, 7,800 miles of interstate pipelines, 2,300 miles of intrastate pipelines, and eight storage facilities. 2018 depr. rate: 3.1%. Has 1,705 employees. CenterPoint Energy owns 54.0% of shares out.; OGE Energy, 25.6%; ArcLight Cap'l. Partners, 7.2%; off. and dir., less than 1% (2018 10-K).

*Additional Company Information from Website:*
Enable Midstream (NYSE:ENBL) is a publicly traded master limited partnership formed in May 2013 that owns, operates and develops strategically located natural gas and crude oil infrastructure assets serving major producing basins and markets: 13,900 miles of gathering lines; 15 major processing plants with approximately 2.6 billion cubic feet per day; ~7,800 miles of interstate pipelines (including Southeast Supply Header, LLC) with 8.4 billion cubic feet per day of transport capacity; ~2,300 miles of intrastate pipelines; 84.5 billion cubic feet of natural gas storage capacity[129]

*Why was the company not included?*
This company began trading on April 11, 2014. As of January 2, 2019, the company has less than five full years of financials. This company performs a substantial amount of gathering and processing functions. Most of the assets are located in Oklahoma, Arkansas, Louisiana, and Texas. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Encana Corporation**
*Company Summary from Value Line:*
Encana Corporation is a leading North American energy producer focused on developing natural gas, oil, and NGL resource plays. The company's core holdings are in the Permian, Eagle Ford, Montney, and Duvernay basins. Total proved reserves ('18 10-K), 1,215.7 million barrels of oil equivalent. 2018 Production; 78.2 million barrels of oil equivalent per day, including 1,158 million cubic feet equivalent of natural gas, 39,200 barrels of NGL, and 89,900 barrels of oil. Has approx. 2,065 employees.

*Additional Company Information from Website:*
Encana has a multi-basin portfolio with scale, anchored by large, contiguous positions in the heart of the Permian and Anadarko basins, and the Montney. This high-quality portfolio is underpinning our strong

[128] http://ir.emergelp.com/news-releases/news-release-details/emerge-energy-services-lp-files-chapter-11, accessed 1/6/2020
[129] https://www.enablemidstream.com/html/pages/p002-about.html, accessed 1/6/2020

financial and operating performance, and provides for the development of high-return liquids developments, moderate growth, free cash generation and a return of cash to our shareholders.[130]

Encana Corporation announced February 13, 2019 that it has completed its acquisition of Newfield Exploration Company in an all-stock transaction.[131]

*Why was the company not included?*
Encana is an energy producer focused on developing natural gas, oil, and natural gas liquid plays. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Energy Transfer L.P.** (formerly known as Energy Transfer Equity, L.P.)
*Company Summary from Value Line:*
Energy Transfer LP (ET) is a master limited partnership that owns a diversified portfolio of energy assets in the U.S. Its core operations include complimentary natural gas midstream, intrastate and interstate transportation and storage assets; crude oil, natural gas liquids and refined product transportation and terminaling assets. Energy Transfer also owns the Lake Charles LNG Company. On a consolidated basis, the ET family owns and operates approximately 86,000 miles of natural gas pipeline. Acquired Energy Transfer Partners, 10/18. Has about 11,768 employees.

*Additional Company Information from Website:*
We are proud to have one of America's largest energy portfolios with assets reaching coast-to-coast, covering 38 states and an international office in Beijing. Our core operations include transportation, storage and terminalling for natural gas, crude oil, NGLs, refined products and liquid natural gas. [132]

Abundant reserves of untapped natural gas will continue to play a vital role in future energy production. We provide natural gas gathering, compression, treating, transportation, storage and marketing services for natural gas, using more than 63,700 miles of pipeline, 150 Bcf of working storage capacity and more than 60 natural gas processing and treating facilities. Our crude oil pipelines and terminals play a critical role in domestic oil and gas production. Our approximately 9,500 miles of pipelines are located across 16 states and are situated atop the nation's premier oil resources, efficiently connecting oil producing regions with premier demand centers. This extensive pipeline footprint, combined with the approximately 35 million barrels of storage capacity within our terminals, enables Energy Transfer to offer the flow assurance that many of our nation's largest producers, refiners and marketers depend on every day. Natural Gas Liquids (NGLs) pipelines transport demethanized mix (Y-grade or raw make) from natural gas processing plants to fractionation plants and storage facilities. NGL fractionators separate Y-grade into purity products which typically include ethane, propane, isobutane, normal butane and natural gasoline. The product is moved to NGL storage facilities, which store Y-grade, purity products and petrochemical feedstocks in underground salt caverns. We provide refined products transportation and terminalling services, as well as acquisition and marketing activities, to refined products markets in several regions of the United States via our integrated pipeline and terminalling assets. These assets include approximately 2,200 miles of refined products pipelines and approximately 35 active refined products marketing terminals with approximately 8 million barrels of refined products

[130] https://www.encana.com/about/, accessed 1/6/2020
[131] https://www.encana.com/news-stories/news-releases/details.html?release=17261, accessed 3/8/2019
[132] https://www.energytransfer.com/about/, accessed 1/6/2020

storage capacity. The proposed Lake Charles LNG project brings together two leading energy companies to develop a world-class LNG export facility in Lake Charles, LA. Energy Transfer, one of the largest pipeline operators in the U.S. and Shell, a worldwide leader in gas and LNG, have signed a Project Framework Agreement to further develop Energy Transfer's existing Lake Charles LNG import facility on the U.S. Gulf Coast for LNG export to global markets. In addition to our core segments, we also have a stake in various operations held by multiple subsidiaries, which include retail propane, natural gas marketing services, natural resources operations, and natural gas compression services, among others. We own 100% of the membership interests of Energy Transfer Group, L.L.C. ("ETG"), which owns all of the partnership interests of Dual Drive Technologies, formerly "ETT". We also own the general partner interests, 39.7 million common units, and 6.4 million class B units, together representing 47.8% of the limited partner interests in USA Compression Partners, LP ("USAC"), which acquired CDM Resource Management from Energy Transfer in the second quarter of 2018. Our Natural Resources Operations primarily involve the management and leasing of coal properties and the subsequent collection of royalties. We also earn revenues from other land management activities, such as selling standing timber, leasing fee-based coal-related infrastructure facilities to certain lessees and end-user industrial plants, collecting oil and gas royalties and from coal transportation, or wheelage fees.[133]

Energy Transfer LP (NYSE: ET) and SemGroup Corporation (NYSE: SEMG) announced December 5, 2019 the completion of their previously announced merger, which resulted in the acquisition of Tulsa-based SemGroup by Dallas-based Energy Transfer. The terms of the agreement were approved by the holders of a majority of SemGroup's outstanding voting stock at a special meeting of SemGroup stockholders on December 4, 2019. As a result of the merger, Energy Transfer issued approximately 57.6 million of its common units to SemGroup stockholders.[134]

*Why was the company not included?*
This company's business segments include natural gas midstream, intrastate and interstate transportation and storage assets; crude oil, natural gas liquids and refined produce transportation and terminating assets. Due to the recent merger with SemGroup Corporation this company is not used as a guideline company for the current assessment. Will consider in the future.

**Enerplus Corporation**
*Company Summary from Value Line:*
Enerplus Corporation engages in the exploration and development of crude oil and natural gas in the U.S. (Montana, North Dakota, Pennsylvania, West Virginia, and Wyoming) and Canada (Alberta, British Columbia, and Saskatchewan). Average daily production in 2018: crude oil, 45.424 bbls; natural gas liquids, 3,858 bbls; natural gas, 259.837 mcf. At 12/31/18 proved plus probable reserves of 427.7 MBOE, including: 208.2 Mbbls of crude oil, 21.1 Mbbls of NGLs; 41.1 Bcf of conventional natural gas; and 1,149.5 Bcf of shale gas. Has about 400 employees.

*Additional Company Information from Website:*
We are focused on the development of high-quality North American oil and natural gas assets. Today, our portfolio includes light oil assets in the Williston Basin (North Dakota and Montana), a position in

[133] https://www.energytransfer.com/business-overviews/, accessed 1/6/2020
[134] https://ir.energytransfer.com/news-releases/news-release-details/energy-transfer-and-semgroup-announce-successful-completion, accessed 1/6/2020

the Marcellus natural gas shale play (northeast Pennsylvania) as well as a group of oil assets under secondary and tertiary recovery in western Canada.[135]

*Why was the company not included?*
This company's main business segments are exploration and development of crude oil and natural gas. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**EnLink Midstream LLC**
*Company Summary from Value Line:*
EnLink Midstream, LLC provides midstream energy services in the United States. It operates throughout Texas, Oklahoma, and Louisiana. The company gathers, compresses, treats, processes, transports, stores, and sells natural gas. It also fractionates, transports, stores, and sells natural gas liquids and crude oil. Midstream energy assets include about 12,000 miles of pipelines, 21 natural gas processing plants and seven fractionators. Has 1,449 employees.

*Additional Company Information from Website:*
EnLink Midstream reliably operates a differentiated midstream platform that is built for long-term, sustainable value creation. EnLink's best-in-class services span the midstream value chain, providing natural gas, crude oil, condensate, and NGL capabilities. Our integrated asset platforms are strategically located in premier production basins and core demand centers, including the Permian Basin, Oklahoma, North Texas, and the Gulf Coast. EnLink's focus is on a strong financial foundation and a commitment to execution excellence to drive attractive returns and significant value for our employees, customers, and investors. Headquartered in Dallas, EnLink is publicly traded through EnLink Midstream, LLC (NYSE: ENLC).[136]

EnLink Midstream Partners, LP and EnLink Midstream, LLC announced that at a unitholder special meeting on January 23, 2019, unitholders overwhelmingly voted to approve the proposed merger agreement whereby EnLink Midstream LLC will acquire all outstanding common units of EnLink Midstream Partners LP not already owned in a unit-for-unit exchange transaction to simplify its corporate structure.[137]

*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.

