BEFORE THE PUBLIC UTILITY COMMISSION

OF THE STATE OF OREGON

UE 394

Cost of Capital

PORTLAND GENERAL ELECTRIC COMPANY

Direct Testimony of

Jardon Jaramillo
Jaki Ferchland
Bente Villadsen, Ph.D.

July 9, 2021

Table of Contents

I. Introduction

1 **Q. Please state your names and positions.**

2 A. My name is Jardon Jaramillo. I am the Senior Director of Treasury, Investor Relations, and

3 Risk Management at Portland General Electric Company (PGE). I am responsible for

4 analyzing PGE's cost of capital and managing the company's treasury function including

5 financing.

6 My name is Jaki Ferchland. I am the Manager of Revenue Requirement in Regulatory

7 Affairs at PGE. I am responsible for analyzing PGE's cost of capital.

8 My name is Bente Villadsen and I am a Principal of The Brattle Group, whose business

9 address is One Beacon Street, Suite 2600, Boston, Massachusetts, 02108. I have been asked

10 by PGE to estimate the cost of equity that PGE should be allowed an opportunity to earn on

11 the equity portion of its rate base for the period starting May 1, 2022.

12 Our qualifications are included at the end of this testimony.

13 **Q. What is the purpose of your testimony?**

14 A. The purpose of our testimony is to recommend PGE's authorized cost of capital and capital

15 structure for the 2022 test year. PGE's cost of capital and capital structure were last approved

16 in Order No. 18-464 in December 2018.

17 PGE's requested cost of capital and capital structure are necessary to support its credit

18 profile for access to low-cost debt and equity markets, to fund its capital investments planned

19 for 2022, and to provide PGE the opportunity to earn a fair return for equity shareholders

20 while keeping its costs reasonable for customers. Guidance regarding the appropriate

1   authorized cost of capital is provided by the Bluefield[1] and Hope[2] United States Supreme

2   Court decisions, as well as ORS 756.040.

3   **Q. What is PGE's requested overall cost of capital for this filing?**

4   A.   We request and support a 6.938% cost of capital for the 2022 test year. This cost of capital

5   reflects PGE's currently authorized return on equity (ROE) of 9.50%, its currently authorized

6   capital structure of 50% debt and 50% equity, and an updated long-term cost of debt of

7   4.375%.

8   Table 1 below shows the recommended cost of the two components of PGE's capital,

9   common equity and long-term debt. Table 1 also shows PGE's forecasted 2022 regulatory

10   capital structure.

**Table 1
PGE's Weighted Cost of Capital
Test Year 2022**

Component	Average Outstanding ($000) [1]	Percent of Capital [2]	Component Cost	Weighted Cost
Long-term Debt	$3,223,174	50%	4.375%	2.188%
Common Equity	$2,830,105	50%	9.500%	4.750%
Total	**$6,053,279**	**100%**		**6.938%**

[1]   "Average Outstanding" reflects PGE's projected average values of long-term debt and common equity for 2022.

[2]   "Percent of Capital" reflects PGE's long-term targeted regulatory capital structure of 50% debt, 50% equity, and is used to calculate PGE's weighted average cost of capital (Weighted Cost).

11   **Q. Did PGE issue debt as a result of the energy trading losses in 2020?**

12   A.   The energy trading losses resulted in a cash need for the company, which was met with the

13   debt issuance completed in the fourth quarter of 2020.

14   **Q. Does your requested regulatory capital structure include impacts from debt issuances**

15   **associated with the energy trading losses?**

---

[1] Bluefield Water Works v. Public Service Comm'n - 262 U.S. 679 (1923).
[2] FPC v. Hope Nat. Gas Co. - 320 U.S. 591 (1944).

1   A.   No.   PGE's requested regulatory capital structure does not include impacts from debt

2   issuances completed in the fourth quarter of 2020. This is discussed in more detail in Section

3   VI of this testimony.

4   **Q.   How is the remainder of your testimony organized?**

5   A.   In the following section, we describe PGE's financial goals and how PGE manages

6   counterparty risks and liquidity.

7   • Section III provides a review of financial and market regulation changes as well as

8   the recent and near-future financial market and economic conditions;

9   • Section IV discusses PGE's cost of long-term debt, including new and redeemed

10   issuances;

11   • Section V provides the updated analysis that supports maintaining PGE's ROE at

12   its current level of 9.50%;

13   • Section VI discusses PGE's capital structure; and

14   • Section VII provides our qualifications.

II. PGE's Financial Goals

1 **Q. What is PGE's overall financial goal?**

2 A. PGE's overall goal is to provide adequate capital and liquidity to fund PGE operations at the

3 least cost and least risk to customers. Aligned with this goal is protection against unforeseen

4 negative changes in cash flows and managing daily cash and liquidity needs. For these goals,

5 PGE relies on its revolving lines of credit, long-term debt, and common equity.

6 **Q. Does PGE have additional financial goals?**

7 A. Yes. PGE's overall financial goals include financial performance, counterparty credit risk

8 management, and liquidity management:

9   • Solid financial performance including:

10   o Maintaining investment grade credit ratings;

11   o Accessing financial markets at reasonable terms to provide liquidity for

12   operations and capital expenditures;

13   o Achieving an actual ROE that is commensurate with the return on equity

14   achieved by a group of utilities with similar characteristics, service territory,

15   and business risks;

16   o Maintaining a capital structure of approximately 50% debt and 50% equity over

17   time; and

18   o Setting retail prices at a level sufficient to recover prudently incurred costs,

19   including an overall return on utility investment, while taking into account price

20   impacts given the economic conditions facing PGE's customers.

21   • Managing wholesale counterparty and retail customer credit risks to protect our

22   customers and PGE.

1 • Liquidity Management to meet our obligations and support PGE's operations.

A. Solid Financial Performance

2 **Q. Why is it important for PGE to maintain an investment grade credit rating?**

3 A. It is important for PGE to maintain an investment grade credit rating in order to secure

4 financing for both debt and equity at reasonable rates, especially in today's changing financial

5 environment, and to maintain access to wholesale energy markets with the best prices for

6 customers. Without an investment grade credit rating, PGE's access to financing would be

7 limited, at higher rates, and PGE would have to provide significantly more collateral to its

8 counterparties (and may lose the ability to trade with some counterparties) in the wholesale

9 power and gas markets. This would result in higher costs to PGE's customers.

10 **Q. What does PGE do to maintain its investment grade credit rating?**

11 A. Fundamentally, PGE's credit rating is a function of its financial performance, which is driven

12 by PGE's retail prices and its ability to manage costs. The rating agencies, as well as equity

13 investors, expect companies to meet certain financial performance standards to achieve an

14 investment grade credit rating, as demonstrated in the financial and liquidity ratios that the

15 rating agencies publish. PGE takes various steps to ensure that its financial performance

16 continues to place it within the range of the appropriate financial ratios. PGE accomplishes

17 this through continuous financial management that includes closely monitoring budgets,

18 minimizing costs to finance operations through the optimal use of revolving credit line, long-

19 term debt, and equity, closely monitoring capital structure; and analyzing counterparty risks

20 and taking appropriate mitigation measures. Using all of these measures helps PGE maintain

21 financial performance levels necessary for investment grade credit ratings.

1 **Q. Financial performance is an important element for the rating agencies. Do rating**

2 **agencies also consider other factors?**

3 A. Yes. Other factors that rating agencies consider include regulatory and recovery risk,

4 corporate operations and growth, customer and portfolio diversification, and liquidity and

5 other financial measures. We note that in prior years, the rating agencies have been concerned

6 with PGE's earnings volatility due to one-time but significant write-offs, the asymmetric

7 deadband on the Power Cost Adjustment Mechanism (PCAM), and Oregon's regulatory

8 policies, in general. The rating agencies also continue to consider the liabilities associated

9 with long-term Power Purchase Agreements (PPAs), including Qualifying Facility (QF)

10 contracts, as imputed debt on the balance sheet, which increases the company's debt-to-equity

11 ratios. PGE closely monitors the evolving rating agencies' methodologies and annually visits

12 the major rating agencies for presentations and discussions.

13 **Q. Have PGE's bond ratings changed recently?**

14 A. The most recent change in PGE's rating occurred in July 2018 when Standard & Poor's (S&P)

15 upgraded PGE's rating on its long-term debt. PGE's long-term debt rating from Moody's

16 remains one notch higher than S&P.

17 **Q. Have rating agencies recently changed outlooks on PGE?**

18 A. Yes. S&P changed the outlook for PGE from Positive to Negative following the

19 announcement of energy trading losses in August 2020. S&P revised its outlook for PGE to

20 stable in January 2021 following the conclusion of the review conducted by the Special

21 Committee of the board of directors.

22 **Q. How does PGE ensure an optimal long-term cost of capital?**

1 A. PGE aims to issue long-term debt so that debt maturity schedules closely match the investment

2   schedules of its capital projects. PGE prefers First Mortgage Bonds (FMBs) as the primary

3   form of debt because they have a lower cost than unsecured alternatives. PGE evaluates

4   private placement market rates, bank term loans, and a delayed draw/forward structure to

5   arrive at the lowest reasonable financing costs available at the time of PGE's financing need.

6 Q. **How does PGE determine the timing of its financing?**

7 A. PGE forecasts its cash needs, which include capital expenditures, debt maturities, dividends

8   and changes in working capital, and attempts to match its long-term financing proceeds to

9   meet those requirements. In the past, PGE has used a delayed draw for its long-term bonds

10   that allowed us to fix the interest rate on the upcoming bond issue, removing interest rate and

11   funding risk.

12 Q. **Does PGE's financial performance impact its desired long-term capital structure?**

13 A. Yes. As we stated earlier, PGE's desired long-term capital structure is 50% equity and 50%

14   long-term debt, although it may fluctuate somewhat from year to year. We believe that the

15   50% equity in PGE's authorized capital structure helps it better withstand difficult situations,

16   such as under-earning due to events outside of PGE's control and continued pressure on equity

17   capitalization ratios due to imputed debt. In 2020, PGE's financial performance was impacted

18   by higher power costs associated with energy trading losses. As stated above, the energy

19   trading losses resulted in a cash need for the company, which was met with the debt issuance

20   completed in the fourth quarter of 2020 which impacted PGE's accounting capital structure.

21 Q. **How does PGE maintain its capital structure at 50% equity and 50% long-term debt?**

22 A. To maintain this capital structure, PGE primarily monitors the size and frequency of its debt

23   issuances. In the future, PGE plans to continue to use equity issuances, stock repurchases,

1   capital expenditure programs, the debt markets, and cash from operations to help maintain

2   PGE's desired capital structure.

B.   Manage Customer and Counterparty Credit Risks

3   **Q.   Why is it important for PGE to manage customer credit risks?**

4   A.   It is important to manage credit risks to limit losses associated with non-payment of

5   customers' bills.

6   **Q.   What customer credit risks does PGE face?**

7   A.   PGE's energy deliveries and revenues are subject to industry and customer-specific risks and

8   uncertainty, including potential shut down of customer facilities, curtailment of customers'

9   operations, or changes in capacity as a result of economic or specific circumstances. In 2020,

10   PGE's customers were impacted by restrictions put in place to limit the spread of COVID-19.

11   To mitigate the effect on customers, in March 2020, PGE initiated a voluntary suspension of

12   disconnecting customers for non-payment and the imposition of late fees on past due bills.

13   For small commercial customers, these activities resumed in December 2020, and for

14   residential customers, this extends into August 2021[3]. The moratorium has resulted in a

15   significant   increase   in   residential   and   commercial   arrearages   and   uncollectible

16   customer payments[4]. PGE serves some of the hardest hit industries including transportation,

17   retail, restaurants, and recreation.

18   **Q.   Has PGE experienced an increase in customer bankruptcies as a result of COVID-19?**

19   A.   PGE did not experience a significant increase in large customer bankruptcies as a result of

---

[3] Order No. 21-164, Docket No. UM 2114.
[4] As of March 31, 2021, PGE's deferred balance for its COVID-19 deferral was $10 million, comprised primarily of bad debt expense in excess of what is currently considered in customer prices. PGE expects bad debt expense to be $6 million to $8 million for the year-ended 2021.

1   COVID-19. The biggest negative impact was felt by smaller commercial accounts that faced

2   changing demand and operational challenges. PGE also anticipates experiencing a number of

3   residential bankruptcies and inability to pay by residential customers as we continue to recover

4   from the economic impacts associated with COVID-19.

5   **Q. How does PGE manage its customer credit risk exposure?**

6   A.   For nonresidential customers, PGE attempts to minimize the impact of customer defaults and

7   manage customer credit risk by proactively monitoring customer payment habits with PGE

8   as well as reviewing commercial credit reports such as Dun and Bradstreet, Moody's, S&P

9   and Credit Risk Monitor. If warranted, PGE may collect deposits from high-risk customers

10   to minimize loss in the event of a default.

11   PGE performs credit reviews of its customers, particularly large customers, and

12   associated industries annually. Other items, such as negative company and industry news, a

13   public debt rating downgrade, or consistent late payment trends with PGE may trigger a credit

14   review. PGE's load forecasters work closely with its Key Customer Managers to gain a better

15   understanding of the business forecasts provided by large customers and their potential

16   consequences on PGE's retail load. After review, PGE determines the appropriate deposit

17   required from a large customer. This deposit typically is up to one-sixth of the annual bill.

18   **Q. How does PGE manage counterparty risk?**

19   A.   PGE manages its counterparty risk in wholesale power transactions using the same methods

20   as for large customers. PGE performs credit reviews of wholesale power counterparties, both

21   purchasers and sellers, and then determines the appropriate amount of collateral required from

22   a counterparty based on their credit risk profile. PGE also sets a minimum credit ratings

23   threshold below which it will not trade with a counterparty.

1 **Q. How does PGE manage supplier financial viability?**

2 A. PGE manages its supplier financial viability through a review of supplier financials, and the

3 use of external financial reporting and evaluation providers, similar to how it manages credit

4 risk for large customers and other counterparties.

C. Liquidity Management

5 **Q. What is PGE's strategy for liquidity management and related revolving credit facility**

6 **sizing?**

7 A. PGE's strategy is four-fold:

8   1. Carry sufficient credit levels to support both operational and power supply needs

9   over a five-year, forward-looking time horizon.

10   2. Achieve a designation of adequate or better from rating agencies (based on

11   Moody's and S&P's interpretation of PGE's liquidity).

12   3. Fund short-term debt requirements using commercial paper or revolving credit

13   facility loans as appropriate. Issue letters of credit in lieu of cash collateral, if the

14   pricing is advantageous.

15   4. Manage market exposure related to maturing lines of credit by replacing them one

16   year prior to maturity.

17 **Q. Has PGE separately analyzed its revolving lines of credit requirements?**

18 A. Yes. PGE periodically analyzes its revolver requirements separately for power supply and

19 other operational needs, the sum of which yields the total liquidity requirement for PGE's

20 needs. This approach enables PGE to ensure that its power and gas procurement efforts have

21 enough liquidity to meet collateral requirements, while also maintaining sufficient liquidity

22 for other operations.

1   **Q. When did PGE last perform such an analysis?**

2   A. PGE last analyzed its revolving lines of credit requirements in June 2021.

3   **Q. What were the results of that analysis?**

4   A. After a preliminary benchmark analysis of our peer's revolving credit facilities, PGE

5   determined that it is currently below median on all prevailing credit ratios. As a general

6   principle, a company's revolving credit facility should be one times EBITDA, which would

7   necessitate PGE to increase its current facility to $650 million.

8   PGE will continue to monitor the need to increase the revolver in future years.

9   **Q. Did you determine how the results of this analysis would affect PGE's ratings by**

10   **Moody's and/or S&P?**

11   A. Yes. For Moody's criteria, PGE's liquidity profile would be rated "adequate" in 2021 and

12   2022. For S&P, PGE would be rated "adequate" in 2021 and 2022 based on their rating

13   criteria. Based on this analysis, PGE determined that a revolver capacity of $650 million

14   would be sufficient at this time to service the company's short-term financing needs.

III. Uncertainty in Regulation, Accounting, and Financial Markets

A. Regulation and Financial Markets

1 **Q. What are PGE's current bond ratings?**

2 A. PGE's current bond ratings for secured (first mortgage) long-term debt are A1 from Moody's

3 and A from S&P. Ratings for unsecured debts are A3 and BBB+. PGE's credit ratings, which

4 were recently affirmed, are provided in PGE Exhibit 902.

5 **Q. You noted above that rating agencies consider a utility commission's regulatory policy**

6 **when determining a company's rating. Can you provide some additional detail?**

7 A. Yes. Regulatory policy that supports timely recovery of prudent costs is essential to

8 maintaining a stable, investment grade credit rating. Both Moody's and S&P consider

9 regulatory policy a key factor in their determination of a utility's creditworthiness. Moody's

10 places 25% weight on the factor "Regulatory Framework."[5] S&P indicates that "[r]egulation

11 is the most critical aspect that underlies regulated integrated utilities' creditworthiness."[6] Key

12 characteristics in the assessment of regulatory environment for both credit rating firms include

13 the consistency and predictability of Commission decisions, as well as the timely recovery of

14 prudently incurred costs.

15 **Q. Have financial analysts or rating agencies noted any concerns regarding regulatory**

16 **mechanisms for PGE?**

17 A. Yes. Financial analysts have expressed concerns regarding the company's PCAM. PGE's

18 asymmetrical deadband is unique. Most electric utilities tend to have a 'pass through' of their

---

[5] With the other three factors and their weights being "Ability to Recover Costs and Earn Returns," 25%, "Diversification," 10%, and "Financial Strength and Liquidity," 40%. "Rating Methodology – Regulated Electric and Gas Utilities." Moody's Investor Service- December 23, 2013.
[6] "Key Credit Factors for the Regulated Utilities Industry." Standard & Poor's- November 19, 2013.

1   power costs if a PCAM is in place, with no deadbands. Thus, it is not unexpected that analysts

2   have expressed concerns about PGE's wide deadband and the asymmetry of benefits

3   allocation, which could result in "meaningful" impacts on PGE's earnings, increasing

4   volatility. Wolfe Research sees the PCAM as a source of earnings volatility that contributes

5   to a valuation discount to the peer group: "We raise our [price target]… which still reflects a

6   10% discount to our group average given structural lag and earnings volatility due to the

7   PCAM."[7] Wells Fargo mentions the following risks for PGE: negative regulatory

8   developments, risks related to the asymmetrical PCAM (hydro, plant outages, etc.), and lower

9   than expected sales growth/higher than expected expense inflation.[8] Bank of America lists

10   the PCAM as a "downside risk".[9] Goldman Sachs views the mechanism as currently

11   constructed to be a source of incremental risk: "unlike most utilities which can pass through

12   all fuel/purchase power costs, POR's authorized power cost adjustment mechanism (PCAM)

13   only allows for a limited pass-through of costs within an established band, creating

14   incremental risk for the company."[10]

15   **Q. What concerns have financial analysts expressed regarding the decoupling mechanism?**

16   A. Most electric utilities do not have a cap on their uncollected revenues associated with

17   decreased energy use per customer. Analysts have expressed concerns about PGE's 2% cap,

18   which has impacted PGE's earnings in 2020 and will continue to impact PGE's earnings in

19   2021, increasing earnings volatility. Wolfe Research mentions: "POR's decoupling

20   mechanism only covers residential and commercial for moves of up to 2%; POR expects to

---

[7] "Been POR enough; upgrade" – Wolfe Research – 16 July, 2020.
[8] "POR Solid Q3 Update – Investigation Into Trading Losses Ongoing" – Wells Fargo – 30 October, 2020.
[9] "Could this be the inflection in sentiment?" – Bank of America – 2 November, 2020.
[10] "Portland General Electric Co. (POR): Material power management impact to pressure 2020 results; Sell"
Goldman Sachs – 25 August 2020.

1   breach that threshold to the downside for commercial but remain under to the upside for

2   residential (POR would have to refund if resi went above 2%). POR trailed the UTY by 460bps

3   following the update. We have maintained our U/P rating in the past, citing POR's EPS

4   volatility relative to peers".[11]   Goldman Sachs views the mechanism as an "unfavorable

5   demand recovery structure that offsets the benefits of robust residential electric usage in the

6   current environment."[12]   Guggenheim views the current construction of the mechanism as a

7   "unique challenge": "This presents a unique challenge as the residential growth is decoupled,

8   while only the first 2% of commercial is recovered."[13]

9   **Q. How does increased earnings volatility impact PGE's cost of capital?**

10   A. Financial theory states that, all else equal, increased earnings volatility results in increased

11   uncertainty or risk and thus, a higher return to investors. This is because investors and

12   creditors require greater compensation for owning an investment with more risk. All else

13   equal, a firm with greater earnings volatility will have a higher cost of capital than a firm with

14   more stable earnings. If the current PCAM structure results in a higher level of earnings

15   volatility relative to that faced by comparable firms, then investors' required rate of return for

16   PGE will be higher as well. As a result, investors will demand a higher return to hold PGE's

17   debt or common stock, which will increase the cost to finance PGE activities.

B.   Update of Financial and Accounting Regulation Changes

18   **Q. What challenges does PGE face in connection to FASB[14] pronouncements?**

19   A. Accounting Standards Codification (ASC) 810 Consolidation of Variable Interest Entities

---

[11] "Earnings lock down" – Wolfe Research – 26 April, 2020
[12] "Portland General Electric Co. (POR): Key takeaways from virtual management meetings" – Goldman Sachs – 16 August, 2020.
[13] "POR – Return to Normalcy? Not Quite but Portland Managing Through" – Guggenheim Securities – 31 July, 2020.
[14] Financial Accounting Standards Board (FASB)

1   (VIE), provides guidance for determining the financial reporting for entities over which

2   control is attained by means other than through voting rights. Under ASC 810, consolidation

3   is based on the power to direct significant activities of the VIE and the obligation to absorb

4   losses that are significant to the VIE. The entity with the power to direct significant activities

5   and the obligation to absorb significant losses becomes the "primary beneficiary" of the VIE

6   and, in turn, is required to consolidate the financial statement of the VIE for financial reporting

7   to the Securities and Exchange Commission (SEC). ASC 810 requires consolidated financial

8   statements to reflect total assets under control and total liabilities for which an entity is

9   responsible.

10   Under ASC 810, although it is not involved in the creation of these entities and has no

11   equity or debt invested, PGE may be required to reflect the total assets, liabilities, and non-

12   controlling interests of its PPA counterparties on PGE's balance sheet on an ongoing basis

13   when reporting its financial position on a consolidated basis. Some of the counter-party

14   entities are expected to be highly debt leveraged and consolidating their capital structure will

15   likely increase PGE's debt-to-equity capital structure. This high debt leverage will impact

16   PGE's creditworthiness, as the increase to PGE's debt-to-equity percentage increases

17   financial risk.

18   **Q. Has the FASB revised or added Accounting Standards that could impact PGE?**

19   A. On January 1, 2019, PGE adopted Accounting Standards Codification (ASC) Topic 842,

20   which supersedes the previous lease accounting requirements for lessees and lessors within

21   Topic 840, Leases. Among other requirements, lessees are required to recognize all leases,

22   including operating leases, on the balance sheet and record corresponding right-of-use assets

23   and lease liabilities. Accounting for lessors is substantially unchanged from prior accounting

1   principles. Lessees are required to classify leases as either finance leases or operating leases.

2   Initial balance sheet measurement is similar for both types of leases; however, expense

3   recognition and amortization of right-of-use assets will differ. Operating leases will reflect

4   lease expense on a straight-line basis, while finance leases will result in the separate

5   presentation of interest expense on the lease liability (as calculated using the effective interest

6   method) and amortization expense of the right-of-use asset.

7   **Q. How did this change impact financial results?**

8   A. Upon adoption of the new standard on January 1, 2019, PGE recognized right-of-use assets

9   and liabilities on its balance sheet from operating and finance leases of $44 million.

10 **Q. Does this change how costs related to leases are recovered from customers?**

11 A. No. Cost recovery methods have not changed from ASC 840 to ASC 842. PGE has

12   historically recovered its costs related to leases via recovery of lease payments, either through

13   general rate cases or other mechanisms, such as the Annual Update Tariff (AUT). Leased

14   assets have not been included in rate base historically.

15 **Q. How do the rating agencies view this change to PGE's financial reporting?**

16 A. The rating agencies consider operating and finance leases to be debt which poses a constraint

17   on PGE's ability to borrow. With the adoption of ASC 842 the rating agencies no longer need

18   to impute the lease amount and can now directly reclassify the lease liability on the balance

19   sheet as debt. Moody's and S&P made adjustments, adding all of PGE's lease liabilities to the

20   Company's outstanding long-term and short-term debt to come up with a final adjusted debt

21   amount. As a result, this impacts our key credit ratios including FFO/Debt (S&P) and CFO

22   Pre-WC/Debt (Moody's).

23 **Q. What challenges does PGE face in connection with imputed debt??**

1   A.   PGE faces significant risks and uncertainties connected with imputed debt from purchased

2   power contracts: S&P "imputes" additional debt to PGE's capital structure based on the

3   payments under long-term PPAs. S&P believes that because of these quasi-debt instruments,

4   an adjustment must be made to the capital structure to reflect the additional leverage of PPAs.

5   As PGE acquires additional long-term capacity contracts and QF contracts, this imputed debt

6   adjustment could result in increases in the debt ratio large enough to create a quantitative

7   trigger for potential ratings downgrades. A ratings downgrade by S&P from PGE's current

8   rating level could result in higher interest rates on debt issuances, an inability to attract equity

9   capital at a reasonable price, and additional collateral postings for power supply operations.

IV. Cost of Long-Term Debt

1   **Q. What is PGE's cost of long-term debt?**

2   A. PGE's cost of long-term debt in 2022 is expected to be 4.375%. PGE Exhibit 901 presents

3   the amount and the effective cost of PGE's outstanding long-term debt for the test year. This

4   includes existing bond issuances as of June 30, 2021, as well as other bond issuances expected

5   in 2021 and 2022.

6   **Q. How did you calculate the cost of long-term debt for 2022?**

7   A. We included the applicable adjustments to debt as approved in OPUC Order No. 18-464 when

8   calculating the amount of debt outstanding. The full amount and cost for each issuance of

9   debt outstanding at year end is included. We then multiply the amount outstanding by the

10   effective interest rate for each bond issuance. The effective interest rate represents the internal

11   rate of return for each of the cash flows associated with each debt issuance, including all

12   unamortized call premiums and issuance expenses for debt issuances replaced before maturity

13   with less expensive financings. Table 2 below summarizes PGE's cost of long-term debt for

14   the 2022 test year.

Table 2
PGE's Cost of Long-Term Debt ($000)

	2022 Forecast
Principal Amount	$3,306,508
Annual Interest Cost	$144,664
Effective Interest Rate	**4.375%**

15 **Q. What future debt issuances did you include in your analysis?**

16 A. We expect to issue up to $400 million in long-term fixed rate debt during 2021 and $100

17   million in long-term fixed rate debt during 2022 and have included the full amounts in our

18   calculation as our current best estimate.

1 **Q. What is the expected term, coupon rate, and issuance cost for the bonds to be issued in**

2 **2021 and 2022?**

3 A. PGE currently expects to issue a 30-year tranche of FMBs in 2021 with a coupon rate of

4 3.90%. This tranche is expected to be funded during the fourth quarter of 2021. PGE currently

5 expects to issue a 30-year tranche of FMBs in 2022 with a coupon rate of 4.22%. This tranche

6 is expected to be funded during the fourth quarter of 2022. We will update our cost of debt

7 as actual terms become available.

8 **Q. How are the estimated coupon rates and issuance costs derived by PGE?**

9 A. The rates are based on an indicative new issuance pricing analysis, which includes a current

10 estimated credit spread provided by a subset of PGE's investment banks and a forecast of

11 treasury rates from *Global Insight*.

12 **Q. Is there any long-term PGE debt maturing in 2021 or 2022?**

13 A. Yes. PGE has $160 million of term loans maturing in 2021. There are no scheduled maturities

14 in 2022.

15 **Q. Did PGE issue any long-term debt following the energy trading losses?**

16 A. PGE issued two tranches of FMBs for a total for $230 million following the energy trading

17 losses. The process to issue these FMBs had not started until after PGE's announcement of

18 the trading loss.

19 **Q. How has PGE treated the amounts associated with the energy trading losses in its**

20 **calculation of long-term debt?**

21 A. The $127 million of debt issued in Q4 of 2020 associated with the energy trading losses, net

22 of taxes, were removed from PGE's cost of long-term debt calculation, as PGE has elected

23 not to include any costs associated with the energy trading loses in this rate case.

V. Cost of Equity

1 **Q. Please summarize your results regarding the ROE.**

2 A. I, Bente Villadsen, recommend that PGE be allowed to earn the requested ROE of 9.5 percent

3 on the equity portion of its regulated rate base at the requested 50% equity capital structure. I

4 consider that recommendation conservative and it is based on my finding that the estimated

5 range for an electric utility sample's cost of equity is in the range of 8.5% to 10¾% and

6 supported by data estimated for natural gas and water utilities. Within that range, I find a

7 ROE in the range of 9.5 to 10.25 percent is the most appropriate as that is the average low and

8 high of my electric utility sample results, respectively. The natural gas and water utilities

9 support that range. The recommendation is based on my implementation of standard cost of

10 capital estimation models including two versions each of the Discounted Cash Flow (DCF)

11 model and the Capital Asset Pricing Model (CAPM), as well as an Implied Risk Premium

12 analysis as well as an analysis of PGE's business risk. Table 3 below summarizes the model

13 results using the requested 50% equity capital structure.

14 I recognize that the Public Utility Commission of Oregon in the past has favored the DCF

15 method and in particular the multi-stage DCF model. However, the results from the multi-

16 stage DCF are substantially lower than those from other models (e.g., the CAPM and risk

17 premium) and also much lower than the ROE allowed electric utilities across the country.[15]

18 Plausibly, the COVID-19 pandemic severely impacted the economy in general and therefore

19 a contemporaneous measure of expected growth may not reflect the conditions going forward,

20 which would result in a downward biased ROE result.[16]

---

[15] According to S&P Global Intelligence the average allowed ROE for 2021 year-to-date (as of June 9, 2021) was 9.47%.

[16] The difference between the results from the multi-stage DCF model and those of other models has increased over the past year.

Table 3
Summary of Reasonable Ranges of Estimates at 50% Equity

	Electric Sample	
	Low	High
CAPM*	9.8%	10.7%
ECAPM*	9.9%	10.7%
Multi-Stage DCF	8.4%	
Single-Stage DCF		10.1%
Risk Premium	9.8%	9.8%
Range	8.4%	10.7%
Average, all methods	9.5%	10.3%

* Ignores the constant ATWACC approach

1 Because the multi-stage DCF under estimates the cost of equity at this time, I find a

2 reasonable range to consider for electric utilities before any company-specific risk factors are

3 considered to be 9 ½% to 10 ¼ % ROE at the 50% equity.[17] This range was determined as

4 the average of relied upon methods rounded to the nearest ¼ percent.

5 In the current environment electric utilities are facing substantial changes longer term and

6 challenging load and cost recovery due to the COVID-19 period. Specifically, moratoriums

7 on disconnections, such as that in place in Oregon,[18] have resulted in larger uncollectable

8 balances and therefore currently lower cash flow to the utility. Hence, the circumstances are

9 not as in the past for which reason, I find it beneficial to confirm the estimates for other

10 regulated industries and to that end I selected a sample of highly regulated gas and water

11 utilities. These regulated industries confirm the low end of the recommended range and

12 indicates a higher upper end for the ROE. Thus, results within the electric sample range are

13 conservative. A summary of these results is presented below in Table 4.

---

[17] The CAPM / ECAPM range above ignores results from the constant ATWACC approach as Commission staff in the past has taken issue with the method and is thus conservative as those figures indicate a higher ROE.
[18] Oregon's moratorium on disconnections was recently extended to June 30, 2021. Source: Oregon utility regulators extend disconnection moratorium to June 30 - KTVZ

Table 4
Summary Results for Natural Gas and Water Utilities

	Gas & Water		Gas Sample		Water Sample	
	Low	High	Low	High	Low	High
CAPM*	9.8%	11.0%	9.9%	10.9%	9.8%	11.0%
ECAPM*	9.8%	10.9%	9.9%	10.9%	9.8%	10.9%
Multi-Stage DCF	7.8%		8.5%		7.1%	
Single-Stage DCF		10.9%		11.0%		10.9%
Range	7.8%	11.0%	8.5%	11.0%	7.1%	11.0%
Average, all methods	9.2%	10.9%	9.4%	10.9%	8.9%	10.9%

* Ignores the constant ATWACC approach

1   The results in Table 4 span a wider range than the electric ROE estimates but are

2   consistent with the results and therefore confirm that the electric utility sample range is

3   reasonable.

4 **Q. Do you have any preliminary comments regarding the appropriate ROE?**

5 A. Yes. The current determination of PGE's allowed ROE takes place during the ongoing

6   uncertainty in economic and financial conditions due to the ongoing impacts of the COVID-

7   19 pandemic, which has led to unprecedented low U.S. Treasury bond yields and substantial

8   volatility in stock and commodity price. Although risk-free rates have increased and market

9   volatility has declined, the risk premium that investors require to hold equity rather than

10   government bonds remain elevated. Going forward, the length and extent of the impacts of

11   the pandemic are not known and will depend on how measures impacting commerce stay in

12   place and how fast the effects of the COVID-19 pandemic dissipate.[19]   More recently,

13   concerns regarding inflation and risks of inflation have come to light – for example, the

14   Consumer Price Index, a common measure of inflation, increased by 4.2% from April 2020

---

[19] I acknowledge that all of society has been impacted to a degree not seen in decades, but I focus my discussion on the financial and economic impacts in this report. I also note that most states have recently reopened the economy.

1   to April 2021 – the largest 12-month increase since September 2008.[20]

2   In light of this uncertainty, it is important to assure investors that the allowed ROE and

3   capital structure is such that PGE can continue to raise the needed capital to continue to

4   provide service to its customers, while also providing a return that is comparable to those

5   investors expect. To that end, I note that the average allowed ROE for natural gas utilities in

6   2021 year to date was 9.6% on an average of 51% equity.[21]

7 **Q. How is the remainder of your testimony organized?**

8 A. Section A formally defines the cost of capital and explains the techniques for estimating it in

9   the context of utility rate regulation. Section B discusses conditions and trends in capital

10   markets and their impacts on the cost of capital. Section C explains my analyses and presents

11   the results. Section D discusses PGE's business risk characteristics that are relevant to my

12   recommended allowed ROE and concludes with a summary of my recommendations.

A.   Cost of Capital Principles and Approach

Risk and the Cost of Capital

13 **Q. How is the "Cost of Capital" defined?**

14 A. The cost of capital is defined as the expected rate of return in capital markets on alternative

15   investments of equivalent risk. Put differently, it is the rate of return investors require based

16   on the risk-return alternatives available in competitive capital markets. The cost of capital is

17   a type of opportunity cost: it represents the rate of return that investors could expect to earn

18   elsewhere without bearing more risk. "Expected" is used in the statistical sense: the mean of

---

[20] U.S. Bureau of Labor Statistics, "Consumer Price Index up 4.2% from April 2020 to April 2021," May 19, 2021, accessed May 24, 2021, https://www.bls.gov/opub/ted/2021/consumer-price-index-up-4-2-percent-from-april-2020-to-april-2021.htm.
[21] S&P Global Intelligence as of June 4, 2021.

1   the distribution of possible outcomes. The terms "expect" and "expected," as in the definition

2   of the cost of capital itself, refer to the probability-weighted average over all possible

3   outcomes.

4   The definition of the cost of capital recognizes a tradeoff between risk and return that can

5   be represented by the "security market risk-return line" or "Security Market Line" for short.

6   This Security Market Line is depicted below. The higher the risk, the higher the cost of capital

7   required.