**EnLink Midstream Partners L.P.**
*Company Summary from Value Line:*
Not available.

[135] https://www.enerplus.com/about/our-story.cfm, accessed 3/6/2019
[136] https://www.enlink.com/our-company/, accessed 1/6/2020
[137] https://www.prnewswire.com/news-releases/enlink-midstream-partners-lp-unitholders-approve-simplification-merger-300783241.html, accessed 1/6/2020

*Additional Company Information from Website:*
EnLink Midstream Partners LP and EnLink Midstream, LLC announced that at a unitholder special meeting on January 23, 2019, unitholders overwhelmingly voted to approve the proposed merger agreement whereby EnLink Midstream LLC will acquire all outstanding common units of EnLink Midstream Partners LP not already owned in a unit-for-unit exchange transaction to simplify its corporate structure.[138]

*Why was the company not included?*
No longer publicly traded.

**Enterprise Products Partners LP**
*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 Partners, 2/15. Assets include 49,200 miles of pipelines, 260 MMBbls of storage capacity for liquids and 14 Bcf for natural gas. Four segments: NGL Pipeline (53% of 2018 revenues); Crude Oil Pipelines, (21%); Petrochemical & Refined Products, (15%); Natural Gas Pipelines, (11%); Employs 7,000.

*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.[139]

*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. However, the department is using corporations, not partnerships as guideline companies in the Gas Transmission Pipeline market segment.

**EOG Resources Inc.**
*Company Summary from Value Line:*
EOG Resources Inc. engages in the exploration, development, and production of natural gas and crude oil. Utilizes producing basins mainly in the U.S., Canada, China, the U.K., and offshore Trinidad. In 2018, total net proved natural gas reserves were 4.7 trillion cubic feet equivalent, and net proved crude oil and natural gas liquids reserves were 2,928 million barrels. Est'd pretax present value of reserves: $40.5 billion. Has 2,800 employees.

[138] https://www.prnewswire.com/news-releases/enlink-midstream-partners-lp-unitholders-approve-simplification-merger-300783241.html, accessed 1/6/2020
[139] http://www.enterpriseproducts.com/about-us, accessed 1/6/2020

*Additional Company Information from Website:*
EOG Resources Inc. (NYSE:EOG) is one of the largest crude oil and natural gas exploration and production companies in the United States with proved reserves in the United States, Trinidad and China. EOG's business strategy is to maximize the rate of return on investment of capital by controlling operating and capital costs and maximizing reserve recoveries. EOG strives to maintain the lowest possible operating cost structure that is consistent with prudent and safe operations.[140]

*Why was the company not included?*
EOG Resources Inc. main business segments include exploration and production of natural gas and crude oil. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**EQT Corporation**
*Company Summary from Value Line:*
EQT Corporation is a natural gas producer with emphasis in the Appalachian Basin. It is the largest producer of natural gas in the U.S., base on average daily sales volumes, with 21.8 trillion cubic feet equivalent of proved reserves across approximately 1.4 million acres (including roughly 1.1 million acres in the Marcellus play). 2018 production, 1,494.6 Mmcfe. Completed acquisition of Rice Energy 11/17. Has approximately 865 employees.

*Additional Company Information from Website:*
EQT Corporation is a leading independent natural gas producer with an evolutionary focus on our future. EQT has operations in Pennsylvania, West Virginia and Ohio and is dedicated to responsibly developing our world-class asset base in the core of the Appalachian Basin. While we are currently the largest producer of natural gas in the United States, we know being the biggest doesn't always mean being the best. With that in mind, EQT is making strides toward becoming the best producer by creating long-term value for all stakeholders, including employees, landowners, communities, industry partners and investors.[141]

*Why was the company not included?*
EQT Corporation is a natural gas producer. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**EQT MidStream Partners L.P.**
*Company Summary from Value Line:*
EQM 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 74% of Partnership revenues for the year ended December 31, 2018. Acquired Rice Midstream Partners 7/18. Inc.

---

[140] https://www.eogresources.com/wp-content/uploads/2019/04/FactSheet-2019.pdf, accessed 1/6/2020
[141] https://www.eqt.com/about/corporate-profile, accessed 1/6/2020

*Additional Company Information from Website:*
EQM Midstream Partners LP (EQM) is a growth-oriented limited partnership formed to own, operate, acquire, and develop midstream assets in the Appalachian Basin. As one of the largest gatherers of natural gas in the United States, EQM provides midstream services to producers, utilities, and other customers through its strategically located natural gas transmission, storage, and gathering systems, and water services to support energy development and production in the Marcellus and Utica regions. EQM owns approximately 950 miles of FERC-regulated interstate pipelines and approximately 1,900 miles of high- and low-pressure gathering lines.[142]

Equitrans Midstream Corporation (ETRN) and EQM Midstream Partners, LP (EQM) announced 4/10/2019 that EQM has completed the acquisition of a 60% interest in Eureka Midstream Holdings, LLC and 100% interest in Hornet Midstream, LLC for total consideration of $1,030 million, comprised of approximately $860 million in cash and approximately $170 million of assumed pro-rate debt.[143]

*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. This company was also involved in a merger recently.

**Equitrans Midstream Corporation**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
On February 21, 2018, EQT Corporation (EQT) announced plans to separate its separately managed gathering, transmission and storage, and water services operations (Midstream Business) from its natural gas, oil and natural gas liquids development, production and sales and commercial operations (Upstream Business). The separation of the Midstream Business from the Upstream Business will culminate in the spinoff from EQT of a new company named Equitrans Midstream Corporation. Equitrans Midstream will trade on the NYSE under the ticker symbol ETRN. The separation of the two companies is intended to provide shareholders with equity ownership in two, separate, publicly traded companies that will be able to focus exclusively on each of their respective businesses.[144]

Equitrans Midstream Corporation (NYSE:ETRN), one of the largest natural gas gatherers and transmission pipeline operators in the United States , with a premier asset footprint in the Marcellus and Utica Shale region, today announced that it has completed the previously announced spin-off from EQT Corporation (NYSE: EQT). As a standalone publicly traded company, Equitrans Midstream's common stock begins "regular-way" trading today on the NYSE under the symbol "ETRN."[145]

[142] https://www.eqm-midstreampartners.com/about-us/, accessed 1/6/2020
[143] https://www.streetinsider.com/Press+Releases/EQM+Midstream+Partners+Completes+Strategic+Acquisition+of+Eureka+Midstream+and+Hornet+Midstream/15360429.html, accessed 1/6/2020
[144] https://www.equitransmidstream.com/, accessed 1/6/2020
[145] https://ir.equitransmidstream.com/news/news-archives/news-details/2018/Equitrans-Midstream-Launches-as-a-Strong-Standalone-Midstream-Company-with-a-Premier-Asset-Footprint/default.aspx, accessed 3/6/2019

*Why was the company not included?*
Began trading on New York Stock Exchange on 11/13/2018. Consider after financials are established.

**Extraction Oil & Gas Inc.**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
Denver-based Extraction Oil & Gas is a domestic energy company focusing on the exploration and production of oil and gas reserves in the Rocky Mountains. We are committed to safe and responsible operations in the Greater Wattenberg Field of Colorado's Denver-Julesburg Basin.

Extraction Oil & Gas was created in December 2012 and has since assembled a strong technical team with years of experience in horizontal drilling and completion operations. Our growth strategy includes high-quality acreage acquisitions and forming strategic joint ventures with select operators in the Greater Wattenberg Field.[146]

*Why was the company not included?*
Extraction Oil & Gas Inc. is an exploration and production company. These business segments are not similar to the main business segments of the companies 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. Its 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 its midstream operations segment.

*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.[147]

[146] http://www.extractionog.com/, accessed 1/6/2020

[147] https://www.ferrellgas.com/our-company/investor-information/, accessed 1/6/2020

Ferrellgas Partners, L.P. (NYSE:FGP) ("Ferrellgas" or the "Company") announced March 1, 2019 the acquisition of Reliable Propane, a third-party Blue Rhino distributor based in Sikeston, Missouri. The transaction is expected to be immediately accretive and is further evidence of the partnership's longstanding commitment to growing its core propane business. Terms of the transaction were not disclosed.[148]

*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. Genesis' operations are primarily located in Texas, Louisiana, Arkansas, Mississippi, Alabama, Florida, Wyoming and the Gulf of Mexico. Has 2100 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 communities in which we operate is evident in our project design, construction and day to day operations.[149]

---

[148] https://www.globenewswire.com/news-release/2019/03/01/1745315/0/en/Ferrellgas-Partners-L-P-Announces-Acquisition-of-Reliable-Propane.html, accessed 1/7/2020
[149] http://genesisenergy.com/about/, accessed 1/6/2020

*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-to-destination capabilities from the mid-continent region of the US and Canada to the east and west coasts. As of September 30, 2019, the partnership had a portfolio of 1,566 owned, leased and/or supplied gasoline stations, including 295 directly operated convenience stores, primarily in the Northeast. Has 2500 employees.