Figure 1
The Security Market Line
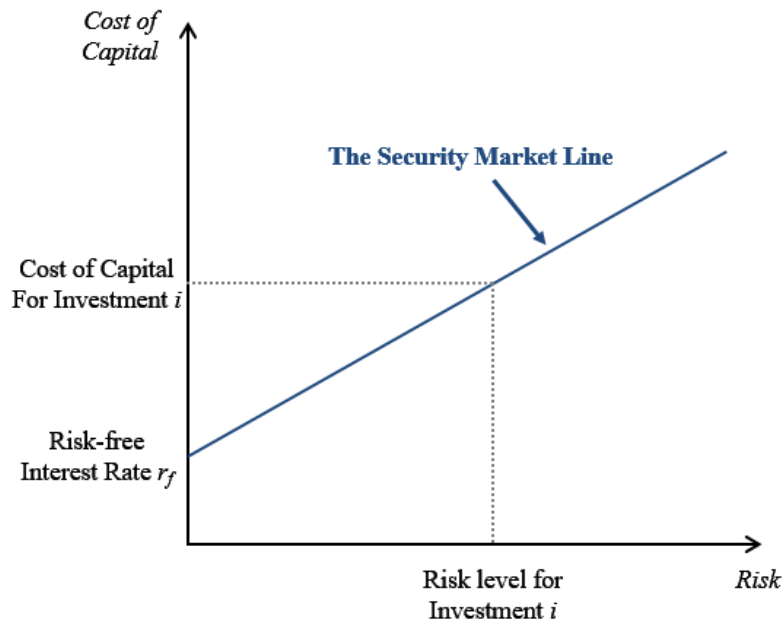
8   **Q. What factors contribute to systematic risk for an equity investment?**

9   A. When estimating the cost of equity for a given asset or business venture, two categories of

10   risk are important. The first is business risk, which is the degree to which the cash flows

11   generated by the business (and its assets) vary in response to moves in the broader market. In

12   context of the CAPM, business risk can be quantified in terms of an "asset beta" or "unlevered

1   beta." For a company with an asset beta of 1, the value of its enterprise will increase (decrease)

2   by 1% for a 1% increase (decline) in the market index.

3   The second category of risk relevant for an equity investment depends on how the

4   business enterprise is financed and is called financial risk. Section B below explains how

5   financial risk affects the systematic risk of equity.

6   **Q. What are the guiding standards that define a just and reasonable allowed rate of return**

7   **on rate-regulated utility investments?**

8   A. The seminal guidance on this topic was provided by the U.S. Supreme Court in the *Hope* and

9   *Bluefield* cases,[22] which found that:

10   • The return to the equity owner should be commensurate with returns on investments

11   in other enterprises having corresponding risks;[23]

12   • The return should be reasonably sufficient to assure confidence in the financial

13   soundness of the utility; and

14   • The return should be adequate, under efficient and economical management for the

15   utility to maintain and support its credit and enable it to raise the money necessary

16   for the proper discharge of its public duties.[24]

17   **Q. How does the standard for a just and reasonable rate of return relate to the cost of**

18   **capital?**

19   A. The first component of the *Hope* and *Bluefield* standard, as articulated above, is directly

---

[22] Bluefield Water Works & Improvement Co. v. Public Service Com'n of West Virginia, 262 U.S. 679
(1923)("Bluefield"), and Federal Power Com'n v. Hope Natural Gas Co., 320 U.S. 591 (1944) ("Hope").
[23] Hope, 320 U.S. at 603.
[24] Bluefield, 262 U.S. at 680.

1   aligned with the financial concept of the opportunity cost of capital.[25] The cost of capital is

2   the rate of return investors can expect to earn in capital markets on alternative investments of

3   equivalent risk.[26]

4   By investing in a regulated utility asset, investors are tying up some capital in that

5   investment, thereby foregoing alternative investment opportunities. Hence, the investors are

6   incurring an "opportunity cost" equal to the returns available on those alternative investments.

7   The allowed return on equity needs to be at least as high as the expected return offered by

8   alternative investments of equivalent risk or investors will choose these alternatives instead.

9   If it is not, the utility's ability to raise capital and fund its operations will be negatively

10   impacted. This is a fundamental concept in cost of capital proceedings for regulated utilities,

11   such as PGE.

12   **Q. Please summarize how you considered risk when estimating the cost of capital.**

13   A.   To evaluate comparable business risk, I looked to a proxy group of regulated electric utilities

14   and supported the analysis by similar calculations for natural gas and water utilities. The

15   electric utilities I consider have a high proportion of regulated assets and revenue, with the

16   majority having more than 80% of assets subject to regulation and the remainder having at

17   least 50% subject to regulation. Additionally, they all have a network of assets that are used

18   to serve end-use customers and they are capital intensive (meaning that each dollar in revenue

19   requires substantial investment in fixed assets). Like PGE the majority own electric

20   distribution, generation, and transmission. The natural gas and water utilities are similarly

---

[25] A formal link between the opportunity cost of capital as defined by financial economics and the proper expected rate of return for utilities was developed by Stewart C. Myers, "Application of Finance Theory to Public Utility Rate Cases," Bell Journal of Economics & Management Science 3:58-97 (1972).

[26] The opportunity cost of capital is also referred to as simply the "cost of capital," and can be equivalently described in terms of the "required return" needed to attract investment in a particular security or other asset (i.e., the level of expected return at which investors will find that asset at least as attractive as an alternative investment).

1   highly regulated and serve a mixture of customers through a network of fixed assets.

2   However, because they do not provide electric service, I ensure my recommendation is fully

3   supported by the electric sample. Further (as explained in Section B below), I analyzed and

4   adjusted for differences in financial risk due to different levels of financial leverage among

5   the proxy companies and between the capital structures of the proxy companies and also

6   between the capital structures of the proxy companies and the regulatory capital structure that

7   will be applied to PGE for ratemaking purposes. To determine where the estimated range of

8   PGE's ROE reasonably falls, I compared the business risk of PGE to that of the proxy

9   companies.

Financial Risk and the Cost of Equity

10   **Q. How does capital structure affect the cost of equity?**

11   A. Debtholders in a company have a fixed claim on the assets of the company and are paid prior

12   to the company's owners (equity holders) who hold the inherently variable residual claim on

13   the company's operating cash flows. Because equity holders only receive the profit that is

14   left over after the fixed debt payments are made, higher degrees of debt in the capital structure

15   amplify the variability in the expected rate of return earned by equity-holders.   This

16   phenomenon of debt resulting in financial leverage for equity holders means that, all else

17   equal, a greater proportion of debt in the capital structure increases risk for equity holders,

18   causing them to require a higher rate of return on their equity investment, even for an

19   equivalent level of underlying business risk. This fact has been clearly acknowledged in the

20   Commission Staff's calculations of the cost of equity for utilities, which in the past has relied

21   on a version of the Hamada method.[27]

---

[27] See, for example, direct testimony of Matt Muldoon in UE 294, p. 15.

1 **Q. How do differences in financial leverage affect the estimation of the cost of equity?**

2 A. The DCF models and the CAPM rely on market data to estimate the cost of equity for the

3 proxy companies, so the results reflect the value of the capital that investors hold during the

4 estimation period (market values).

5 The authorized ROE in turn is applied to the regulatory equity portion of PGE's rate base.

6 Because the cost of equity is measured using a group of proxy companies, it may well be the

7 case that these companies finance their operations with a different debt and equity proportion

8 than the proportion the Commission allows in PGE's capital structure. Specifically, the DCF

9 models (and the CAPM) measure the cost of equity using market data and consequently are

10 measures of the cost of equity using the proportion of debt and equity that is inherent in that

11 data. Therefore, I consider the impact of any difference between the financial risk inherent in

12 those cost of equity estimates and the capital structure used to determine PGE's required return

13 on equity.

14 Differences in financial risk due to the different degree of financial leverage in PGE's

15 regulatory capital structure compared to the capital structures of the proxy companies mean

16 that the equity betas measured for the proxy companies must be adjusted before they can be

17 applied in determining PGE's return on equity. Similarly, the cost of equity measured by

18 applying the DCF models to the proxy companies' market data requires adjustment if it is to

19 serve as an estimate of the appropriate allowed ROE for PGE at the regulatory capital structure

20 that the Commission grants.

21 Importantly, taking differences in financial leverage into account does not change the

22 value of the rate base. Rather, it acknowledges the fact that a higher degree of financial

23 leverage in the regulatory capital structure imposes a higher degree of financial risk for an

1   equity investment in PGE's rate base than is experienced by equity investors in the market-

2   traded stock of the less leveraged proxy companies.

3 **Q. How specifically do you consider the financial risk in your analysis using market data**

4   **for the proxy group companies?**

5 A. The impact of financial risk is taken into account in an analysis of cost of equity using market-

6   based models such as the DCF and CAPM in several manners.[28] One way is to determine the

7   after-tax weighted-average cost of capital for the proxy group using the equity and debt

8   percentages as the weight assigned to the cost of equity and debt. Financial theory holds that

9   for a given level of business risk, the weighted average cost of capital is constant over a broad

10   set of capital structures, i.e., the weighted average cost of capital is the same at, for example,

11   55 and 45 percent equity, as the cost of equity increases as the percentage of equity decreases.

12   I estimate the weighted cost of capital for each utility in the proxy group based on that utility's

13   capital structure. I then evaluate the average weighted cost of capital across the proxy group.

14   Once the weighted cost of capital is determined for the proxy group, I can then determine the

15   cost of equity that is required at PGE's capital structure. This approach assumes that the after-

16   tax weighted average cost of capital is constant for a range that spans the capital structures

17   used to estimate the cost of equity and the regulatory capital structure.

18   A second approach was developed by Professor Hamada, who estimated the cost of equity

19   using the CAPM and made comparisons between companies with different capital structures

20   using beta. Specifically, in the Hamada approach, I use the estimated beta to calculate what

21   beta would be associated with a 100 percent equity financed firm to obtain a so-called all-

---

[28] The impact of financial leverage on the risk premium model needs to be considered separately as it uses
regulatory data rather than market data, meaning that differences in regulatory capital structures are relevant for this
model. As PGE's requested capital structure is very close to that of the average electric utility that has had a rate
case decided in recent years, I make no adjustments for financial leverage in this model.

1   equity or assets beta and then re-lever the beta to determine the beta associated with the

2   regulatory capital structure. This requires an estimate of the systematic risk associated with

3   debt (i.e., the debt beta), which is usually quite small. This is the approach that previously

4   has been taken by Commission Staff. In Exhibit 905, I set forth additional technical details

5   regarding the methods that can be used to account for financial risk when estimating the cost

6   of capital. This approach is well recognized and described in standard finance textbooks.

7   **Q. Can you provide a numerical illustration of how the cost of equity changes, all else being**

8   **equal, when the degree of leverage changes?**

9   A. Yes. I constructed a simple example below, where only the leverage of a company varies. I

10   assumed the return on equity is 11.00% at a 50% equity capital structure and determine the

11   return on equity that would result in the same overall return if the percentage of equity in the

12   capital structure were reduced to 45%. Importantly, regardless of the equity percentage,

13   customers will pay $80 in capital costs – the only difference between the two companies is

14   how that $80 is split between equity and debt holders. This principle is illustrated in Figure 2

15   below.

Figure 2
Illustration of the Impact of Financial Risk on ROE

		Company A (50% Equity)	Company B (45% Equity)
Rate Base	[a]	$1,000	$1,000
Equity	[b]	$500	$450
Debt	[c]	$500	$550
Total Cost of Capital (8%)	[d] = [a] × 8%	$80.0	$80.0
Cost of Debt (5%)	[e] = [c] × 5%	$25.0	$27.5
Equity Return	[f] = [d] - [e]	$55.0	$52.5
Rate of Return on Equity (ROE)	**[g] = [f] / [b]**	**11.00%**	**11.67%**

1   Figure 2 above illustrates how financial risk[29] affects returns and the ROE. The overall

2   return remains the same for Company A and B at $80. But Company B with the lower equity

3   share and higher financial leverage must earn a higher percentage ROE in order to maintain

4   the same overall return. This higher percentage allowed ROE represents the increased risk to

5   equity investors caused by the higher degree of leverage.

6   The principle illustrated in Figure 2 is an example of the first adjustment I perform to

7   account for differences in financial risk when conducting estimates of the cost of equity

8   applicable to PGE.

9 **Q. Does this approach apply to the risk premium analysis?**

10 A. Yes, to the extent that there are differences between the capital structures of the companies

11   used to determine the benchmark ROE and PGE, I need to consider whether I am comparing

12   apples to apples. However, because the allowed ROE, which is used in the risk premium

13   model, usually is applied to book value capital structures, it is the book value capital structure

14   that is relevant for the risk premium method. Further, the average book value capital structure

15   for electric utilities for which I have allowed ROE data for, the past has been close to that of

16   PGE, so I do not need to make any adjustments to the estimated ROE. I note that for 2020

17   and 2021 year-to-date the average allowed equity percentage were 49.7 and 49.2 percent,

18   respectively.[30] Thus, comparable to that requested by PGE.

Approach to Estimating the Cost of Equity

19 **Q. Please describe your approach for determining the cost of equity for PGE.**

20 A. As stated above, the standard for establishing a fair rate of return on equity requires that a

---

[29] Financial risk is risk that a company has due to its capital structure, specifically the higher a company's debt, the larger the financial risk.
[30] S&P Global Market Intelligence assessed June 4, 2021.

1   regulated utility be allowed to earn a return equivalent to what an investor could expect to

2   earn on an alternative investment of equivalent risk. Therefore, my approach to estimating

3   the cost of equity for PGE focuses on measuring the expected returns required by investors to

4   invest in companies that face business and financial risks comparable to those faced by PGE.

5   Because certain models require market data, my considerations of comparable companies is

6   restricted to those that have publicly traded stocks. To this end, I have selected a proxy group

7   consisting of publicly traded electric utilities. These are listed as publicly traded electric

8   utilities by Value Line and have the majority of their assets subject to regulation with most

9   having in excess of 80 percent regulated assets.[31] I also consider a group of natural gas

10   distribution and water utilities to assess the reasonableness of the results and my

11   recommendation. I rely on standard financial models to estimate the cost of equity, including

12   two versions of the DCF as preferred by Commission Staff in the past. As economic

13   conditions currently are very uncertain, I consider it necessary to also consider other estimates

14   from the CAPM and risk premium-based models.

B.   Capital Market Conditions and the Cost of Capital

15   **Q. What do you cover in this section?**

16   A. In this section, I address recent changes in capital market conditions, the increased volatility

17   in equity and debt markets, and how these factors affect the cost of equity and its estimation.

18   Specifically, I address (i) interest rate developments; (ii) investors perception of the market

---

[31] I consider a natural gas distribution utility sample and a sample including water utilities in addition to the electric sample. The latter samples have the advantage of being highly regulated and, like electric utilities are engaged in distributing a commodity through an extensive network of fixed assets. My recommendation, however, is fully supported by the electric sample.

1   risk premium, (iii) federal stimulus to the economy, and (iv) inflation risks and the impact on

2   cost of equity.

3 **Q. Why do you discuss capital market conditions in a testimony aimed at determining**

4   **PGE's ROE?**

5 A. Capital market conditions are important to cost of equity estimation methodologies and can

6   affect the inputs to the cost of equity models. Inputs to the DCF model are affected by the

7   economy in general, as economic growth will affect growth rates and utility stock prices.

8   Consequently, the capital market developments affect the growth rates, dividend yields, and

9   the assessment of estimates' reasonableness.

10   Furthermore, the risk-free rate is an input to the risk premium and CAPM. Therefore,

11   recent and expected developments in government bond yields are important to assess the

12   validity of any measure of the risk-free rate. Similarly, the Market Risk Premium (MRP) is an

13   input to the CAPM, so factors that affect the MRP (e.g. volatility and changes in investors'

14   risk perceptions) are vital for accurate determination of the ROE. Federal stimulus plausibly

15   will impact the economy's growth rate, interest rates as well as inflation and are therefore

16   important for ROE determination. Lastly, as the cost of equity is determined in nominal terms,

17   an increase in the inflation rate will impact the cost of equity – even if the real cost of equity

18   remains constant.

19 **Q. Can you provide a summary of recent events that have impacted capital market**

20   **conditions?**

21 A. Over the past year, capital markets experienced unprecedented levels of uncertainty due to the

22   impacts of the COVID-19 pandemic on the global economy. Following the formal pandemic

23   declaration by the World Health Organization in March 2020, governments around the world

1 sought to limit the health and economic impacts from the outbreak. States issued stay-at-

2 home orders and major portions of the U.S. economy shut down. This also led to a significant

3 rise in unemployment with over 77 million people filing initial unemployment claims since

4 March 21, 2020.[32]

5 To mitigate the economic impact, the U.S. Federal Reserve cut its policy rate to 0 to 0.25

6 percent and announced "unlimited" quantitative easing and emergency liquidity programs.[33]

7 The U.S. also passed the $2.1 trillion CARES Act, which provided direct aid to people and

8 businesses and also bolstered unemployment benefits. Despite these efforts, the U.S.

9 economy contracted substantially and by June 2020 the U.S. entered a recession.[34] In the 1st

10 and 2nd Quarter of 2020, real GDP decreased by an annualized rate of 5.0% and 31.4%,

11 respectively.[35]

12 More recently, the U.S. government has passed a $1.7 trillion American Rescue Plan,

13 which similarly is intended to stimulate the U.S. economy.[36] These efforts have added about

14 $1.5 trillion to the U.S. economy to date and the federal deficit reached a higher level than at

15 any time since World War II at the end of 2020.[37] The level of federal spending and need to

16 finance the deficit has created some fears of inflation. For example, Obama's former

17 economic advisor and Harvard professor, Lawrence Summers, has warned that "*the trillions*

---

[32] U.S. Department of Labor, "Unemployment Insurance Weekly Claims," New Release, December 10, 2020. Data, accessed March 2, 2021, https://oui.doleta.gov/unemploy/claims.asp.
[33] U.S. Federal Reserve, "Federal Reserve Announces Extensive New Measures to Support the Economy," Press Release, March 23, 2020.
[34] National Bureau of Economic Research, "Determination of the February 2020 Peak in US Economic Activity," June 8, 2020, accessed September 21, 2020, https://www.nber.org/cycles/june2020.html.
[35] Bureau of Economic Analysis, "Gross Domestic Product, 2nd Quarter 2020 (Third Estimate); Corporate Profits, (Revised)", U.S. Department of Commerce, September 30, 2020. Accessed October 2, 2020, https://www.bea.gov/news/2020/gross-domestic-product-third-estimate-corporate-profits-revised-and-gdp-industry-annual.
[36] See, for example, Senate passes Biden's $1.9 trillion relief package including $1,400 stimulus checks (yahoo.com)
[37] See Exhibit BV-xx for details.

1 *of dollars Biden wanted to spend could create "'inflationary pressures of a kind we have not*

2 *seen in a generation.'* "[38] Professor Summers' concerns are consistent with recent inflation

3 concerns expressed in Bank of America's recent Fund Manager Survey, where inflation

4 topped the list of managers concerns.[39]

5 Rising inflation is introducing new uncertainties to the financial markets and increasing

6 the return required by investors to hold risky assets. Specifically, because the allowed ROE

7 is a nominal return, an increase in inflation would result in the value of any allowed ROE

8 being reduced. Thus, with the risk of inflation increasing, there is an increased risk that the

9 allowed ROE will be downward biased within a relatively short time, e.g., a year

10 Economic condition improved in the second half of 2020 and the first few months of

11 2021. In the 3rd and 4th Quarter, real GDP increased by an annualized rate of 33.4% and

12 4.1%, respectively.[40] Also, in Q1, 2021, preliminary estimates is that the economy grew at

13 an annualized rate of 6.4 percent.[41] Despite the rebound, recent employment figures have

14 been disappointing.[42] The Federal Reserve also remains cautious about the pace and extent

15 of the recovery. In December 2020, the Federal Reserve reiterated "Economic activity and

16 employment have continued to recover but remain well below their levels at the beginning of

17 the year," and "the ongoing public health crisis will continue to weigh on economic activity,

18 employment, and inflation in the near term, and poses considerable risk to the economic

---

[38] Lydia Moynihan, New York Post, "Larry Summers raises inflation concerns as he blasts Biden's spending," May 17, 2021.
[39] CNBC, "Investors now fear inflation more than COVID, Bank of America Survey shows," March 16, 2021.
[40] Bureau of Economic Analysis, "Gross Domestic Product, Fourth Quarter and Year 2020 (Second Estimate)", U.S. Department of Commerce, February 25, 2021. Accessed March 2, 2021, https://www.bea.gov/news/2021/gross-domestic-product-fourth-quarter-and-year-2020-second-estimate.
[41] Gross Domestic Product, 1st Quarter 2021 (Second Estimate); Corporate Profits, 1st Quarter 2021 (Preliminary Estimate) | U.S. Bureau of Economic Analysis (BEA)
[42] May's Jobs Report Misses Expectations as Signs of Labor Shortage Peek Through | Barron's (barrons.com)

1   outlook over the medium term."[43] The Federal Reserve has kept its policy interest rate at 0 to

2   0.25 percent and is also continues to support financial markets through its expanded

3   quantitative easing programs.[44]

4   While the length and extent of the economic impacts from the COVID-19 pandemic are

5   unknown, the impacts are expected to persist for some time.

6   **Q.   What are the expectations going forward?**

7   A.   The impacts on the economy and unemployment will depend on how long the economy

8   remains partially shut down, but the economy is expected to continue to recover in mid-2021

9   based on recent forecasts. Recent survey by economist, such as the Blue Chip Economic

10   Indicators (BCEI) survey, indicate that U.S. real GDP will increase by 5.7% in 2021 and 4.1%

11   in 2022 for a nominal GDP at about 8 and 6 percent, respectively.[45] In August, the U.S.

12   Federal Reserve announced a policy change whereby they would target inflation of 2% on

13   average, noting that the Federal Reserve would hold overnight borrowing interest rates lower

14   for longer.[46] Recent projections from the FOMC clarified that policy rates will remain at

15   current levels through at least 2023.[47] This will likely continue to exert downward pressure

16   on interest rates over the near to medium term although the impact of inflation pressures has

17   yet to be seen.

18   **Q.   How does this impact the cost of equity estimation for PGE?**

---

[43] Board of Governors of the Federal Reserve System, "Federal Reserve issues FOMC statement," December 16, 2020, https://www.federalreserve.gov/newsevents/pressreleases/monetary20201216a.htm.
[44] Ibid.
[45] Wolters Kluwer Blue Chip Economic Indicators and PwC Analysis, February 2021, p. 2-3
[46] U.S. Federal Reserve, "Federal Open Market Committee announces approval of updates to its Statement on Longer-Run Goals and Monetary Policy Strategy," August 27, 2020, accessed March 2, 2021, https://www.federalreserve.gov/newsevents/pressreleases/monetary20200827a.htm.
[47] U.S. Federal Reserve, "March 17, 2021: FOMC Projections materials, accessible version," March 17, 2020, https://www.federalreserve.gov/monetarypolicy/fomcprojtabl20210317.htm.

1   A. It is important to remember that the cost of equity and capital structure established for PGE in

2   this proceeding is expected to be in effect beyond the current extraordinary impacts of the

3   COVID-19 pandemic. The analysis and recommendations should reflect expected market

4   conditions that will prevail over the relevant rate period and not exclusively current market

5   conditions. As discussed further below, many of the inputs to the cost of equity estimation

6   methodologies are currently at unprecedented levels. Sole reliance on current economic and

7   financial conditions to estimate PGE's cost of equity would unfairly lock PGE and their

8   customers into the current economic and financial environment. Doing so would also not

9   provide a fair return, especially when compared to other utilities that did not undergo a cost

10   of capital proceeding during this period. However, the current conditions create an exorbitant

11   amount of uncertainty about the future and, if the financial crisis can be used as a guide,

12   investors' heighted perception of risk are likely to linger.

Interest Rates

13   Q. **How do interest rates affect the cost of equity?**

14   A. The current interest rate environment affects the cost of equity estimation in several ways.

15   Most directly, the CAPM takes as one of its inputs a measure of the risk-free rate (see Figure

16   3). The estimated cost of equity using the CAPM decreases (increases) by one percentage

17   point when the risk-free rate decreases (increases) by one percentage point. Therefore, to the

18   extent that prevailing government yields are depressed due to economic uncertainties related

19   to COVID-19 or the monetary policy responses, using current yields as the risk-free rate will

20   depress the CAPM estimate below what is representative of the forward-looking cost of

21   equity, which will be in effect during the relevant regulatory period. Put differently, with

22   current government bond yields downwardly biased due to flight-to-quality behavior by

1   investors and "unlimited" quantitative easing programs by the U.S. Federal Reserve, using

2   current yields in the CAPM will also downward bias the cost of equity estimate. At the same

3   time, a low interest rate is associated with a high market risk premium, so that these two

4   measures offset one another to a degree. To avoid any bias in the cost of equity estimate, it is

5   important to use a forecasted risk-free rate and consider whether the rate needs to be

6   normalized (or the risk premium investors require needs to be adjusted) to ensure the resulting

7   CAPM estimate reflects a non-biased estimate of PGE's cost of equity over the relevant

8   regulatory period. As the economy begins to recover, as forecasted, interest rates are expected

9   to increase from current levels.[48]   Therefore, the allowed fair return on equity for utilities

10   should reflect the future interest rate environment.

11   **Q. What are the relevant developments regarding interest rates?**

12   A. Current interest rates remain low with the 10-year government bond yield standing at 1.65%

13   as of April 30, 2021, despite significant improvement since the historic low levels in 2020.

14   Interest rates on 10-year U.S. Government bonds were at 1.86% at the end of 2019.[49]   As

15   large parts of the economy began to shut down in response to the pandemic, investors fled

16   riskier assets for safer assets. This demand for U.S. government bonds caused bond yields to

17   decrease rapidly. On March 9, 2020, the entire U.S. yield curve fell below 100 bps for the

18   first time in history and the 10-year U.S. government bond yield hit a record low of 0.339%.[50]

19   Since then, the U.S. government bond yields have risen – perhaps in the light of the recent

---

[48] The 10-year treasury bond yield has increased more than 50 basis points from the summer of 2020; for example, the yield was 0.55% on August 6, 2020 but stood at 1.63% on March 17, 2021

[49] Bloomberg accessed October 23, 2020 and Federal Reserve; FRED assessed December 3, 2020

[50] Sunny Oh, "Treasury yield curve sinks below 1% after oil and coronavirus worries rout stocks," Market Watch, March 9, 2020, accessed March 31, 2020, https://www.marketwatch.com/story/30-year-treasury-yield-tumbles-below-1-after-oil-and-coronavirus-worries-rout-stocks-2020-03-09

1   reopening of the economy – but still remain near historic lows and below end of 2019 levels.

2   The current 10-year U.S. Government bond yield is approximately 1.65.[51]

3   Looking forward, treasury bonds are forecasted to increase, which is depicted in 3 below.

4   BCEI March and May 2021 edition forecasts that the yield on 10-year treasury bonds will

5   increase. Specifically, BCEI projects the 10-year government bond yield will be 2.1, 2.3 and

6   2.5 percent in 2022, 2023 and 2024, respectively (see Figure 5). [52] The expectations for the

7   period after January 1, 2022 is what is relevant for this proceeding as rates are going into

8   effect in 2022 and remain for a period. Because the risk-free rates is an input to several cost

9   of equity estimation models, the relationship between current and forecasted risk-free rates is

10   an important consideration.

---

[51] Bloomberg, accessed May 10, 2021
[52] Wolters Kluwer Blue Chip Economic Indicators and PwC Analysis, May 2021 (2022) and March 2021 (2023-24), p. 14.

UE 394 – PGE Direct Testimony of Jaramillo, Ferchland, Villadsen

Figure 3
Historical and Projected Ten-Year Treasury Bond Yields[53]
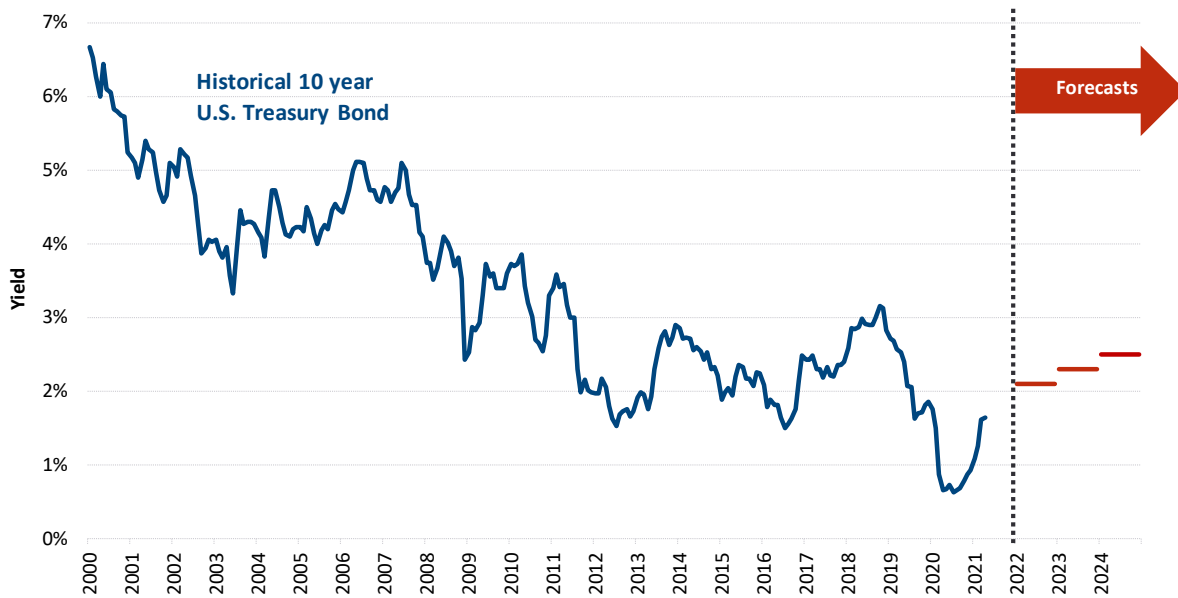
Source: Historical data from Bloomberg. Forecasts from Blue Chip Economic Indicators March and May 2021 issue.

Risk Premiums[54]

1 **Q. What is the current evidence regarding market volatility?**

2 A. During the early months of COVID-19, financial markets became extremely volatile as shown

3   in near-term common volatility measures, such as the VIX, which is frequently referred to as

4   the market's fear index. The VIX reached an all-time high of 82.69 on March 16, 2020, which

5   was higher than the peak of 80.86 during the Financial Crisis. However, the VIX has slowly

6   retreated from recent highs to between 16.7 to 27.5 in May 2021 with the highest level seen

7   at the beginning of the month on May 12, 2021.[55] As a result, investors are faced with

---

[53] Id.

[54] In past proceedings, I have considered the spread between utility bond yields and government bonds yields over the long term as well as over a recent period to assess whether the spread is elevated. Because the current spread is comparable to the long-term average, I shall not address the issue – not do I consider any potential impact on the MRP or forecasted risk-free rate.

[55] Bloomberg, as of February 28, 2021 and CBOE as of January 27, 2021.
(https://www.google.com/search?q=VIX+cboe&sourceid=ie7&rls=com.microsoft:en-US:IE-Address&ie=&oe=#spf=1611799158418).

1   somewhat higher volatility today than before the COVID-19 pandemic. Because a higher

2   market volatility implies a higher risk premium, the developments in market volatility are

3   relevant to PGE's cost of equity.

Figure 4
VIX

Source: Bloomberg as of 2/28/2021
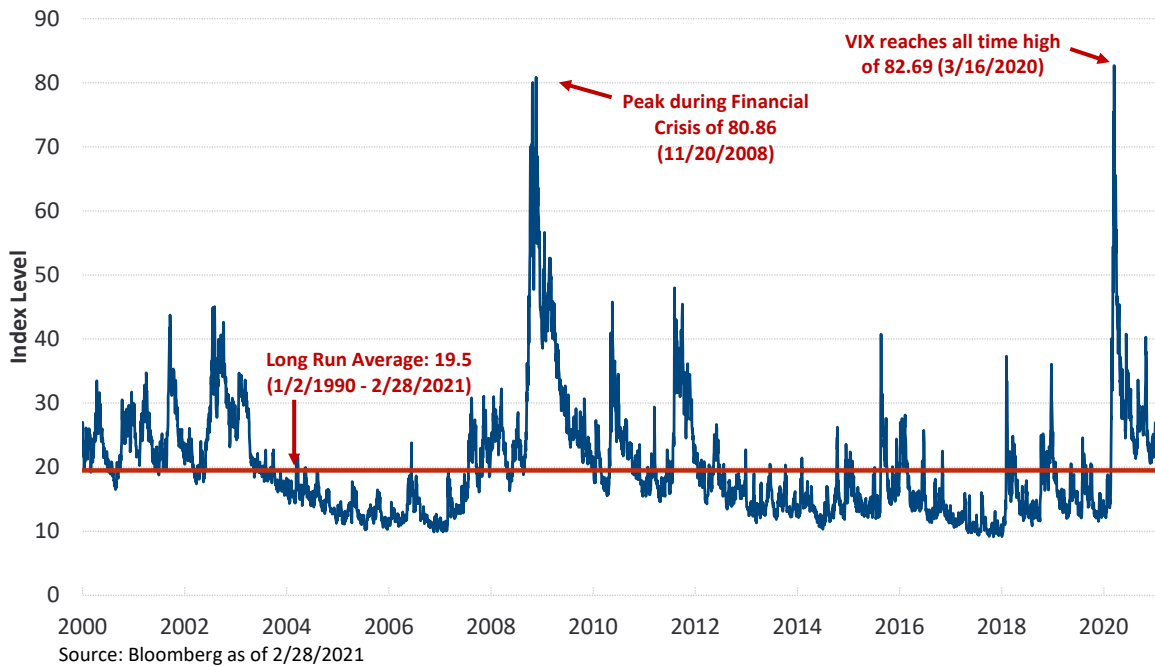
4   Similarly, the SKEW index, which measures the market's willingness to pay for

5   protection against negative "black swan" stock market events (i.e., sudden substantial

6   downturns),[56] shows that investors are cautious. A SKEW value of 100 indicates outlier

7   returns are unlikely, but as the SKEW increases, the probability of outlier returns becomes

8   more significant. Figure 5 below shows the development in the SKEW since 2005 and that

9   the index has recently increased following a period of declining SKEW. The index spiked

10   over 155.3 on May 28, 2021, which is well above its long run average of 120.1. The recent

11   spike in the SKEW shows that investors continue to pay for protection against downside risks.

---

[56] For example, http://www.cboe.com/products/vix-index-volatility/volatility-indicators/skew.

Figure 5
SKEW

Source: Bloomberg as of 2/28/2021
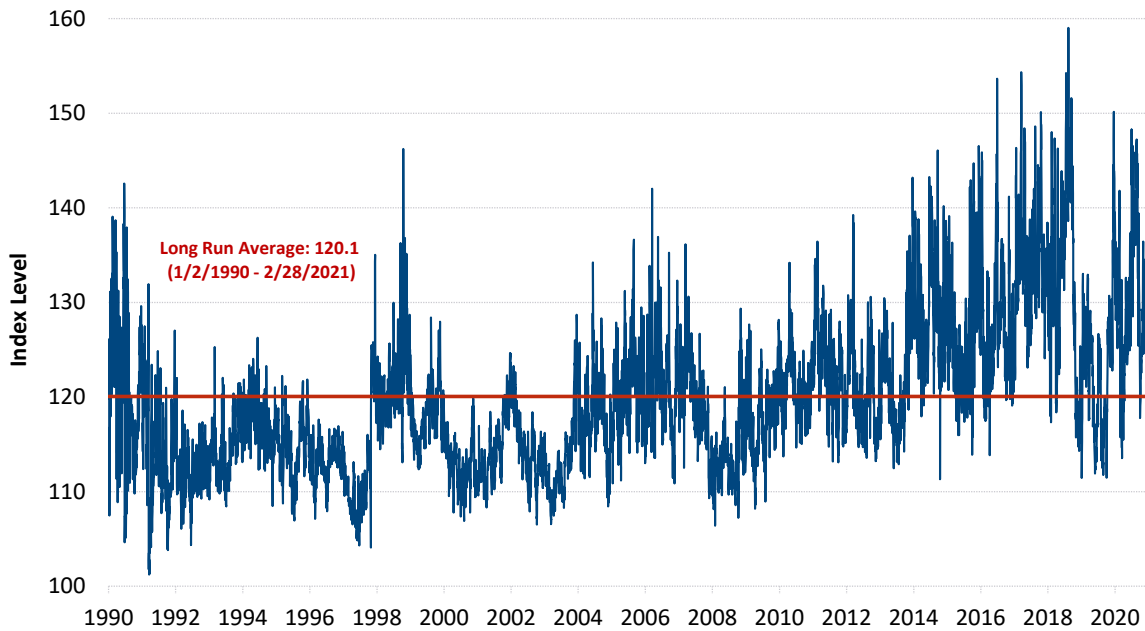
1   While the current level of the VIX is close to its long-run average the very high level of

2   the SKEW is consistent with investors being cautious about investing in equity. Such

3   circumstances lead investors to require a higher premium to invest in assets or financial

4   instruments that are not risk-free.