*Additional Company Information from Website:*
With approximately 1,600 locations primarily in the Northeast, Global Partners is one of the region's largest independent owners, suppliers and operators of gasoline stations and convenience stores. Global also owns, controls or has access to one of the largest terminal networks in New England and New York, through which it distributes gasoline, distillates, residual oil and renewable fuels to wholesalers, retailers and commercial customers. In addition, Global engages in the transportation of petroleum products and renewable fuels by rail from the mid-continental U.S. and Canada. Global, a master limited partnership, trades on the New York Stock Exchange under the ticker symbol "GLP."[150]

*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 company also owns, supplies, and operates gasoline stations and convenience stores. These business segments are not similar to the main business segments of the companies 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-or pay capacity commitments. Green Plains owns 39 ethanol storage facilities at or near 17 ethanol production plants in

[150] http://www.globalp.com/, accessed 1/6/2020

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. Has 40 employees.

*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. We intend to seek opportunities to grow our business by pursuing organic projects and acquisitions of complementary assets from third parties in cooperation with our parent.[151]

*Why was the company not included?*
This company's main operating segments are ethanol storage, fuel terminals, and transportation. The transportation segment includes railcars. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Hess Midstream Partners LP**
*Company Summary from Value Line:*
Hess Midstream Partners LP (HESM) focuses on processing natural gas and fractionating natural gas liquids (NGLs) in the United States. HESM conducts its business through three operating segments: gathering; processing and storage; and terminaling and export. It engages in terminaling and loading crude oil and NGLs; transporting crude oil through rail cars; and storing and terminaling propane. The gathering business consists of its 20% controlling economic interest in Hess North Dakota Pipelines Operations, LP (Gathering Opco), which owns the company's North Dakota natural gas, NGL and crude oil gathering systems. Hess Midstream Partners GP, LLC is the general partner of the company. The company's initial assets are primarily located in the Bakken and Three Forks Shale plays in the Williston Basin area of North Dakota, one of the most prolific crude oil producing basins in North America.

*Additional Company Information from Website:*
Hess Midstream (NYSE: HESM) is a fee-based, growth-oriented midstream company that owns high-quality infrastructure located in the core of the Bakken. Our integrated assets are strategically located in the core of the Bakken and offer a diversified service offering attractive netback pricing and access to a range of export options. These factors provide us with a competitive advantage in capturing additional volumes from third parties, including producers that are seeking to grow production in the Bakken and reduce crude oil trucking and natural gas flaring.[152]

Hess Midstream Partners LP (NYSE: HESM) (the "Company" or "HESM") announced December 16, 2019 that the Company has completed its previously announced acquisition of Hess Infrastructure Partners LP ("HIP"), IDR simplification and conversion from a master limited partnership into an "Up-C" structure by merging with Hess Midstream LP ("Hess Midstream"), an entity taxed as a corporation for U.S. federal income tax purposes. At the effective time of the transaction, each HESM common unit held by Hess Midstream Partners LP public unitholders converted on a one-for-one basis into a newly issued Class A share representing a limited partner interest in Hess Midstream. Based on the number of

[151] http://www.greenplainspartners.com/about, accessed 1/6/2020
[152] https://hessmidstream.gcs-web.com/about-us, accessed 1/6/2020

HESM common units held by Hess Midstream Partners LP public unitholders, Hess Midstream issued approximately 17 million Class A shares to HESM public unitholders. As part of the transaction, Hess Midstream Partners LP changed its name to "Hess Midstream Operations LP" and will continue as a consolidated subsidiary of Hess Midstream, the new publicly listed entity. Hess Midstream Partners LP common units ceased trading on the New York Stock Exchange ("NYSE") effective after the market close today and the Class A shares will begin trading on the NYSE under the ticker symbol "HESM" at the opening of the market on December 17, 2019.

*Why was the company not included?*
Hess Midstream Partners LP focuses on processing natural gas and fractionating natural gas (NGLs). These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**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. The petroleum products and by-products the company collects, transports, stores and markets are produced by oil and gas companies. It owns and operates: 19 marine shore-based terminal facilities and 14 specialty terminal facilities; 31 inland marine tank barges, 17 inland push boats and one offshore tug and barge unit that transport petroleum products and by-products.

*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 include: terminalling, processing, storage, and packaging services for petroleum products and by-products; land and marine transportation services for petroleum products and by-products, chemicals, and specialty products; sulfur and sulfur-based products processing, marketing, manufacturing, and distribution; natural gas liquids marketing, distribution, and transportation services. The petroleum products and by-products we collect, transport, store, and market are produced primarily by major and 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 U.S. Gulf Coast region, which is a major hub for petroleum refining, natural gas gathering and processing and support services for the exploration and production industry.[153]

Martin Midstream Partners L.P. (NASDAQ:MMLP) (the "Partnership") announced January 2, 2019 the completion of its previously announced purchase of Martin Transport, Inc. ("MTI") from Martin Resource Management Corporation. MTI operates a fleet of tank trucks providing transportation of

[153] http://www.martinmidstream.com/about-us, accessed 1/6/2020

petroleum products, liquid petroleum gas, chemicals, sulfur and other products, as well as owns twenty-three terminals located throughout the Gulf Coast and Midwest.[154]

*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.

**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 (42% of ’18 revs; 35% of ’18 op. inc.), construction services (31%, 16%), natural gas distribution (18%, 18%); electric (7%, 16%) and pipeline and energy services (2%, 15%). Utilities sell gas & electricity in northwest and upper midwest U.S. Construction materials has 1.1 billion tons of construction reserves. Has 11,797 employees.

*Additional Company Information from Website:*
A strong infrastructure is the heart of our 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 two lines of business: regulated energy delivery and construction materials and services. 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 grew our company by developing businesses around our expertise. Today, MDU Resources is a multibillion-dollar corporation with operations, customers and employees across the country. We have more than 13,000 employees during peak construction season and are authorized to conduct business in 44 states. MDU Resources is the largest publicly traded company headquartered in North Dakota. Our stock has traded since 1948 under the symbol MDU on the New York Stock Exchange. We have paid dividends uninterrupted to our shareholders for 82 years. We have increased dividends 29 consecutive years, a feat accomplished by fewer than 90 of the U.S.-listed companies. Our commitment to paying dividends is reflected in our membership in the S&P High-Yield Dividend Aristocrats index.[155]

MDU Resources Group, Inc. (NYSE: MDU) today said it has completed its previously announced holding company reorganization. MDU Resources Group, Inc. is now the parent holding company of Montana-Dakota Utilities Co., formerly known as MDU Resources Group, Inc., as the reorganized entity has assumed the name MDU Resources Group, Inc. This holding company reorganization is intended to simplify the organizational structure and provide additional financing flexibility. The reorganization was not implemented in connection with any particular corporate transaction, and no material operational or financial impact is expected. In the holding company reorganization, stockholders automatically became stockholders of the new MDU Resources, on a one-for-one basis, with the same number of shares and same ownership percentage of common stock that they held immediately prior to the reorganization. The ticker symbol of MDU Resources common stock remains

[154] http://ir.martinmidstream.com/news-releases/news-release-details/martin-midstream-partners-lp-completes-acquisition-martin, accessed 1/7/2020
[155] https://www.mdu.com/our-business-overview, accessed 1/6/2020

"MDU" and the CUSIP number remains the same. The holding company reorganization is intended to be a tax-free transaction for U.S. federal income tax purposes for stockholders.[156]

*Why was the company not included?*
MDU Resources Group Inc. largest business segment is construction materials and contracting, and second largest business segment is construction services. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**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.

*Additional Company Information from Website:*
MPLX is a diversified, growth-oriented master limited partnership formed in 2012 by MPC to own, operate, develop and acquire midstream energy infrastructure assets. We are engaged in the gathering, processing and transportation of natural gas; the gathering, transportation, fractionation, storage and marketing of NGLs; the transportation, storage and distribution of crude oil and refined petroleum products; as well as refining logistics and fuels distribution services. MPLX provides services in the midstream sector across the hydrocarbon value chain through our Logistics and Storage and Gathering and Processing segments.[157]

MLPX LP announced July 30, 2019 that the company has completed its acquisition of Andeavor Logistics LP in a unit-for-unit transaction (with a blended exchange ratio of 1.07 times) and assumption of approximately $5 billion of debt. As of July 30, 2019, Andeavor Logistics ceased to be publicly traded and its common units discontinued trading on the New York Stock Exchange.[158]

*Why was the company not 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. However, this company was recently involved in a merger with Andeavor Logistics LP.

**National Fuel Gas Company**
*Company Summary from Value Line:*
National Fuel Gas Company is engaged in the production, gathering, transportation, distribution, and marketing of natural gas & oil. Exploration/Production (46.1% of '18 profit), Pipeline/Storage (21.3%), Gathering (14.2%), Utility (13.1%), Energy Marketing (.1%), & Other (5.2%). NFG has a large position

[156] https://www.prnewswire.com/news-releases/mdu-resources-completes-holding-company-reorganization-300771770.html, accessed 1/7/2020
[157] http://www.mplx.com/About_MPLX/, accessed 1/6/2020
[158] https://www.prnewswire.com/news-releases/mplx-completes-acquisition-of-andeavor-logistics-300893108.html, accessed 1/6/2020

in the Marcellus Shale basin in western NY & PA and oil reserves in CA. Proved reserves as of 9/30/18: 27,663 Mbbl of oil & 2,357,342 MMcf of natural gas. Employs 2,105.