5 **Q. What is the Market Risk Premium?**

6 A. In general, a risk premium is the amount of "excess" return – above the risk-free rate of return

7   – that investors require to compensate them for taking on risk. As illustrated in Figure 1 the

8   riskier the investment, the larger the risk premium investors will require.

9   The MRP is the risk premium associated with investing in the market as a whole. Since

10   the so-called "market portfolio" embodies the maximum possible degree of diversification for

1   investors,[57] the MRP is a highly relevant benchmark indicating the level of risk compensation

2   demanded by capital market participants. It is also a direct input necessary to estimating the

3   cost of equity using the CAPM and other risk-positioning models.

4 **Q. Please explain the current evidence related to the MRP.**

5 A. Bloomberg's forward looking estimate of the MRP for the U.S. increased to as high as 9.84

6   percent in March 2020 and remains high at an average of 8.55 percent for the last two weeks

7   of April reaching 8.95 percent on April 30th – albeit lower compared to March 2020 levels,

8   the market risk premium has increased recently.**[58]**

Figure 6
Bloomberg's Daily Market Risk Premium and Risk Free Rate
(Jan. 2020 – Apr. 2021)

---
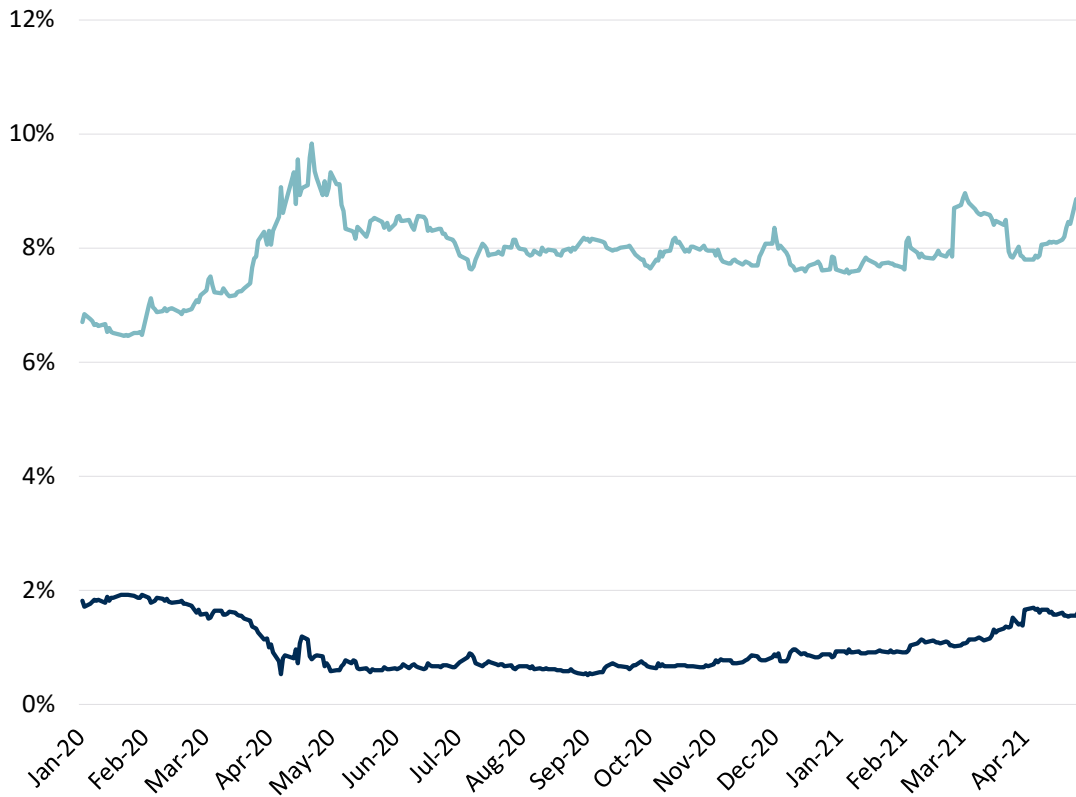
[57] In finance theory, the "market portfolio" describes a value-weighted combination of all risky investment assets (e.g., stocks, bonds, real estate) that can be purchased in markets. In practice, academics and financial analysts nearly always use a broad-based stock market index, such as the S&P 500, to represent the overall market.
[58] Bloomberg, as of April 30, 2021. Measured over a 10-year U.S. Treasury bond.

1 **Q. Are higher risk premiums relevant given that treasuries are near historic lows?**

2 A. Yes – this is highly relevant for cost of equity estimation as current risk-free rates are

3 extremely low. On March 9, 2020, the entire U.S. yield curve settled below 1.00% for the

4 first time in history.[59] Since then, U.S. Government bond yields have increased with the 20-

5 year and 30-year bond yields at 2.2%.

6 As shown above in Figure 9, the MRP has also increased as the risk-free rate declined.

7 Further, as shown in both academic and industry analyses, the allowed risk premium over the

8 risk-free rate is inversely related to the risk-free rate. For example, Villadsen et al. (2017)

9 found that the allowed risk premium increases by approximately 0.44% for each 1% decline

10 in the risk-free rate for the period 1990 to 2015.[60] Morin finds that the risk premium increases

11 by 0.52% for each 1% decline in the risk-free rate.[61] As shown in Figure 9 above, this

12 phenomenon is also documented in the forward-looking market risk premium calculated by

13 Bloomberg. According to Bloomberg, the MRP is 8.05 – 8.45% over a 20-year treasury bond

14 in late April,[62] which is higher than the historical average MRP of about 7.25 percent. It is

15 also an increase over the forward-looking MRPs at the end of 2019 of 6.48%, which were

16 much more in line with the historical average MRP.[63]

17 **Q. Is there evidence that the MRP will remain elevated going forward?**

[59] According to the Federal Reserve, the yield on the 10-year, 20-year, and 30-year Treasury bonds on March 9, 2020 was 0.54%, 0.87%, and 0.99% respectively. These yields have since increased slightly. Source:https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yield
[60] Bente Villadsen, Michael J. Vilbert, Dan Harris, and A. Lawrence Kolbe, "Risk and Return for Regulated Industries," Academic Press, 2017, pp. 118-119.
[61] Roger A. Morin, "New Regulatory Finance," Public Utilities Reports, Inc., 2006, pp. 123-125.
[62] Bloomberg, as of May 14, 2021, 2021. The 8.05 – 8.45% MRP is relative to the contemporaneous yield over a 20-Yr treasury bond. Relative to the contemporaneous yield over a 10-Yr treasury bond, the Bloomberg reported MRP were 8.55% and 8.95%.
[63] Id.

1   A. Yes. In 2015, Duarte and Rose of the Federal Reserve of New York performed a study that

2   aggregated the results of many models of the required MRP in the United States and tracked

3   them over time.[64] This analysis found a very high MRP after the financial crisis, relative to

4   time periods prior to the crisis.

5   The authors estimated the MRP that resulted from a range of models each year from 1960

6   through the time of their study. The authors then reported the average as well as the first

7   principal component of the results.[65] The authors found that the models used to determine the

8   risk premium were converging to provide comparable estimates and that the average annual

9   estimate of the MRP had reached an all-time high in 2012-2013. (Figure 7 below is a copy of

10   the summary chart from Duarte and Rosa's 2015 paper). These directional trends identified

11   by Duarte and Rosa are reasonably consistent with those observed from Bloomberg and they

12   further support the proposition that the elevation of the MRP over its historical pre-crisis levels

13   was a persistent feature of capital markets in the time following the financial crisis.

14   Specifically, the financial crisis saw high volatility and a flight to quality – similar to

15   conditions seen in 2020 in response to the COVID-19 pandemic and the period during which

16   the authors found a high MRP broadly coincide with the period of low interest rates.

17   Therefore, it is reasonable to expect that the current MRP will remain elevated compared to

18   historical levels, especially given the uncertainty related to the extent of economic and

19   financial impacts from COVID-19 and the historically low interest rates.

---

[64] Fernando Durate and Carlo Rosa, "The Equity Risk Premium: A Review of Models," *Federal Reserve Bank of New York*, December 2015 ("Duarte and Rosa, 2015")
https://www.newyorkfed.org/research/staff_reports/sr714.html.
[65] Duarte and Rosa emphasize the "first principal component" of the 20 models. This means that the authors used statistics to compute the weighted average combination of the models that captures the variability among the 20 models over time.

Figure 7
Duarte and Rosa's Chart 3
One-Year Ahead MRP and Cross-Sectional Mean of Models
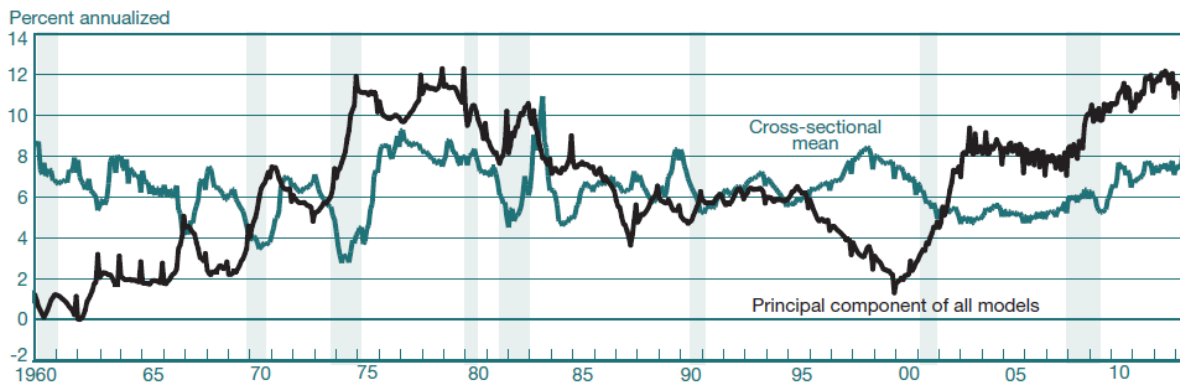
1 **Q. Please summarize how the economic developments discussed above have affected the**

2 **return on equity and debt that investors require.**

3 A. Utilities rely on investors in capital markets to provide funding to support their capital

4 expenditure programs and efficient business operations. Investors consider the risk-return

5 tradeoff in choosing how to allocate their capital among different investment opportunities. It

6 is therefore important to consider how investors view the current economic conditions,

7 including the plausible developments in the risk-free rate and the growth in the U.S. GDP.

8 These investors have been affected by the recent market development and in particular

9 the increase in the market risk premium, so there are reasons to believe that their risk aversion

10 remains elevated relative to pre-COVID-19 levels. As PGE is expected to be compensated as

11 a utility on the equity component of its rate base, the same factors would affect PGE's equity.

12 **Q. How does this impact the cost of equity estimation for PGE?**

13 A. It is important to remember that the cost of equity and capital structure established for PGE in

14 this proceeding is expected to be in effect beyond the current extraordinary impacts of the

15 COVID-19 pandemic. The analysis and recommendations should reflect expected market

16 conditions that will prevail over the relevant rate period and not exclusively the current market

1   conditions. As discussed further below, many of the inputs to the cost of equity estimation

2   methodologies are currently at unprecedented levels. Sole reliance on current economic and

3   financial conditions to estimate PGE's cost of equity would unfairly lock PGE and their

4   customers into the current economic and financial environment. Doing so would also not

5   provide a fair return, especially when compared to other utilities that did not undergo a cost

6   of capital proceeding during this period. However, the current conditions create an exorbitant

7   amount of uncertainty about the future and, if the financial crisis can be used as a guide,

8   investors' heightened perception of risk are likely to linger.

C. Estimating the Cost of Equity

9 **Q. How do you go about estimating the cost of equity for PGE?**

10 A. First, I select a sample of electric utilities, whose characteristics resemble those of PGE. I

11   also look at results from a group of highly regulated gas and water utilities. Second, I estimate

12   the cost of equity for the sample using several estimation methods to ensure that my measure

13   reasonably reflects investor expectations. Third, I assess PGE's specific risks to determine a

14   reasonable range given the company's specific characteristics and the current economy.

Proxy Group Selection

15 **Q. How do you identify proxy companies of comparable business risk to PGE?**

16 A. I select a sample of publicly traded electric utilities, whose characteristics resemble those of

17   PGE and as a second benchmark a group of natural gas and water utilities. The proxy

18   companies are similar to PGE in that they are rate regulated by state utility commissions,

19   provide customers a product through a network of assets, and rely on substantial capital to

20   provide service, i.e., they are capital intensive as is PGE. The primary electric sample further

21   has the advantage of being in the same industry.

1 **Q. Why are you including gas and water utilities when evaluating the cost of capital for an**

2 **electric utility?**

3 A. For several reasons. First, the electric industry share regulatory characteristics with the natural

4 gas and the water utility industry as the industries all are regulated and commonly by the same

5 regulatory body. They all rely on a network of assets to distribute a commodity, are capital

6 intensive, and serve a mix of residential, commercial, and industrial customers. Second,

7 investors make comparisons across regulated companies, so it becomes important to consider

8 whether the returns awarded PGE are comparable not only to other electric utilities but also

9 to other similar risk benchmarks – I consider a broader sample of natural gas and water utilities

10 a reasonable benchmark. Third, the electric (and gas) industry is expected to undergo

11 substantial changes as customers, regulators and the legislature focus on carbon reductions.

12 This means that initiatives in a specific state influences stock prices and analysts' evaluations

13 along with more fundamental operating and market conditions. I therefore select a group of

14 other utilities, where there are less carbon considerations,[66] to assess whether the estimates

15 from the electrics are reasonable.

16 I note that my recommended ROE for PGE is fully supported by the electric utility sample

17 but I find the gas and water samples provides additional confirmation of the estimates.

18 **Q. Please summarize how you selected the members of the Electric Sample and the Gas &**

19 **Water Samples.**

20 A. To identify companies suitable for inclusion, I started with the universe of publicly traded

21 companies in the electric, natural gas and water utility industries as identified by Value Line

22 Investment Analyzer (Value Line). I started with Value Line's list of publicly traded

---

[66] More recently, carbon considerations have become an issue for gas LDCs, too.

1   companies classified as electric, gas LDCs or water utilities. Next, I reviewed business

2   descriptions and financial reports of these companies and eliminated companies that had less

3   than 50% of their assets dedicated to regulated utility activities in their industry, e.g.,

4   electricity, natural gas or water utility services.

5   With this group of companies, I applied further screening criteria to eliminate companies

6   that have had recent significant events that could affect the market data necessary to perform

7   cost of capital estimation. Specifically, I identified companies that have cut their dividends

8   or engaged in substantial merger and acquisition (M&A) activities over the relevant estimation

9   window.[67] I eliminated companies with such dividend cuts because the announcement of a

10   cut may produce disturbances in the stock prices and growth rate expectations in addition to

11   potentially being a signal of financial distress. I generally eliminated companies with

12   significant M&A activities because such events typically affect a company's stock price in

13   ways that are not representative of how investors perceive its business and financial risk

14   characteristics. For example, a utility's stock price will commonly jump upon the

15   announcement of an acquisition to match the acquirer's bid.

16   Further, I require companies have an investment grade credit rating[68] and more than $300

17   million in market capitalization for liquidity purposes. A final, and fundamental, requirement

18   is that the proxy companies have the necessary data available for estimation. I also eliminated

19   Portland General Electric Company from the estimation process to avoid any impact of the

20   PGE's data on the estimation results used to assess PGE's cost of capital.[69]

---

[67] As described in Sections 5B and 5C, the CAPM requires five years of historical data, while the DCF relies on current market data.

[68] In some cases, a proxy company does not have a credit rating from any of the major rating agencies. However, if they were to be rated, they would receive an investment grade rating. In these instances, I assign the company the average credit rating of the rest of the proxy group.

[69] FirstEnergy was also eliminated due to the ongoing investigations into Ohio's nuclear subsidiaries.

1 **Q. What are the characteristics of the Proxy Groups?**

2 A. I calculate my results for both the electric proxy group and for the combined Gas and Water

3 Utility Proxy Group. The proxy group(s) are comprised of electric utilities, and gas and water

4 utilities, respectively. The final proxy group consists of 32 electric utilities, supported by 9

5 gas and 7 water utilities. The characteristics of the electric utility proxy companies are listed

6 in Table 5 below.

7 The electric utility companies are distribution, transmission and commonly the

8 production of a commodity to end customers. The natural gas and water utilities are engaged

9 in the distribution of a commodity through a network of pipes and mains.[70] While the product

10 differs across gas and water utilities, they are all focused on distribution, a mix of residential,

11 commercial and industrial customers and all are regulated. Further, the electric proxy group

12 companies have an average credit rating of approximately BBB, which is in line with PGE's

13 credit rating of BBB+ from S&P Ratings. The natural gas and water companies have slightly

14 higher credit ratings.

15 Table 5 and Table 6 report the proxy companies' annual revenues for the most recent

16 year; most commonly 3/31/2021 and also reports the market capitalization, credit rating, beta

17 and growth rate. The annual revenue as well as the market cap was obtained from Bloomberg.

18 The credit rating is reported by Bloomberg.[71] The growth rate is a weighted average between

19 estimates from Thomson Reuters and *Value Line*. Betas were obtained from *Value Line*.

---

[70] Some water utilities are also engaged in water production at wells or other facilities.
[71] In cases where a company does not have a S&P rating from Bloomberg, Moody's rating was obtained from Moody's, annual reports, or Bloomberg.

Table 5
Electric Utility Proxy Group

Company	Annual Revenue (2020) ($MM)	Regulated Assets	Market Cap. (Q1 2021) ($MM)	Value Line Beta	S&P Credit Rating	Moody's Credit Rating	Long-Term Growth Estimate
	[1]	[2]	[3]	[4]	[5]		[6]
ALLETE	$1,197	MR	$3,572	0.90	BBB	WR	9.1%
Alliant Energy	$3,401	R	$13,180	0.85	A-	WR	5.7%
Amer. Elec. Power	$15,452	R	$41,719	0.75	A-	Baa2	6.2%
Ameren Corp.	$5,920	R	$20,329	0.80	BBB+	WR	7.1%
Avista Corp.	$1,345	R	$3,217	0.95	BBB	Baa2	6.9%
Black Hills	$1,793	MR	$4,159	1.00	BBB+	Baa2	4.9%
CMS Energy Corp.	$6,899	R	$17,207	0.75	BBB+	Baa2	7.2%
CenterPoint Energy	$7,798	R	$12,240	1.15	BBB+	Baa2	-3.3%
Consol. Edison	$12,689	R	$24,921	0.75	A-	Baa2	3.2%
DTE Energy	$12,933	R	$25,278	0.95	BBB+	Baa2	6.2%
Duke Energy	$24,069	R	$72,162	0.85	A-	Baa2	5.0%
Edison Int'l	$13,748	R	$22,514	0.95	BBB	Baa3	2.9%
Entergy Corp.	$10,531	MR	$19,647	0.95	BBB+	Baa2	5.6%
Evergy Inc.	$5,409	R	$13,384	0.95	A-	Baa2	5.7%
Eversource Energy	$9,357	R	$28,799	0.90	A-	Baa1	7.0%
Exelon Corp.	$34,182	R	$42,102	0.95	BBB+	Baa2	4.9%
IDACORP Inc.	$1,376	R	$5,021	0.80	BBB	Baa1	3.3%
MGE Energy	$556	R	$2,584	0.70	AA-	n/a	4.7%
NextEra Energy	$17,110	R	$144,727	0.90	A-	n/a	8.7%
NorthWestern Corp.	$1,264	R	$3,470	0.95	BBB	Baa2	4.3%
OGE Energy	$3,322	R	$6,470	1.05	BBB+	WR	4.9%
Otter Tail Corp.	$917	R	$1,899	0.85	BBB	WR	8.2%
Pinnacle West Capital	$3,622	R	$9,004	0.90	A-	WR	4.1%
Public Serv. Enterprise	$9,711	R	$29,610	0.90	BBB+	Baa1	3.1%
Sempra Energy	$11,600	R	$39,444	0.95	BBB+	Baa2	6.9%
Southern Co.	$21,267	R	$64,403	0.95	A-	Baa2	6.3%
Unitil Corp.	$427	R	$710	0.85	BBB+	n/a	4.8%
WEC Energy Group	$7,825	R	$28,568	0.80	A-	Baa1	6.3%
Xcel Energy Inc.	$12,256	R	$34,620	0.80	A-	Baa1	6.3%
Electric Sample	$8,896		$25,343	0.89	BBB+		5.4%

Sources and Notes:
[1]: Bloomberg as of April 30, 2021.
[2]: Key R - Regulated (80% or more of assets regulated).
    MR - Mostly Regulated (less than 80% of assets regulated).
[3]: See Schedule No. BV-3 Panels A through I.
[4]: See Schedule No. BV-10
[5]: Bloomberg as of April 30, 2021.
[6]: See Schedule No. BV-5.

1   I note that CenterPoint Energy currently does not have a positive growth rate, so the

2   DCF model was not implemented for this company.

Table 6
Panel A Gas Utility Proxy Group

Company	Annual Revenue (2020) ($MM)	Regulated Assets	Market Cap. (Q4 2020) ($MM)	Value Line Beta	S&P Credit Rating	Long-Term Growth Estimate
	[1]	[2]	[3]	[4]	[5]	[6]
Atmos Energy	$2,860	R	$12,274	0.80	A	6.9%
Chesapeake Utilities	$488	R	$1,869	0.80	A-	6.3%
New Jersey Resources	$1,793	MR	$3,338	0.95	A-	8.2%
NiSource Inc.	$4,682	R	$8,793	0.85	BBB+	8.8%
Northwest Natural	$774	R	$1,459	0.80	BBB+	4.3%
ONE Gas Inc.	$1,530	R	$4,150	0.80	A	6.1%
South Jersey Inds.	$1,541	R	$2,232	1.05	BBB	7.3%
Southwest Gas	$3,299	R	$3,516	0.95	BBB+	7.0%
Spire Inc.	$1,801	R	$3,323	0.85	A-	6.3%
Average	$2,085		$4,550	0.87	A-	6.8%

Sources and Notes:
[1]: Bloomberg as of March 31, 2021.
[2]: Key R - Regulated (80% or more of assets regulated).
      MR - Mostly Regulated (less than 80% of assets regulated).
[3]: See Schedule No. BV-3 Panels A through I.
[4]: See Schedule No. BV-10
[5]: Bloomberg as of March 31, 2021.
[6]: See Schedule No. BV-5.

Table 7
Panel B Water Utility Proxy Group

Company	Annual Revenue (2020) ($MM)	Regulated Assets	Market Cap. (Q4 2020) ($MM)	Value Line Beta	S&P Credit Rating	Long-Term Growth Estimate
	[1]	[2]	[3]	[4]	[5]	[6]
Amer. States Water	$488	R	$2,874	0.65	A+	5.4%
Amer. Water Works	$3,777	R	$27,177	0.85	A	7.6%
Artesian Res Corp	$88	R	$354	0.75	A	4.0%
California Water	$794	R	$2,672	0.65	A+	8.6%
Essential Utilities	$1,463	R	$11,431	0.95	A	5.0%
Global Water Resources Inc	$39	R	$334	0.75	A	15.0%
Middlesex Water	$142	R	$1,264	0.70	A	3.7%
SJW Group	$565	R	$1,953	0.85	A-	7.4%
York Water Co. (The)	$54	R	$619	0.80	A-	5.0%
Average	$823		$5,409	0.77	A	6.9%

Sources and Notes:
[1]: Bloomberg as of March 31, 2021.
[2]: Key R - Regulated (80% or more of assets regulated).
      MR - Mostly Regulated (less than 80% of assets regulated).
[3]: See Schedule No. BV-3 Panels A through I.
[4]: See Schedule No. BV-10
[5]: Bloomberg as of March 31, 2021.
[6]: See Schedule No. BV-5.

1   **Q. How do the proxy companies compare to PGE in terms of financial metrics?**

2   A. PGE's revenue was $2,145 for 2020.[72]   Compared to the annual revenue of the proxy

3   companies, PGE's revenue is smaller than the electric companies, larger than the water

4   companies but very much in line with that of the gas companies. PGE's senior unsecured

5   credit rating is BBB+ from S&P Global Ratings[73] and in line with the average credit rating of

6   the electric utility proxy group but below that of the natural gas and water utilities. Lastly,

7   PGE is an integrated electric utility as is most of the companies in the electric utility proxy

8   group. Also similar to the average proxy company, PGE has more than 80% of its assets

9   subject to regulation.[74]

10 **Q. What regulatory capital structure did you use for PGE?**

11 A. As recommended by PGE Company Witnesses Jardon Jaramillo and Jaki Ferchland, I use a

12   capital structure including 50% equity in my recommendation. The Commission has in the

13   past accepted a capital structure including 50 percent equity for PGE.

DCF Based Estimates

14 **Q. Please describe the DCF model's approach to estimating the cost of equity.**

15 A. The DCF model attempts to estimate the cost of capital for a given company directly, rather

16   than based on its risk relative to the market as the CAPM does. The DCF method assumes

17   that the market price of a stock is equal to the present value of the dividends that its owners

18   expect to receive. The method also assumes that this present value can be calculated by the

19   standard formula for the present value of a cash flow – literally a stream of expected "cash

---

[72] Value Line Investment Survey as of April 23 2021.
[73] S&P, "Portland General Electric," March 27, 2020.
[74] EEI 2019 Financial Review (2019 is the most recent year available); FinancialReview_2019.pdf (eei.org)

1   flows" discounted at a risk-appropriate discount rate. When the cash flows are dividends, that

2   discount rate is the cost of equity capital:

3
$$P_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \cdots + \frac{D_T}{(1+r)^T} \qquad (3)$$

4   Where,

5   P_0 is the current market price of the stock;

6   D_t is the dividend cash flow expected at the end of period t;

7   T is the last period in which a dividend cash flow is to be received; and

8   r is the cost of equity capital.

9   Importantly, this formula implies that if the current market price and the pattern of

10   expected dividends are known, it is possible to "solve for" the discount rate r that makes the

11   equation true. In this sense, a DCF analysis can be used to estimate the cost of equity capital

12   implied by the market price of a stock and market expectations for its future dividends.

13   Many DCF applications assume that the growth rate lasts into perpetuity, so the formula

14   can be rearranged algebraically to directly estimate the cost of capital. Specifically, the

15   implied DCF cost of equity can then be calculated using the well-known "DCF formula" for

16   the cost of capital:

17
$$r = \frac{D_1}{P_0} + g = \frac{D_0}{P_0} \times (1 + g) + g \qquad (4)$$

18   where D_0 is the current dividend, which investors expect to increase at rate g by the end of

19   the next period, and over all subsequent periods into perpetuity.

20   Equation (4) says that if equation (3) holds, the cost of capital equals the expected

21   dividend yield plus the (perpetual) expected future growth rate of dividends. I refer to this as

22   the single-stage DCF model; it is also known as the Gordon Growth model, in honor of its

23   originator, Professor Myron J Gordon.

1 **Q. Are there other versions of the DCF model?**

2 A. Yes. There are many alternative versions, notably (i) multi-stage models, (ii) models that use

3 cash flow rather than dividends, or (iii) versions that combine aspects of (i) and (ii).[75] One

4 such alternative expands the Gordon Growth model to three stages. In the multistage model,

5 earnings and dividends can grow at different rates, but must grow at the same rate in the final,

6 constant growth rate period. [76]

7 In my implementation of the multi-stage DCF, I assume that companies grow their

8 dividend for five years at the forecasted company-specific rate of earnings growth, with that

9 growth then tapering over the next five years toward the growth rate of the overall economy

10 (i.e., the long-term gross domestic product (GDP) growth rate forecasted to be in effect ten

11 years or more into the future).

DCF Inputs and Results

12 **Q. What growth rate information do you use?**

13 A. The first step in my DCF analysis (either constant growth or multi-stage formulations) is to

14 examine a sample of investment analysts' forecasted earnings growth rates for companies in

15 my proxy group. For the single-stage DCF and for the first stage of the multi-stage DCF, I

16 use investment analyst forecasts of company-specific growth rates sourced from *Value Line*

17 and Thomson Reuters *IBES*.

---

[75] The Surface Transportation Board uses a cash flow-based model with three stages. See, for example, Surface Transportation Board Decision, "STB Ex Parte No. 664 (Sub-No. 1)," Decided January 23, 2009.

[76] See Exhibit 905 for further discussion of the various versions of the DCF model, as well as the details of the specific versions I implement in this proceeding.

1   For the long-term growth rate for the final, constant-growth stage of the multistage DCF

2   estimates, I use the long-term U.S. GDP growth forecast of 3.9 percent from BCEI.[77] Thus,

3   the long-run (or terminal) growth rate in the multi-stage model is nominal GDP growth.

4   Additionally, I relied on the dividend yield of the companies, which I estimate using the

5   most recently available dividend information (currently) and the average of the last 15 days

6   of stock prices ending April 30, 2021. As the single largest advantage of the DCF model is

7   that it uses current market information, I find it is important to use a relatively short time

8   period to determine the dividend yield – yet to avoid the bias caused by any one day. I believe

9   a 15-day average accomplishes that goal. Because the stock price of utilities currently is

10   higher than they historically have been and because some companies engage in share

11   buybacks, the dividend yield underestimates the yield on cash distributions to investors.

12   **Q. Please address the input data in the DCF model.**

13   A. The Gordon Growth/single-stage DCF models require forecast growth rates that reflect

14   investor expectations about the pattern of dividend growth for the companies over a

15   sufficiently long horizon, but estimates are typically only available for 3-5 years.

16   One issue with the data is that it includes solely dividend payments as cash distributions

17   to shareholders, while some companies also use share repurchases to distribute cash to

18   shareholders. To the extent that companies in my samples use share repurchases, the DCF

19   model using dividend yields will underestimate the cost of equity for these companies. While

20   there are companies in my sample that have engaged in share buybacks in the past, the

21   magnitude is currently not large.

---

[77] See Blue Chip Economic Indicators, March 2021, p. 14.

UE 394 – PGE Direct Testimony of Jaramillo, Ferchland, Villadsen

1   A second issue is that the flight to quality has resulted in higher than usual stock prices

2   for water utilities and hence lower than usual dividend yields. As a result, the dividend yield

3   may be downward biased. The multi-stage DCF model additionally requires a measure of the

4   long-term GDP growth.

5   **Q. Please summarize the DCF-based cost of equity estimates for the proxy groups.**

6   A. The results of the DCF-based estimation for the proxy groups are displayed below in Table

7   8.[78]

Table 8
DCF Model Results at 50% Equity

	Single-Stage	Multi-Stage
Electric Sample	10.1%	8.4%
Gas Sample	11.0%	8.5%
Water Sample	10.9%	7.1%

8   **Q. How do you interpret the results of your DCF Analyses?**

9   A. The DCF model calculates the electric proxy group's ROE at 8.4 to 10.1 percent and provides

10   a wider range for the gas LDC and water utility samples at 7.1 to 11 percent. Because the

11   DCF model requires forecasted growth rates that are based on stable economic conditions to

12   satisfy the constant dividend growth assumption, the model's results are currently subject to

13   uncertainty and it is necessary to rely on additional methods. I believe the results from the

14   multi-stage model currently understates the cost of equity for a regulated entity, so that a

15   reasonable range based on the results above is in the range of 9¼ to 10 percent when using

16   the DCF results alone.[79]

---

[78] Details of the DCF model are included in Exhibit 903, Schedules BV-5 to BV-8 for the electric sample and in Exhibit 904, Schedules BV-5 to BV-8 for the gas and water sample.
[79] The lower bound was determined as the average of the single-stage and the multi-stage result for the electric sample.

Risk Premium Model Estimates

1   **Q. Did you estimate the cost of equity that results from analysis of risk premiums implied**

2   **by allowed ROEs in past utility rate cases?**

3   A. Yes. In this type of analysis, sometimes called the "risk premium model," the cost of equity

4   capital for utilities is estimated based on the historical relationship between allowed ROEs in

5   utility rate cases and the risk-free rate of interest at the time the ROEs were granted. These

6   estimates add a "risk premium" implied by this relationship to the relevant (prevailing or

7   forecast) risk-free interest rate:

$$Cost\ of\ Equity = r_f + Risk\ Premium \tag{5}$$

9   **Q. What are the merits of this approach?**

10   A. First, it estimates the cost of equity from regulated entities as opposed to holding companies,

11   so that the relied-upon figure is directly applicable to a rate base. Second, the allowed returns

12   are readily observable to market participants, who will use this one data input in making

13   investment decisions, so that the information is at the very least a good check on whether the

14   return is comparable to that of other investments. Third, I analyze the spread between the

15   allowed ROE at a given time and the then-prevailing interest rate to ensure that I properly

16   consider the interest rate regime at the time the ROE was awarded. This implementation

17   ensures that I can compare allowed ROE granted at different times and under different interest

18   rate regimes.[80]

19   **Q. How did you use rate case data to estimate the risk premiums for your analysis?**

20   A. The rate case data from 1990 through March 2021 (most recent quarter) is derived from

---

[80] The premium is estimated by comparing the average excess yield on 20-year versus 10-year Government Bonds over the period 1990-2020, using data from Bloomberg.

1   Regulatory Research Associates.[81]   Using this data I compared (statistically) the average

2   allowed rate of return on equity granted by U.S. state regulatory agencies in electric utility

3   rate cases to the average 20-year Treasury bond yield that prevailed in each quarter.[82]   I

4   calculated the allowed utility "risk premium" in each quarter as the difference between

5   allowed returns and the Treasury bond yield, since this represents the compensation for risk

6   allowed by regulators. Then I used the statistical technique of ordinary least squares (OLS)

7   regression to estimate the parameters of the linear equation:

8    $$Risk\ Premium\ =\ A_0\ +\ A_1\ \times\ (Treausury\ Bond\ Yield) \qquad (6)$$

9   I derived my estimates of A_0 and A_1 using standard statistical methods (OLS regression)

10   and found that the regression has a high degree of explanatory power in a statistical sense. I

11   report my results for the respective classifications of rate cases below in Table 9.[83] I note that

12   the results displayed in Table 9 below shows that the risk premium model fits the data well as

13   the R-squared is above 80% for the more recent period of 2011 to today and above 2/3 for the

14   full period. The R-squared is a measure of how well the data fits the model and these R-

15   squared indicate solid results.

---

[81] S&P Market Intelligence, as of April 2021.
[82] I rely on the 20-year government bond to be consistent with the analysis using the CAPM to avoid confusion about the risk-free rate. While it is important to use a long-term risk-free rate to match the long-lived nature of the assets, the exact maturity is a matter of choice.
[83] Exhibit 903, Schedule BV-16 contains my risk premium analysis.

Table 9
Implied Risk Premium Model Estimates

	R Squared	Estimate of Intercept (A0)	Estimate of Slope (A1)	Implied Cost of Equity Range
	[1]	[2]	[3]	[4]
Electric Utility	0.859	8.53%	-0.552	9.8%

Sources and Notes:
[1]-[3]: Estimated Using S&P Market Intelligence, as of March 2021
[4]: Risk-free rate of 2.8%

1   The negative slope coefficient reflects the empirical fact that regulators grant smaller risk

2   premiums when risk-free interest rates (as measured by Treasury bond yields) are higher. This

3   is consistent with past observations that the premium investors require to hold equity over

4   government bonds increases as government bond yields decline. In the regression described

5   above the risk premium declined by less than the increase in Treasury bond yields. Therefore,

6   the allowed ROE on average declined by less than 100 bps when the government bond yield

7   declined by 100 bps.

8   **Q. What conclusions did you draw from your risk premium analysis?**

9   A.   The result in Table 9 indicates a ROE of 9.8% for an average electric utility based on the risk

10   premium model, which is above the electric utility based estimates from the DCF models but

11   below the highest estimates from the gas and water utilities. While the risk premium model

12   is based on historical allowed returns and not underpinned by fundamental financial principles

13   in the manner of the CAPM and DCF models, I believe that this analysis, when properly

14   designed, executed, and placed in the proper context, is a valid and useful approach to

15   estimating utility ROEs.   Because the risk premium analysis as implemented takes into

16   account the interest rate prevailing during the quarter the decision that granted an ROE used

17   in the analysis was issued, it provides a useful benchmark for the cost of equity in any interest

1   environment. Because it relies on the returns for regulated utilities, I believe this method

2   provides a good way to directly assess whether the ROE is commensurate with that available

3   to alternative regulated investments of similar risk.

The CAPM Based Cost of Equity Estimates

4 **Q. Please briefly explain the CAPM.**

5 A. CAPM assumes the collective investment decisions of investors in capital markets will result

6   in equilibrium prices for all risky assets such that the returns investors expect to receive on

7   their investments are commensurate with the risk of those assets relative to the market as a

8   whole. The CAPM posits a risk-return relationship known as the Security Market Line (see

9   Figure 2 in Section 3), in which the required expected return on an asset (above the risk-free

10   return) is proportional to that asset's relative risk as measured by that asset's beta.

11   More precisely, the CAPM states that the cost of capital for an investment, S (*e.g.*, a

12   particular common stock), is determined by the risk-free rate plus the stock's systematic risk

13   (as measured by beta) multiplied by the market risk premium. Mathematically, the relationship

14   is given by the following equation:

$$r_s = r_f + \beta_s \times MRP \tag{7}$$

16   r_S is the cost of capital for investment S;

17   r_f is the risk-free interest rate;

18   β_S is the beta risk measure for the investment S; and

19   MRP is the market equity risk premium.

20   The CAPM is a "risk-positioning model," which operates on the principle (corroborated

21   by empirical data) that investors price risky securities to offer a higher expected rate of return

22   than safe securities. It says that an investment, whose returns do not vary relative to market

1   returns, should receive the risk-free interest rate (that is the return on a zero-risk security, the

2   y-axis intercept in Figure 2), whereas investments of the same risk as the overall market (*i.e.*,

3   those that by definition have average systematic market risk) are priced so as to expect to

4   return the risk-free rate plus the MRP. Further, it says that the risk premium of a security over

5   the risk-free rate equals the product of the beta of that security and the MRP.

Inputs to the CAPM

6   **Q. What inputs does your implementation of the CAPM require?**

7   A.   As demonstrated by equation (7), estimating the cost of equity for a given company requires

8   a measure of the risk-free rate and the MRP, as well as a measure of the stock's beta. There

9   are several choices and sources of data that inform the selection of these inputs. I discuss these

10   issues below (Additional technical detail, along with a discussion of the finance theory

11   underlying the CAPM is provided in Exhibit 905.

12   **Q. What value did you use for the risk-free rate?**

13   A.   I use the yield on a 20-year U.S. Treasury bond as the risk-free rate for purposes of my

14   analysis. Recognizing the fact that the cost of capital set in this proceeding will be in effect

15   from 2022 and onwards, I rely on a forecast of what Government bond yields will be mid-way

16   through the 2022-2024 period. Relying on the May 2021 BCEI for 2022 and the March 2021

17   BCEI for 2023 and 2024, the estimated yield on 10-year U.S. Treasury bond yields will be

18   2.1% in 2022, 2.3% in 2023, and 2.5% in 2024, so I rely on the 2023 (midpoint) value of

19   2.3%.[84] I then adjust this value upwards by 50 basis points to reflect the historical maturity

---

[84] Wolters Kluwer Blue Chip Economic Indicators and PwC Analysis, Consensus Forecasts, March 2021, p. 3 and p. 14 and BCEI May 2021 p. 3.

1   premium for the 20-year U.S. Treasury bond yield over the 10 U.S. Treasury bond yield.[85]

2   This gives me a risk-free rate of 2.80%.

3   Additionally, it is important to recognize the implication of higher spreads between utility

4   bond yields and U.S. Government bond yields. In the past, I have also considered the spread

5   between utility bond yields and government bond yields, but as of now the spread is elevated

6   by about 15 bps, so I make no adjustments for this spread.

7 **Q. What value did you use for the MRP?**

8 A. Like the cost of capital itself, the MRP is a forward-looking concept. It is by definition the

9   premium above the risk-free interest rate that investors can expect to earn by investing in a

10   value-weighted portfolio of all risky investments in the market. The premium is not directly

11   observable. Rather, it must be inferred or forecasted based on known market information. One

12   commonly used method for estimating the MRP is to measure the historical average premium

13   of market returns over the income returns on government bonds' income returns over a long

14   historical period.[86]   The average market risk premium from 1926 to the present (2020) is

15   7.25%.[87]

16   However, investors may require a higher or lower risk premium, reflecting their

17   investment alternatives and aggregate level of risk aversion at any given time. As explained

18   in Section 4, there is evidence that investors' level of risk aversion is elevated relative to the

19   time before the COVID-19 pandemic and may remain elevated for some time, even after the

20   pandemic. In recognition of the evidence that forward-looking measures of expected market

---

[85] This maturity premium is estimated by comparing the average excess yield on 20-year versus 10-year Government Bonds over the period 1990-2020, using data from Bloomberg.
[86] The longest period for which Duff & Phelps reports data is 1926 to current. Based on financial textbooks such as Ross, Westerfield and Jaffe, "Corporate Finance," 10'th Edition, 2013, pp. 324-327, I use the longest period for which reliable estimates are available – in this case 1926 to 2020.
[87] Duff & Phelps, Ibbotson SBBI 2021 Valuation Yearbook 10-21.

1   equity risk premium are higher than the long-term historical average, I also perform a CAPM

2   calculation using Bloomberg's forecasted MRP of about 8% for the last two weeks of April,

3   2021. I note that this is conservative as the April 30, 2021 forecasted MRP is 8.45%.[88]

4   **Q. Please summarize the parameters of the scenarios and variations you considered in your**

5   **CAPM and ECAPM analyses.**

6   A. Both Scenario 1 and Scenario II use the forecasted 20 year U.S. Treasury rate for 2022-24 of

7   2.80%. Scenario I combine that with a historical MRP of 7.25%, while Scenario II combines

8   the risk-free rate with a forecasted MRP of 8%.

9   **Q. What betas did you use for the companies in your proxy groups?**

10   A. I used *Value Line* betas, which are estimated using the most recent five years of weekly

11   historical returns data.[89] The *Value Line* levered equity betas are reported in Figure 11 above.

12   Importantly, these betas—which are measured (by *Value Line*) using the market stock return

13   data of the proxy companies—reflect the level of financial risk inherent in the proxy

14   companies' market value leverage ratios over the estimation period. Because PGE's

15   regulatory capital structure includes a higher proportion of debt financing than does the market

16   data on the proxy companies used to estimate the ROE, the financial risk associated with an

17   equity investment in PGE's rate base is correspondingly greater than the financial risk borne

18   by investors in the proxy companies' publicly traded stock.[90] Importantly, the CAPM-based

19   models use market data to estimate the ROE, so that it is the market value capital structure

20   that is the relevant comparison across companies. Consequently, standard textbook techniques

21   are applied to unlever the *Value Line* betas reported in Figure 11 above and relever the

---

[88] Bloomberg as of April 30, 2021.
[89] See Value Line Glossary, accessible at http://www.valueline.com/Glossary/Glossary.aspx
[90] As shown in Figure 4, the higher (lower) the debt ratio is the higher (lower) the cost of equity, all else equal.

1   resulting asset betas at PGE's regulatory capital structure. See Exhibit 903, Schedules BV-13

2   to BV-15.[91]

The Empirical CAPM

3   **Q.   What other equity risk premium model do you use?**

4   A.   Empirical research has long shown that the CAPM tends to overstate the actual sensitivity of

5   the cost of capital to beta: low-beta stocks tend to have higher risk premiums than predicted

6   by the CAPM and high-beta stocks tend to have lower risk premiums than predicted.[92] A

7   number of variations on the original CAPM theory have been proposed to explain this finding,

8   but the observation itself can also be used to estimate the cost of capital directly, using beta to

9   measure relative risk by making a direct empirical adjustment to the CAPM.

10   The second variation on the CAPM that I employ makes use of these empirical findings.

11   It estimates the cost of capital with the equation,

12
$$r_S = r_f + \alpha + \beta_S \times (MRP - \alpha) \tag{2}$$

13   where α is the "alpha" adjustment of the risk-return line, a constant, and the other symbols

14   are defined as for the CAPM (see equation (2) above).

15   I label this model the Empirical Capital Asset Pricing Model, or "ECAPM." The alpha

16   adjustment has the effect of increasing the intercept but reducing the slope of the Security

17   Market Line in Figure 2, which results in a Security Market Line that more closely matches

18   the results of empirical tests. This adjustment is portrayed in Figure 14 below. In other words,

---

[91] Exhibit 905 provides a detailed description of the standard textbook formulas used to implement the "Hamada" technique for unlevering measured equity betas based on the proxy companies' capital structures to calculate "asset betas" that measure the proxy companies' business risk independent of the financial risk impact of differing capital structures. The proxy group average asset betas are then relevered at the target capital structure (i.e., PGE's regulatory capital structure), with the precise relevered beta depending on the specific version of the unlevering/relevering formula employed.

[92] *See* Figure A-2 in Exhibit 905 for references to relevant academic articles.

1   the ECAPM produces more accurate predictions of eventual realized risk premiums than does

2   the CAPM.

Figure 8
The Empirical Security Market Line
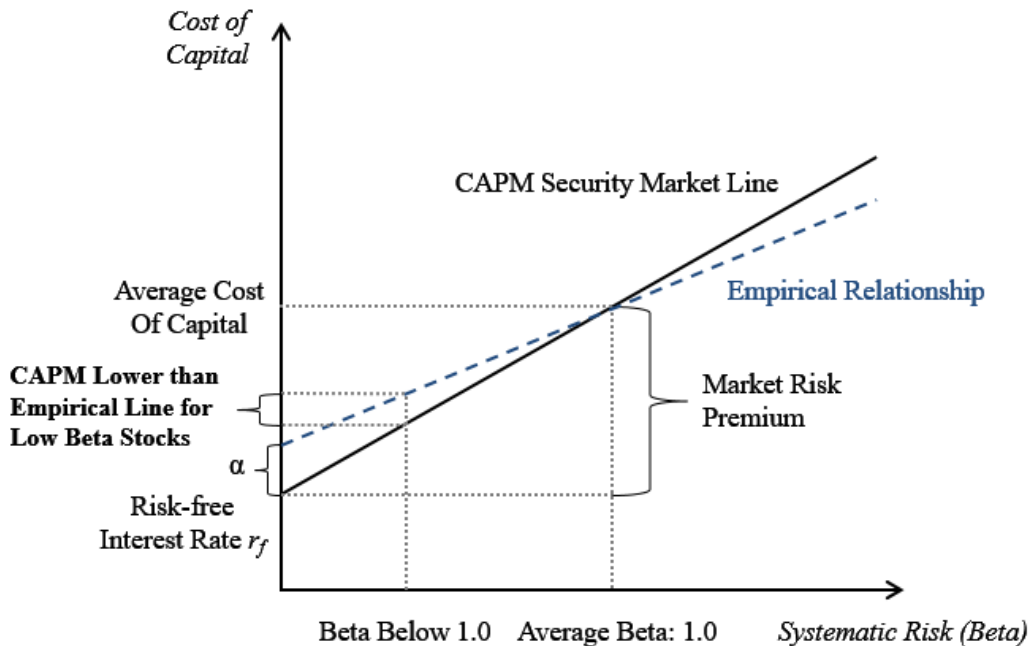
3   **Q. Why do you use the ECAPM?**

4   A. Academic research finds that the CAPM has not generally performed well as an empirical

5   model. One of its shortcomings is directly addressed by the ECAPM, which recognizes the

6   consistent empirical observation that the CAPM underestimates the cost of capital for low

7   beta stocks. In other words, the ECAPM is based on recognizing that the actual observed risk-

8   return line is flatter and has a higher intercept than that predicted by the CAPM. The alpha

9   parameter (α) in the ECAPM adjusts for this fact, which has been established by repeated

10   empirical tests of the CAPM. In summary, these studies estimate alpha parameters that range

1 between 1%[93] and 7.32%.[94] I apply an alpha parameter of 1.5% in my application of the

2 ECAPM. Exhibit 905 provides further discussion of the empirical findings that have tested

3 the CAPM and also provides documentation for the magnitude of the adjustment, α.

Results from the CAPM Based Models

4 **Q. Please summarize the results of the CAPM-based models.**

5 A. The results of the CAPM and ECAPM estimation for the electric sample are presented in

6 Table 10 below. The results for the natural gas and water samples are presented in Tables 11

7 and 12, respectively.[95] The ranges of results for each model (CAPM and ECAPM) reflect the

8 application of different specific versions of the textbook formulas used to account for the

9 impact of different financial leverage on financial risk.

---

[93] Black, Fischer. Beta and Return. *The Journal of Portfolio Management* 20 (Fall): 8-18.
[94] Fama, Eugene F. and Kenneth R. French. 1992. The Cross-Section of Expected Stock Returns. *Journal of Finance* 47 (June): 427-465.
[95] Details for the CAPM / ECAPM model for the electric sample are in Exhibit 903, Schedule No. BV-9 to BV-15. The details for the gas and water sample are in Exhibit 904, Schedule No. BV-9 to BV-15.

Table 10
CAPM and ECAPM Summary at 50% Equity

Estimated Return on Equity	Scenario 1 [1]	Scenario 2 [2]
Electric Sample		
Financial Risk Adjusted Method		
CAPM	10.1%	10.8%
ECAPM (α = 1.5%)	10.3%	11.0%
Hamada Adjustment Without Taxes		
CAPM	9.9%	10.7%
ECAPM (α = 1.5%)	9.9%	10.7%
Hamada Adjustment With Taxes		
CAPM	9.8%	10.5%
ECAPM (α = 1.5%)	9.9%	10.6%

Sources and Notes:

[1]: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%.

[2]: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%.

Table 11
Panel A – CAPM and ECAPM Summary for Natural Gas Sample

Estimated Return on Equity	Scenario 1 [1]	Scenario 2 [2]
Gas Sample		
Financial Risk Adjusted Method		
CAPM	10.3%	11.2%
ECAPM (α = 1.5%)	10.6%	11.4%
Hamada Adjustment Without Taxes		
CAPM	10.2%	10.9%
ECAPM (α = 1.5%)	10.1%	10.9%
Hamada Adjustment With Taxes		
CAPM	9.9%	10.7%
ECAPM (α = 1.5%)	9.9%	10.7%

Sources and Notes:

[1]: Long-Term Risk Free Rate of 2.60%, Long-Term Market Risk Premium of 7.25%.

[2]: Long-Term Risk Free Rate of 2.60%, Long-Term Market Risk Premium of 8.00%.

Table 12
Panel B – CAPM and ECAPM Summary for Water Utility Sample

Estimated Return on Equity	Scenario 1 [1]	Scenario 2 [2]
Water Sample		
Financial Risk Adjusted Method		
CAPM	10.5%	11.3%
ECAPM ($\alpha = 1.5\%$)	11.0%	11.8%
Hamada Adjustment Without Taxes		
CAPM	10.2%	11.0%
ECAPM ($\alpha = 1.5\%$)	10.1%	10.9%
Hamada Adjustment With Taxes		
CAPM	9.8%	10.5%
ECAPM ($\alpha = 1.5\%$)	9.8%	10.5%

Sources and Notes:
[1]: Long-Term Risk Free Rate of 2.60%, Long-Term Market Risk Premium of 7.25%.
[2]: Long-Term Risk Free Rate of 2.60%, Long-Term Market Risk Premium of 8.00%.

1   **Q. How do you interpret the results of your CAPM and ECAPM analyses?**

2   A. The results in Tables 10-12 above range from 9.8% to about 10¾ percent for the electric

3   sample ignoring the financial risk adjusted method. The results from the natural gas and water

4   sample are consistent with this range but slightly higher.

5   **Q. Do the results from the gas and water utilities support the ROE results above?**

6   A. Yes. The gas utilities and water utilities exhibit similar to higher CAPM and ECAPM results.

Summary of Results

7   **Q. Please summarize your results before considering where to place PGE.**

8   A. Assuming a 50% equity capital structure for PGE, I find the reasonable range of ROE for

9   electric utilities to be those displayed below (all figures are rounded to the nearest ¼ percent).

10   Next, I consider PGE specific risks to inform my recommendation of a reasonable ROE for

11   PGE.

Table 13
Summary Results for Electric Utilities at 50% Equity

CAPM/ ECAPM	9.75% - 10.75%
DCF	9.25% – 10.0%
Risk Premium	9.8%

1 Q. **What is a reasonable range for the proxy group?**

2 A. Based on the results above, I find that a reasonable range for the CAPM / ECAPM is 9.75 to

3   10.75 percent, a reasonable range for the DCF is 9.25 to 10.0 percent, and the risk premium

4   is about 9.8 percent.

D.   PGE Specific Circumstances and ROE Recommendation

5 Q. **How does the business risk of PGE compare to that of the sample?**

6 A. Like the companies in the electric sample, PGE's business is concentrated in the regulated

7   electric utility industry. It also has a credit rating that is comparable to that of the sample.

8   However, there are several areas in which PGE faces higher risk than the peer group of electric

9   utilities. First, unlike many of its peers, PGE currently has an asymmetric deadband in its

10   PCAM. According to Regulatory Research Associates (RRA), which is part of Standard &

11   Poor's, the majority of electric utilities do not share power cost over or under recovery with

12   customers.[96]   Second, PGE has an asymmetric ROE test, which makes it challenging to earn

13   the allowed ROE as only earnings in excess but not under earnings are shared with customers.

14   Third, there is a cap on its energy efficiency decoupling mechanism, which similar to the

15   asymmetric earnings test makes it more challenging to earn the allowed ROE. Fourth, PGE

16   is smaller than the average electric utility and research has shown that the CAPM tends to

17   underestimate the cost of equity for smaller companies.

---

[96] S&P Global Intelligence, "RRA Regulatory Focus: Adjustment Clauses," November 12, 2019.

1   Specifically, Duff & Phelps calculates a size premium that they add to the cost of equity

2   for companies that are smaller in size. Specifically, the average electric utility in the sample

3   has a market cap of approximately $7.9 billion, while that of PGE is about $3.7 billion,

4   measured at year-end 2020. Thus, the average electric sample company is included in Duff

5   & Phelps' decile 4, while PGE is in decile 5. Duff & Phelps estimates that the size premium

6   for a decile 5 company is approximately one percent.[97]

7   **Q. What do you recommend for PGE cost of equity in this proceeding?**

8   A. The reasonable range as shown in Figure 18 above, is 9.25 to 10.75 percent using the DCF,

9   CAPM/ECAPM and risk premium models, but it is more accurate to narrow that range to 9.5

10   percent to 10.25 percent for the electric utility industry as that is the average of the low and

11   high estimates, respectively. I also note that the majority of my estimates are in this range

12   and only the highest and lowest estimates fall outside the range. I understand that PGE is

13   applying for an ROE of 9.5 percent, which I consider conservative given the range of 9.5 to

14   10.25 percent. Consequently, I fully support the applied for ROE.

---

[97] Duff & Phelps Cost of Capital Nagivator as of December 31, 2020 (assessed 1/31/2021).

VI. Capital Structure

1 **Q. How did you determine the appropriate regulatory capital structure for 2022?**

2 A. We evaluated PGE's regulatory capital structure using the forecasted income statement and

3 balance sheet for 2022. Additionally, we considered several factors, including: 1) PGE's need

4 to maintain its financial strength; 2) flexibility and adequate liquidity; 3) its ability to maintain

5 reliable and economical access to the capital markets; 4) minimizing the cost of capital to

6 customers and shareholders; and 5) Commission Order No. 18-464 in Docket UE 335. We

7 also considered PGE's desire to maintain a capital structure consisting of 50% long-term debt

8 and 50% equity.

9 **Q. Has the Commission recently approved a 50% equity and 50% debt regulatory capital**

10 **structure for other utilities in Oregon?**

11 A. Yes. In docket No. UE 374, the Commission adopted an equity percentage of 50% for

12 PacifiCorp in line with Staff's recommendation. The Commission stated: "We find that a

13 more balanced capital structure serves to reduce the cost of equity to customers, without

14 jeopardizing the financial integrity of the company. We find that a capital structure of 50

15 percent equity achieves that balance."[98]

16 **Q. Does PGE expect to issue common equity between now and the end of 2022?**

17 A. No. At this time PGE does not anticipate additional equity issuances, but we will provide an

18 update if financing plans change.

19 **Q. Are you seeking a different regulatory capital structure than in docket UE 335?**

20 A. No. In UE 335, the OPUC adopted a settlement among the parties that reaffirmed PGE's

21 regulated capital structure at 50% equity and 50% debt, and PGE was encouraged to make

---

[98] Order No. 20-473, Docket No. UE 374. December 18, 2020.

1   efforts to secure longer-term debt, rather than shorter term-debt, which it has done. PGE's

2   long-term goal continues to be to maintain its capital structure at 50% equity and 50% debt;

3   however, the equity ratio fluctuates around the 50% target level, due to the timing and size of

4   debt and equity issuances.

5   **Q. Why does PGE not consider a more leveraged regulatory capital structure?**

6   A.   A 50% debt and 50% equity capital structure is the optimal debt-to-equity ratio for PGE

7   because it offers a balance between the ideal debt-to-equity range and reduces PGE's cost of

8   capital. The equity portion of PGE's capital structure is important because it represents how

9   PGE finances its cash needs, which directly impacts customer prices. We believe that the

10   50% equity in PGE's capital structure helps it better withstand difficult situations, such as

11   under-earning due to events outside of PGE's control. It is also required to help offset the

12   leverage imputed by the rating agencies due to purchased power. Additionally, PGE faces

13   risks in today's banking environment because of its relatively small size, and it must maintain

14   a solid capital structure and financial flexibility to help manage customer costs and provide

15   shareholder value.

16 **Q. How did PGE's accounting capital structure change following the debt issuances after**

17   **the energy trading loss?**

18 A.   When examining the accounting equity ratio, PGE's capital structure consisted of increased

19   debt following the energy trading losses given the issuances following the energy trading loss

20   in Q4 of 2020.[99] In accordance with the other adjustments made in the case for the energy

21   trading losses, we have removed the debt associated with the trading losses from our cost

---

[99] Based on PGE's results of operations and the OPUC ratio for calculating debt to equity.

1   of debt and we have adjusted equity to reflect a capital structure excluding the trading

2   losses. PGE continues to target 50% debt and 50% equity over the long run.

3   **Q. Aside from the risks discussed above, what other types of significant risks does PGE**

4   **encounter today?**

5   A. PGE encounters a variety of risks including:

6   • Hydro and wind availability and weather changes, including wildfires, create risk

7   for PGE in several ways, including: lower than average stream flows; lower than

8   average wind speeds and the timing of it; and volatility in electricity usage because

9   of sudden, unexpected weather changes and severe storms and wildfires. This

10   weather risk is not mitigated by PGE's decoupling mechanism. These risks can

11   potentially force PGE to purchase more spot energy, when the markets may be tight.

12   The costs resulting from these purchases could be greater than what is included in

13   customer prices.

14   • Regional economic weakness can adversely affect PGE's revenues. Weakness in

15   Oregon's economy can lead to a decline in electricity usage as customers become

16   more conservative. This can negatively impact PGE's revenues, thereby reducing

17   PGE's profits, which negatively affect PGE's retained earnings and returns to

18   investors. Lower retained earnings affect our ability to reinvest in the business.

19   • Uncertainty regarding financial and business operations contingencies are noted in

20   PGE's SEC annual 10-K and quarterly 10-Q filings.[100] PGE could be vulnerable

21   to cyber security and physical assets attacks. The electric industry is going through

---

[100] https://investors.portlandgeneral.com/sec-filings/sec-filing/10-k/0000784977-21-000007 Starting with page 115, Note 19- 2020 SEC Form 10-K. https://investors.portlandgeneral.com/sec-filings/sec-filing/10-q/0000784977-21-000023. Starting with page 24, Note 8- the most recent 4/30/21 PGE SEC Form 10-Q.

1 accelerated technological changes, which can make a basic premise of the current

2 business model (economies of scales gained from central generation facilities)

3 obsolete.

4 • Uncertain federal and state energy policy from legislative or regulatory efforts to

5 reduce greenhouse gas emissions and water discharges from thermal plants could

6 lead to increased capital and operating costs. Operating changes required of PGE

7 in order to comply with existing and new laws related to fish and wildlife also could

8 materially increase PGE costs.

9 **Q. Do the financial markets agree that these are risks for PGE?**

10 A. Yes. Recent reports from various equity analysts include at least one of the risks listed above.

11 We have included recent reports from Wells Fargo and Bank of America in our work papers.

12 **Q. Can PGE mitigate these risks?**

13 A. PGE can manage some of these risks, but not others. For risks that PGE can manage, PGE

14 develops management capabilities and core competencies, as well as establishes strong

15 processes and procedures to mitigate those risks. PGE is proactively implementing programs

16 that will better prepare it for the operational impacts of adverse events. The completion of the

17 IOC is an example of our efforts. Other examples include improving the ability to recover

18 from catastrophic events remains a key strategic focus of PGE. PGE's Department of

19 Business Continuity and Emergency Management has developed formal recovery plans to

20 address disasters and implement emergency management procedures.

21 We note, however, that there are risks that PGE cannot manage including those associated

22 with the government or regulatory framework. For these types of risk, PGE ensures that it is

1   prepared and capable of responding to them to the best of its ability and PGE continues to

2   actively participate in the legislative and regulatory arenas.

3   **Q. Could the risks addressed above alter the cost of capital you request?**

4   A. Yes. If these risks result in financial distress to PGE and/or its peers, the cost of long-term

5   debt and the cost of equity will increase, with a resulting long-term cost impact on customers

6   through increased borrowing costs and possibly a ratings downgrade.

VII. Qualifications

1   **Q. Mr. Jaramillo, please state your educational background and experience.**

2   A. I received a Bachelor of Arts degree in economics from Northwest Nazarene University and

3   a Master of Business Administration at the University of California, Los Angeles. I am also

4   a certified public accountant. Prior to joining PGE, I worked at Deloitte & Touche, where I

5   served various public utilities as an external auditor and worked in mergers and acquisitions

6   consulting. I joined PGE in 2011, becoming the Director of Compensation and Benefits in

7   2013. I held this position until January 2017. I was the Controller and Assistant Treasurer for

8   PGE through May 2020. I am currently the Senior Director of Treasury, Investor Relations,

9   and Risk Management.

10   **Q. Ms. Ferchland, please state your educational background and experience.**

11   A. I received a Bachelor of Science in electrical engineering and a Master of Business

12   Administration both from the University of Denver and a Post-Baccalaureate in accounting

13   from the Portland State University. I joined PGE in 2015 as an Investor Relations Analyst

14   and transitioned to the Principal Treasury Analyst role in 2017 where I worked with PGE's

15   revolving credit facility, debt issuances, and annual rating agency presentations. I became the

16   Manager of Revenue Requirement within Rates and Regulatory Affairs in November 2019.

17   **Q. Dr. Villadsen, please state your educational background and experience.**

18   A. I hold a Ph.D. from Yale University's School of Management with a concentration in

19   accounting. I have a joint degree in mathematics and economics (Bachelor of Science and

20   Master of Science) from University of Aarhus in Denmark. Prior to joining The Brattle Group,

21   I was a Professor of Accounting at the University of Iowa, University of Michigan, and at

22   Washington University in St. Louis where I taught financial and cost accounting. I have also

1   taught graduate classes in econometrics and quantitative methods. I have worked as a

2   consultant for Risoe National Laboratories in Denmark.

3   My work concentrates in the areas of regulatory finance and accounting. My recent work

4   has focused on accounting issues, damages, cost of capital and regulatory finance. In the

5   regulatory finance area, I have testified on cost of capital and accounting, analyzed credit

6   issues in the utility industry, risk management practices as well the impact of regulatory

7   initiatives such as energy efficiency and decoupling on cost of capital and earnings. I have

8   been involved in accounting disclosure issues and principles including impairment testing,

9   fair value accounting, leases, accounting for hybrid securities, accounting for equity

10   investments, cash flow estimation as well as overhead allocation. I have estimated damages

11   in the U.S. as well as internationally for companies in the construction, telecommunications,

12   energy, cement, and railroad industry. I have filed testimony and testified in federal and state

13   court, in international and U.S. arbitrations and before state and federal regulatory

14   commissions. My testimonies and expert reports pertain to accounting issues, damages,

15   discount rates and cost of capital for regulated entities. A detailed vita of my qualifications is

16   included in Exhibit 906.

17   **Q. Does this conclude your testimony?**

18   A. Yes.

List of Exhibits

Exhibit	Description
901C	Cost of Long-Term Debt
902	Standard & Poor's and Moody's Investors Service Credit Ratings
903	Cost of Equity Estimates – Electric Sample
904	Cost of Equity Estimates – Natural Gas and Water Sample
905	Technical Appendix
906	Villadsen Resume

Exhibit 901 contains confidential information and is subject to General Protective Order 21-206.

Information provided in electronic format only.

Standard & Poor's and Moody's Investors Service Credit Ratings

	S&P	Rating Date	Moody's	Rating Date
Senior Secured Debt	A	1/14/2021	A1	3/29/2021
Senior Unsecured	BBB+	1/14/2021	A3	3/29/2021
Short-term/ Commercial Paper	A-2	1/14/2021	P-2	3/29/2021

"Credit Opinion: Portland General Electric Company" January 14, 2021. Standard & Poor's
"Credit Opinion: Portland General Electric Company" March 29, 2021. Moody's Investors Service

Schedule No. BV-1

Table of Contents

Schedule No. BV-2

Electric Sample

Classification of Companies by Assets

Company	Company Category
ALLETE	MR
Alliant Energy	R
Amer. Elec. Power	R
Ameren Corp.	R
Avista Corp.	R
Black Hills	MR
CMS Energy Corp.	R
CenterPoint Energy	R
Consol. Edison	R
DTE Energy	R
Duke Energy	R
Edison Int'l	R
Entergy Corp.	MR
Evergy Inc.	R
Eversource Energy	R
Exelon Corp.	R
IDACORP Inc.	R
MGE Energy	R
NextEra Energy	R
NorthWestern Corp.	R
OGE Energy	R
Otter Tail Corp.	R
Pinnacle West Capital	R
Public Serv. Enterprise	R
Sempra Energy	R
Southern Co.	R
Unitil Corp.	R
WEC Energy Group	R
Xcel Energy Inc.	R

Sources and Notes:

Calculations based on EEI definitions and Company 10K filings:

   R = Regulated (greater than 80 percent of total assets are regulated).

   MR = Mostly Regulated (Less than 80 percent of total assets are regulated).

Schedule No. BV-3

Market Value of the Electric Sample

Panel A: ALLETE

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$2,321	$2,321	$2,271	$2,199	$2,097	$2,002	$1,850	[a]
Shares Outstanding (in millions) - Common	52	52	52	52	51	51	49	[b]
Price per Share - Common	$70	$68	$61	$83	$70	$67	$57	[c]
Market Value of Common Equity	$3,663	$3,572	$3,155	$4,268	$3,614	$3,419	$2,796	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$3,663	$3,572	$3,155	$4,268	$3,614	$3,419	$2,796	[f]= [d] + [e]
Market to Book Value of Common Equity	1.58	1.54	1.39	1.94	1.72	1.71	1.51	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$378	$378	$275	$556	$404	$361	$379	[j]
Current Liabilities	$575	$575	$623	$322	$400	$365	$224	[k]
Current Portion of Long-Term Debt	$304	$304	$330	$23	$106	$163	$15	[l]
Net Working Capital	$108	$108	($18)	$257	$110	$159	$170	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	#N/A N/A	#N/A N/A	#N/A N/A	#N/A N/A	$0	$1	$1	[n]
Adjusted Short-Term Debt	$0	$0	#VALUE!	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$1,667	$1,667	$1,420	$1,551	$1,397	$1,370	$1,551	[p]
Book Value of Long-Term Debt	$1,971	$1,971	N/A	$1,573	$1,503	$1,533	$1,566	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$1,971	$1,971	$1,792	$1,535	$1,628	$1,654	$1,676	
Carrying Amount	$1,806	$1,806	$1,623	$1,495	$1,513	$1,569	$1,605	
Adjustment to Book Value of Long-Term l	$165	$165	$169	$39	$114	$85	$71	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,136	$2,136	N/A	$1,613	$1,617	$1,618	$1,637	[s] = [q] + [r].
Market Value of Debt	$2,136	$2,136	N/A	$1,613	$1,617	$1,618	$1,637	[t] = [s].
MARKET VALUE OF FIRM								
	$5,798	$5,707	N/A	$5,881	$5,231	$5,036	$4,433	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	63.17%	62.58%	N/A	72.58%	69.09%	67.88%	63.07%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	N/A	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	36.83%	37.42%	N/A	27.42%	30.91%	32.12%	36.93%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel B: Alliant Energy

($MM)

	DCF Capital	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$5,766	$5,766	$5,502	$4,682	$4,232	$3,897	$3,765	[a]
Shares Outstanding (in millions) - Common	250	250	250	237	231	228	114	[b]
Price per Share - Common	$56	$53	$47	$47	$40	$40	$36	[c]
Market Value of Common Equity	$13,975	$13,180	$11,774	$11,192	$9,211	$9,018	$4,109	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$13,975	$13,180	$11,774	$11,192	$9,211	$9,018	$4,109	[f]= [d] + [e]
Market to Book Value of Common Equity	2.42	2.29	2.14	2.39	2.18	2.31	1.09	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$200	$200	$200	$200	$200	$200	$200	[h]
Market Value of Preferred Equity	$200	$200	$200	$200	$200	$200	$200	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$755	$755	$912	$815	$726	$750	$769	[j]
Current Liabilities	$1,408	$1,408	$1,650	$1,588	$2,074	$1,165	$1,349	[k]
Current Portion of Long-Term Debt	$308	$308	$357	$260	$856	$5	$313	[l]
Net Working Capital	($345)	($345)	($381)	($513)	($492)	($411)	($267)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$336	$336	$271	$515	$431	$303	$213	[n]
Adjusted Short-Term Debt	$336	$336	$271	$513	$431	$303	$213	[o] = See Sources and Notes.
Long-Term Debt	$6,471	$6,471	$5,834	$5,377	$4,057	$4,316	$3,523	[p]
Book Value of Long-Term Debt	$7,115	$7,115	$6,462	$6,150	$5,344	$4,624	$4,050	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$8,109	$8,109	$6,920	$5,861	$5,448	$4,799	$4,336	
Carrying Amount	$6,777	$6,777	$6,190	$5,503	$4,866	$4,320	$3,836	
Adjustment to Book Value of Long-Term	$1,332	$1,332	$730	$358	$581	$479	$501	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$8,447	$8,447	$7,191	$6,508	$5,925	$5,102	$4,550	[s] = [q] + [r].
Market Value of Debt	$8,447	$8,447	$7,191	$6,508	$5,925	$5,102	$4,550	[t] = [s].
MARKET VALUE OF FIRM	$22,622	$21,827	$19,165	$17,900	$15,336	$14,320	$8,859	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	61.78%	60.38%	61.43%	62.53%	60.06%	62.97%	46.38%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.88%	0.92%	1.04%	1.12%	1.30%	1.40%	2.26%	[w] = [i] / [u].
Debt - Market Value Ratio	37.34%	38.70%	37.52%	36.36%	38.64%	35.63%	51.36%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel C: Amer. Elec. Power

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$21,028	$21,028	$19,782	$19,243	$18,500	$17,689	$18,127	[a]
Shares Outstanding (in millions) - Common	499	499	495	493	493	492	491	[b]
Price per Share - Common	$88	$84	$81	$84	$67	$67	$65	[c]
Market Value of Common Equity	$43,876	$41,719	$40,157	$41,379	$33,080	$32,904	$31,947	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$43,876	$41,719	$40,157	$41,379	$33,080	$32,904	$31,947	[f]= [d] + [e]
Market to Book Value of Common Equity	2.09	1.98	2.03	2.15	1.79	1.86	1.76	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$4,258	$4,258	$5,292	$3,915	$4,135	$3,616	$4,146	[j]
Current Liabilities	$10,220	$10,220	$11,655	$7,991	$9,471	$7,915	$7,222	[k]
Current Portion of Long-Term Debt	$2,371	$2,371	$2,344	$1,818	$2,616	$2,514	$2,033	[l]
Net Working Capital	($3,591)	($3,591)	($4,019)	($2,258)	($2,720)	($1,784)	($1,042)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$3,048	$3,048	$4,464	$1,858	$2,659	$1,536	$1,221	[n]
Adjusted Short-Term Debt	$3,048	$3,048	$4,019	$1,858	$2,659	$1,536	$1,042	[o] = See Sources and Notes.
Long-Term Debt	$30,840	$30,840	$26,519	$23,996	$18,845	$16,722	$17,749	[p]
Book Value of Long-Term Debt	$36,259	$36,259	$32,882	$27,672	$24,120	$20,772	$20,825	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$37,457	$37,457	$30,172	$24,094	$23,650	$22,212	$21,201	
Carrying Amount	$31,073	$31,073	$26,726	$23,347	$21,173	$20,391	$19,573	
Adjustment to Book Value of Long-Term	$6,385	$6,385	$3,447	$747	$2,476	$1,821	$1,629	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$42,644	$42,644	$36,329	$28,419	$26,596	$22,593	$22,454	[s] = [q] + [r].
Market Value of Debt	$42,644	$42,644	$36,329	$28,419	$26,596	$22,593	$22,454	[t] = [s].
MARKET VALUE OF FIRM								
	$86,519	$84,362	$76,485	$69,798	$59,676	$55,497	$54,401	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	50.71%	49.45%	52.50%	59.28%	55.43%	59.29%	58.73%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	49.29%	50.55%	47.50%	40.72%	44.57%	40.71%	41.27%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
 Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
 (1): 0 if [m] > 0.
 (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
 (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel D: Ameren Corp.