*Additional Company Information from Website:*
**Utility -** National Fuel Gas Distribution Corporation sells or transports natural gas to more than 740,000 customers through a local distribution system located in western New York and northwestern Pennsylvania. **Pipeline and Storage -** National Fuel Gas Supply Corporation provides interstate natural gas transmission and storage for affiliated and nonaffiliated companies through an integrated gas pipeline system that extends over 2,300 miles from southwestern Pennsylvania to the New York-Canadian border at the Niagara River. Empire Pipeline, Inc. provides interstate natural gas transmission services for affiliated and nonaffiliated companies through a high-pressure gas pipeline system that extends throughout Western and Central New York, over 245 miles from the New York-Canadian border at the Niagara River to interconnections with the Millennium Pipeline near Corning, NY and Marcellus Shale producers in North-Central Pennsylvania, and east to the Syracuse, NY area. Empire delivers gas to other interstate pipelines, large manufacturing facilities, local gas utilities and electric generation plants that are located along its pipeline. These local gas utilities and electric generators rely on this delivered natural gas to dependably provide energy to over 1 million consumers. **Gathering -** National Fuel Gas Midstream Company, LLC's primary business is to build, own and operate natural gas processing and pipeline gathering facilities in the Appalachian region. **Exploration and Production -** Seneca Resources Company, LLC explores for, develops and produces natural gas and oil reserves in California and Appalachia, including the Marcellus Shale.[159]

*Why was the company not included?*
National Fuel Gas Company's largest business segment is exploration and production. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**NGL Energy Partners LP**
*Company Summary from Value Line:*
NGL Energy Partners LP, together with its subsidiaries, engages in the crude oil logistics, water solutions, liquids, retail propane, and refined products and renewables businesses. The company purchases crude oil from producers and transports it to refineries for resale at pipeline injection stations, storage terminals, barge loading facilities, rail facilities, refineries, and other trade hubs; and provides storage, terminaling, trucking, marine, and pipeline transportation services. It is involved in the treatment and disposal of wastewater generated from crude oil and natural gas production operations; disposal of solids, such as tank bottoms, drilling fluids, and drilling muds. It supplies natural gas liquids to retailers, wholesalers, refiners, and petrochemical plants in the United States and Canada through its 21 terminals. It sells propane, distillates, and equipment and supplies to end users consisting of residential, agricultural, commercial, and industrial customers. Has 2400 employees.

*Additional Company Information from Website:*
We are a publicly traded Master Limited Partnership listed under the ticker symbol "NGL" on the New York Stock Exchange. NGL Energy Partners LP is a diversified midstream MLP that provides multiple services to producers and end-users, including transportation, storage, blending and marketing of crude oil, NGLs, refined products / renewables, and water solutions. Vertical integration enables NGL to be the full service provider: Transport crude oil from the wellhead to refiners; Wastewater from the

[159] https://www.natfuel.com/aboutus.aspx, accessed 1/6/2020

wellhead to treatment for disposal, recycle or discharge; Natural Gas Liquids from fractionators / hubs to refineries and end users; Refined Products from refiners to customers.[160]

Nov. 1, 2019-- NGL Energy Partners LP (NYSE: NGL) ("NGL" or the "Partnership") announced it has closed its previously announced acquisition of all of the equity interests of Hillstone Environmental Partners, LLC ("Hillstone") from Golden Gate Capital for approximately $600 million, subject to certain adjustments. Hillstone provides water pipeline and disposal infrastructure solutions to producers with a core operational focus in the state line area of southern Eddy and Lea Counties, New Mexico and northern Loving County, Texas in the Delaware Basin, which complements NGL's existing Delaware Basin water franchise.[161]

*Why was the company not included?*
NGL Resources has several other business segments besides transportation, including blending and marketing of crude oil, water solutions, and settling propane, distillates, and equipment and supplies to end users. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Noble Midstream Partners L.P.**
*Company Summary from Value Line:*
Noble Midstream Partners, LP is a growth oriented Delaware master limited partnership formed 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. The company was founded in 2014 by its parent company Noble Energy, Inc. In September 2019, the company announced that Thomas W. Christensen was appointed chief financial officer of the General Partner. Has 160 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 Pipeline, a 16-inch common

160 http://www.nglenergypartners.com/about-ngl/, accessed 1/6/2020
161 http://www.nglenergypartners.com/investor-relations/press-releases/, accessed 1/7/2020

carrier crude oil pipeline serving the southern Delaware Basin (assets owned by joint venture with Plains All American Pipeline).[162]

Midstream Partners LP (NYSE: NBLX) ("Noble Midstream" or the "Partnership") announced November 15, 2019 it has entered into a definitive agreement (the "Contribution and Simplification Agreement" or "the Transactions") to acquire the Partnership's incentive distribution rights (IDRs) and substantially all of Noble Energy's (NYSE: NBL) ("Noble Energy") remaining midstream interests for $1.6 billion. The total consideration will consist of both cash and common units of limited partner interests in the Partnership ("common units").[163]

*Why was the company not included?*
Noble Midstream Partners business segments include operations and acreage dedications in the DJ Basin and Delaware Basin, natural gas gathering and processing facilities. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing. However, Noble Midstream Partners has co-ownership of a common carrier pipeline with Plains All American Pipeline. The department reviews Plains All American Pipeline as a guideline company.

**Oasis Midstream Partners LP**
*Company Summary from Value Line:*
Oasis Midstream Partners LP is a growth oriented, fee-based master limited partnership formed by its sponsor, Oasis Petroleum Inc., to own, develop, operate and acquire a diversified portfolio of midstream assets in North America that are integral to the oil and natural gas operations of Oasis Petroleum and are strategically positioned to capture volumes from other producers. Its current midstream operations are performed exclusively within the Williston Basin, one of the most prolific crude oil producing basins in North America. The company expects to grow acquisitively through accretive, dropdown acquisitions, as well as organically as Oasis Petroleum continues to develop its acreage. Additionally, it expects to grow by offering services to third parties and through acquisitions of midstream assets from third parties. Oasis Midstream Partners LP was founded in 2013 and is based in Houston, Texas.

*Additional Company Information from Website:*
We are a growth-oriented, fee-based master limited partnership formed by Oasis Petroleum Inc. (NYSE: OAS), to own, develop, operate and acquire a diversified portfolio of midstream assets in North America. Our current assets are located in the heart of the oil rich Williston Basin and are integral to the oil and natural gas operations of Oasis Petroleum. However, our assets are also strategically positioned to capture volumes from other producers as we grow. Our management team has extensive expertise in the oil and gas industry and has a proven track record of identifying, acquiring and executing large, repeatable development programs across North America. We operate a diversified portfolio of midstream infrastructure assets in North America, with a current focus in the Williston Basin. We offer full service midstream solutions to customers covering their oil, gas and water needs. Today, Oasis Midstream Partners is primarily focused on production gathering and gas processing. Our full scale of operations includes: **Natural Gas -** Gathering, compression, processing and gas lift supply; **Crude Oil -** Gathering, terminaling and transportation; **Water -** Gathering & disposal of produced water and freshwater distribution.[164]

[162] http://www.nblmidstream.com/about-us/, accessed 1/6/2020
[163] https://www.businesswire.com/news/home/20191115005077/en/Noble-Midstream-Announces-Simplification-Acquisition-Midstream-Interests, accessed 1/7/2020
[164] https://www.oasismidstream.com/, accessed 1/6/2020

*Why was the company not included?*
Oasis Midstream Partners LP is primarily focused on production gathering and gas processing. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Paramount Resources Ltd.**
*Company Summary from Value Line:*
Paramount Resources Ltd. is an independent exploration and production company that produces, develops, acquires, and explores for crude oil, natural gas, and natural gas liquids, with primary operations in Canada. Its principal properties are located in the Southern and Western portions of Alberta, as well as British Columbia. The company also invests in public and private corporations. Acquired Apache Canada Ltd. (8/17) and completed a merger transaction with Trilogy Energy Corporation. (9/17). Has 655 employees.

*Additional Company Information from Website:*
Paramount Resources Ltd. is a leading, independent Canadian energy company that is focused on responsibly developing its world-class portfolio of diverse resource plays while consistently building value for shareholders. Paramount explores for, develops, produces and markets natural gas, oil and natural gas liquids in Alberta, British Columbia, and the Northwest Territories. Operating in Canada since 1976, Paramount's combination of focused approach, technical expertise and financial depth has propelled the Company into one of the top exploration and production firms in Canada.[165]

*Why was the company not included?*
Paramount Resources Ltd.'s main business segments include exploration, developing, producing, and marketing natural gas, oil, and natural gas liquids. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**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 company's assets include Delaware City rail unloading terminal, a light crude oil rail unloading terminal, which serves Delaware City and Paulsboro refineries; Toledo truck unloading Terminal, that serves Toledo refinery; Delaware City west heavy unloading rack, a heavy crude oil unloading facility, which serves Delaware City refinery; and a terminaling facility that consists of 27 propane storage bullets and a truck loading facility. Its storage facility consists of 30 tanks for storing crude oil, refined products, and intermediates. The company was founded in 2012 and is based in Parsippany, New Jersey. Has 82 employees.

[165] http://www.paramountres.com/about-us, accessed 1/6/2020

*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.[166]

PBF Energy Inc. (NYSE:PBF) ("PBF Energy") and PBF Logistics LP (NYSE:PBFX) ("PBF Logistics") February 28, 2019 closed the IDR Simplification transaction previously announced on February 14, 2019. As a result, PBF Energy holds approximately 30 million PBF Logistics common units, representing 54% of the outstanding common units, with a market value of approximately $655 million based on today's closing price of $21.84.[167]

*Why was the company not included?*
This company's business segments are transporting & terminaling and storage. Transportation assets include rail. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**PDC Energy Inc.**
*Company Summary from Value Line:*
PDC Energy Inc. is a domestic independent exploration and production company that produces, develops, acquires, and explores for crude oil, natural gas, and natural gas liquids, with primary operations in the Wattenberg Field in Colorado and the Delaware Basin in Texas. As of Dec. 31, 2018, the company owned an interest in approximately 2,875 gross producing wells, of which approximately 1125 were horizontal. Production of 40.2 MMboe from continuing operations for the year ended December 2018, an increase of 26% compared to 2017. Has 600 employees.

*Additional Company Information from Website:*
Founded in 1969, PDC Energy is an independent exploration and production company focused on responsible development of natural resources in some of the most prolific oil and gas regions in the United States, specifically in the core of the Wattenberg Field in Colorado and the Delaware Basin in West Texas. We apply our multi-disciplined technical expertise to the development of unconventional oil and gas resources to generate positive results in a responsible manner. PDC Energy is committed and dedicated to serving the interests of all our stakeholders by being both a good steward of the resources we operate and delivering attractive returns to our investors.[168]

PDC Energy, Inc. ("PDC" or the "Company") (NASDAQ: PDCE) and SRC Energy, Inc. ("SRC") (NYSE: SRCI) today announced they have entered into a definitive merger agreement under which PDC will acquire SRC in an all-stock transaction valued at approximately $1.7 billion, including SRC's net debt of approximately $685 million as of June 30, 2019. Under the terms of the agreement, SRC shareholders will receive a fixed exchange ratio of 0.158 PDC shares for each share of SRC common stock, representing an implied value of $3.99 per share based on the PDC closing price as of August 23,

[166] http://www.pbflogistics.com/, accessed 1/6/2020
[167] https://www.pbflogistics.com/press-releases/2019/03-01-2019-024943715, accessed 1/7/2020
[168] http://www.pdce.com/about-pdc-energy/, accessed 1/6/2020

2019. The transaction, which is expected to close in the fourth quarter of 2019, has been unanimously approved by each company's board of directors.[169]

*Why was the company not included?*
PDC Energy, Inc.'s main business segments are exploration and production of crude oil, natural gas, and natural gas liquids. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**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. Acquired Veresen in 2017. 2018 net volumes (operating income): Conventional Pipelines: 35% (52%); Oil Sands Pipelines: 43% (9%); Transmission Pipelines: 23% (39%). Daily 2018 liquids throughput: 2.521 billion barrels; Oil Sands & Heavy Oil, 51%; Conventional Pipelines, 36%; Midstream NGLs, 7%; Gas Services, 6%. Has 1,539 employees.

*Additional Company Information from Website:*
Pembina is a leading transportation and midstream service provider that has been serving North America's energy industry for over 60 years. Pembina owns an integrated system of pipelines that transports various hydrocarbon liquids and natural gas products produced primarily in western Canada. The Company also owns gas gathering and processing facilities and an oil and natural gas liquids infrastructure and logistics business. Pembina's integrated assets and commercial operations along the majority of the hydrocarbon value chain allow it to offer a full spectrum of midstream and marketing services to the energy sector. Pembina is committed to identifying additional opportunities to connect hydrocarbon production to new demand locations throughout the development of infrastructure that would extend Pembina's service offering even further along the hydrocarbon value chain. These new developments will contribute to ensuring that hydrocarbons produced in the Western Canadian Sedimentary Basin and the other basins where Pembina operates, can reach the highest value markets throughout the world.[170]

Pembina Pipeline Corporation announced August 21, 2019 that it has entered into agreements pursuant to which it will acquire Kinder Morgan Canada Limited and the U.S. portion of the Cochin Pipeline system from Kinder Morgan Inc. for a total purchase price of approximately $4.35 billion. The transaction values Kinder Morgan Canada at approximately $2.3 billion, or $15.02 per share, based on an all-share exchange ratio of 0.3068 of a common share of Pembina per KML security and Pembina's 30-day volume weighted average price on the date hereof: and Cochin US at approximately $2.05 billion for cash consideration.[171]

[169] https://www.globenewswire.com/news-release/2019/08/26/1906348/0/en/PDC-Energy-Announces-Strategic-Combination-with-SRC-Energy-in-All-Stock-Transaction.html, accessed 1/7/2020
[170] http://www.pembina.com/about-us, accessed 1/6/2020
[171] https://www.prnewswire.com/news-releases/pembina-pipeline-corporation-to-acquire-kinder-morgan-canada-and-the-cochin-pipeline-for-4-35-billion-and-increase-dividend-300904977.html, accessed 1/6/2020

*Why was the company not included?*
This company is not traded on an American Stock Exchange; financial information is provided in Canadian dollars.

**Plains GP Holdings L.P.**
*Company Summary from Value Line:*
Plains GP Holdings L.P., a limited partnership, does not directly own any operating assets. Its principal source of cash flow is from its indirect investment in Plains All American Pipeline, L.P. (PAA) and an approximate 55% limited partnership of Plains AAP, L.P.. 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, and natural gas. It owns an extensive network of pipeline, terminalling, storage, and gathering assets. PAA has 60,350 employees.

*Additional Company Information from Website:*
Plains GP Holdings (NYSE: PAGP) is a publicly traded entity that owns a non-economic controlling general partner interest in PAA and an indirect limited partner interest in PAA, one of the largest energy infrastructure and logistics companies in North America.[172]

*Why was the company not included?*
This company was not included because we used Plains All American Pipeline L.P. as a guideline company.

**QEP Resources Inc.**
*Company Summary from Value Line:*
QEP Resources, Inc. is an independent energy company spun off from Questar Corp. in June of 2010. It acquires, explores for, develops, and produces natural gas, oil, and natural gas liquids in North Dakota, Wyoming, Kansas, Texas, Louisiana, Montana, and Colorado. Sold midstream business, 12/14. Total proved reserves at 12/31/18: 658.2 million barrels of oil equivalent. Had 465 employees at 12/31/2018.

*Additional Company Information from Website:*
With a proud legacy and an exciting future, QEP Resources is a leading independent crude oil and natural gas exploration and production company focused on two of the most prolific resource plays in the continental United States — the Permian Basin in Texas and the Williston Basin in North Dakota. Our portfolio of low-cost, high-quality resource plays provides a solid foundation for sustainable growth with 658.2 MMboe of year-end 2018 proved reserves. Our total 2018 production of 51,857.9 Mboe consisted of approximately 52% crude oil. Headquartered in Denver, Colorado, QEP is an S&P MidCap 400 Index member company and its common shares trade on the New York Stock Exchange under the ticker symbol QEP.[173]

*Why was the company not included?*
QEP Resources Inc.'s business segments include exploration, development, and production of natural gas, oil, and natural gas liquids. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

[172] https://www.plainsallamerican.com/, accessed 1/6/2020
[173] http://www.qepres.com/about/, accessed 1/6/2020

**Shell Midstream Partners L.P.**

*Company Summary from Value Line:*

Shell Midstream Partner L.P. was formed in March 2014 and is a subsidiary of Shell Pipeline Company LP. It owns and operates pipelines and other midstream assets, including refined products terminals and processing facilities. It operates both onshore and offshore pipelines that originate in Louisiana, Mississippi, and the Gulf of Mexico. Its processing terminals are in Washington, Oregon, Michigan, Illinois, and Texas.

*Additional Company Information from Website:*

Shell Midstream Partners L.P. (ticker: SHLX) is a fee-based, growth-oriented master limited partnership formed by Shell to own, operate, develop and acquire pipelines and other midstream assets. Shell Midstream Partners' 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. The company generates substantially all of its revenue under long-term agreements by charging fees for the transportation of crude oil and refined products through its pipelines. Shell Midstream Partners does not engage in the marketing and trading of any commodities.[174]

Shell Midstream Partners, L.P. (NYSE: SHLX) announced May 13, 2019 that it has entered into an agreement to acquire Shell's 25.97% equity interest in Explorer Pipeline Company (Explorer) and 10.125% equity interest in Colonial Pipeline Company (Colonial) for $800 million. The acquisition will increase Shell Midstream Partners' interest in Explorer to 38.59% and in Colonial to 16.125%.[175]

*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).

**Southcross Energy Partners L.P.**

*Company Summary from Value Line:*

Not available.

*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 Our integrated operations

[174] https://www.shell.com/investors/shell-midstream-partners-lp.html, accessed 1/6/2020

[175] https://www.shellmidstreampartners.com/news-releases/news-release-details/shell-midstream-partners-lp-announces-agreement-acquire, accessed 1/7/2020

provide a full range of complementary services extending from wellhead to market, including gathering natural gas at the wellhead, treating natural gas to meet downstream pipeline and customer quality standards, processing natural gas to separate NGLs from the natural gas, fractionating the resulting NGLs into the various components and selling or delivering pipeline quality natural gas and NGLs to various industrial and energy markets as well as large pipeline systems. Through our network of pipelines, we provide the means of connecting our suppliers of natural gas to our customers, which include industrial, commercial and power generation customers and local distribution companies.[176]

Southcross Energy Partners L.P. together with its subsidiaries announced on April 1, 2019 that it has voluntarily filed for relief under Chapter 11 of the Bankruptcy Code in the U.S. Bankruptcy Court for the District of Delaware.[177]

*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. Also, the company filed for Chapter 11 Bankruptcy.