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$9,148	$9,148	$8,085	$7,705	$7,230	$7,064	$6,869	[a]
Shares Outstanding (in millions) - Common	256	256	247	246	244	243	243	[b]
Price per Share - Common	$84	$80	$72	$73	$55	$55	$49	[c]
Market Value of Common Equity	$21,429	$20,329	$17,715	$17,973	$13,395	$13,369	$11,868	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$21,429	$20,329	$17,715	$17,973	$13,395	$13,369	$11,868	[f]= [d] + [e]
Market to Book Value of Common Equity	2.34	2.22	2.19	2.33	1.85	1.89	1.73	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,823	$1,823	$1,464	$1,422	$1,567	$1,450	$1,458	[j]
Current Liabilities	$2,307	$2,307	$2,367	$2,392	$3,345	$2,762	$1,839	[k]
Current Portion of Long-Term Debt	$8	$8	$357	$343	$1,170	$681	$135	[l]
Net Working Capital	($476)	($476)	($546)	($608)	($627)	($631)	($246)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$889	$889	$615	$799	$960	$914	$581	[n]
Adjusted Short-Term Debt	$476	$476	$546	$627	$608	$631	$246	[o] = See Sources and Notes.
Long-Term Debt	$11,527	$11,527	$9,378	$8,250	$6,766	$6,597	$6,881	[p]
Book Value of Long-Term Debt	$12,011	$12,011	$10,281	$9,220	$8,544	$7,909	$7,262	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$13,315	$13,315	$10,441	$8,669	$8,531	$7,772	$7,814	
Carrying Amount	$11,086	$11,086	$9,357	$8,439	$7,935	$7,276	$7,275	
Adjustment to Book Value of Long-Term	$2,229	$2,229	$1,084	$230	$596	$496	$539	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$14,240	$14,240	$11,365	$9,450	$9,140	$8,405	$7,801	[s] = [q] + [r].
Market Value of Debt	$14,240	$14,240	$11,365	$9,450	$9,140	$8,405	$7,801	[t] = [s].
MARKET VALUE OF FIRM								
	$35,669	$34,569	$29,080	$27,423	$22,535	$21,774	$19,669	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	60.08%	58.81%	60.92%	65.54%	59.44%	61.40%	60.34%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	39.92%	41.19%	39.08%	34.46%	40.56%	38.60%	39.66%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
 Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
 (1): 0 if [m] > 0.
 (2): The absolute value of [m] if [m] < 0 and ||[m]|| < [n].
 (3): [n] if [m] < 0 and ||[m]|| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel E: Avista Corp.

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$2,030	$2,030	$1,959	$1,867	$1,758	$1,686	$1,590	[a]
Shares Outstanding (in millions) - Common	69	69	67	66	66	64	63	[b]
Price per Share - Common	$47	$46	$43	$41	$51	$39	$40	[c]
Market Value of Common Equity	$3,244	$3,217	$2,875	$2,690	$3,355	$2,528	$2,525	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$3,244	$3,217	$2,875	$2,690	$3,355	$2,528	$2,525	[f]= [d] + [e]
Market to Book Value of Common Equity	1.60	1.58	1.47	1.44	1.91	1.50	1.59	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$344	$344	$274	$365	$310	$357	$279	[j]
Current Liabilities	$506	$506	$566	$567	$670	$367	$432	[k]
Current Portion of Long-Term Debt	$7	$7	$114	$112	$275	$3	$93	[l]
Net Working Capital	($155)	($155)	($177)	($90)	($85)	($6)	($59)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$203	$203	$185	$119	$50	$105	$90	[n]
Adjusted Short-Term Debt	$155	$155	$177	$90	$50	$6	$59	[o] = See Sources and Notes.
Long-Term Debt	$2,177	$2,177	$1,958	$1,874	$1,543	$1,730	$1,531	[p]
Book Value of Long-Term Debt	$2,339	$2,339	$2,249	$2,076	$1,868	$1,739	$1,684	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$1,190	$1,190	$1,125	$1,142	$1,068	$1,049	$1,056	
Carrying Amount	$964	$964	$964	$1,054	$951	$951	$951	
Adjustment to Book Value of Long-Term	$226	$226	$161	$89	$117	$98	$105	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,565	$2,565	$2,410	$2,165	$1,985	$1,837	$1,789	[s] = [q] + [r].
Market Value of Debt	$2,565	$2,565	$2,410	$2,165	$1,985	$1,837	$1,789	[t] = [s].
MARKET VALUE OF FIRM								
	$5,809	$5,782	$5,285	$4,855	$5,339	$4,365	$4,313	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	55.85%	55.64%	54.39%	55.41%	62.83%	57.92%	58.53%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	44.15%	44.36%	45.61%	44.59%	37.17%	42.08%	41.47%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel F: Black Hills

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$2,625	$2,625	$2,523	$2,279	$1,819	$1,674	$1,481	[a]
Shares Outstanding (in millions) - Common	63	63	63	60	54	53	51	[b]
Price per Share - Common	$70	$66	$59	$73	$53	$66	$59	[c]
Market Value of Common Equity	$4,370	$4,159	$3,730	$4,410	$2,836	$3,526	$3,035	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$4,370	$4,159	$3,730	$4,410	$2,836	$3,526	$3,035	[f]= [d] + [e]
Market to Book Value of Common Equity	1.66	1.58	1.48	1.93	1.56	2.11	2.05	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$579	$579	$490	$485	$492	$401	$402	[j]
Current Liabilities	$1,230	$1,230	$720	$591	$789	$392	$639	[k]
Current Portion of Long-Term Debt	$7	$7	$6	$7	$256	$6	$0	[l]
Net Working Capital	($644)	($644)	($224)	($100)	($41)	$16	($237)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$816	$816	$319	$165	$164	$51	$216	[n]
Adjusted Short-Term Debt	$644	$644	$224	$100	$41	$0	$216	[o] = See Sources and Notes.
Long-Term Debt	$3,529	$3,529	$3,137	$2,955	$2,859	$3,211	$3,159	[p]
Book Value of Long-Term Debt	$4,180	$4,180	$3,367	$3,062	$3,155	$3,216	$3,375	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$4,208	$4,208	$3,479	$3,039	$3,351	$3,351	$1,992	
Carrying Amount	$3,537	$3,537	$3,146	$2,957	$3,115	$3,217	$1,854	
Adjustment to Book Value of Long-Term	$672	$672	$334	$83	$235	$134	$139	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$4,852	$4,852	$3,701	$3,144	$3,391	$3,351	$3,513	[s] = [q] + [r].
Market Value of Debt	$4,852	$4,852	$3,701	$3,144	$3,391	$3,351	$3,513	[t] = [s].
MARKET VALUE OF FIRM								
	$9,221	$9,011	$7,431	$7,554	$6,226	$6,877	$6,548	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	47.39%	46.15%	50.20%	58.38%	45.54%	51.27%	46.35%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	52.61%	53.85%	49.80%	41.62%	54.46%	48.73%	53.65%	[x] = [t] / [u].

Sources and Notes:

Bloomberg as of April 30, 2021

Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.

The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.

   Prices are reported in Workpaper #1 to Schedule No. BV-6.

[e] = Market Value of GP equity is not estimated here.

[o] =

   (1): 0 if [m] > 0.

   (2): The absolute value of [m] if [m] < 0 and ||[m]|| < [n].

   (3): [n] if [m] < 0 and ||[m]|| > [n].

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel G: CMS Energy Corp.

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equi	$5,727	$5,727	$5,185	$4,858	$4,596	$4,370	$4,109	[a]
Shares Outstanding (in millions) - Commo	290	290	286	284	283	280	279	[b]
Price per Share - Common	$64	$59	$57	$55	$44	$45	$42	[c]
Market Value of Common Equity	$18,403	$17,207	$16,449	$15,700	$12,395	$12,540	$11,591	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$18,403	$17,207	$16,449	$15,700	$12,395	$12,540	$11,591	[f]= [d] + [e]
Market to Book Value of Common Equity	3.21	3.00	3.17	3.23	2.70	2.87	2.82	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$2,513	$2,513	$2,817	$2,376	$2,207	$2,215	$1,890	[j]
Current Liabilities	$2,885	$2,885	$2,940	$2,106	$2,482	$1,926	$2,047	[k]
Current Portion of Long-Term Debt	$1,506	$1,506	$1,721	$852	$1,286	$812	$950	[l]
Net Working Capital	$1,134	$1,134	$1,598	$1,122	$1,011	$1,101	$793	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$30	$0	$0	$0	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$13,612	$13,612	$12,616	$11,240	$9,082	$9,233	$8,284	[p]
Book Value of Long-Term Debt	$15,118	$15,118	$14,337	$12,092	$10,368	$10,045	$9,234	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Deb	$17,512	$17,512	$14,185	$11,630	$10,715	$9,953	$9,599	
Carrying Amount	$15,120	$15,120	$13,062	$11,589	$10,204	$9,504	$9,125	
Adjustment to Book Value of Long-Ter	$2,392	$2,392	$1,123	$41	$511	$449	$474	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$17,510	$17,510	$15,460	$12,133	$10,879	$10,494	$9,708	[s] = [q] + [r].
Market Value of Debt	$17,510	$17,510	$15,460	$12,133	$10,879	$10,494	$9,708	[t] = [s].
MARKET VALUE OF FIRM								
	$35,913	$34,717	$31,909	$27,833	$23,274	$23,034	$21,299	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	51.24%	49.56%	51.55%	56.41%	53.26%	54.44%	54.42%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	48.76%	50.44%	48.45%	43.59%	46.74%	45.56%	45.58%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
　　Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
　　(1): 0 if [m] > 0.
　　(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
　　(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel H: CenterPoint Energy

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$6,353	$6,353	$6,970	$6,476	$4,857	$3,537	$3,506	[a]
Shares Outstanding (in millions) - Common	552	552	503	502	431	431	431	[b]
Price per Share - Common	$24	$22	$14	$31	$27	$28	$21	[c]
Market Value of Common Equity	$13,251	$12,240	$7,275	$15,349	$11,653	$11,932	$8,943	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$13,251	$12,240	$7,275	$15,349	$11,653	$11,932	$8,943	[f]= [d] + [e]
Market to Book Value of Common Equity	2.09	1.93	1.04	2.37	2.40	3.37	2.55	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$2,363	$2,363	$1,740	$1,740	$0	$0	$0	[h]
Market Value of Preferred Equity	$2,363	$2,363	$1,740	$1,740	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$3,219	$3,219	$4,164	$3,419	$3,049	$2,896	$2,335	[j]
Current Liabilities	$4,326	$4,326	$4,042	$3,139	$2,616	$2,642	$2,534	[k]
Current Portion of Long-Term Debt	$1,788	$1,788	$1,426	$420	$613	$787	$1,124	[l]
Net Working Capital	$681	$681	$1,548	$700	$1,046	$1,041	$925	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$927	$927	$893	$687	$674	$727	$498	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$14,048	$14,048	$13,830	$13,808	$8,176	$7,892	$7,354	[p]
Book Value of Long-Term Debt	$15,836	$15,836	$15,256	$14,228	$8,789	$8,679	$8,478	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$15,226	$15,226	$16,067	$9,140	$8,679	$5,079	$0	
Carrying Amount	$13,401	$13,401	$15,093	$9,308	$9,220	$4,865	$0	
Adjustment to Book Value of Long-Term	$1,825	$1,825	$974	($168)	($541)	$214	$0	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$17,661	$17,661	$16,230	$14,060	$8,248	$8,893	$8,478	[s] = [q] + [r].
Market Value of Debt	$17,661	$17,661	$16,230	$14,060	$8,248	$8,893	$8,478	[t] = [s].
MARKET VALUE OF FIRM								
	$33,275	$32,264	$25,245	$31,149	$19,901	$20,825	$17,421	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	39.82%	37.94%	28.82%	49.28%	58.55%	57.30%	51.33%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	7.10%	7.32%	6.89%	5.59%	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	53.08%	54.74%	64.29%	45.14%	41.45%	42.70%	48.67%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel I: Consol. Edison

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$19,033	$19,033	$18,261	$17,369	$15,654	$14,498	$13,193	[a]
Shares Outstanding (in millions) - Common	342	342	334	327	311	305	294	[b]
Price per Share - Common	$77	$73	$80	$85	$77	$77	$75	[c]
Market Value of Common Equity	$26,397	$24,921	$26,631	$27,705	$23,821	$23,624	$22,038	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$26,397	$24,921	$26,631	$27,705	$23,821	$23,624	$22,038	[f]= [d] + [e]
Market to Book Value of Common Equity	1.39	1.31	1.46	1.60	1.52	1.63	1.67	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$4,587	$4,587	$5,026	$3,781	$3,773	$3,017	$3,185	[j]
Current Liabilities	$6,559	$6,559	$6,311	$6,348	$5,651	$3,441	$4,436	[k]
Current Portion of Long-Term Debt	$1,875	$1,875	$2,170	$2,080	$1,291	$33	$739	[l]
Net Working Capital	($97)	($97)	$885	($487)	($587)	($391)	($512)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,581	$1,581	$1,208	$1,435	$1,389	$836	$1,199	[n]
Adjusted Short-Term Debt	$97	$97	$0	$487	$587	$391	$512	[o] = See Sources and Notes.
Long-Term Debt	$21,379	$21,379	$20,223	$17,759	$14,730	$14,829	$12,222	[p]
Book Value of Long-Term Debt	$23,351	$23,351	$22,393	$20,326	$16,608	$15,253	$13,473	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$26,808	$26,808	$22,738	$18,740	$18,147	$16,093	$13,856	
Carrying Amount	$22,349	$22,349	$19,973	$18,145	$16,029	$14,774	$12,745	
Adjustment to Book Value of Long-Term	$4,459	$4,459	$2,765	$595	$2,118	$1,319	$1,111	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$27,810	$27,810	$25,158	$20,921	$18,726	$16,572	$14,584	[s] = [q] + [r].
Market Value of Debt	$27,810	$27,810	$25,158	$20,921	$18,726	$16,572	$14,584	[t] = [s].
MARKET VALUE OF FIRM								
	$54,207	$52,731	$51,789	$48,626	$42,547	$40,196	$36,622	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	48.70%	47.26%	51.42%	56.98%	55.99%	58.77%	60.18%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	51.30%	52.74%	48.58%	43.02%	44.01%	41.23%	39.82%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
　Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
　(1): 0 if [m] > 0.
　(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
　(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel J: DTE Energy

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$12,552	$12,552	$11,822	$10,545	$9,888	$9,194	$8,887	[a]
Shares Outstanding (in millions) - Common	194	194	193	183	181	179	179	[b]
Price per Share - Common	$139	$130	$90	$124	$102	$101	$89	[c]
Market Value of Common Equity	$26,858	$25,278	$17,390	$22,731	$18,547	$18,188	$16,008	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$26,858	$25,278	$17,390	$22,731	$18,547	$18,188	$16,008	[f]= [d] + [e]
Market to Book Value of Common Equity	2.14	2.01	1.47	2.16	1.88	1.98	1.80	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$4,376	$4,376	$3,526	$2,840	$2,957	$2,567	$2,362	[j]
Current Liabilities	$2,595	$2,595	$3,972	$3,647	$2,541	$1,834	$2,209	[k]
Current Portion of Long-Term Debt	$502	$502	$419	$1,532	$106	$13	$462	[l]
Net Working Capital	$2,283	$2,283	($27)	$725	$522	$746	$615	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$52	$52	$1,131	$156	$635	$59	$365	[n]
Adjusted Short-Term Debt	$0	$0	$27	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$20,098	$20,098	$17,150	$12,874	$12,185	$11,758	$8,758	[p]
Book Value of Long-Term Debt	$20,600	$20,600	$17,596	$14,406	$12,291	$11,771	$9,220	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$18,031	$18,031	$18,031	$13,825	$13,274	$11,905	$9,835	
Carrying Amount	$19,439	$19,439	$16,606	$13,622	$12,288	$11,270	$9,285	
Adjustment to Book Value of Long-Term	($1,408)	($1,408)	$1,425	$203	$986	$635	$550	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$19,192	$19,192	$19,021	$14,609	$13,277	$12,406	$9,770	[s] = [q] + [r].
Market Value of Debt	$19,192	$19,192	$19,021	$14,609	$13,277	$12,406	$9,770	[t] = [s].
MARKET VALUE OF FIRM								
	$46,050	$44,470	$36,411	$37,340	$31,824	$30,594	$25,778	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	58.32%	56.84%	47.76%	60.88%	58.28%	59.45%	62.10%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	41.68%	43.16%	52.24%	39.12%	41.72%	40.55%	37.90%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel K: Duke Energy

($MM)

	DCF Capital	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$46,224	$46,224	$44,959	$44,056	$41,792	$41,179	$39,892	[a]
Shares Outstanding (in millions) - Common	769	769	735	728	701	700	689	[b]
Price per Share - Common	$100	$94	$79	$90	$77	$82	$79	[c]
Market Value of Common Equity	$76,623	$72,162	$57,750	$65,703	$53,715	$57,478	$54,583	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$76,623	$72,162	$57,750	$65,703	$53,715	$57,478	$54,583	[f]= [d] + [e]
Market to Book Value of Common Equity	1.66	1.56	1.28	1.49	1.29	1.40	1.37	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$1,962	$1,962	$1,962	$974	$0	$0	$0	[h]
Market Value of Preferred Equity	$1,962	$1,962	$1,962	$974	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$8,508	$8,508	$10,181	$9,168	$8,279	$8,005	$7,943	[j]
Current Liabilities	$17,333	$17,333	$15,170	$12,282	$12,998	$10,941	$10,891	[k]
Current Portion of Long-Term Debt	$5,586	$5,586	$5,077	$2,805	$3,951	$1,977	$2,075	[l]
Net Working Capital	($3,239)	($3,239)	$88	($309)	($959)	($959)	($873)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$4,064	$4,064	$3,033	$3,029	$2,969	$3,558	$3,486	[n]
Adjusted Short-Term Debt	$3,239	$3,239	$0	$309	$768	$959	$873	[o] = See Sources and Notes.
Long-Term Debt	$56,120	$56,120	$57,725	$55,169	$49,030	$47,021	$38,232	[p]
Book Value of Long-Term Debt	$64,945	$64,945	$62,802	$58,283	$53,749	$49,957	$41,180	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$69,292	$69,292	$63,062	$54,534	$55,331	$49,161	$0	
Carrying Amount	$59,863	$59,863	$58,126	$54,529	$52,279	$47,895	$0	
Adjustment to Book Value of Long-Term	$9,429	$9,429	$4,936	$5	$3,052	$1,266	$0	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$74,374	$74,374	$67,738	$58,288	$56,801	$51,223	$41,180	[s] = [q] + [r].
Market Value of Debt	$74,374	$74,374	$67,738	$58,288	$56,801	$51,223	$41,180	[t] = [s].
MARKET VALUE OF FIRM								
	$152,959	$148,498	$127,450	$124,965	$110,516	$108,701	$95,763	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	50.09%	48.59%	45.31%	52.58%	48.60%	52.88%	57.00%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	1.28%	1.32%	1.54%	0.78%	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	48.62%	50.08%	53.15%	46.64%	51.40%	47.12%	43.00%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel L: Edison Int'l

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$14,085	$14,085	$13,351	$10,526	$11,696	$12,051	$11,439	[a]
Shares Outstanding (in millions) - Common	379	379	363	326	326	326	326	[b]
Price per Share - Common	$60	$59	$52	$64	$63	$80	$71	[c]
Market Value of Common Equity	$22,781	$22,514	$18,912	$20,767	$20,423	$25,968	$23,152	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$22,781	$22,514	$18,912	$20,767	$20,423	$25,968	$23,152	[f]= [d] + [e]
Market to Book Value of Common Equity	1.62	1.60	1.42	1.97	1.75	2.15	2.02	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$3,138	$3,138	$2,193	$2,193	$2,193	$2,191	$2,192	[h]
Market Value of Preferred Equity	$3,138	$3,138	$2,193	$2,193	$2,193	$2,191	$2,192	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$5,328	$5,328	$4,911	$3,999	$2,992	$2,046	$2,427	[j]
Current Liabilities	$9,497	$9,497	$6,248	$5,375	$4,647	$4,416	$4,233	[k]
Current Portion of Long-Term Debt	$1,124	$1,124	$975	$237	$479	$981	$295	[l]
Net Working Capital	($3,045)	($3,045)	($362)	($1,139)	($1,176)	($1,389)	($1,511)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$2,520	$2,520	$1,275	$932	$70	$295	$363	[n]
Adjusted Short-Term Debt	$2,520	$2,520	$362	$932	$70	$295	$363	[o] = See Sources and Notes.
Long-Term Debt	$21,021	$21,021	$19,734	$16,468	$13,367	$11,662	$11,243	[p]
Book Value of Long-Term Debt	$24,665	$24,665	$21,071	$17,637	$13,916	$12,938	$11,901	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$23,824	$23,824	$20,137	$14,844	$13,760	$12,368	$12,252	
Carrying Amount	$20,337	$20,337	$18,343	$14,711	$12,123	$11,156	$11,259	
Adjustment to Book Value of Long-Term	$3,487	$3,487	$1,794	$133	$1,637	$1,212	$993	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$28,152	$28,152	$22,865	$17,770	$15,553	$14,150	$12,894	[s] = [q] + [r].
Market Value of Debt	$28,152	$28,152	$22,865	$17,770	$15,553	$14,150	$12,894	[t] = [s].
MARKET VALUE OF FIRM								
	$54,071	$53,804	$43,970	$40,730	$38,169	$42,309	$38,238	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	42.13%	41.84%	43.01%	50.99%	53.51%	61.38%	60.55%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	5.80%	5.83%	4.99%	5.38%	5.75%	5.18%	5.73%	[w] = [i] / [u].
Debt - Market Value Ratio	52.06%	52.32%	52.00%	43.63%	40.75%	33.44%	33.72%	[x] = [t] / [u].

Sources and Notes:

Bloomberg as of April 30, 2021

Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.

The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.

   Prices are reported in Workpaper #1 to Schedule No. BV-6.

[e] = Market Value of GP equity is not estimated here.

[o] =

   (1): 0 if [m] > 0.

   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].

   (3): [n] if [m] < 0 and |[m]| > [n].

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel M: Entergy Corp.

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$11,017	$11,017	$10,224	$8,970	$7,975	$8,057	$9,361	[a]
Shares Outstanding (in millions) - Common	201	201	200	190	181	179	179	[b]
Price per Share - Common	$106	$98	$93	$95	$78	$76	$78	[c]
Market Value of Common Equity	$21,339	$19,647	$18,609	$18,039	$14,120	$13,582	$13,932	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$21,339	$19,647	$18,609	$18,039	$14,120	$13,582	$13,932	[f]= [d] + [e]
Market to Book Value of Common Equity	1.94	1.78	1.82	2.01	1.77	1.69	1.49	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$254	$254	$254	$219	$198	$203	$318	[h]
Market Value of Preferred Equity	$254	$254	$254	$219	$198	$203	$318	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$4,789	$4,789	$3,974	$3,408	$3,656	$3,397	$4,001	[j]
Current Liabilities	$4,512	$4,512	$6,018	$4,861	$5,233	$3,879	$3,839	[k]
Current Portion of Long-Term Debt	$629	$629	$1,230	$215	$1,261	$336	$799	[l]
Net Working Capital	$906	$906	($814)	($1,239)	($1,239)	($145)	$961	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,028	$1,028	$1,942	$1,942	$805	$1,323	$766	[n]
Adjusted Short-Term Debt	$0	$0	$814	$1,239	$316	$145	$0	[o] = See Sources and Notes.
Long-Term Debt	$24,075	$24,075	$18,229	$17,394	$15,613	$13,951	$13,526	[p]
Book Value of Long-Term Debt	$24,704	$24,704	$20,273	$18,848	$17,190	$14,432	$14,326	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$24,814	$24,814	$19,060	$15,880	$15,367	$14,816	$13,579	
Carrying Amount	$22,370	$22,370	$17,874	$16,168	$15,075	$14,833	$13,326	
Adjustment to Book Value of Long-Term	$2,444	$2,444	$1,186	($288)	$292	($17)	$253	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$27,149	$27,149	$21,459	$18,560	$17,482	$14,415	$14,579	[s] = [q] + [r].
Market Value of Debt	$27,149	$27,149	$21,459	$18,560	$17,482	$14,415	$14,579	[t] = [s].
MARKET VALUE OF FIRM								
	$48,742	$47,049	$40,322	$36,818	$31,800	$28,200	$28,829	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	43.78%	41.76%	46.15%	48.99%	44.40%	48.16%	48.33%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.52%	0.54%	0.63%	0.60%	0.62%	0.72%	1.10%	[w] = [i] / [u].
Debt - Market Value Ratio	55.70%	57.70%	53.22%	50.41%	54.98%	51.12%	50.57%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
    Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel N: Evergy Inc.

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$8,806	$8,806	$8,529	$9,423	#N/A N/A	#N/A N/A	#N/A N/A	[a]
Shares Outstanding (in millions) - Common	227	227	227	245	#N/A N/A	#N/A N/A	#N/A N/A	[b]
Price per Share - Common	$63	$59	$55	$57	$51	$55	$48	[c]
Market Value of Common Equity	$14,316	$13,384	$12,424	$14,043	N/A	N/A	N/A	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$14,316	$13,384	$12,424	$14,043	N/A	N/A	N/A	[f]= [d] + [e]
Market to Book Value of Common Equity	1.63	1.52	1.46	1.49	N/A	N/A	N/A	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$2,002	$2,002	$1,733	$1,928	#N/A N/A	#N/A N/A	#N/A N/A	[j]
Current Liabilities	$3,244	$3,244	$2,398	$3,335	#N/A N/A	#N/A N/A	#N/A N/A	[k]
Current Portion of Long-Term Debt	$534	$534	$20	$750	$0	$0	$0	[l]
Net Working Capital	($708)	($708)	($645)	($658)	N/A	N/A	N/A	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,660	$1,660	$1,377	$1,670	#N/A N/A	#N/A N/A	#N/A N/A	[n]
Adjusted Short-Term Debt	$708	$708	$645	$658	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$9,119	$9,119	$8,994	$7,232	#N/A N/A	#N/A N/A	#N/A N/A	[p]
Book Value of Long-Term Debt	$10,361	$10,361	$9,658	$8,639	N/A	N/A	N/A	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$11,274	$11,274	$9,750	$7,412	$4,011	$0	$0	
Carrying Amount	$9,627	$9,627	$8,998	$7,342	$3,688	$0	$0	
Adjustment to Book Value of Long-Tern	$1,647	$1,647	$752	$70	$323	$0	$0	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$12,008	$12,008	$10,411	$8,710	N/A	N/A	N/A	[s] = [q] + [r].
Market Value of Debt	$12,008	$12,008	$10,411	$8,710	N/A	N/A	N/A	[t] = [s].
MARKET VALUE OF FIRM								
	$26,324	$25,392	$22,835	$22,753	N/A	N/A	N/A	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	54.38%	52.71%	54.41%	61.72%	N/A	N/A	N/A	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	N/A	N/A	N/A	[w] = [i] / [u].
Debt - Market Value Ratio	45.62%	47.29%	45.59%	38.28%	N/A	N/A	N/A	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel O: Eversource Energy

($MM)

	DCF Capital	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$14,233	$14,233	$13,210	$11,637	$11,184	$10,804	$10,438	[a]
Shares Outstanding (in millions) - Common	343	343	336	317	317	317	317	[b]
Price per Share - Common	$88	$84	$79	$71	$58	$59	$58	[c]
Market Value of Common Equity	$30,174	$28,799	$26,511	$22,521	$18,274	$18,713	$18,241	[d]= [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$30,174	$28,799	$26,511	$22,521	$18,274	$18,713	$18,241	[f]= [d] + [e]
Market to Book Value of Common Equity	2.12	2.02	2.01	1.94	1.63	1.73	1.75	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$156	$156	$156	$156	$156	$156	$156	[h]
Market Value of Preferred Equity	$156	$156	$156	$156	$156	$156	$156	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$3,147	$3,147	$2,563	$2,301	$2,771	$2,511	$2,591	[j]
Current Liabilities	$5,539	$5,539	$3,396	$4,559	$4,096	$3,334	$2,594	[k]
Current Portion of Long-Term Debt	$1,211	$1,211	$532	$817	$1,097	$774	$379	[l]
Net Working Capital	($1,181)	($1,181)	($301)	($1,442)	($227)	($48)	$376	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,872	$1,872	$661	$1,478	$1,049	$976	$770	[n]
Adjusted Short-Term Debt	$1,181	$1,181	$301	$1,442	$227	$48	$0	[o] = See Sources and Notes.
Long-Term Debt	$14,783	$14,783	$13,899	$12,293	$12,016	$9,268	$9,145	[p]
Book Value of Long-Term Debt	$17,175	$17,175	$14,732	$14,552	$13,341	$10,090	$9,524	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$18,420	$18,420	$15,170	$13,155	$12,877	$9,981	$9,426	
Carrying Amount	$16,179	$16,179	$14,098	$13,086	$12,326	$9,603	$9,035	
Adjustment to Book Value of Long-Term	$2,241	$2,241	$1,072	$69	$552	$377	$391	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$19,416	$19,416	$15,804	$14,621	$13,892	$10,468	$9,915	[s] = [q] + [r].
Market Value of Debt	$19,416	$19,416	$15,804	$14,621	$13,892	$10,468	$9,915	[t] = [s].
MARKET VALUE OF FIRM								
	$49,745	$48,371	$42,471	$37,298	$32,321	$29,336	$28,312	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	60.66%	59.54%	62.42%	60.38%	56.54%	63.79%	64.43%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.31%	0.32%	0.37%	0.42%	0.48%	0.53%	0.55%	[w] = [i] / [u].
Debt - Market Value Ratio	39.03%	40.14%	37.21%	39.20%	42.98%	35.68%	35.02%	[x] = [t] / [u].

Sources and Notes:

Bloomberg as of April 30, 2021

Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.

The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.

   Prices are reported in Workpaper #1 to Schedule No. BV-6.

[e] = Market Value of GP equity is not estimated here.

[o] =

   (1): 0 if [m] > 0.

   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].

   (3): [n] if [m] < 0 and |[m]| > [n].

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel P: Exelon Corp.

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equi	$32,015	$32,015	$32,482	$31,357	$30,231	$26,530	$25,717	[a]
Shares Outstanding (in millions) - Commo	977	977	974	971	965	926	922	[b]
Price per Share - Common	$45	$43	$35	$50	$38	$36	$35	[c]
Market Value of Common Equity	$44,153	$42,102	$33,737	$48,360	$36,757	$33,270	$32,275	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$44,153	$42,102	$33,737	$48,360	$36,757	$33,270	$32,275	[f]= [d] + [e]
Market to Book Value of Common Equity	1.38	1.32	1.04	1.54	1.22	1.25	1.25	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$193	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$193	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$12,997	$12,997	$12,476	$12,476	$11,533	$12,194	$11,364	[j]
Current Liabilities	$13,580	$13,580	$11,774	$12,229	$10,153	$14,437	$13,770	[k]
Current Portion of Long-Term Debt	$2,281	$2,281	$2,848	$2,757	$1,203	$3,645	$2,058	[l]
Net Working Capital	$1,698	$1,698	$3,550	$3,004	$2,583	$1,402	($348)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$3,128	$3,128	$1,979	$1,254	$1,654	$2,048	$3,640	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$348	[o] = See Sources and Notes.
Long-Term Debt	$36,638	$36,638	$35,198	$34,745	$33,294	$31,685	$29,955	[p]
Book Value of Long-Term Debt	$38,919	$38,919	$38,046	$37,502	$34,497	$35,330	$32,361	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Deb	$43,752	$43,752	$40,033	$35,869	$36,705	$34,813	$25,924	
Carrying Amount	$36,912	$36,912	$36,039	$35,424	$34,264	$34,005	$25,145	
Adjustment to Book Value of Long-Te	$6,840	$6,840	$3,994	$445	$2,441	$808	$779	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$45,759	$45,759	$42,040	$37,947	$36,938	$36,138	$33,140	[s] = [q] + [r].
Market Value of Debt	$45,759	$45,759	$42,040	$37,947	$36,938	$36,138	$33,140	[t] = [s].
MARKET VALUE OF FIRM								
	$89,912	$87,861	$75,777	$86,307	$73,695	$69,408	$65,608	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	49.11%	47.92%	44.52%	56.03%	49.88%	47.93%	49.19%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	0.29%	[w] = [i] / [u].
Debt - Market Value Ratio	50.89%	52.08%	55.48%	43.97%	50.12%	52.07%	50.51%	[x] = [t] / [u].

Sources and Notes:

Bloomberg as of April 30, 2021

Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.

The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.

　Prices are reported in Workpaper #1 to Schedule No. BV-6.

[e] = Market Value of GP equity is not estimated here.

[o] =

　　(1): 0 if [m] > 0.

　　(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].

　　(3): [n] if [m] < 0 and |[m]| > [n].

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel Q: IDACORP Inc.