**Southwestern Energy Company**
*Company Summary from Value Line:*
Southwestern Energy Company is primarily engaged in the exploration & production of natural gas and oil. Exploration & production property locations include the Fayetteville Shale and the Marcellus Shale. Also has E&P activities in Colorado and Louisiana. At 12/18, the company owned 11,921 billion cubic feet equivalent of total proven natural gas and oil reserves. Sold utility Arkansas Western Gas Co., 7/08. Has 960 employees.

*Additional Company Information from Website:*
Southwestern Energy Company (NYSE: SWN), is an independent energy company focused on responsibly exploring and producing America's abundant supply of natural gas, natural gas liquids and oil. For 90 years, the company has been deeply committed to providing energy that helps power the world, fueling economic growth across the U.S. and North America. Southwestern Energy is playing a critical role in moving the United States towards energy independence. Not only has the shale revolution encouraged SWN and other energy companies to produce more natural gas – a source of clean, reliable, abundant and affordable energy – but it has also placed the U.S. as the world's leading natural gas producer since 2009. Southwestern Energy trades on the New York Stock Exchange under the ticker symbol SWN. The company is headquartered in Houston, Texas, with operations principally in Pennsylvania and West Virginia. The Marketing Services unit markets SWN-produced and third-party natural gas.[178]

*Why was the company not included?*
Southwestern Energy Company main business segments include exploration and production of natural gas and oil. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

---

[176] http://www.southcrossenergy.com/about/, accessed 1/6/2020
[177] https://www.southcrossenergy.com/, accessed 1/6/2020
[178] https://www.swn.com/about/, accessed 1/6/2020

**Sprague Resources L.P.**

*Company Summary from Value Line:*

Sprague Resources LP engages in the purchase, storage, distribution, and sale of refined petroleum products and natural gas in the United States. The company purchases and sells various refined products, such as heating oil, diesel fuel, residual fuel oil, kerosene, jet fuel, gasoline, and asphalt to wholesale and commercial customers. Its wholesale customers consist of approximately 1,100 home heating oil retailers, and diesel fuel and gasoline resellers; and commercial customers include federal and state agencies, municipalities, regional transit authorities, large industrial companies, real estate management companies, hospitals, educational institutions, and asphalt paving companies. It purchases, sells, and distributes natural gas to approximately 15,000 commercial and industrial customer locations across 13 states in the Northeast and Mid-Atlantic. Sprague Resources LP was founded in 1870 and is headquartered in Portsmouth, New Hampshire. Has 800 employees.

*Additional Company Information from Website:*

Founded in 1870 as the Charles H. Sprague Company, Sprague Resources LP is one of the largest independent wholesale suppliers of energy and materials handling services in the Northeast. Sprague Resources LP offers an extensive range of liquid distillate (e.g., heating oil and diesel), gasoline and residual fuel products and services as well as competitive natural gas supply and materials handling capabilities. Sprague Resources LP's customers benefit from its extensive network of owned and operated terminals throughout the Northeast and the company's investment in customized products and solutions. Sprague Resources LP offers a diversity of offerings that is unmatched in its service territories and it is constantly searching for ways to expand its capabilities.[179]

*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 company engages in the marketing and distribution of coal. These business segments are not similar to the main business segments of the companies 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 9/30/18, serves about 1.0 million active propane customers through roughly 700 locations in 41 states, concentrated on the east and west coasts of the United States. Sold approximately 440 million gallons of propane and 31.0 million gallons of fuel oil in fiscal 2018. Has 3,277 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 3,300 full-time employees, Suburban Propane maintains business operations in 41 states,

[179] http://investors.spragueenergy.com/investor-overview, accessed 1/6/2020

providing prompt, reliable service to approximately 1 million residential, commercial, industrial and agricultural customers through 700 locations.[180]

*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 focuses on owning, developing, and operating midstream energy infrastructure assets primarily shale formations in the continental United States. The company provides natural gas gathering, treating, and processing services, as well as crude oil and produced water gathering services. It operates in five unconventional resource basins, including the Appalachian Basin, which comprises the Utica and Point Pleasant shale formations in southeastern Ohio, and the Marcellus Shale formation in northern West Virginia; the Williston Basin that consists of the Bakken and Three Forks shale formations in northwestern North Dakota; the Fort Worth Basin, which includes the Barnett Shale formation in north-central Texas; the Piceance Basin that comprises the Mesaverde formation, and the Mancos and Niobrara shale formations in western Colorado and eastern Utah; and the Denver-Julesburg Basin, which includes the Niobrara and Codell shale formations in northeastern Colorado.

*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 six 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 Denver-Julesburg Basin, which includes the Niobrara and Codell shale formations in Colorado and Wyoming; the Permian Basin, which includes the Bone Spring and Wolfcamp formations in New Mexico; the Fort Worth Basin in Texas, which includes the Barnett Shale formation; and the Piceance Basin in Colorado and Utah, which includes the liquids-rich Mesaverde formation as well as the emerging Mancos and Niobrara Shale formations. 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 Niobrara G&P system, which serves the DJ Basin; and the Summit Permian system, which serves the northern Delaware Basin. SMLP has an equity investment in and operates Double E Pipeline, LLC, which is developing natural gas transmission infrastructure that will provide transportation service from multiple receipt points in the Delaware Basin to various delivery points in and around the Waha Hub in Texas. SMLP also has an equity investment in Ohio Gathering, which operates extensive natural gas gathering and condensate stabilization infrastructure in the Utica Shale in Ohio. We generate a substantial majority

[180] https://www.suburbanpropane.com/about/, accessed 1/6/2020

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, Niobrara G&P, Summit Permian, and Double E Pipeline.[181]

*Why was the company not included?*
This company's main business segments are natural gas gathering, treating and compression services. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Tallgrass Energy LP (formerly known as Tallgrass Energy GP, L.P.)**
*Company Summary from Value Line:*
Tallgrass Energy LP is a limited partnership. Its main cash-generating asset is an approximate 55.8%, as of 2/8/19, membership interest in Tallgrass Equity. These entities acquire and develop midstream energy assets, including natural gas and crude oil transportation, gathering, processing, and terminaling. TGE also owns a 75% interest in the Rocky Express Pipeline. Has a footprint in several hydrocarbon basins, including Powder River, Permian, Eagle Ford, Bakken, and Marcellus. All directors and officers own 47% of combined Class A (TGE) and Class B shares (not listed and not entitled to distribution from TGE) (2018 10K).

*Additional Company Information from Website:*
We're a growth-oriented midstream energy company, transporting crude oil and natural gas from some of the nation's most prolific basins in the Rocky Mountains, Upper Midwest and Appalachian regions with access to major demand markets in the Rockies, the Midwest, eastern Ohio and points beyond. Since our inception in 2012, we've built a strong portfolio of integrated transportation, storage, terminal, water management, gathering, processing and treating assets to support our customers, increase value and deliver pace-setting shareholder returns. We own and operate more than 8,300 miles of natural gas pipeline, more than 800 miles of crude pipeline, and more than 300 miles of water pipeline across a broad portion of the U.S. We also have one of the industry's leading water reclamation programs situated in close proximity to producers. At every step of the way, our focus is on creating value for our customers, helping them move product in ways that lead to timely, accurate and safe delivery at higher margins. At Tallgrass Energy, we work hard to create value for our customers and provide creative solutions that help them succeed in any market environment.[182]

Tallgrass Energy, LP announced 12/17/2019 that it has entered into a definitive merger agreement pursuant to which affiliates of Blackstone Infrastructure Partners together with affiliates of Engas, GIC,

[181] http://www.summitmidstream.com/about, accessed 1/6/2020
[182] http://www.tallgrassenergylp.com/About.aspx, accessed 1/6/2020

NPS and USS will acquire all of the publicly-held outstanding Class A shares of TGE for $22.45 in cash per Class A Share.[183]

*Why was the company not included?*
Tallgrass Energy LP is a midstream energy company that transports crude oil and natural gas. This company is similar to the Fluid Transportation Pipeline Companies that the State Assessed Section is responsible for valuing. Tallgrass Energy entered into a merger agreement in December 2019.

**Targa Resources Corporation**
*Company Summary from Value Line:*
Targa Resources is a leading provider of midstream services and is one of the largest independent midstream energy companies in N.A. It operates a diversified portfolio of midstream energy assets. Targa is engaged in the business of gathering, compressing, treating, processing, and selling natural gas, along with storing, fractionating, treating, transporting, and selling NGLs. Plant natural gas inlet 3,937.4 MMcf/d; Gross NGL production, 415.7 MBbl/d; Crude oil gathered 146.8 MBbl/d (all as of 12/31/18). 2018 depr. rate: 4.8%. Has 2,460 employees.

*Additional Company Information from Website:*
Targa is a leading provider of midstream services and is one of the largest independent midstream energy companies in North America. We own, operate, acquire and develop a diversified portfolio of complementary midstream energy assets.[184]

*Why was the company not included?*
Targa Resources Corporation has several other main business segments besides common carrier transportation of gas or fluids. These include, selling, services to LPG exporters, gathering, compressing, treating, processing, fractionating, etc. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**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 publicly traded master limited partnership which has delivered value to its investors while maintaining a solid cash distribution coverage ratio. Through its disciplined

[183] http://ir-tge.tallgrassenergylp.com/file/Index?KeyFile=401678489, accessed 1/16/2020
[184] https://ir.targaresources.com/investor-relations, accessed 1/6/2020

investment philosophy, TC PipeLines now has investments in eight 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, TC Energy Corporation, whose subsidiaries also operate 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. We are well positioned with a strong and conservative balance sheet, a low general partner cash take and an ample amount of available liquidity.[185]

*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. However, the department is using corporations, not partnerships as guideline companies in the Gas Transmission Pipeline market segment.