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equ	$2,569	$2,569	$2,467	$2,380	$2,257	$2,159	$2,058	[a]
Shares Outstanding (in millions) - Comm	51	51	50	50	50	50	50	[b]
Price per Share - Common	$101	$99	$86	$100	$85	$82	$74	[c]
Market Value of Common Equity	$5,088	$5,021	$4,344	$5,027	$4,295	$4,143	$3,731	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$5,088	$5,021	$4,344	$5,027	$4,295	$4,143	$3,731	[f]= [d] + [e]
Market to Book Value of Common Equity	1.98	1.95	1.76	2.11	1.90	1.92	1.81	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$594	$594	$473	$576	$638	$409	$587	[j]
Current Liabilities	$262	$262	$248	$273	$332	$181	$312	[k]
Current Portion of Long-Term Debt	$0	$0	$0	$0	$130	$0	$101	[l]
Net Working Capital	$332	$332	$225	$303	$436	$228	$377	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$0	$0	$0	$23	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$2,000	$2,000	$1,837	$1,835	$1,834	$1,745	$1,744	[p]
Book Value of Long-Term Debt	$2,000	$2,000	$1,837	$1,835	$1,964	$1,745	$1,845	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Deb	$2,467	$2,467	$2,084	$1,943	$1,915	$1,859	$1,813	
Carrying Amount	$2,000	$2,000	$1,837	$1,835	$1,746	$1,746	$1,726	
Adjustment to Book Value of Long-Te	$467	$467	$247	$108	$169	$113	$87	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,467	$2,467	$2,084	$1,943	$2,133	$1,858	$1,932	[s] = [q] + [r].
Market Value of Debt	$2,467	$2,467	$2,084	$1,943	$2,133	$1,858	$1,932	[t] = [s].
MARKET VALUE OF FIRM								
	$7,555	$7,488	$6,428	$6,970	$6,428	$6,001	$5,664	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	67.35%	67.06%	67.58%	72.12%	66.82%	69.04%	65.88%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	32.65%	32.94%	32.42%	27.88%	33.18%	30.96%	34.12%	[x] = [t] / [u].

Sources and Notes:

Bloomberg as of April 30, 2021

Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.

The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.

   Prices are reported in Workpaper #1 to Schedule No. BV-6.

[e] = Market Value of GP equity is not estimated here.

[o] =

   (1): 0 if [m] > 0.

   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].

   (3): [n] if [m] < 0 and |[m]| > [n].

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel R: MGE Energy

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equit	$998	$998	$869	$829	$787	$733	$697	[a]
Shares Outstanding (in millions) - Commo	36	36	35	35	35	35	35	[b]
Price per Share - Common	$74	$71	$63	$66	$56	$63	$51	[c]
Market Value of Common Equity	$2,681	$2,584	$2,194	$2,295	$1,929	$2,194	$1,759	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$2,681	$2,584	$2,194	$2,295	$1,929	$2,194	$1,759	[f]= [d] + [e]
Market to Book Value of Common Equity	2.69	2.59	2.52	2.77	2.45	2.99	2.52	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$202	$202	$162	$221	$249	$254	$247	[j]
Current Liabilities	$184	$184	$111	$112	$106	$84	$118	[k]
Current Portion of Long-Term Debt	$5	$5	$20	$5	$24	$4	$34	[l]
Net Working Capital	$23	$23	$71	$113	$167	$175	$164	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$54	$54	$3	$6	$3	$0	$0	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$536	$536	$540	$510	$397	$391	$356	[p]
Book Value of Long-Term Debt	$541	$541	$560	$515	$422	$396	$390	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$639	$639	$612	$519	$475	$430	$436	
Carrying Amount	$528	$528	$548	$502	$427	$391	$396	
Adjustment to Book Value of Long-Ter	$111	$111	$64	$16	$48	$39	$40	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$652	$652	$624	$531	$470	$435	$430	[s] = [q] + [r].
Market Value of Debt	$652	$652	$624	$531	$470	$435	$430	[t] = [s].
MARKET VALUE OF FIRM								
	$3,332	$3,236	$2,817	$2,826	$2,399	$2,629	$2,189	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	80.44%	79.86%	77.86%	81.21%	80.41%	83.46%	80.34%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	19.56%	20.14%	22.14%	18.79%	19.59%	16.54%	19.66%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel S: NextEra Energy

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$37,378	$37,378	$36,403	$34,226	$32,706	$25,497	$22,912	[a]
Shares Outstanding (in millions) - Common	1,961	1,961	489	479	471	468	461	[b]
Price per Share - Common	$79	$74	$54	$48	$40	$33	$29	[c]
Market Value of Common Equity	$154,110	$144,727	$26,508	$22,963	$18,781	$15,300	$13,531	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$154,110	$144,727	$26,508	$22,963	$18,781	$15,300	$13,531	[f]= [d] + [e]
Market to Book Value of Common Equity	4.12	3.87	0.73	0.67	0.57	0.60	0.59	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$8,237	$8,237	$9,725	$8,222	$5,612	$5,827	$7,096	[j]
Current Liabilities	$15,783	$15,783	$13,722	$17,926	$9,579	$9,761	$10,587	[k]
Current Portion of Long-Term Debt	$3,837	$3,837	$2,489	$2,614	$1,168	$2,766	$2,145	[l]
Net Working Capital	($3,709)	($3,709)	($1,508)	($7,090)	($2,799)	($1,168)	($1,346)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$2,766	$2,766	$3,601	$7,716	$2,969	$2,559	$2,472	[n]
Adjusted Short-Term Debt	$2,766	$2,766	$1,508	$7,090	$2,799	$1,168	$1,346	[o] = See Sources and Notes.
Long-Term Debt	$46,065	$46,065	$41,116	$29,883	$28,062	$28,539	$27,791	[p]
Book Value of Long-Term Debt	$52,668	$52,668	$45,113	$39,587	$32,029	$32,473	$31,282	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$51,525	$51,525	$42,928	$30,043	$35,447	$31,623	$30,412	
Carrying Amount	$46,082	$46,082	$39,667	$29,498	$33,134	$30,418	$28,897	
Adjustment to Book Value of Long-Term	$5,443	$5,443	$3,261	$545	$2,313	$1,205	$1,515	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$58,111	$58,111	$48,374	$40,132	$34,342	$33,678	$32,797	[s] = [q] + [r].
Market Value of Debt	$58,111	$58,111	$48,374	$40,132	$34,342	$33,678	$32,797	[t] = [s].
MARKET VALUE OF FIRM								
	$212,221	$202,838	$74,882	$63,095	$53,123	$48,978	$46,328	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	72.62%	71.35%	35.40%	36.39%	35.35%	31.24%	29.21%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	27.38%	28.65%	64.60%	63.61%	64.65%	68.76%	70.79%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
    Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel T: NorthWestern Corp.

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equi	$2,114	$2,114	$2,060	$1,990	$1,835	$1,709	$1,615	[a]
Shares Outstanding (in millions) - Commo	54	54	54	54	53	52	52	[b]
Price per Share - Common	$68	$64	$58	$71	$52	$58	$61	[c]
Market Value of Common Equity	$3,696	$3,470	$3,162	$3,808	$2,760	$3,031	$3,156	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$3,696	$3,470	$3,162	$3,808	$2,760	$3,031	$3,156	[f]= [d] + [e]
Market to Book Value of Common Equity	1.75	1.64	1.53	1.91	1.50	1.77	1.95	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$359	$359	$330	$288	$258	$245	$250	[j]
Current Liabilities	$386	$386	$348	$347	$326	$545	$518	[k]
Current Portion of Long-Term Debt	$3	$3	$3	$2	$2	$2	$2	[l]
Net Working Capital	($25)	($25)	($15)	($57)	($66)	($298)	($266)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$0	$0	$229	$162	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$229	$162	[o] = See Sources and Notes.
Long-Term Debt	$2,478	$2,478	$2,256	$2,100	$2,038	$1,817	$1,794	[p]
Book Value of Long-Term Debt	$2,481	$2,481	$2,259	$2,102	$2,040	$2,048	$1,958	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Deb	$2,630	$2,630	$2,417	$2,118	$1,902	$1,852	$1,845	
Carrying Amount	$2,315	$2,315	$2,233	$2,102	$1,793	$1,793	$1,782	
Adjustment to Book Value of Long-Te	$314	$314	$184	$16	$108	$59	$63	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,795	$2,795	$2,442	$2,118	$2,149	$2,107	$2,021	[s] = [q] + [r].
Market Value of Debt	$2,795	$2,795	$2,442	$2,118	$2,149	$2,107	$2,021	[t] = [s].
MARKET VALUE OF FIRM								
	$6,492	$6,265	$5,605	$5,926	$4,909	$5,139	$5,177	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	56.94%	55.38%	56.43%	64.27%	56.23%	58.99%	60.97%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	43.06%	44.62%	43.57%	35.73%	43.77%	41.01%	39.03%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
 Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel U: OGE Energy

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$3,606	$3,606	$3,553	$3,976	$3,842	$3,444	$3,298	[a]
Shares Outstanding (in millions) - Common	200	200	200	200	200	200	200	[b]
Price per Share - Common	$33	$32	$30	$43	$32	$36	$28	[c]
Market Value of Common Equity	$6,636	$6,470	$5,961	$8,591	$6,359	$7,171	$5,576	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$6,636	$6,470	$5,961	$8,591	$6,359	$7,171	$5,576	[f]= [d] + [e]
Market to Book Value of Common Equity	1.84	1.79	1.68	2.16	1.66	2.08	1.69	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$503	$503	$523	$454	$494	$538	$456	[j]
Current Liabilities	$1,837	$1,837	$855	$884	$1,215	$915	$707	[k]
Current Portion of Long-Term Debt	$6	$6	$6	$3	$500	$225	$0	[l]
Net Working Capital	($1,328)	($1,328)	($327)	($428)	($222)	($152)	($251)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,278	$1,278	$375	$366	$194	$128	$188	[n]
Adjusted Short-Term Debt	$1,278	$1,278	$327	$366	$194	$128	$188	[o] = See Sources and Notes.
Long-Term Debt	$3,495	$3,495	$3,196	$2,944	$2,500	$2,703	$2,629	[p]
Book Value of Long-Term Debt	$4,779	$4,779	$3,528	$3,313	$3,194	$3,056	$2,817	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$4,328	$4,328	$3,646	$3,322	$3,388	$2,904	$2,656	
Carrying Amount	$3,494	$3,494	$3,195	$3,147	$2,999	$2,631	$2,899	
Adjustment to Book Value of Long-Term	$834	$834	$451	$175	$389	$273	($244)	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$5,613	$5,613	$3,979	$3,488	$3,582	$3,330	$2,573	[s] = [q] + [r].
Market Value of Debt	$5,613	$5,613	$3,979	$3,488	$3,582	$3,330	$2,573	[t] = [s].
MARKET VALUE OF FIRM								
	$12,249	$12,083	$9,940	$12,079	$9,942	$10,500	$8,149	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	54.18%	53.55%	59.97%	71.12%	63.97%	68.29%	68.42%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	45.82%	46.45%	40.03%	28.88%	36.03%	31.71%	31.58%	[x] = [t] / [u].

Sources and Notes:

Bloomberg as of April 30, 2021

Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.

The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.

  Prices are reported in Workpaper #1 to Schedule No. BV-6.

[e] = Market Value of GP equity is not estimated here.

[o] =

  (1): 0 if [m] > 0.

  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].

  (3): [n] if [m] < 0 and |[m]| > [n].

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel V: Otter Tail Corp.

($MM)

	DCF Capital	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$888	$888	$800	$740	$708	$679	$614	[a]
Shares Outstanding (in millions) - Common	42	42	40	40	40	39	38	[b]
Price per Share - Common	$47	$46	$41	$50	$43	$37	$28	[c]
Market Value of Common Equity	$1,951	$1,899	$1,655	$1,983	$1,702	$1,460	$1,075	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$1,951	$1,899	$1,655	$1,983	$1,702	$1,460	$1,075	[f]= [d] + [e]
Market to Book Value of Common Equity	2.20	2.14	2.07	2.68	2.40	2.15	1.75	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$259	$259	$256	$274	$240	$219	$210	[j]
Current Liabilities	$459	$459	$176	$201	$166	$236	$233	[k]
Current Portion of Long-Term Debt	$140	$140	$5	$4	$0	$45	$52	[l]
Net Working Capital	($61)	($61)	$85	$77	$74	$28	$29	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$135	$135	$20	$44	$30	$59	$43	[n]
Adjusted Short-Term Debt	$61	$61	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$624	$624	$742	$607	$590	$490	$494	[p]
Book Value of Long-Term Debt	$825	$825	$747	$611	$590	$536	$546	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$858	$858	$742	$602	$543	$584	$563	
Carrying Amount	$765	$765	$690	$590	$491	$539	$498	
Adjustment to Book Value of Long-Term De	$94	$94	$53	$11	$52	$45	$65	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$919	$919	$799	$623	$642	$581	$611	[s] = [q] + [r].
Market Value of Debt	$919	$919	$799	$623	$642	$581	$611	[t] = [s].
MARKET VALUE OF FIRM								
	$2,870	$2,818	$2,454	$2,605	$2,344	$2,041	$1,686	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	67.98%	67.39%	67.43%	76.10%	72.60%	71.54%	63.75%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	32.02%	32.61%	32.57%	23.90%	27.40%	28.46%	36.25%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
    Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel W: Pinnacle West Capital

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$5,683	$5,683	$5,469	$5,251	$5,020	$4,829	$4,600	[a]
Shares Outstanding (in millions) - Common	113	113	112	112	112	112	111	[b]
Price per Share - Common	$84	$80	$74	$96	$78	$83	$73	[c]
Market Value of Common Equity	$9,451	$9,004	$8,335	$10,727	$8,709	$9,289	$8,110	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$9,451	$9,004	$8,335	$10,727	$8,709	$9,289	$8,110	[f]= [d] + [e]
Market to Book Value of Common Equity	1.66	1.58	1.52	2.04	1.74	1.92	1.76	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,170	$1,170	$1,078	$876	$957	$795	$826	[j]
Current Liabilities	$1,331	$1,331	$2,295	$1,591	$1,874	$1,194	$1,586	[k]
Current Portion of Long-Term Debt	$74	$74	$662	$315	$582	$125	$358	[l]
Net Working Capital	($86)	($86)	($555)	($399)	($335)	($274)	($402)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$215	$215	$563	$244	$370	$207	$262	[n]
Adjusted Short-Term Debt	$86	$86	$555	$244	$335	$207	$262	[o] = See Sources and Notes.
Long-Term Debt	$6,826	$6,826	$4,885	$4,940	$4,291	$4,274	$3,463	[p]
Book Value of Long-Term Debt	$6,986	$6,986	$6,102	$5,499	$5,208	$4,606	$4,082	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$7,613	$7,613	$6,194	$5,234	$5,305	$4,426	$4,106	
Carrying Amount	$6,314	$6,314	$5,633	$5,138	$4,872	$4,147	$3,820	
Adjustment to Book Value of Long-Term	$1,299	$1,299	$562	$95	$433	$279	$286	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$8,285	$8,285	$6,664	$5,595	$5,641	$4,885	$4,369	[s] = [q] + [r].
Market Value of Debt	$8,285	$8,285	$6,664	$5,595	$5,641	$4,885	$4,369	[t] = [s].
MARKET VALUE OF FIRM								
	$17,736	$17,289	$14,998	$16,321	$14,350	$14,175	$12,479	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	53.29%	52.08%	55.57%	65.72%	60.69%	65.54%	64.99%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	46.71%	47.92%	44.43%	34.28%	39.31%	34.46%	35.01%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel X: Public Serv. Enterprise

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$16,277	$16,277	$15,249	$14,814	$14,104	$13,005	$13,318	[a]
Shares Outstanding (in millions) - Common	504	504	504	504	504	505	505	[b]
Price per Share - Common	$63	$59	$42	$59	$49	$45	$46	[c]
Market Value of Common Equity	$31,642	$29,610	$21,252	$29,917	$24,481	$22,523	$23,085	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$31,642	$29,610	$21,252	$29,917	$24,481	$22,523	$23,085	[f]= [d] + [e]
Market to Book Value of Common Equity	1.94	1.82	1.39	2.02	1.74	1.73	1.73	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$3,595	$3,595	$3,727	$3,027	$2,806	$2,716	$3,263	[j]
Current Liabilities	$4,546	$4,546	$5,160	$4,473	$3,948	$3,111	$2,910	[k]
Current Portion of Long-Term Debt	$1,429	$1,429	$1,665	$925	$1,000	$500	$562	[l]
Net Working Capital	$478	$478	$232	($521)	($142)	$105	$915	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$665	$665	$1,062	$1,151	$594	$315	$12	[n]
Adjusted Short-Term Debt	$0	$0	$0	$521	$142	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$15,590	$15,590	$14,306	$13,466	$12,072	$10,898	$9,676	[p]
Book Value of Long-Term Debt	$17,019	$17,019	$15,971	$14,912	$13,214	$11,398	$10,238	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$19,143	$19,143	$16,723	$14,767	$14,062	$12,003	$10,256	
Carrying Amount	$16,180	$16,180	$15,108	$14,462	$13,068	$11,395	$9,568	
Adjustment to Book Value of Long-Term	$2,963	$2,963	$1,615	$305	$994	$608	$688	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$19,982	$19,982	$17,586	$15,217	$14,208	$12,006	$10,926	[s] = [q] + [r].
Market Value of Debt	$19,982	$19,982	$17,586	$15,217	$14,208	$12,006	$10,926	[t] = [s].
MARKET VALUE OF FIRM								
	$51,624	$49,592	$38,838	$45,134	$38,689	$34,529	$34,011	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	61.29%	59.71%	54.72%	66.28%	63.28%	65.23%	67.87%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	38.71%	40.29%	45.28%	33.72%	36.72%	34.77%	32.13%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel Y: Sempra Energy

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$22,545	$22,545	$17,859	$15,088	$14,151	$13,264	$11,946	[a]
Shares Outstanding (in millions) - Common	303	303	292	274	264	251	249	[b]
Price per Share - Common	$137	$130	$107	$125	$111	$111	$102	[c]
Market Value of Common Equity	$41,426	$39,444	$31,387	$34,203	$29,273	$27,851	$25,386	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$41,426	$39,444	$31,387	$34,203	$29,273	$27,851	$25,386	[f]= [d] + [e]
Market to Book Value of Common Equity	1.84	1.75	1.76	2.27	2.07	2.10	2.13	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$1,474	$1,474	$2,278	$2,278	$1,713	$20	$20	[h]
Market Value of Preferred Equity	$1,474	$1,474	$2,278	$2,278	$1,713	$20	$20	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$4,200	$4,200	$5,424	$3,262	$3,394	$2,953	$2,883	[j]
Current Liabilities	$6,875	$6,875	$12,177	$8,612	$9,109	$5,812	$5,132	[k]
Current Portion of Long-Term Debt	$505	$505	$2,079	$2,204	$1,871	$839	$1,066	[l]
Net Working Capital	($2,170)	($2,170)	($4,674)	($3,146)	($3,844)	($2,020)	($1,183)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,817	$1,817	$5,742	$2,523	$3,665	$2,054	$1,177	[n]
Adjusted Short-Term Debt	$1,817	$1,817	$4,674	$2,523	$3,665	$2,020	$1,177	[o] = See Sources and Notes.
Long-Term Debt	$22,023	$22,023	$20,198	$20,193	$21,740	$14,791	$13,361	[p]
Book Value of Long-Term Debt	$24,345	$24,345	$26,951	$24,920	$27,276	$17,650	$15,604	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$25,478	$25,478	$10,003	$7,086	$7,153	$7,153	$7,153	
Carrying Amount	$22,259	$22,259	$8,625	$6,435	$6,117	$6,117	$6,117	
Adjustment to Book Value of Long-Term	$3,219	$3,219	$1,378	$651	$1,036	$1,036	$1,036	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$27,564	$27,564	$28,329	$25,571	$28,312	$18,686	$16,640	[s] = [q] + [r].
Market Value of Debt	$27,564	$27,564	$28,329	$25,571	$28,312	$18,686	$16,640	[t] = [s].
MARKET VALUE OF FIRM								
	$70,464	$68,482	$61,994	$62,052	$59,298	$46,557	$42,046	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	58.79%	57.60%	50.63%	55.12%	49.37%	59.82%	60.38%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	2.09%	2.15%	3.67%	3.67%	2.89%	0.04%	0.05%	[w] = [i] / [u].
Debt - Market Value Ratio	39.12%	40.25%	45.70%	41.21%	47.75%	40.14%	39.58%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel Z: Southern Co.

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$28,482	$28,482	$27,725	$26,437	$24,676	$25,094	$20,797	[a]
Shares Outstanding (in millions) - Common	1,059	1,059	1,056	1,040	1,012	995	919	[b]
Price per Share - Common	$65	$61	$52	$52	$44	$50	$51	[c]
Market Value of Common Equity	$68,600	$64,403	$55,432	$53,779	$44,500	$49,982	$46,496	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$68,600	$64,403	$55,432	$53,779	$44,500	$49,982	$46,496	[f]= [d] + [e]
Market to Book Value of Common Equity	2.41	2.26	2.00	2.03	1.80	1.99	2.24	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$291	$291	$291	$291	$324	$727	$727	[h]
Market Value of Preferred Equity	$291	$291	$291	$291	$324	$727	$727	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$9,469	$9,469	$9,430	$8,709	$9,524	$8,427	$5,461	[j]
Current Liabilities	$11,586	$11,586	$9,553	$9,919	$13,630	$12,284	$7,856	[k]
Current Portion of Long-Term Debt	$3,779	$3,779	$2,039	$2,541	$3,235	$3,269	$2,392	[l]
Net Working Capital	$1,662	$1,662	$1,916	$1,331	($871)	($588)	($3)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,092	$1,092	$1,710	$1,251	$4,271	$2,818	$1,195	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$871	$588	$3	[o] = See Sources and Notes.
Long-Term Debt	$48,379	$48,379	$45,845	$42,177	$44,446	$42,786	$26,091	[p]
Book Value of Long-Term Debt	$52,158	$52,158	$47,884	$44,718	$48,552	$46,643	$28,486	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$56,264	$56,264	$48,339	$44,824	$51,348	$46,286	$27,913	
Carrying Amount	$48,349	$48,349	$44,561	$45,023	$48,151	$45,080	$27,216	
Adjustment to Book Value of Long-Tern	$7,915	$7,915	$3,778	($199)	$3,197	$1,206	$697	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$60,073	$60,073	$51,662	$44,519	$51,749	$47,849	$29,183	[s] = [q] + [r].
Market Value of Debt	$60,073	$60,073	$51,662	$44,519	$51,749	$47,849	$29,183	[t] = [s].
MARKET VALUE OF FIRM								
	$128,964	$124,767	$107,385	$98,589	$96,573	$98,558	$76,406	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	53.19%	51.62%	51.62%	54.55%	46.08%	50.71%	60.85%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.23%	0.23%	0.27%	0.30%	0.34%	0.74%	0.95%	[w] = [i] / [u].
Debt - Market Value Ratio	46.58%	48.15%	48.11%	45.16%	53.59%	48.55%	38.19%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and ||[m]|| < [n].
  (3): [n] if [m] < 0 and ||[m]|| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel AA: Unitil Corp.

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equity	$403	$403	$388	$374	$348	$302	$290	[a]
Shares Outstanding (in millions) - Common	15	15	15	15	15	14	14	[b]
Price per Share - Common	$51	$47	$51	$54	$45	$45	$42	[c]
Market Value of Common Equity	$773	$710	$758	$812	$668	$628	$583	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$773	$710	$758	$812	$668	$628	$583	[f]= [d] + [e]
Market to Book Value of Common Equity	1.92	1.76	1.96	2.17	1.92	2.08	2.01	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$133	$133	$126	$134	$145	$126	$128	[j]
Current Liabilities	$123	$123	$147	$165	$146	$177	$146	[k]
Current Portion of Long-Term Debt	$10	$10	$8	$21	$33	$33	$20	[l]
Net Working Capital	$20	$20	($14)	($10)	$31	($18)	$2	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$37	$37	$72	$66	$45	$77	$48	[n]
Adjusted Short-Term Debt	$0	$0	$14	$10	$0	$18	$0	[o] = See Sources and Notes.
Long-Term Debt	$520	$520	$440	$376	$368	$311	$316	[p]
Book Value of Long-Term Debt	$530	$530	$461	$407	$401	$362	$336	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$633	$633	$519	$422	$457	$370	$345	
Carrying Amount	$523	$523	$438	$387	$376	$317	$306	
Adjustment to Book Value of Long-Term	$110	$110	$81	$35	$81	$54	$40	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$640	$640	$542	$441	$482	$415	$376	[s] = [q] + [r].
Market Value of Debt	$640	$640	$542	$441	$482	$415	$376	[t] = [s].
MARKET VALUE OF FIRM								
	$1,413	$1,350	$1,301	$1,254	$1,150	$1,044	$959	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	54.71%	52.59%	58.29%	64.79%	58.09%	60.18%	60.79%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	[w] = [i] / [u].
Debt - Market Value Ratio	45.27%	47.39%	41.69%	35.20%	41.89%	39.80%	39.19%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel AB: WEC Energy Group

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equi	$10,767	$10,767	$10,344	$9,985	$9,668	$9,126	$8,818	[a]
Shares Outstanding (in millions) - Commo	315	315	315	315	316	316	316	[b]
Price per Share - Common	$96	$91	$89	$78	$62	$60	$59	[c]
Market Value of Common Equity	$30,271	$28,568	$28,187	$24,757	$19,414	$19,054	$18,547	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$30,271	$28,568	$28,187	$24,757	$19,414	$19,054	$18,547	[f]= [d] + [e]
Market to Book Value of Common Equity	2.81	2.65	2.72	2.48	2.01	2.09	2.10	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$30	$30	$30	$30	$30	$30	$30	[h]
Market Value of Preferred Equity	$30	$30	$30	$30	$30	$30	$30	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$2,356	$2,356	$1,845	$2,008	$1,981	$1,855	$1,896	[j]
Current Liabilities	$3,715	$3,715	$2,848	$2,890	$3,606	$2,055	$2,230	[k]
Current Portion of Long-Term Debt	$787	$787	$694	$370	$958	$158	$152	[l]
Net Working Capital	($572)	($572)	($308)	($512)	($667)	($41)	($181)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,580	$1,580	$827	$1,145	$1,200	$670	$896	[n]
Adjusted Short-Term Debt	$572	$572	$308	$512	$667	$41	$181	[o] = See Sources and Notes.
Long-Term Debt	$12,318	$12,318	$11,195	$10,393	$8,644	$9,173	$9,009	[p]
Book Value of Long-Term Debt	$13,677	$13,677	$12,197	$11,274	$10,269	$9,372	$9,342	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Deb	$14,343	$14,343	$13,036	$10,555	$10,342	$9,818	$9,681	
Carrying Amount	$12,451	$12,451	$11,858	$10,336	$9,562	$9,286	$9,222	
Adjustment to Book Value of Long-Te	$1,893	$1,893	$1,178	$219	$780	$532	$459	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$15,570	$15,570	$13,375	$11,493	$11,049	$9,904	$9,801	[s] = [q] + [r].
Market Value of Debt	$15,570	$15,570	$13,375	$11,493	$11,049	$9,904	$9,801	[t] = [s].
MARKET VALUE OF FIRM								
	$45,871	$44,169	$41,592	$36,281	$30,494	$28,988	$28,379	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	65.99%	64.68%	67.77%	68.24%	63.67%	65.73%	65.36%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.07%	0.07%	0.07%	0.08%	0.10%	0.10%	0.11%	[w] = [i] / [u].
Debt - Market Value Ratio	33.94%	35.25%	32.16%	31.68%	36.23%	34.17%	34.54%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-3

Market Value of the Electric Sample

Panel AC: Xcel Energy Inc.

($MM)

	DCF Capital Structure	1st Quarter, 2021	1st Quarter, 2020	1st Quarter, 2019	1st Quarter, 2018	1st Quarter, 2017	1st Quarter, 2016	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	03/31/21	03/31/20	03/31/19	03/31/18	03/31/17	03/31/16	
Book Value, Common Shareholder's Equi	$14,700	$14,700	$13,302	$12,329	$11,561	$11,070	$10,672	[a]
Shares Outstanding (in millions) - Commc	538	538	525	515	509	508	508	[b]
Price per Share - Common	$70	$64	$59	$56	$44	$44	$41	[c]
Market Value of Common Equity	$37,781	$34,620	$31,060	$29,051	$22,484	$22,433	$20,839	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$37,781	$34,620	$31,060	$29,051	$22,484	$22,433	$20,839	[f]= [d] + [e]
Market to Book Value of Common Equity	2.57	2.36	2.33	2.36	1.94	2.03	1.95	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$4,315	$4,315	$2,983	$2,909	$2,782	$2,633	$2,733	[j]
Current Liabilities	$4,877	$4,877	$5,839	$4,424	$4,122	$3,708	$3,189	[k]
Current Portion of Long-Term Debt	$242	$242	$1,245	$170	$457	$755	$657	[l]
Net Working Capital	($320)	($320)	($1,611)	($1,345)	($883)	($319)	$201	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,477	$1,477	$1,765	$1,252	$1,025	$605	$183	[n]
Adjusted Short-Term Debt	$320	$320	$1,611	$1,252	$883	$319	$0	[o] = See Sources and Notes.
Long-Term Debt	$22,757	$22,757	$18,173	$17,727	$14,522	$13,696	$13,148	[p]
Book Value of Long-Term Debt	$23,319	$23,319	$21,029	$19,149	$15,862	$14,771	$13,805	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Deb	$24,412	$24,412	$20,227	$16,755	$16,531	$15,513	$14,095	
Carrying Amount	$20,066	$20,066	$18,109	$16,209	$14,977	$14,450	$13,148	
Adjustment to Book Value of Long-Te	$4,346	$4,346	$2,118	$546	$1,554	$1,063	$947	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$27,665	$27,665	$23,147	$19,695	$17,416	$15,834	$14,752	[s] = [q] + [r].
Market Value of Debt	$27,665	$27,665	$23,147	$19,695	$17,416	$15,834	$14,752	[t] = [s].
MARKET VALUE OF FIRM								
	$65,446	$62,285	$54,207	$48,746	$39,900	$38,267	$35,591	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	57.73%	55.58%	57.30%	59.60%	56.35%	58.62%	58.55%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	42.27%	44.42%	42.70%	40.40%	43.65%	41.38%	41.45%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of April 30, 2021
Capital structure from 1st Quarter, 2021 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 1st Quarter, 2021 balance sheet information and a 15-trading day average closing price ending on 4/30/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2016 to 2020 10-Ks.

Schedule No. BV-4

Electric Sample

Capital Structure Summary of the Electric Sample

Company	DCF Capital Structure			5-Year Average Capital Structure		
	Common Equity - Value Ratio	Preferred Equity - Value Ratio	Debt - Value Ratio	Common Equity - Value Ratio	Preferred Equity - Value Ratio	Debt - Value Ratio
	[1]	[2]	[3]	[4]	[5]	[6]
ALLETE	0.63	0.00	0.37	0.68	0.00	0.26
Alliant Energy	0.62	0.01	0.37	0.61	0.01	0.37
Amer. Elec. Power	0.51	0.00	0.49	0.55	0.00	0.45
Ameren Corp.	0.60	0.00	0.40	0.61	0.00	0.39
Avista Corp.	0.56	0.00	0.44	0.57	0.00	0.43
Black Hills	0.47	0.00	0.53	0.50	0.00	0.50
CMS Energy Corp.	0.51	0.00	0.49	0.53	0.00	0.47
CenterPoint Energy	0.40	0.07	0.53	0.46	0.04	0.50
Consol. Edison	0.49	0.00	0.51	0.54	0.00	0.46
DTE Energy	0.58	0.00	0.42	0.57	0.00	0.43
Duke Energy	0.50	0.01	0.49	0.50	0.01	0.50
Edison Int'l	0.42	0.06	0.52	0.50	0.05	0.44
Entergy Corp.	0.44	0.01	0.56	0.46	0.01	0.53
Evergy Inc.	0.54	0.00	0.46	0.55	0.00	0.45
Eversource Energy	0.61	0.00	0.39	0.61	0.00	0.39
Exelon Corp.	0.49	0.00	0.51	0.49	0.00	0.51
IDACORP Inc.	0.67	0.00	0.33	0.69	0.00	0.31
MGE Energy	0.80	0.00	0.20	0.81	0.00	0.19
NextEra Energy	0.73	0.00	0.27	0.42	0.00	0.58
NorthWestern Corp.	0.57	0.00	0.43	0.58	0.00	0.42
OGE Energy	0.54	0.00	0.46	0.63	0.00	0.37
Otter Tail Corp.	0.68	0.00	0.32	0.71	0.00	0.29
Pinnacle West Capital	0.53	0.00	0.47	0.60	0.00	0.40
Public Serv. Enterprise	0.61	0.00	0.39	0.62	0.00	0.38
Sempra Energy	0.59	0.02	0.39	0.55	0.02	0.43
Southern Co.	0.53	0.00	0.47	0.51	0.00	0.49
Unitil Corp.	0.55	0.00	0.45	0.59	0.00	0.41
WEC Energy Group	0.66	0.00	0.34	0.66	0.00	0.34
Xcel Energy Inc.	0.58	0.00	0.42	0.57	0.00	0.43
Electric Sample Average	0.57	0.01	0.43	0.57	0.01	0.42

Sources and Notes:

[1], [4]:Workpaper #1 to Schedule No. BV-4.

[2], [5]:Workpaper #2 to Schedule No. BV-4.

[3], [6]:Workpaper #3 to Schedule No. BV-4.

Values in this table may not add up exactly to 1.0 because of rounding.

Schedule No. BV-5

Electric Sample

Estimated Growth Rates of the Electric Sample

Company	Thomson Reuters IBES Estimate		Value Line			
	Long-Term Growth Rate	Number of Estimates	EPS Year 2021 Estimate	EPS Year 2024-2026 Estimate	Annualized Growth Rate	Combined Growth Rate
	[1]	[2]	[3]	[4]	[5]	[6]
ALLETE	7.0%	1	3.10	4.75	11.3%	9.1%
Alliant Energy	5.7%	3	2.60	3.25	5.7%	5.7%
Amer. Elec. Power	6.2%	4	4.65	6.00	6.6%	6.2%
Ameren Corp.	7.5%	2	3.70	4.75	6.4%	7.1%
Avista Corp.	6.9%	1	2.10	2.75	7.0%	6.9%
Black Hills	4.7%	2	3.85	4.75	5.4%	4.9%
CMS Energy Corp.	7.2%	6	2.85	3.75	7.1%	7.2%
CenterPoint Energy	-5.9%	4	1.40	1.85	7.2%	-3.3%
Consol. Edison	2.9%	3	4.25	5.00	4.1%	3.2%
DTE Energy	6.0%	3	7.15	9.25	6.6%	6.2%
Duke Energy	5.0%	4	5.15	6.25	5.0%	5.0%
Edison Int'l	-0.5%	1	4.10	5.25	6.4%	2.9%
Entergy Corp.	5.5%	3	5.95	7.50	6.0%	5.6%
Evergy Inc.	5.7%	3	3.40	4.25	5.7%	5.7%
Eversource Energy	7.0%	5	3.85	5.00	6.8%	7.0%
Exelon Corp.	5.1%	5	3.00	3.50	3.9%	4.9%
IDACORP Inc.	2.6%	2	4.80	5.75	4.6%	3.3%
MGE Energy	4.7%	1	2.70	3.25	4.7%	4.7%
NextEra Energy	8.6%	7	2.45	3.50	9.3%	8.7%
NorthWestern Corp.	4.6%	3	3.50	4.00	3.4%	4.3%
OGE Energy	3.8%	2	2.10	2.75	7.0%	4.9%
Otter Tail Corp.	9.0%	1	2.45	3.25	7.3%	8.2%
Pinnacle West Capital	3.5%	4	5.05	6.50	6.5%	4.1%
Public Serv. Enterprise	2.6%	4	3.65	4.50	5.4%	3.1%
Sempra Energy	6.1%	2	7.75	10.75	8.5%	6.9%
Southern Co.	6.5%	4	3.25	4.00	5.3%	6.3%
Unitil Corp.	4.8%	1	n/a	n/a	n/a	4.8%
WEC Energy Group	6.1%	4	4.00	5.25	7.0%	6.3%
Xcel Energy Inc.	6.3%	2	2.95	3.75	6.2%	6.3%

Sources and Notes:

[1] - [2]: Thomson Reuters as of April 30, 2021.

[3] - [4]: From Valueline Investment Analyzer as of April 30, 2021.

[5]: ([4] / [3]) ^ (1/4) - 1.

[6]: ([1] x [2] + [5]) / ([2] + 1).

  Weighted average growth rate. If information is missing from one source, the weighted average is based solely on the other source.

Schedule No. BV-6

DCF Cost of Equity of the Electric Sample

Panel A: Simple DCF Method (Quarterly)

Company	Stock Price	Most Recent Dividend	Quarterly Dividend Yield	Combined Long-Term Growth Rate	Quarterly Growth Rate	DCF Cost of Equity
	[1]	[2]	[3]	[4]	[5]	[6]
ALLETE	$70.17	$0.63	0.92%	9.1%	2.2%	13.1%
Alliant Energy	$55.87	$0.40	0.73%	5.7%	1.4%	8.8%
Amer. Elec. Power	$87.88	$0.74	0.85%	6.2%	1.5%	9.9%
Ameren Corp.	$83.87	$0.55	0.67%	7.1%	1.7%	10.0%
Avista Corp.	$46.86	$0.42	0.92%	6.9%	1.7%	10.8%
Black Hills	$69.50	$0.57	0.82%	4.9%	1.2%	8.4%
CMS Energy Corp.	$63.57	$0.44	0.70%	7.2%	1.7%	10.1%
CenterPoint Energy	$24.01	$0.16	0.66%	-3.3%	-0.8%	-0.7%
Consol. Edison	$77.18	$0.78	1.01%	3.2%	0.8%	7.5%
DTE Energy	$138.64	$1.09	0.79%	6.2%	1.5%	9.6%
Duke Energy	$99.64	$0.97	0.98%	5.0%	1.2%	9.1%
Edison Int'l	$60.04	$0.66	1.11%	2.9%	0.7%	7.6%
Entergy Corp.	$106.36	$0.95	0.91%	5.6%	1.4%	9.4%
Evergy Inc.	$63.07	$0.54	0.86%	5.7%	1.4%	9.3%
Eversource Energy	$87.86	$0.60	0.70%	7.0%	1.7%	10.0%
Exelon Corp.	$45.19	$0.38	0.86%	4.9%	1.2%	8.5%
IDACORP Inc.	$100.73	$0.71	0.71%	3.3%	0.8%	6.2%
MGE Energy	$74.12	$0.37	0.50%	4.7%	1.2%	6.8%
NextEra Energy	$78.59	$0.39	0.50%	8.7%	2.1%	10.8%
NorthWestern Corp.	$68.15	$0.62	0.92%	4.3%	1.1%	8.1%
OGE Energy	$33.15	$0.40	1.23%	4.9%	1.2%	10.0%
Otter Tail Corp.	$47.00	$0.39	0.85%	8.2%	2.0%	11.8%
Pinnacle West Capital	$83.83	$0.83	1.00%	4.1%	1.0%	8.3%
Public Serv. Enterprise	$62.78	$0.51	0.82%	3.1%	0.8%	6.5%
Sempra Energy	$136.72	$1.10	0.82%	6.9%	1.7%	10.4%
Southern Co.	$64.78	$0.64	1.00%	6.3%	1.5%	10.5%
Unitil Corp.	$51.39	$0.38	0.75%	4.8%	1.2%	7.9%
WEC Energy Group	$95.97	$0.68	0.72%	6.3%	1.5%	9.3%
Xcel Energy Inc.	$70.22	$0.46	0.66%	6.3%	1.5%	9.1%

Sources and Notes:
[1]: Workpaper #1 to Schedule No. BV-6.
[2]: Workpaper #2 to Schedule No. BV-6.
[3]: ([2] / [1]) x (1 + [5]).
[4]: Schedule No. BV-5, [6].
[5]: {(1 + [4]) ^ (1/4)} - 1.
[6]: {([3] + [5] + 1) ^ 4} - 1.

Schedule No. BV-6

DCF Cost of Equity of the Electric Sample

Panel B: Multi-Stage DCF (Using Blue Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company	Stock Price	Most Recent Dividend	Combined Long-Term Growth Rate	Growth Rate: Year 6	Growth Rate: Year 7	Growth Rate: Year 8	Growth Rate: Year 9	Growth Rate: Year 10	GDP Long-Term Growth Rate	DCF Cost of Equity
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
ALLETE	$70.17	$0.63	9.1%	8.3%	7.4%	6.5%	5.6%	4.8%	3.9%	9.1%
Alliant Energy	$55.87	$0.40	5.7%	5.4%	5.1%	4.8%	4.5%	4.2%	3.9%	7.3%
Amer. Elec. Power	$87.88	$0.74	6.2%	5.8%	5.5%	5.1%	4.7%	4.3%	3.9%	8.0%
Ameren Corp.	$83.87	$0.55	7.1%	6.6%	6.1%	5.5%	5.0%	4.4%	3.9%	7.3%
Avista Corp.	$46.86	$0.42	6.9%	6.4%	5.9%	5.4%	4.9%	4.4%	3.9%	8.5%
Black Hills	$69.50	$0.57	4.9%	4.7%	4.6%	4.4%	4.2%	4.1%	3.9%	7.6%
CMS Energy Corp.	$63.57	$0.44	7.2%	6.6%	6.1%	5.5%	5.0%	4.4%	3.9%	7.4%
CenterPoint Energy	$24.01	$0.16	-3.3%	-2.1%	-0.9%	0.3%	1.5%	2.7%	3.9%	5.6%
Consol. Edison	$77.18	$0.78	3.2%	3.4%	3.5%	3.6%	3.7%	3.8%	3.9%	8.0%
DTE Energy	$138.64	$1.09	6.2%	5.8%	5.4%	5.0%	4.7%	4.3%	3.9%	7.7%
Duke Energy	$99.64	$0.97	5.0%	4.8%	4.6%	4.4%	4.3%	4.1%	3.9%	8.3%
Edison Int'l	$60.04	$0.66	2.9%	3.1%	3.3%	3.4%	3.6%	3.7%	3.9%	8.3%
Entergy Corp.	$106.36	$0.95	5.6%	5.3%	5.0%	4.8%	4.5%	4.2%	3.9%	8.1%
Evergy Inc.	$63.07	$0.54	5.7%	5.4%	5.1%	4.8%	4.5%	4.2%	3.9%	7.9%
Eversource Energy	$87.86	$0.60	7.0%	6.5%	6.0%	5.4%	4.9%	4.4%	3.9%	7.4%
Exelon Corp.	$45.19	$0.38	4.9%	4.7%	4.6%	4.4%	4.2%	4.1%	3.9%	7.7%
IDACORP Inc.	$100.73	$0.71	3.3%	3.4%	3.5%	3.6%	3.7%	3.8%	3.9%	6.7%
MGE Energy	$74.12	$0.37	4.7%	4.6%	4.4%	4.3%	4.2%	4.0%	3.9%	6.1%
NextEra Energy	$78.59	$0.39	8.7%	7.9%	7.1%	6.3%	5.5%	4.7%	3.9%	6.7%
NorthWestern Corp.	$68.15	$0.62	4.3%	4.2%	4.2%	4.1%	4.0%	4.0%	3.9%	7.8%
OGE Energy	$33.15	$0.40	4.9%	4.7%	4.5%	4.4%	4.2%	4.1%	3.9%	9.3%
Otter Tail Corp.	$47.00	$0.39	8.2%	7.4%	6.7%	6.0%	5.3%	4.6%	3.9%	8.4%
Pinnacle West Capital	$83.83	$0.83	4.1%	4.1%	4.0%	4.0%	4.0%	3.9%	3.9%	8.1%
Public Serv. Enterprise	$62.78	$0.51	3.1%	3.2%	3.4%	3.5%	3.6%	3.8%	3.9%	7.1%
Sempra Energy	$136.72	$1.10	6.9%	6.4%	5.9%	5.4%	4.9%	4.4%	3.9%	8.0%
Southern Co.	$64.78	$0.64	6.3%	5.9%	5.5%	5.1%	4.7%	4.3%	3.9%	8.7%
Unitil Corp.	$51.39	$0.38	4.8%	4.7%	4.5%	4.4%	4.2%	4.1%	3.9%	7.2%
WEC Energy Group	$95.97	$0.68	6.3%	5.9%	5.5%	5.1%	4.7%	4.3%	3.9%	7.4%
Xcel Energy Inc.	$70.22	$0.46	6.3%	5.9%	5.5%	5.1%	4.7%	4.3%	3.9%	7.1%

Sources and Notes:

[1]: Workpaper #1 to Schedule No. BV-6.
[2]: Workpaper #2 to Schedule No. BV-6.
[3]: Schedule No. BV-5, [6].
[4]: [3] - {([3] - [9])/ 6}.
[5]: [4] - {([3] - [9])/ 6}.

[6]: [5] - {([3] - [9])/ 6}.
[7]: [6] - {([3] - [9])/ 6}.
[8]: [7] - {([3] - [9])/ 6}.
[9]: BlueChip Economic Indicators, March 2021 This number is assumed to beperpetual.
[10]: Workpaper #3 to Schedule No. BV-6.

Schedule No. BV-7

Overall After-Tax DCF Cost of Capital of the Electric Sample

Panel A: Simple DCF Method (Quarterly)

Company	1st Quarter, 2021 S&P Bond Rating	1st Quarter, 2021 Preferred Equity Rating	DCF Cost of Equity	DCF Common Equity to Market Value Ratio	Cost of Preferred Equity	DCF Preferred Equity to Market Value Ratio	DCF Cost of Debt	DCF Debt to Market Value Ratio	Portland General Electric's Representative Income Tax Rate	Overall Weighted After-Tax Cost of Capital
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
ALLETE	BBB	-	13.1%	0.63	-	0.00	3.7%	0.37	27.0%	9.3%
Alliant Energy	A	A	8.8%	0.62	3.4%	0.01	3.4%	0.37	27.0%	6.4%
Amer. Elec. Power	A	-	9.9%	0.51	-	0.00	3.4%	0.49	27.0%	6.2%
Ameren Corp.	BBB	-	10.0%	0.60	-	0.00	3.7%	0.40	27.0%	7.1%
Avista Corp.	BBB	-	10.8%	0.56	-	0.00	3.7%	0.44	27.0%	7.3%
Black Hills	BBB	-	8.4%	0.47	-	0.00	3.7%	0.53	27.0%	5.4%
CMS Energy Corp.	BBB	-	10.1%	0.51	-	0.00	3.7%	0.49	27.0%	6.5%
CenterPoint Energy	BBB	BBB	~~0.7%~~	0.40	3.7%	0.07	3.7%	0.53	27.0%	~~1.5%~~
Consol. Edison	A	-	7.5%	0.49	-	0.00	3.4%	0.51	27.0%	4.9%
DTE Energy	BBB	-	9.6%	0.58	-	0.00	3.7%	0.42	27.0%	6.7%
Duke Energy	A	A	9.1%	0.50	3.4%	0.01	3.4%	0.49	27.0%	5.8%
Edison Int'l	BBB	BBB	7.6%	0.42	3.7%	0.06	3.7%	0.52	27.0%	4.8%
Entergy Corp.	BBB	BBB	9.4%	0.44	3.7%	0.01	3.7%	0.56	27.0%	5.7%
Evergy Inc.	A	-	9.3%	0.54	-	0.00	3.4%	0.46	27.0%	6.2%
Eversource Energy	A	A	10.0%	0.61	3.4%	0.00	3.4%	0.39	27.0%	7.0%
Exelon Corp.	BBB	-	8.5%	0.49	-	0.00	3.7%	0.51	27.0%	5.6%
IDACORP Inc.	BBB	-	6.2%	0.67	-	0.00	3.7%	0.33	27.0%	5.1%
MGE Energy	AA	-	6.8%	0.80	-	0.00	3.2%	0.20	27.0%	5.9%
NextEra Energy	A	-	10.8%	0.73	-	0.00	3.4%	0.27	27.0%	8.5%
NorthWestern Corp.	BBB	-	8.1%	0.57	-	0.00	3.7%	0.43	27.0%	5.8%
OGE Energy	BBB	-	10.0%	0.54	-	0.00	3.7%	0.46	27.0%	6.7%
Otter Tail Corp.	BBB	-	11.8%	0.68	-	0.00	3.7%	0.32	27.0%	8.9%
Pinnacle West Capital	A	-	8.3%	0.53	-	0.00	3.4%	0.47	27.0%	5.6%
Public Serv. Enterprise	BBB	-	6.5%	0.61	-	0.00	3.7%	0.39	27.0%	5.0%
Sempra Energy	BBB	BBB	10.4%	0.59	3.7%	0.02	3.7%	0.39	27.0%	7.3%
Southern Co.	A	A	10.5%	0.53	3.4%	0.00	3.4%	0.47	27.0%	6.7%
Unitil Corp.	BBB	BBB	7.9%	0.55	3.7%	0.00	3.7%	0.45	27.0%	5.6%
WEC Energy Group	A	A	9.3%	0.66	3.4%	0.00	3.4%	0.34	27.0%	7.0%
Xcel Energy Inc.	A	-	9.1%	0.58	-	0.00	3.4%	0.42	27.0%	6.3%
Simple Electric Sample Average			9.2%	0.57	3.5%	0.00	3.6%	0.42	27.0%	6.4%

Sources and Notes:
[1]: Bloomberg as of March 31, 2021.
[2]: Preferred ratings were assumed equal to debt rating
[3]: Schedule No. BV-6; Panel A, [6].
[4]: Schedule No. BV-4, [1].
[5]: Workpaper #2 to Schedule No. BV-11, Panel C.
[6]: Schedule No. BV-4, [2].
[7]: Workpaper #2 to Schedule No. BV-11, Panel B.
[8]: Schedule No. BV-4, [3].
[9]: Provided by Portland General Electric.
[10]: ([3] x [4]) + ([5] x [6]) + {[7] x [8] x (1 - [9])}. A strikethrough indicates the utility was excluded from the full sample average calculation as a result of its cost of equity not exceeding its cost of debt by 150 basis points

Schedule No. BV-7

Overall After-Tax DCF Cost of Capital of the Electric Sample

Panel B: Multi-Stage DCF (Using Blue Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company	1st Quarter, 2021 S&P Bond Rating	1st Quarter, 2021 Preferred Equity Rating	DCF Cost of Equity	DCF Common Equity to Market Value Ratio	Cost of Preferred Equity	DCF Preferred Equity to Market Value Ratio	DCF Cost of Debt	DCF Debt to Market Value Ratio	Portland General Electric's Representative Income Tax Rate	Overall Weighted After-Tax Cost of Capital
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
ALLETE	BBB	-	9.1%	0.63	-	0.00	3.7%	0.37	27.0%	6.8%
Alliant Energy	A	A	7.3%	0.62	3.4%	0.01	3.4%	0.37	27.0%	5.5%
Amer. Elec. Power	A	-	8.0%	0.51	-	0.00	3.4%	0.49	27.0%	5.3%
Ameren Corp.	BBB	-	7.3%	0.60	-	0.00	3.7%	0.40	27.0%	5.5%
Avista Corp.	BBB	-	8.5%	0.56	-	0.00	3.7%	0.44	27.0%	5.9%
Black Hills	BBB	-	7.6%	0.47	-	0.00	3.7%	0.53	27.0%	5.0%
CMS Energy Corp.	BBB	-	7.4%	0.51	-	0.00	3.7%	0.49	27.0%	5.1%
CenterPoint Energy	BBB	BBB	5.6%	0.40	3.7%	0.07	3.7%	0.53	27.0%	3.9%
Consol. Edison	A	-	8.0%	0.49	-	0.00	3.4%	0.51	27.0%	5.1%
DTE Energy	BBB	-	7.7%	0.58	-	0.00	3.7%	0.42	27.0%	5.6%
Duke Energy	A	A	8.3%	0.50	3.4%	0.01	3.4%	0.49	27.0%	5.4%
Edison Int'l	BBB	BBB	8.3%	0.42	3.7%	0.06	3.7%	0.52	27.0%	5.1%
Entergy Corp.	BBB	BBB	8.1%	0.44	3.7%	0.01	3.7%	0.56	27.0%	5.1%
Evergy Inc.	A	-	7.9%	0.54	-	0.00	3.4%	0.46	27.0%	5.4%
Eversource Energy	A	A	7.4%	0.61	3.4%	0.00	3.4%	0.39	27.0%	5.5%
Exelon Corp.	BBB	-	7.7%	0.49	-	0.00	3.7%	0.51	27.0%	5.2%
IDACORP Inc.	BBB	-	6.7%	0.67	-	0.00	3.7%	0.33	27.0%	5.4%
MGE Energy	AA	-	6.1%	0.80	-	0.00	3.2%	0.20	27.0%	5.4%
NextEra Energy	A	-	6.7%	0.73	-	0.00	3.4%	0.27	27.0%	5.5%
NorthWestern Corp.	BBB	-	7.8%	0.57	-	0.00	3.7%	0.43	27.0%	5.6%
OGE Energy	BBB	-	9.3%	0.54	-	0.00	3.7%	0.46	27.0%	6.3%
Otter Tail Corp.	BBB	-	8.4%	0.68	-	0.00	3.7%	0.32	27.0%	6.6%
Pinnacle West Capital	A	-	8.1%	0.53	-	0.00	3.4%	0.47	27.0%	5.5%
Public Serv. Enterprise	BBB	-	7.1%	0.61	-	0.00	3.7%	0.39	27.0%	5.4%
Sempra Energy	BBB	BBB	8.0%	0.59	3.7%	0.02	3.7%	0.39	27.0%	5.8%
Southern Co.	A	A	8.7%	0.53	3.4%	0.00	3.4%	0.47	27.0%	5.8%
Unitil Corp.	BBB	BBB	7.2%	0.55	3.7%	0.00	3.7%	0.45	27.0%	5.2%
WEC Energy Group	A	A	7.4%	0.66	3.4%	0.00	3.4%	0.34	27.0%	5.7%
Xcel Energy Inc.	A	-	7.1%	0.58	-	0.00	3.4%	0.42	27.0%	5.1%
Multi-Stage Electric Sample Average			7.7%	0.57	3.5%	0.01	3.6%	0.43	27.0%	5.5%

Sources and Notes:

[1]: Bloomberg as of March 31, 2021.
[2]: Preferred ratings were assumed equal to debt rating
[3]: Schedule No. BV-6, Panel B, [10].
[4]: Schedule No. BV-4, [1].
[5]: Workpaper #2 to Schedule No. BV-11, Panel C.
[6]: Schedule No. BV-4, [2].
[7]: Workpaper #2 to Schedule No. BV-11, Panel B.
[8]: Schedule No. BV-4, [3].
[9]: Provided by Portland General Electric.
[10]: ([3] x [4]) + ([5] x [6]) + {[7] x [8] x (1 - [9])}. A strikethrough indicates the utility was excluded from the full sample average calculation as a result of its cost of equity not exceeding its cost of debt by 150 basis points

Schedule No. BV-8

DCF Cost of Equity at Portland General Electric's Proposed Capital Structure

Electric Sample

	Overall After - Tax Cost of Capital	Portland General Electric's Representative Regulatory % Debt	Representative Cost of BBB Rated Utility Debt	Portland General Electric's Representative Income Tax Rate	Portland General Electric's Representative Regulatory % Equity	Estimated Return on Equity
	[1]	[2]	[3]	[4]	[5]	[6]
Electric Sample						
Simple DCF Quarterly	6.4%	50.0%	3.7%	27.0%	50.0%	10.1%
Multi-Stage DCF - Using the Blue Chip Economic Indicator Long-Term GDP Growth Forecast as the Perpetual Rate	5.5%	50.0%	3.7%	27.0%	50.0%	8.2%

Sources and Notes:
[1]: Schedule No. BV-7; Panels A-B, [10].
[2]: Provided by Portland General Electric.
[3]: Based on a BBB rating. Yield from Bloomberg as of April 30, 2021.
[4]: Provided by Portland General Electric.
[5]: Provided by Portland General Electric.
[6]: {[1] - ([2] x [3] x (1 - [4]))} / [5].

Schedule No. BV-9 Risk-Free Rates

BCEI Forecast of 10 year U.S. Treasury Yield	**[a]**	**2.30%**
Long-run Average of 20 year U.S. Treasury Yield	[b]	5.01%
Long-run Average of 10 year U.S. Treasury Yield	[c]	4.53%
Maturity Premium	**[d] = [b] - [c]**	**0.50%**
Base Projection of 20 year U.S. Treasury Yield	**[e] = [a] + [d]**	**2.80%**

Sources and Notes:

[a]: Blue Chip Economic Indicators, May 2021 (for 2022) and March 2021 (for 2023 and 20
Average Projection for 2022, 2023 and 2024 Yield.

[b], [c]: Bloomberg as of 3/31/2021, see Workpaper #1 to Schedule No. BV-9.

Schedule No. BV-10

Risk Positioning Cost of Equity of the Electric Sample (Using Value Line Betas)

Panel A: Scenario 1 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%

Company	Long-Term Risk-Free Rate	Value Line Betas	Long-Term Market Risk Premium	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
ALLETE	2.80%	0.90	7.25%	9.3%	9.5%
Alliant Energy	2.80%	0.85	7.25%	9.0%	9.2%
Amer. Elec. Power	2.80%	0.75	7.25%	8.2%	8.6%
Ameren Corp.	2.80%	0.80	7.25%	8.6%	8.9%
Avista Corp.	2.80%	0.95	7.25%	9.7%	9.8%
Black Hills	2.80%	1.00	7.25%	10.1%	10.1%
CMS Energy Corp.	2.80%	0.75	7.25%	8.2%	8.6%
CenterPoint Energy	2.80%	1.15	7.25%	11.1%	10.9%
Consol. Edison	2.80%	0.75	7.25%	8.2%	8.6%
DTE Energy	2.80%	0.95	7.25%	9.7%	9.8%
Duke Energy	2.80%	0.85	7.25%	9.0%	9.2%
Edison Int'l	2.80%	0.95	7.25%	9.7%	9.8%
Entergy Corp.	2.80%	0.95	7.25%	9.7%	9.8%
Evergy Inc.	2.80%	0.95	7.25%	9.7%	9.8%
Eversource Energy	2.80%	0.90	7.25%	9.3%	9.5%
Exelon Corp.	2.80%	0.95	7.25%	9.7%	9.8%
IDACORP Inc.	2.80%	0.80	7.25%	8.6%	8.9%
MGE Energy	2.80%	0.70	7.25%	7.9%	8.3%
NextEra Energy	2.80%	0.90	7.25%	9.3%	9.5%
NorthWestern Corp.	2.80%	0.95	7.25%	9.7%	9.8%
OGE Energy	2.80%	1.05	7.25%	10.4%	10.3%
Otter Tail Corp.	2.80%	0.85	7.25%	9.0%	9.2%
Pinnacle West Capital	2.80%	0.90	7.25%	9.3%	9.5%
Public Serv. Enterprise	2.80%	0.90	7.25%	9.3%	9.5%
Sempra Energy	2.80%	0.95	7.25%	9.7%	9.8%
Southern Co.	2.80%	0.95	7.25%	9.7%	9.8%
Unitil Corp.	2.80%	0.85	7.25%	9.0%	9.2%
WEC Energy Group	2.80%	0.80	7.25%	8.6%	8.9%
Xcel Energy Inc.	2.80%	0.80	7.25%	8.6%	8.9%

Sources and Notes:

[1], [3]: Villadsen Direct Testimony.

[2]: From Valueline Investment Analyzer as of April 30, 2021.

[4]: [1] + ([2] x [3]).

[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-10

Risk Positioning Cost of Equity of the Electric Sample (Using Value Line Betas)

Panel B: Scenario 2 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%

Company	Long-Term Risk-Free Rate	Value Line Betas	Long-Term Market Risk Premium	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
ALLETE	2.80%	0.90	8.00%	10.0%	10.2%
Alliant Energy	2.80%	0.85	8.00%	9.6%	9.8%
Amer. Elec. Power	2.80%	0.75	8.00%	8.8%	9.2%
Ameren Corp.	2.80%	0.80	8.00%	9.2%	9.5%
Avista Corp.	2.80%	0.95	8.00%	10.4%	10.5%
Black Hills	2.80%	1.00	8.00%	10.8%	10.8%
CMS Energy Corp.	2.80%	0.75	8.00%	8.8%	9.2%
CenterPoint Energy	2.80%	1.15	8.00%	12.0%	11.8%
Consol. Edison	2.80%	0.75	8.00%	8.8%	9.2%
DTE Energy	2.80%	0.95	8.00%	10.4%	10.5%
Duke Energy	2.80%	0.85	8.00%	9.6%	9.8%
Edison Int'l	2.80%	0.95	8.00%	10.4%	10.5%
Entergy Corp.	2.80%	0.95	8.00%	10.4%	10.5%
Evergy Inc.	2.80%	0.95	8.00%	10.4%	10.5%
Eversource Energy	2.80%	0.90	8.00%	10.0%	10.2%
Exelon Corp.	2.80%	0.95	8.00%	10.4%	10.5%
IDACORP Inc.	2.80%	0.80	8.00%	9.2%	9.5%
MGE Energy	2.80%	0.70	8.00%	8.4%	8.9%
NextEra Energy	2.80%	0.90	8.00%	10.0%	10.2%
NorthWestern Corp.	2.80%	0.95	8.00%	10.4%	10.5%
OGE Energy	2.80%	1.05	8.00%	11.2%	11.1%
Otter Tail Corp.	2.80%	0.85	8.00%	9.6%	9.8%
Pinnacle West Capital	2.80%	0.90	8.00%	10.0%	10.2%
Public Serv. Enterprise	2.80%	0.90	8.00%	10.0%	10.2%
Sempra Energy	2.80%	0.95	8.00%	10.4%	10.5%
Southern Co.	2.80%	0.95	8.00%	10.4%	10.5%
Unitil Corp.	2.80%	0.85	8.00%	9.6%	9.8%
WEC Energy Group	2.80%	0.80	8.00%	9.2%	9.5%
Xcel Energy Inc.	2.80%	0.80	8.00%	9.2%	9.5%

Sources and Notes:

[1], [3]: Villadsen Direct Testimony.

[2]: From Valueline Investment Analyzer as of April 30, 2021.

[4]: [1] + ([2] x [3]).

[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-11

Overall After-Tax Risk Positioning Cost of Capital of the Electric Sample (Using Value Line Betas)

Panel A: CAPM Cost of Equity Scenario 1 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%

Company	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity	5-Year Average Common Equity to Market Value Ratio	Weighted - Average Cost of Preferred Equity	5-Year Average Preferred Equity to Market Value Ratio	Weighted-Average Cost of Debt	5-Year Average Debt to Market Value Ratio	Electric's Representative Income Tax Rate	Overall After-Tax Cost of Capital (CAPM)	Overall After-Tax Cost of Capital (ECAPM 1.5%)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
ALLETE	9.3%	9.5%	0.68	-	0.00	3.7%	0.26	27.0%	7.0%	7.1%
Alliant Energy	9.0%	9.2%	0.61	3.4%	0.01	3.4%	0.37	27.0%	6.5%	6.6%
Amer. Elec. Power	8.2%	8.6%	0.55	-	0.00	3.4%	0.45	27.0%	5.7%	5.9%
Ameren Corp.	8.6%	8.9%	0.61	-	0.00	3.7%	0.39	27.0%	6.3%	6.5%
Avista Corp.	9.7%	9.8%	0.57	-	0.00	3.7%	0.43	27.0%	6.7%	6.8%
Black Hills	10.1%	10.1%	0.50	-	0.00	3.7%	0.50	27.0%	6.4%	6.4%
CMS Energy Corp.	8.2%	8.6%	0.53	-	0.00	3.7%	0.47	27.0%	5.7%	5.8%
CenterPoint Energy	11.1%	10.9%	0.46	3.7%	0.04	3.5%	0.50	27.0%	6.6%	6.5%
Consol. Edison	8.2%	8.6%	0.54	-	0.00	3.4%	0.46	27.0%	5.6%	5.8%
DTE Energy	9.7%	9.8%	0.57	-	0.00	3.7%	0.43	27.0%	6.7%	6.7%
Duke Energy	9.0%	9.2%	0.50	3.4%	0.01	3.4%	0.50	27.0%	5.7%	5.8%
Edison Int'l	9.7%	9.8%	0.50	3.7%	0.05	3.7%	0.44	27.0%	6.3%	6.3%
Entergy Corp.	9.7%	9.8%	0.46	3.7%	0.01	3.7%	0.53	27.0%	5.9%	6.0%
Evergy Inc.	9.7%	9.8%	0.55	-	0.00	3.4%	0.45	27.0%	6.4%	6.5%
Eversource Energy	9.3%	9.5%	0.61	3.4%	0.00	3.4%	0.39	27.0%	6.6%	6.7%
Exelon Corp.	9.7%	9.8%	0.49	-	0.00	3.7%	0.51	27.0%	6.2%	6.2%
IDACORP Inc.	8.6%	8.9%	0.69	-	0.00	3.7%	0.31	27.0%	6.8%	7.0%
MGE Energy	7.9%	8.3%	0.81	-	0.00	3.2%	0.19	27.0%	6.8%	7.2%
NextEra Energy	9.3%	9.5%	0.42	-	0.00	3.4%	0.58	27.0%	5.3%	5.4%
NorthWestern Corp.	9.7%	9.8%	0.58	-	0.00	3.7%	0.42	27.0%	6.8%	6.8%
OGE Energy	10.4%	10.3%	0.63	-	0.00	3.6%	0.37	27.0%	7.6%	7.5%
Otter Tail Corp.	9.0%	9.2%	0.71	-	0.00	3.7%	0.29	27.0%	7.2%	7.3%
Pinnacle West Capital	9.3%	9.5%	0.60	-	0.00	3.4%	0.40	27.0%	6.6%	6.7%
Public Serv. Enterprise	9.3%	9.5%	0.62	-	0.00	3.7%	0.38	27.0%	6.8%	6.9%
Sempra Energy	9.7%	9.8%	0.55	3.7%	0.02	3.7%	0.43	27.0%	6.5%	6.6%
Southern Co.	9.7%	9.8%	0.51	3.4%	0.00	3.4%	0.49	27.0%	6.1%	6.2%
Unitil Corp.	9.0%	9.2%	0.59	3.7%	0.00	3.7%	0.41	27.0%	6.4%	6.5%
WEC Energy Group	8.6%	8.9%	0.66	3.4%	0.00	3.4%	0.34	27.0%	6.5%	6.7%
Xcel Energy Inc.	8.6%	8.9%	0.57	-	0.00	3.4%	0.43	27.0%	6.0%	6.2%
Electric Sample Average	9.3%	9.4%	0.57	3.5%	0.01	3.6%	0.42	27.0%	6.4%	6.5%

Sources and Notes:
[1]: Schedule No. BV-10; Panel A, [4].
[2]: Schedule No. BV-10; Panel A, [5].
[3]: Schedule No. BV-4, [4].
[4]: Workpaper #2 to Schedule No. BV-11, Panel C.
[5]: Schedule No. BV-4, [5].
[6]: Workpaper #2 to Schedule No. BV-11, Panel B.
[7]: Schedule No. BV-4, [6].
[8]: Provided by Portland General Electric.
[9] = [1] x [3] + [4] x [5] + [6] x [7] x (1 - [8])
[10] = [2] x [3] + [4] x [5] + [6] x [7] x (1 - [8])

Schedule No. BV-11

Overall After-Tax Risk Positioning Cost of Capital of the Electric Sample (Using Value Line Betas)

Panel B: CAPM Cost of Equity Scenario 2 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%

Company	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity	5-Year Average Common Equity to Market Value Ratio	Weighted - Average Cost of Preferred Equity	5-Year Average Preferred Equity to Market Value Ratio	Weighted-Average Cost of Debt	5-Year Average Debt to Market Value Ratio	Electric's Representative Income Tax Rate	Overall After-Tax Cost of Capital (CAPM)	Overall After-Tax Cost of Capital (ECAPM 1.5%)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Company	capmlt	ecapmlt2	capm_equity_ratio	average	capm_pref_ratio	average	capm_debt_ratio		CAPM	ECAPM2
ALLETE	10.0%	10.2%	0.68	-	0.00	3.7%	0.26	27.0%	7.5%	7.6%
Alliant Energy	9.6%	9.8%	0.61	3.4%	0.01	3.4%	0.37	27.0%	6.9%	7.0%
Amer. Elec. Power	8.8%	9.2%	0.55	-	0.00	3.4%	0.45	27.0%	6.0%	6.2%
Ameren Corp.	9.2%	9.5%	0.61	-	0.00	3.7%	0.39	27.0%	6.7%	6.9%
Avista Corp.	10.4%	10.5%	0.57	-	0.00	3.7%	0.43	27.0%	7.1%	7.2%
Black Hills	10.8%	10.8%	0.50	-	0.00	3.7%	0.50	27.0%	6.8%	6.8%
CMS Energy Corp.	8.8%	9.2%	0.53	-	0.00	3.7%	0.47	27.0%	5.9%	6.1%
CenterPoint Energy	12.0%	11.8%	0.46	3.7%	0.04	3.5%	0.50	27.0%	7.0%	6.9%
Consol. Edison	8.8%	9.2%	0.54	-	0.00	3.4%	0.46	27.0%	5.9%	6.1%
DTE Energy	10.4%	10.5%	0.57	-	0.00	3.7%	0.43	27.0%	7.1%	7.1%
Duke Energy	9.6%	9.8%	0.50	3.4%	0.01	3.4%	0.50	27.0%	6.0%	6.1%
Edison Int'l	10.4%	10.5%	0.50	3.7%	0.05	3.7%	0.44	27.0%	6.6%	6.7%
Entergy Corp.	10.4%	10.5%	0.46	3.7%	0.01	3.7%	0.53	27.0%	6.3%	6.3%
Evergy Inc.	10.4%	10.5%	0.55	-	0.00	3.4%	0.45	27.0%	6.8%	6.9%
Eversource Energy	10.0%	10.2%	0.61	3.4%	0.00	3.4%	0.39	27.0%	7.0%	7.1%
Exelon Corp.	10.4%	10.5%	0.49	-	0.00	3.7%	0.51	27.0%	6.5%	6.5%
IDACORP Inc.	9.2%	9.5%	0.69	-	0.00	3.7%	0.31	27.0%	7.2%	7.4%
MGE Energy	8.4%	8.9%	0.81	-	0.00	3.2%	0.19	27.0%	7.2%	7.6%
NextEra Energy	10.0%	10.2%	0.42	-	0.00	3.4%	0.58	27.0%	5.6%	5.7%
NorthWestern Corp.	10.4%	10.5%	0.58	-	0.00	3.7%	0.42	27.0%	7.2%	7.2%
OGE Energy	11.2%	11.1%	0.63	-	0.00	3.6%	0.37	27.0%	8.1%	8.0%
Otter Tail Corp.	9.6%	9.8%	0.71	-	0.00	3.7%	0.29	27.0%	7.6%	7.8%
Pinnacle West Capital	10.0%	10.2%	0.60	-	0.00	3.4%	0.40	27.0%	7.0%	7.1%
Public Serv. Enterprise	10.0%	10.2%	0.62	-	0.00	3.7%	0.38	27.0%	7.2%	7.3%
Sempra Energy	10.4%	10.5%	0.55	3.7%	0.02	3.7%	0.43	27.0%	6.9%	7.0%
Southern Co.	10.4%	10.5%	0.51	3.4%	0.00	3.4%	0.49	27.0%	6.5%	6.5%
Unitil Corp.	9.6%	9.8%	0.59	3.7%	0.00	3.7%	0.41	27.0%	6.8%	6.9%
WEC Energy Group	9.2%	9.5%	0.66	3.4%	0.00	3.4%	0.34	27.0%	6.9%	7.1%
Xcel Energy Inc.	9.2%	9.5%	0.57	-	0.00	3.4%	0.43	27.0%	6.3%	6.5%
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	27.0%	n/a	n/a
Electric Sample Average	9.9%	10.1%	0.57	3.5%	0.01	3.6%	0.42	27.0%	6.8%	6.9%