**Third Coast Midstream LLC (formerly known as American Midstream Partners L.P.)**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
American Midstream is now Third Coast Midstream.[186]

Third Coast Midstream LLC is a full-service midstream company headquartered in Houston, Texas. Our operations are focused on delivering efficient, safe, and dependable service to our customers. The company's assets include natural gas transmission and gathering pipelines, crude oil pipelines, natural gas processing plants, NGL fractionation facilities, NGL pipelines, and terminals. We are focused on the Gulf Coast area and unlocking the strategic value that the region brings the industry. Our primary assets are strategically located in some of the most prolific onshore and offshore producing regions and key demand markets in the United States. We have direct exposure to prolific producing regions, including the Eagle Ford Shale of South Texas, the Deepwater Gulf of Mexico, and the Cotton Valley/Haynesville Shale of East Texas: 5,100 Miles of Onshore and Offshore Natural Gas, Crude Oil and NGL Pipelines; 17 Gathering Systems; 7 Natural Gas Processing Plants; 4 Fractionation Facilities; 1 Terminal Site with Approximately 3.0 MMBbls of Aboveground Storage Capacity.[187]

American Midstream Partners LP (AMID) announced 7/23/2019 the completion of previously announced merger transactions contemplated by that certain Agreement and Plan of Merger, dated March 17, 2019, by and amount the Partnership, American Midstream GP LLC and affiliates of ArcLight Energy Partners Fund V, LP. As a result of the Merger, the Partnership's common units will no longer be publicly traded on the New York Stock Exchange and will be deregistered under the Securities Exchange Act of 1934.[188]

*Why was the company not included?*
No longer publicly traded.

---

[185] http://www.tcpipelineslp.com/, accessed 1/6/2020
[186] http://americanmidstream.com/, accessed 1/6/2020
[187] https://www.3cmidstream.com/, accessed 1/6/2020
[188] http://www.americanmidstream.com/investor-relations/press-releases/press-release-details/2019/American-Midstream-Announces-Completion-of-Merger/default.aspx, accessed 1/6/2020

**TransMontaigne Partners L.P.**
*Company Summary from Value Line:*
Not available.

*Additional Company Information from Website:*
TransMontaigne Partners LLC is a leading provider of terminaling, storage, transportation and related services to the energy industry. We are a growth-oriented company 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.[189]

*Why was the company not included?*
This company's main business segments are terminaling and storage. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Western Midstream Partners LP** (Formerly known as Western Gas Equity Partners, L.P.)
*Company Summary from Value Line:*
Western Midstream Partners LP (formed by the merger between Western Gas Partners and its general partner Western Gas Equity in February 2019) is a growth-oriented master limited partnership. It is engaged in the acquisition, ownership, development, and operation of midstream pipeline assets. Pipelines are located in the Rocky Mountains (8,394 miles), Texas/New Mexico (4,191), and North central Pennsylvania (146). Also owns, operates, or has equity interests in gathering systems, treating facilities, and natural gas processing plants.

*Additional Company Information from Website:*
Western Midstream Partners LP is a growth-oriented Delaware master limited partnership formed to acquire, own, develop and operate midstream energy assets. With midstream assets located in the Rocky Mountains, North-central Pennsylvania and Texas, WES is engaged in the business of gathering, compressing, treating, processing, and transporting natural gas; gathering, stabilizing and transporting condensate, natural gas liquids and crude oil; and gathering and disposing of produced water for its customers.[190]

Western Gas Equity Partners, LP ("WGP") and Western Gas Partners, LP ("WES") announced February 28, 2019 the completion of their previously announced merger of a wholly owned subsidiary of WGP with and into WES, with WES continuing as the surviving entity and a subsidiary of WGP (the "Merger"). At the effective time of the Merger, each WES common unit (other than certain WES common units held by affiliates of WGP) converted into the right to receive 1.525 WGP common units. Based on the WES units outstanding, WGP issued approximately 234 million WGP common units to WES unitholders in connection with the Merger. Immediately following the Merger, WGP changed its name to "Western Midstream Partners, LP", and its common units will begin trading on the New York Stock Exchange ("NYSE") under

[189] http://www.transmontaignepartners.com/about-us/company-overview/, accessed 1/6/2020
[190] http://www.westernmidstream.com/About/, accessed 1/6/2020

the ticker symbol "WES" when the market opens today. In addition, Western Gas Partners, LP has changed its name to "Western Midstream Operating, LP", and its common units will no longer trade on the NYSE.[191]

*Why was the company not included?*
This company's main business segments include gathering and treating. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing. Also, recently involved in a merger with a related company.

**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 more than 5,000 employees.

*Additional Company Information from Website:*
World Fuel Services (NYSE: INT) is 83 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.[192]

*Why was the company not included?*
This company is a global fuel distributor. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**WPX Energy Inc.**
*Company Summary from Value Line:*
WPX Energy Inc. is an independent natural gas and oil exploration and production company. It predominately operates in the Piceance Basin of the Rocky Mountain region. It also possesses interests in New Mexico, Texas, and N. Dakota. Principal operations are in the Delaware, Williston, and San Juan Basins. At Dec. 31, 2018, WPX's proven reserves amounted to 479 MMboe (bcfe) 21% of the reserves were natural gas, 61% crude oil, and 18% natural gas liquids. Spun off from The Williams Co. in 12/11. Sold Apco 10/14.

*Additional Company Information from Website:*
WPX is a $10 billion energy producer based in Tulsa, Okla., that employs approximately 600 people. Our core positions are in the Permian and Williston basins. Total production is approximately 80% oil/liquids and 20% natural gas. We also have an emerging infrastructure portfolio in the Permian Basin. We challenge ourselves to challenge the status quo. We value critical, creative thinking that makes us exponentially better. As our COO says, "Prior success can be the greatest enemy of future success. We're always looking for the next step-change." Constantly thinking ahead isn't just a core competency,

[191] https://www.prnewswire.com/news-releases/western-gas-completes-simplification-and-acquisition-transactions-300804162.html, accessed 1/7/2020
[192] https://www.wfscorp.com/about-us, accessed 1/6/2020

we believe it gives WPX a competitive edge. For example, this is why we secured take-away capacity for our oil and gas in the Permian before bottlenecks occurred.[193]

*Why was the company not included?*
WPX Energy Inc.'s main business segments include natural gas and oil exploration and production. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

# 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 BC Rail and GLT mid-'04; EJ&E 1/09. Petroleum & Chemicals, 17% of '18 revenues; Metals & Minerals, 12%; Forest Products, 13%; Intermodal, 25%; Coal, 4%; Grain & Fertilizer, 17%; Automotive, 6%; Other, 6%. 2018 labor costs: 16% of revenue. 2018 operating ratio: 61.6%. Has about 24,000 employees.

*Additional Company Information from Website:*
CN is a true backbone of the economy whose team of approximately 24,000 railroaders transports more than C$250 billion worth of goods annually for a wide range of business sectors, ranging from resource products to manufactured products to consumer goods, across a rail network of approximately 20,000 route-miles spanning Canada and mid-America. At CN, we take pride in being regarded internationally as one of the best-performing transportation and logistics companies. Our commitment is to create value for both customers and shareholders by deepening customer engagement, leveraging the strength of our franchise and delivering Operational and Service Excellence.[194]

*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 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 22%, of 2018 freight revenue; intermodal, 22%; chemicals/plastics, 17%; coal, 9%; other, 30%. Operating ratio in 2018: 61.3%. Employs 12,770 as of 12/31/18.

[193] https://www.wpxenergy.com/about/our-expertise, accessed 1/6/2020
[194] https://www.cn.ca/en/about-cn/, accessed 1/7/2020

*Additional Company Information from Website:*
Founded in 1881 to connect Canada, today we deliver transportation solutions that connect North America and the world. By doing this safely and efficiently, we create long-term sustainable value for our shareholders and the broader economy. We are grounded in the foundations of precision scheduled railroading. We operate safely, optimize assets, control costs, provide service and develop people. These are the foundations that have led CP's turnaround from 2012 to today – taking us from industry laggard to industry leader. From our multi-year strategic and business plans to our daily operations and sales and marketing playbooks, everything we do is driven by, and tested against, our purpose, our values and the foundations of precision scheduled railroading. We are environmental stewards who believe in re-investing in our business for long-term, sustainable and low-cost growth.[195]

*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. 2018 rail operating ratio: 60.3%. Had about 22,500 employees, as of 12/31/18.

*Additional Company Information from Website:*
CSX Corporation, together with its subsidiaries based in Jacksonville, Fla., is one of the nation's leading transportation suppliers. The company's rail and intermodal businesses provide rail-based transportation services including traditional rail service and the transport of intermodal containers and trailers. Overall, the CSX Transportation network encompasses about 21,000 route miles of track in 23 states, the District of Columbia and the Canadian provinces of Ontario and Quebec. Our transportation network serves some of the largest population centers in the nation. Nearly two-thirds of Americans live within CSX's service territory. CSX serves major markets in the eastern United States and has access to over 70 ocean, river and lake port terminals along the Atlantic and Gulf Coasts, the Mississippi River, the Great Lakes and the St. Lawrence Seaway. The company also has access to Pacific ports through alliances with western railroads. CSX moves a broad portfolio of products across the country in a way that minimizes the effect on the environment, takes traffic off an already congested highway system, and minimizes fuel consumption and transportation costs.[196]

*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.

---

[195] https://www.cpr.ca/en/about-cp/our-purpose, accessed 1/7/2020

[196] https://www.csx.com/index.cfm/about-us/company-overview/, accessed 1/7/2020

**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 (51% of '18 revenue), Australia (24%), and U.K./Europe/ (25%). '18 freight revenue mix: Pulp & Paper, 11%; Coal, 8%; Minerals & Stone, 14%; Metals, 11%; Other, 56%. Has 7,300 employees. '18 operating ratio: 82.0%.

*Additional Company Information from Website:*
Genesee & Wyoming Inc. owns or leases 119 freight railroads worldwide (collectively "G&W" or the "company")* organized in eight locally managed operating regions with 8,000 employees serving 3,000 customers. G&W's six North American regions serve 42 U.S. states and four Canadian provinces and include 113 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 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.[197]

Genesee & Wyoming Inc. (G&W) (NYSE:GWR) announced December 30, 2019 the completion of its previously announced sale to affiliates of Brookfield Infrastructure and GIC. Under the terms of the sale, each issued and outstanding share of G&W common stock converted into the right to receive $112 in cash. As a result of the completion of the sale, G&W's common stock ceased trading on the NYSE prior to market open today and will no longer be listed for trading on the NYSE.[198]

*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. Even though the company was recently acquired and is no longer publicly traded, the department was able to use the financial information available prior to acquisition in order to include Genesee & Wyoming as a guideline for the 2020 Capitalization Rate Study. For the 2021 study, the department is considering developing only the Class I market segment and applying the rates to all railroad companies that the department values.

**Kansas City Southern Inc.**
*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. 2018 rail operating ratio: 64.3%. Has 7,200 employees.

---

[197] https://www.gwrr.com/about_us, accessed 1/7/2020
[198] https://ir.gwrr.com/press-release/acquisitions-investments/genesee-wyoming-announces-completion-sale-brookfield, accessed 1/7/2020

*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.[199]

*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 19,420 route miles of track in 22 eastern and southern states, plus the District of Columbia. Also owns a 58% stake in Conrail. '18 freight revenue mix: coal, 16%; intermodal, 25%; agriculture/consumer prod./gov't, 30%; metals/construction, 13%; other, 16%. Labor costs: about 25% of revenue. Operating ratio: 65.4%. Has 26,662 employees.

*Additional Company Information from Website:*
Norfolk Southern Corporation (NYSE: NSC) is one of the nation's premier transportation companies. Its Norfolk Southern Railway Company 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 is a major transporter of industrial products, including chemicals, agriculture, and metals and construction materials. In addition, the railroad operates the most extensive intermodal network in the East and is a principal carrier of coal, automobiles, and automotive parts.[200]

*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 United States in both track miles and total revenues, with nearly 32,236 route miles serving the western two-thirds of the United States. '18 railroad revenue mix: Premium 18%; Agricultural Products, 21%; Industrial, 27%; Energy, 21%%. About 10% of its sales from Mexico. Divested Overnite Transportation in 11/03. '18 RR operating ratio: 62.7%. Has about 42,900 employees

[199] http://www.kcsouthern.com/en-us/why-choose-kcs/what-we-ship, accessed 1/7/2020
[200] http://www.nscorp.com/content/nscorp/en/about-ns/corporate-profile.html, accessed 1/7/2020

*Additional Company Information from Website:*
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. In the last 10 years, 2009-2018, Union Pacific invested approximately $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, and 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.[201]

*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

**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 377,291 employees.

*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.[202]

*Why was the company not included?*
Berkshire Hathaway is a holding company owning subsidiaries engaged in a number of diverse business activities. 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. The other business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

[201] https://www.up.com/aboutup/corporate_info/uprrover/index.htm, accessed 1/7/2020
[202] http://www.berkshirehathaway.com/2018ar/2018ar.pdf, accessed 1/7/2020, p. K-1

**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 2,225 employees.

*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 jointly own one of the largest aircraft spare engine lease portfolios in the world. We operate through four business segments: Rail North America, Rail International, Portfolio Management, and American Steamship Company ("ASC").[203]

*Why was the company not included?*

GATX Corporation specializes in tank car, freight car, and locomotive leasing. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**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 (81% of 2017 revenues); Wheel Services, Refurbishment & Parts (14%); Leasing & Services (5%). Inc.: OR. At 8/31/18, its backlog consisted of 27,400 railcars. Has about 13,400 employees.

*Additional Company Information from Website:*

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 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.[204]

---

[203] http://www.gatx.com/wps/wcm/connect/GATX/GATX_SITE/Home/About/, accessed 1/7/2020

[204] http://www.gbrx.com/about-us/, accessed 1/7/2020

The Greenbrier Companies, Inc. (NYSE: GBX) announced July 29, 2019 it completed its acquisition of the manufacturing business of American Railcar Industries (ARI) from ITE Management LP (ITE) on July 26, 2019, substantially consistent with the terms of the parties' agreement reached in April. These operations will be fully incorporated into Greenbrier's North American business model both from a manufacturing and commercial perspective.[205]

*Why was the company not included?*
Greenbrier Companies designs, manufactures, repairs, and markets railroad freight cars and related equipment. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**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 (85% of 2018 sales), Paper (14%), and Corporate and Other and Eliminations (1%). In 2018, it produced 4.1 million tons of containerboard at its mills. Corrugated products manufacturing plants sold about 58.9 billion square feet. Has 15,000 employees.

*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.[206]

*Why was the company not included?*
Packing Corporation of America produces containerboard and corrugated products. 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. The company's other business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Trinity Industries Inc.**
*Company Summary from Value Line:*
Trinity Industries, Inc. manufactures railcars and provides a variety of services to the freight market. Its three principal operating segments are: Railcar Manufacturing (railcars and component parts), Railcar Leasing, and Railcar Services. Spun off the Energy Equipment, Construction Products, and Inland Barge divisions in November of 2018. '18 depreciation rate: 3.4% of revenues. Has about 15,600 employees.

---

[205] https://www.gbrx.com/press-room/press-releases/greenbrier-completes-acquisition-of-manufacturing-business-of-american-railcar-industries/, accessed 1/7/2020

[206] https://www.packagingcorp.com/our-company, accessed 1/7/2020

*Additional Company Information from Website:*
Trinity began providing industrial products and services to customers more than 85 years ago. We started as a small butane-tank manufacturer and evolved over time into a premier diversified industrial company with market-leading businesses serving the energy, chemical, agriculture, transportation, and construction sectors. We have a long history of creating value for our shareholders by providing quality products and services to our customers. On Nov. 1, 2018, Trinity separated into two stand-alone public companies through a tax-free spin-off to Trinity shareholders. Trinity Industries, Inc. comprises our rail-related businesses, our highway products business, and our logistics business; Arcosa, Inc. focuses on infrastructure-related products. Our rail-related products and services are marketed under the trade name TrinityRail. Our vision for TrinityRail is to be a premier provider of railcar products and services in North America, while generating high-quality earnings and returns for shareholders. Our vision for our highway products business is to be a premier provider of roadway and roadside products in the United States.[207]

*Why was the company not included?*
Trinity Industries Inc. manufactures railcars and provides a variety of services to the fright market. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

**Wabtec Corporation**
*Company Summary from Value Line:*
Wabtec provides equipment and services to the global rail industry. Products include brakes, air compressors, heat exchangers, cooling systems, door assemblies, and event recorders. The Freight division (36% of 2018 revs) manufactures and services components used in freight trains; the Transit division (64%) makes products for passenger vehicles, e.g., subways and buses. Acquired GE transportation assets (2/19). Foreign revenues: 66%.

*Additional Company Information from Website:*
Wabtec is a leading supplier of critical components, locomotives, services, signaling and logistics systems and services to the global rail industry. We're focused on driving ongoing safety, innovation, efficiency, reliability, and productivity. With best-in-class manufacturing facilities, unmatched digital expertise, always-on global services delivery, and unrivaled product breadth and performance, Wabtec is the rail industry's one-stop shop. Today, we meet the total lifecycle needs of the entire fleet, from new locomotives to modernizations, service, and repairs, adding value at every touchpoint to help customers realize the most value from their investment. To best address the business needs of our rail customers, we offer a variety of products and services through our Freight and Transit segments.[208]

Wabtec Corporation (NYSE: WAB) announced February 25, 2019 it has completed its merger with GE Transportation, a former business unit of GE (NYSE: GE). This merger establishes Wabtec as a Fortune 500, global transportation and logistics leader by combining Wabtec's broad range of freight, transit and electronics products with GE Transportation's best-in-class equipment, services and digital solutions in the locomotive, mining, marine, stationary power and drilling industries. Wabtec has also been notified

[207] http://www.trin.net/about-us, accessed 1/7/2020
[208] https://wabteccorp.com/company/about-us, accessed 1/7/2020

that it will now be included in the S&P 500 Index.[209]

*Why was the company not included?*
Wabtec Corporation provides equipment and services to the global rail industry. These business segments are not similar to the main business segments of the companies the State Assessed Section is responsible for valuing.

[209] https://www.wabtec.com/press-releases/8803/wabtec-completes-successful-merger-ge-transportation, accessed 1/7/2020