Sources and Notes:
[1]: Schedule No. BV-10; Panel B, [4].
[2]: Schedule No. BV-10; Panel B, [5].
[3]: Schedule No. BV-4, [4].
[4]: Workpaper #2 to Schedule No. BV-11, Panel C.
[5]: Schedule No. BV-4, [5].
[6]: Workpaper #2 to Schedule No. BV-11, Panel B.
[7]: Schedule No. BV-4, [6].
[8]: Provided by Portland General Electric.
[9] = [1] x [3] + [4] x [5] + [6] x [7] x (1 - [8])
[10] = [2] x [3] + [4] x [5] + [6] x [7] x (1 - [8])

Schedule No. BV-12

Risk Positioning Cost of Equity at Portland General Electric's Proposed Capital Structure

Electric Sample

Using Value Line Betas

	Overall After-Tax Cost of Capital (Scenario 1)	Overall After-Tax Cost of Capital (Scenario 2)	Portland General Electric's Representative Regulatory % Debt	Representative Cost of BBB-Rated Utility Debt	Portland General Electric's Representative Income Tax Rate	Portland General Electric's Representative Regulatory % Equity	Estimated Return on Equity (Scenario 1)	Estimated Return on Equity (Scenario 2)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Electric Sample								
CAPM using Value Line Betas	6.4%	6.8%	50.0%	3.7%	27.0%	50.0%	10.1%	10.8%
ECAPM (1.50%) using Value Line Betas	6.5%	6.9%	50.0%	3.7%	27.0%	50.0%	10.3%	11.0%

Sources and Notes:

[1]: Schedule No. BV-11; Panel A, [9] - [10].   Scenario 1: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%.
[2]: Schedule No. BV-11; Panel B, [9] - [10].   Scenario 2: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%.
[3]: Provided by Portland General Electric.
[4]: Based on a BBB rating. Yield from Bloomberg as of April 30, 2021.
[5]: Provided by Portland General Electric.
[6]: Provided by Portland General Electric.
[7]: {[1] - ([3] x [4] x (1 - [5])}/ [6]
[8]: {[2] - ([3] x [4] x (1 - [5]))}/ [6]

Schedule No. BV-13

Hamada Adjustment to Obtain Unlevered Asset Beta

Company		Value Line Betas	Debt Beta	5-Year Average Common Equity to Market Value Ratio	5-Year Average Preferred Equity to Market Value Ratio	5-Year Average Debt to Market Value Ratio	Portland General Electric's Representative Income Tax Rate	Asset Beta: Without Taxes	Asset Beta: With Taxes
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
ALLETE	*	0.90	0.10	0.68	0.00	0.26	27.0%	0.64	0.73
Alliant Energy	*	0.85	0.05	0.61	0.01	0.37	27.0%	0.54	0.60
Amer. Elec. Power	*	0.75	0.06	0.55	0.00	0.45	27.0%	0.44	0.49
Ameren Corp.	*	0.80	0.10	0.61	0.00	0.39	27.0%	0.53	0.58
Avista Corp.	*	0.95	0.10	0.57	0.00	0.43	27.0%	0.59	0.65
Black Hills	*	1.00	0.10	0.50	0.00	0.50	27.0%	0.55	0.62
CMS Energy Corp.	*	0.75	0.10	0.53	0.00	0.47	27.0%	0.44	0.49
CenterPoint Energy	*	1.15	0.08	0.46	0.04	0.50	27.0%	0.57	0.65
Consol. Edison	*	0.75	0.05	0.54	0.00	0.46	27.0%	0.43	0.48
DTE Energy	*	0.95	0.10	0.57	0.00	0.43	27.0%	0.58	0.65
Duke Energy	*	0.85	0.05	0.50	0.01	0.50	27.0%	0.45	0.51
Edison Int'l	*	0.95	0.10	0.50	0.05	0.44	27.0%	0.53	0.58
Entergy Corp.	*	0.95	0.10	0.46	0.01	0.53	27.0%	0.49	0.56
Evergy Inc.	*	0.95	0.05	0.55	0.00	0.45	27.0%	0.55	0.62
Eversource Energy	*	0.90	0.05	0.61	0.00	0.39	27.0%	0.56	0.63
Exelon Corp.	*	0.95	0.10	0.49	0.00	0.51	27.0%	0.52	0.59
IDACORP Inc.	*	0.80	0.10	0.69	0.00	0.31	27.0%	0.58	0.62
MGE Energy	*	0.70	0.05	0.81	0.00	0.19	27.0%	0.57	0.60
NextEra Energy	*	0.90	0.05	0.42	0.00	0.58	27.0%	0.41	0.47
NorthWestern Corp.	*	0.95	0.10	0.58	0.00	0.42	27.0%	0.60	0.66
OGE Energy	*	1.05	0.08	0.63	0.00	0.37	27.0%	0.69	0.76
Otter Tail Corp.	*	0.85	0.10	0.71	0.00	0.29	27.0%	0.63	0.68
Pinnacle West Capital	*	0.90	0.05	0.60	0.00	0.40	27.0%	0.56	0.62
Public Serv. Enterprise	*	0.90	0.10	0.62	0.00	0.38	27.0%	0.59	0.65
Sempra Energy	*	0.95	0.10	0.55	0.02	0.43	27.0%	0.56	0.62
Southern Co.	*	0.95	0.05	0.51	0.00	0.49	27.0%	0.51	0.58
Unitil Corp.	*	0.85	0.10	0.59	0.00	0.41	27.0%	0.54	0.60
WEC Energy Group	*	0.80	0.05	0.66	0.00	0.34	27.0%	0.55	0.60
Xcel Energy Inc.	*	0.80	0.05	0.57	0.00	0.43	27.0%	0.48	0.54
Electric Sample Average		0.89	0.08	0.57	0.01	0.42	0.27	0.54	0.60

Sources and Notes:

[1]: Workpaper # 1 to Schedule No. BV-10, [1].

[2]: Workpaper #1 to Schedule No. BV-13, [7].

[3]: Schedule No. BV-4, [4].

[4]: Schedule No. BV-4, [5].

[5]: Schedule No. BV-4, [6].

[6]: Portland General Electric's Representative Tax Rate.

[7]: [1]*[3] + [2]*([4] + [5]).

[8]: {[1]*[3] + [2]*([4]+[5]*(1-[6]))} / {[3] + [4] + [5]*(1 -[6])}.

Schedule No. BV-14

Electric Sample Average Asset Beta Relevered at Portland General Electric's Proposed Capital Structure

	Asset Beta	Assumed Debt Beta	Portland General Electric's Representative Regulatory % Debt	Portland General Electric's Representative Income Tax Rate	Portland General Electric's Representative Regulatory % Equity	Estimated Equity Beta
	[1]	[2]	[3]	[4]	[5]	[6]
Electric Sample						
Asset Beta Without Taxes	0.54	0.10	50.0%	27.0%	50.0%	0.98
Asset Beta With Taxes	0.60	0.10	50.0%	27.0%	50.0%	0.97

Sources and Notes:

[1]: Schedule No. BV-13, [7] - [8].

[2]: Villadsen Testimony.

[3]: Provided by Portland General Electric.

[4]: Portland General Electric's Representative Tax Rate.

[5]: Provided by Portland General Electric.

[6]: [1] + [3]/[5]*([1] - [2]) without taxes, [1] + [3]*(1 - [4])/[5]*([1] - [2]) with taxes.

Schedule No. BV-15

Risk-Positioning Cost of Equity using Hamada-Adjusted Betas

Panel A: Scenario 1 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%

Company	Long-Term Risk-Free Rate	Hamada Adjusted Equity Betas	Long-Term Market Risk	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
Electric Sample					
Asset Beta Without Taxes	2.80%	0.98	7.25%	9.9%	9.9%
Asset Beta With Taxes	2.80%	0.97	7.25%	9.8%	9.9%

Sources and Notes:

[1]: Villadsen Direct Testimony.

[2]: Schedule No. BV-14, [6].

[3]: Villadsen Direct Testimony.

[4]: [1] + ([2] x [3]).

[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-15

Risk-Positioning Cost of Equity using Hamada-Adjusted Betas

Panel B: Scenario 2 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%

Company	Long-Term Risk-Free Rate	Hamada Adjusted Equity Betas	Long-Term Market Risk	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
Electric Sample					
Asset Beta Without Taxes	2.80%	0.98	8.00%	10.7%	10.7%
Asset Beta With Taxes	2.80%	0.97	8.00%	10.5%	10.6%

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Schedule No. BV-14, [6].
[3]: Villadsen Direct Testimony.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-16
Risk Premiums Determined by Relationship Between
Authorized ROEs[1] and Long-term Treasury Bond Rates
During the Period 1990 - 2021
Includes Utility Yield Spread Adjustment
Electric Utilities

Risk Premium = A_0 + (A_1 x Treasury Bond Rate)

R Squared	0.859
Estimate of Intercept (A_0)	8.53%
Estimate of Slope (A_1)	-0.552

Predicted Risk Premium		Exp. Treasury Bond Rate		Est. Cost of Equity for All Electric Utilities
7.03%	+	2.73%	=	9.8%

Sources and Notes:

[1]: Authorized ROE Data from S&P Market Intelligence as of 02/28/2021.

[2]: March 2021 Blue Chip consensus forecast for 2022-24 10 year T-bill yield + maturity premium between 10 year and 20 year U.S. Government bonds + utility yield spread adjustment.

See Regression Results for derivation of regression coefficients A_0 and A_1

Regression Results

Electric Utilities

	Slope	Intercept
Coefficient	-0.552	0.085
Standard Error	0.020	0.001
R Squared	0.859	-

Note: Estimated by regressing Risk Premium on 20 year
Treasury Bond Yield.

Quarterly Risk Premiums for Electric Utilities

1990 - 2021

Quarter	Average Authorized Return on Equity	20 year Treasury Bond Yield	Risk Premium
	[1]	[2]	[3] = [1] - [2]
1990 Q1	12.62%	8.44%	4.19%
1990 Q2	12.85%	8.66%	4.19%
1990 Q3	12.54%	8.75%	3.79%
1990 Q4	12.68%	8.47%	4.21%
1991 Q1	12.66%	8.11%	4.55%
1991 Q2	12.67%	8.23%	4.44%
1991 Q3	12.49%	8.07%	4.43%
1991 Q4	12.42%	7.60%	4.83%
1992 Q1	12.38%	7.55%	4.83%
1992 Q2	11.83%	7.64%	4.18%
1992 Q3	12.03%	7.04%	4.99%
1992 Q4	12.14%	7.14%	5.00%
1993 Q1	11.84%	6.68%	5.15%
1993 Q2	11.64%	6.43%	5.21%
1993 Q3	11.15%	5.97%	5.18%
1993 Q4	11.04%	6.28%	4.76%
1994 Q1	11.07%	6.65%	4.41%
1994 Q2	11.13%	7.48%	3.65%
1994 Q3	12.75%	7.72%	5.03%
1994 Q4	11.24%	8.09%	3.15%
1995 Q1	11.96%	7.76%	4.20%
1995 Q2	11.32%	7.02%	4.30%
1995 Q3	11.37%	6.77%	4.60%
1995 Q4	11.58%	6.30%	5.28%
1996 Q1	11.46%	6.38%	5.08%
1996 Q2	11.46%	7.10%	4.36%
1996 Q3	10.70%	7.09%	3.61%
1996 Q4	11.56%	6.71%	4.85%
1997 Q1	11.08%	6.91%	4.17%
1997 Q2	11.62%	7.02%	4.60%
1997 Q3	12.00%	6.59%	5.41%
1997 Q4	11.06%	6.22%	4.84%
1998 Q1	11.31%	5.95%	5.36%
1998 Q2	12.20%	5.94%	6.26%
1998 Q3	11.65%	5.61%	6.04%
1998 Q4	12.30%	5.38%	6.92%
1999 Q1	10.40%	5.66%	4.74%
1999 Q2	10.94%	6.09%	4.85%
1999 Q3	10.75%	6.40%	4.35%
1999 Q4	11.10%	6.61%	4.49%

Quarterly Risk Premiums for Electric Utilities

1990 - 2021

Quarter	Average Authorized Return on Equity	20 year Treasury Bond Yield	Risk Premium
	[1]	[2]	[3] = [1] - [2]
2000 Q1	11.21%	6.59%	4.62%
2000 Q2	11.00%	6.34%	4.66%
2000 Q3	11.68%	6.10%	5.58%
2000 Q4	12.50%	5.89%	6.61%
2001 Q1	11.38%	5.59%	5.79%
2001 Q2	10.88%	5.84%	5.04%
2001 Q3	10.76%	5.62%	5.14%
2001 Q4	11.57%	5.48%	6.09%
2002 Q1	10.05%	5.74%	4.31%
2002 Q2	11.41%	5.77%	5.64%
2002 Q3	11.25%	5.19%	6.06%
2002 Q4	11.57%	5.02%	6.55%
2003 Q1	11.43%	4.90%	6.52%
2003 Q2	11.16%	4.59%	6.57%
2003 Q3	9.88%	5.17%	4.70%
2003 Q4	11.09%	5.16%	5.93%
2004 Q1	11.00%	4.89%	6.11%
2004 Q2	10.64%	5.36%	5.28%
2004 Q3	10.75%	5.07%	5.68%
2004 Q4	10.91%	4.87%	6.04%
2005 Q1	10.56%	4.76%	5.80%
2005 Q2	10.13%	4.55%	5.57%
2005 Q3	10.85%	4.51%	6.34%
2005 Q4	10.59%	4.77%	5.83%
2006 Q1	10.38%	4.76%	5.62%
2006 Q2	10.63%	5.29%	5.34%
2006 Q3	10.06%	5.09%	4.98%
2006 Q4	10.39%	4.83%	5.55%
2007 Q1	10.39%	4.90%	5.49%
2007 Q2	10.27%	5.07%	5.19%
2007 Q3	10.02%	5.01%	5.01%
2007 Q4	10.39%	4.65%	5.74%
2008 Q1	10.15%	4.40%	5.75%
2008 Q2	10.54%	4.59%	5.94%
2008 Q3	10.38%	4.49%	5.89%
2008 Q4	10.39%	3.97%	6.42%
2009 Q1	10.45%	3.69%	6.76%
2009 Q2	10.58%	4.19%	6.39%
2009 Q3	10.41%	4.28%	6.12%
2009 Q4	10.54%	4.27%	6.28%
2010 Q1	10.45%	4.49%	5.96%
2010 Q2	10.08%	4.20%	5.88%
2010 Q3	10.29%	3.60%	6.69%
2010 Q4	10.34%	3.84%	6.50%
2011 Q1	9.96%	4.32%	5.64%
2011 Q2	10.12%	4.07%	6.05%
2011 Q3	10.36%	3.34%	7.02%
2011 Q4	10.34%	2.75%	7.59%
2012 Q1	10.30%	2.80%	7.51%

Quarterly Risk Premiums for Electric Utilities

1990 - 2021

Quarter	Average Authorized Return on Equity	20 year Treasury Bond Yield	Risk Premium
	[1]	[2]	[3] = [1] - [2]
2012 Q2	9.92%	2.55%	7.36%
2012 Q3	9.78%	2.37%	7.41%
2012 Q4	10.05%	2.46%	7.59%
2013 Q1	9.74%	2.75%	6.99%
2013 Q2	9.84%	2.78%	7.06%
2013 Q3	9.83%	3.44%	6.39%
2013 Q4	9.82%	3.50%	6.32%
2014 Q1	9.57%	3.42%	6.16%
2014 Q2	9.83%	3.18%	6.65%
2014 Q3	9.77%	3.01%	6.76%
2014 Q4	9.78%	2.69%	7.08%
2015 Q1	9.66%	2.32%	7.34%
2015 Q2	9.51%	2.62%	6.89%
2015 Q3	9.47%	2.65%	6.82%
2015 Q4	9.65%	2.60%	7.05%
2016 Q1	9.70%	2.32%	7.38%
2016 Q2	9.41%	2.15%	7.26%
2016 Q3	9.76%	1.91%	7.85%
2016 Q4	9.55%	2.52%	7.04%
2017 Q1	9.61%	2.78%	6.83%
2017 Q2	9.61%	2.64%	6.97%
2017 Q3	9.73%	2.58%	7.15%
2017 Q4	9.74%	2.62%	7.12%
2018 Q1	9.59%	2.91%	6.68%
2018 Q2	9.57%	3.00%	6.58%
2018 Q3	9.66%	3.00%	6.66%
2018 Q4	9.44%	3.17%	6.27%
2019 Q1	9.57%	2.85%	6.71%
2019 Q2	9.58%	2.58%	6.99%
2019 Q3	9.57%	2.08%	7.49%
2019 Q4	9.74%	2.10%	7.65%
2020 Q1	9.45%	1.71%	7.74%
2020 Q2	9.52%	1.15%	8.37%
2020 Q3	9.34%	1.15%	8.20%
2020 Q4	9.32%	1.40%	7.91%
2021 Q1	9.30%	1.76%	7.55%

Sources:

[1]: S&P Markte Intelligence as of 02/28/2021.

[2]: Bloomberg as of 2/28/2020.

Schedule No. BV-1

Table of Contents

Schedule No. BV-2

Sample

Classification of Companies by Assets

Company	Company Category
Amer. States Water	R
Amer. Water Works	R
Artesian Res Corp	R
Atmos Energy	R
California Water	R
Chesapeake Utilities	R
Essential Utilities	R
Global Water Resources Inc	R
Middlesex Water	R
New Jersey Resources	MR
NiSource Inc.	R
Northwest Natural	R
ONE Gas Inc.	R
SJW Group	R
South Jersey Inds.	R
Southwest Gas	R
Spire Inc.	R
York Water Co. (The)	R

Sources and Notes:

Calculations based on EEI definitions and Company 10K filings:

  R = Regulated (greater than 80 percent of total assets are regulated).

  MR = Mostly Regulated (Less than 80 percent of total assets are regulated).

Schedule No. BV-3

Market Value of the Sample

Panel A: Amer. States Water

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$642	$642	$602	$558	$530	$494	$466	[a]
Shares Outstanding (in millions) - Common	37	37	37	37	37	37	37	[b]
Price per Share - Common	$74	$78	$87	$67	$56	$45	$42	[c]
Market Value of Common Equity	$2,722	$2,874	$3,189	$2,466	$2,055	$1,662	$1,533	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$2,722	$2,874	$3,189	$2,466	$2,055	$1,662	$1,533	[f]= [d] + [e]
Market to Book Value of Common Equity	4.24	4.48	5.30	4.42	3.88	3.36	3.29	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$157	$157	$122	$131	$155	$167	$133	[j]
Current Liabilities	$119	$119	$116	$147	$157	$178	$124	[k]
Current Portion of Long-Term Debt	$2	$2	$2	$40	$0	$0	$0	[l]
Net Working Capital	$41	$41	$9	$25	($1)	($11)	$10	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$5	$0	$59	$90	$28	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$1	$11	$0	[o] = See Sources and Notes.
Long-Term Debt	$584	$584	$493	$377	$321	$321	$321	[p]
Book Value of Long-Term Debt	$587	$587	$495	$417	$322	$332	$321	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$560	$560	$376	$388	$424	$424	$404	
Carrying Amount	$444	$444	$285	$325	$325	$326	$326	
Adjustment to Book Value of Long-Term Debt	$115	$115	$91	$63	$99	$98	$78	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$702	$702	$586	$480	$421	$430	$399	[s] = [q] + [r].
Market Value of Debt	$702	$702	$586	$480	$421	$430	$399	[t] = [s].
MARKET VALUE OF FIRM								
	$3,424	$3,576	$3,775	$2,946	$2,476	$2,091	$1,933	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	79.50%	80.37%	84.48%	83.71%	83.00%	79.44%	79.34%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	20.50%	19.63%	15.52%	16.29%	17.00%	20.56%	20.66%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
　Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
　(1): 0 if [m] > 0.
　(2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
　(3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel B: Amer. Water Works

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$6,454	$6,454	$6,121	$5,864	$5,385	$5,218	$5,049	[a]
Shares Outstanding (in millions) - Common	181	181	181	181	178	178	178	[b]
Price per Share - Common	$143	$150	$121	$93	$91	$73	$59	[c]
Market Value of Common Equity	$25,862	$27,177	$21,963	$16,789	$16,150	$12,972	$10,497	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$25,862	$27,177	$21,963	$16,789	$16,150	$12,972	$10,497	[f]= [d] + [e]
Market to Book Value of Common Equity	4.01	4.21	3.59	2.86	3.00	2.49	2.08	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,906	$1,906	$1,285	$781	$720	$784	$657	[j]
Current Liabilities	$2,881	$2,881	$2,045	$2,094	$2,325	$2,392	$1,533	[k]
Current Portion of Long-Term Debt	$342	$342	$42	$71	$322	$574	$54	[l]
Net Working Capital	($633)	($633)	($718)	($1,242)	($1,283)	($1,034)	($822)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,282	$1,282	$786	$964	$905	$849	$628	[n]
Adjusted Short-Term Debt	$633	$633	$718	$964	$905	$849	$628	[o] = See Sources and Notes.
Long-Term Debt	$9,414	$9,414	$8,733	$7,576	$6,498	$5,760	$5,874	[p]
Book Value of Long-Term Debt	$10,389	$10,389	$9,493	$8,611	$7,725	$7,183	$6,556	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$11,807	$11,807	$9,770	$7,921	$7,643	$7,044	$6,757	
Carrying Amount	$9,656	$9,656	$8,664	$7,638	$6,809	$6,320	$5,914	
Adjustment to Book Value of Long-Term Debt	$2,151	$2,151	$1,106	$283	$834	$724	$843	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$12,540	$12,540	$10,599	$8,894	$8,559	$7,907	$7,399	[s] = [q] + [r].
Market Value of Debt	$12,540	$12,540	$10,599	$8,894	$8,559	$7,907	$7,399	[t] = [s].
MARKET VALUE OF FIRM								
	$38,402	$39,717	$32,562	$25,683	$24,709	$20,879	$17,896	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	67.35%	68.43%	67.45%	65.37%	65.36%	62.13%	58.65%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	32.65%	31.57%	32.55%	34.63%	34.64%	37.87%	41.35%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel C: Artesian Res Corp

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$169	$169	$160	$153	$147	$139	$132	[a]
Shares Outstanding (in millions) - Common	9	9	9	9	9	9	9	[b]
Price per Share - Common	$40	$38	$37	$36	$38	$32	$27	[c]
Market Value of Common Equity	$376	$354	$346	$329	$353	$294	$245	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$376	$354	$346	$329	$353	$294	$245	[f]= [d] + [e]
Market to Book Value of Common Equity	2.22	2.09	2.16	2.15	2.41	2.11	1.85	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$18	$18	$14	$16	$19	$15	$14	[j]
Current Liabilities	$44	$44	$26	$38	$28	$19	$22	[k]
Current Portion of Long-Term Debt	$2	$2	$2	$2	$1	$1	$1	[l]
Net Working Capital	($24)	($24)	($10)	($20)	($8)	($3)	($7)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$27	$27	$8	$16	$10	$7	$11	[n]
Adjusted Short-Term Debt	$24	$24	$8	$16	$8	$3	$7	[o] = See Sources and Notes.
Long-Term Debt	$143	$143	$145	$116	$106	$102	$104	[p]
Book Value of Long-Term Debt	$169	$169	$154	$134	$115	$107	$112	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$171	$171	$158	$117	$111	$112	$120	
Carrying Amount	$144	$144	$146	$118	$107	$104	$105	
Adjustment to Book Value of Long-Term Debt	$27	$27	$12	($1)	$4	$8	$15	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$196	$196	$166	$133	$119	$115	$127	[s] = [q] + [r].
Market Value of Debt	$196	$196	$166	$133	$119	$115	$127	[t] = [s].
MARKET VALUE OF FIRM								
	$572	$550	$511	$462	$471	$409	$372	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	65.70%	64.34%	67.60%	71.21%	74.83%	71.83%	65.85%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	34.30%	35.66%	32.40%	28.79%	25.17%	28.17%	34.15%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel D: Atmos Energy

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$7,213	$7,213	$6,128	$5,348	$4,564	$3,699	$3,272	[a]
Shares Outstanding (in millions) - Common	128	128	122	117	111	105	102	[b]
Price per Share - Common	$95	$96	$109	$95	$88	$74	$63	[c]
Market Value of Common Equity	$12,156	$12,274	$13,387	$11,090	$9,729	$7,778	$6,398	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$12,156	$12,274	$13,387	$11,090	$9,729	$7,778	$6,398	[f]= [d] + [e]
Market to Book Value of Common Equity	1.69	1.70	2.18	2.07	2.13	2.10	1.96	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,192	$1,192	$812	$913	$779	$979	$863	[j]
Current Liabilities	$798	$798	$845	$1,455	$959	$1,950	$1,515	[k]
Current Portion of Long-Term Debt	$0	$0	$30	$575	$0	$250	$0	[l]
Net Working Capital	$395	$395	($3)	$32	($181)	($720)	($652)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$0	$337	$941	$763	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$181	$720	$652	[o] = See Sources and Notes.
Long-Term Debt	$5,125	$5,125	$4,528	$3,085	$3,067	$2,314	$2,455	[p]
Book Value of Long-Term Debt	$5,125	$5,125	$4,558	$3,660	$3,248	$3,285	$3,107	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$6,295	$6,295	$4,216	$3,162	$3,382	$2,845	$2,669	
Carrying Amount	$5,160	$5,160	$3,560	$3,085	$3,085	$2,460	$2,460	
Adjustment to Book Value of Long-Term Debt	$1,135	$1,135	$656	$77	$297	$385	$209	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$6,260	$6,260	$5,214	$3,736	$3,545	$3,670	$3,317	[s] = [q] + [r].
Market Value of Debt	$6,260	$6,260	$5,214	$3,736	$3,545	$3,670	$3,317	[t] = [s].
MARKET VALUE OF FIRM								
	$18,416	$18,534	$18,602	$14,827	$13,274	$11,448	$9,715	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	66.01%	66.23%	71.97%	74.80%	73.29%	67.95%	65.86%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	33.99%	33.77%	28.03%	25.20%	26.71%	32.05%	34.14%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and ||m|| < [n].
   (3): [n] if [m] < 0 and ||m|| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel E: California Water

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$921	$921	$780	$730	$699	$659	$642	[a]
Shares Outstanding (in millions) - Common	50	50	49	48	48	48	48	[b]
Price per Share - Common	$55	$53	$51	$47	$44	$34	$23	[c]
Market Value of Common Equity	$2,747	$2,672	$2,472	$2,266	$2,097	$1,641	$1,116	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$2,747	$2,672	$2,472	$2,266	$2,097	$1,641	$1,116	[f]= [d] + [e]
Market to Book Value of Common Equity	2.98	2.90	3.17	3.10	3.00	2.49	1.74	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$266	$266	$185	$189	$228	$142	$128	[j]
Current Liabilities	$589	$589	$359	$321	$491	$250	$148	[k]
Current Portion of Long-Term Debt	$7	$7	$23	$105	$16	$26	$6	[l]
Net Working Capital	($316)	($316)	($151)	($28)	($247)	($82)	($14)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$370	$370	$175	$65	$275	$97	$34	[n]
Adjusted Short-Term Debt	$316	$316	$151	$28	$247	$82	$14	[o] = See Sources and Notes.
Long-Term Debt	$795	$795	$800	$710	$516	$532	$508	[p]
Book Value of Long-Term Debt	$1,118	$1,118	$974	$842	$779	$640	$528	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$944	$944	$873	$850	$607	$631	$600	
Carrying Amount	$786	$786	$809	$815	$532	$558	$519	
Adjustment to Book Value of Long-Term Debt	$158	$158	$64	$35	$76	$73	$82	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$1,276	$1,276	$1,038	$877	$855	$712	$610	[s] = [q] + [r].
Market Value of Debt	$1,276	$1,276	$1,038	$877	$855	$712	$610	[t] = [s].
MARKET VALUE OF FIRM								
	$4,022	$3,948	$3,509	$3,143	$2,952	$2,353	$1,725	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	68.28%	67.68%	70.43%	72.09%	71.05%	69.73%	64.65%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	31.72%	32.32%	29.57%	27.91%	28.95%	30.27%	35.35%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel F: Chesapeake Utilities

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$697	$697	$562	$518	$486	$446	$358	[a]
Shares Outstanding (in millions) - Common	17	17	16	16	16	16	15	[b]
Price per Share - Common	$117	$107	$96	$86	$79	$68	$56	[c]
Market Value of Common Equity	$2,049	$1,869	$1,569	$1,403	$1,293	$1,104	$851	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$2,049	$1,869	$1,569	$1,403	$1,293	$1,104	$851	[f]= [d] + [e]
Market to Book Value of Common Equity	2.94	2.68	2.79	2.71	2.66	2.48	2.38	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$136	$136	$135	$192	$179	$141	$112	[j]
Current Liabilities	$329	$329	$423	$528	$413	$334	$280	[k]
Current Portion of Long-Term Debt	$15	$15	$47	$12	$9	$12	$9	[l]
Net Working Capital	($177)	($177)	($241)	($325)	($225)	($181)	($159)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$176	$176	$247	$294	$251	$210	$173	[n]
Adjusted Short-Term Debt	$176	$176	$241	$294	$225	$181	$159	[o] = See Sources and Notes.
Long-Term Debt	$518	$518	$450	$316	$197	$137	$149	[p]
Book Value of Long-Term Debt	$709	$709	$739	$622	$432	$330	$317	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$549	$549	$505	$324	$215	$162	$165	
Carrying Amount	$523	$523	$487	$327	$205	$146	$154	
Adjustment to Book Value of Long-Term Debt	$26	$26	$18	($3)	$10	$16	$11	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$735	$735	$757	$619	$442	$345	$328	[s] = [q] + [r].
Market Value of Debt	$735	$735	$757	$619	$442	$345	$328	[t] = [s].
MARKET VALUE OF FIRM								
	$2,784	$2,604	$2,326	$2,022	$1,735	$1,450	$1,180	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	73.60%	71.78%	67.45%	69.38%	74.53%	76.17%	72.17%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	26.40%	28.22%	32.55%	30.62%	25.47%	23.83%	27.83%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
    Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel G: Essential Utilities

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$4,684	$4,684	$3,881	$2,009	$1,958	$1,850	$1,726	[a]
Shares Outstanding (in millions) - Common	245	245	221	178	178	177	177	[b]
Price per Share - Common	$44	$47	$46	$34	$38	$30	$30	[c]
Market Value of Common Equity	$10,681	$11,431	$10,168	$6,127	$6,795	$5,345	$5,248	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$10,681	$11,431	$10,168	$6,127	$6,795	$5,345	$5,248	[f]= [d] + [e]
Market to Book Value of Common Equity	2.28	2.44	2.62	3.05	3.47	2.89	3.04	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$380	$380	$2,015	$147	$131	$129	$128	[j]
Current Liabilities	$604	$604	$323	$399	$284	$302	$193	[k]
Current Portion of Long-Term Debt	$92	$92	$106	$145	$114	$151	$36	[l]
Net Working Capital	($132)	($132)	$1,798	($107)	($39)	($22)	($29)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$122	$122	$37	$24	$25	$7	$17	[n]
Adjusted Short-Term Debt	$122	$122	$0	$24	$25	$7	$17	[o] = See Sources and Notes.
Long-Term Debt	$5,563	$5,563	$2,955	$2,398	$2,008	$1,738	$1,720	[p]
Book Value of Long-Term Debt	$5,778	$5,778	$3,061	$2,567	$2,147	$1,895	$1,773	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$0	$0	$0	$0	$0	$0	$0	
Carrying Amount	$0	$0	$0	$0	$0	$0	$0	
Adjustment to Book Value of Long-Term Debt	$0	$0	$0	$0	$0	$0	$0	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$5,778	$5,778	$3,061	$2,567	$2,147	$1,895	$1,773	[s] = [q] + [r].
Market Value of Debt	$5,778	$5,778	$3,061	$2,567	$2,147	$1,895	$1,773	[t] = [s].
MARKET VALUE OF FIRM								
	$16,459	$17,209	$13,229	$8,694	$8,942	$7,240	$7,021	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	64.90%	66.43%	76.86%	70.47%	75.99%	73.83%	74.75%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	35.10%	33.57%	23.14%	29.53%	24.01%	26.17%	25.25%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and ||m|| < [n].
  (3): [n] if [m] < 0 and ||m|| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel H: Global Water Resources Inc

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$32	$32	$25	$28	$15	$15	$20	[a]
Shares Outstanding (in millions) - Common	23	23	22	22	20	20	18	[b]
Price per Share - Common	$17	$15	$13	$10	$9	$9	N/A	[c]
Market Value of Common Equity	$383	$334	$279	$218	$182	$174	N/A	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$383	$334	$279	$218	$182	$174	N/A	[f]= [d] + [e]
Market to Book Value of Common Equity	11.91	10.39	11.31	7.81	12.26	11.60	N/A	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$23	$23	$12	$17	$10	$25	$19	[j]
Current Liabilities	$12	$12	$10	$10	$9	$11	$11	[k]
Current Portion of Long-Term Debt	$2	$2	$0	$0	$0	$0	$2	[l]
Net Working Capital	$13	$13	$2	$8	$1	$14	$10	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$0	$0	$0	$0	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$113	$113	$115	$115	$114	$114	$102	[p]
Book Value of Long-Term Debt	$115	$115	$115	$115	$114	$114	$104	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$128	$128	$121	$108	$116	$108	$117	
Carrying Amount	$113	$113	$115	$115	$114	$115	$105	
Adjustment to Book Value of Long-Term Debt	$15	$15	$6	($7)	$1	($7)	$12	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$130	$130	$121	$108	$116	$108	$116	[s] = [q] + [r].
Market Value of Debt	$130	$130	$121	$108	$116	$108	$116	[t] = [s].
MARKET VALUE OF FIRM								
	$513	$464	$400	$326	$298	$282	N/A	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	74.72%	72.04%	69.70%	66.86%	61.14%	61.74%	N/A	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	N/A	[w] = [i] / [u].
Debt - Market Value Ratio	25.28%	27.96%	30.30%	33.14%	38.86%	38.26%	N/A	[x] = [t] / [u].

Sources and Notes:

Bloomberg as of March 31, 2021

Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.

The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.

   Prices are reported in Workpaper #1 to Schedule No. BV-6.

[e] = Market Value of GP equity is not estimated here.

[o] =

   (1): 0 if [m] > 0.

   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].

   (3): [n] if [m] < 0 and |[m]| > [n].

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel I: Middlesex Water

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$346	$346	$324	$249	$229	$218	$207	[a]
Shares Outstanding (in millions) - Common	17	17	17	16	16	16	16	[b]
Price per Share - Common	$78	$72	$63	$53	$41	$42	$26	[c]
Market Value of Common Equity	$1,366	$1,264	$1,104	$876	$670	$691	$428	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$1,366	$1,264	$1,104	$876	$670	$691	$428	[f]= [d] + [e]
Market to Book Value of Common Equity	3.95	3.65	3.41	3.52	2.92	3.16	2.07	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$2	$2	$2	$2	$2	$2	$2	[h]
Market Value of Preferred Equity	$2	$2	$2	$2	$2	$2	$2	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$34	$34	$29	$31	$29	$27	$24	[j]
Current Liabilities	$57	$57	$65	$94	$65	$47	$28	[k]
Current Portion of Long-Term Debt	$8	$8	$8	$7	$7	$6	$6	[l]
Net Working Capital	($15)	($15)	($28)	($56)	($28)	($14)	$2	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$2	$2	$20	$49	$28	$12	$3	[n]
Adjusted Short-Term Debt	$2	$2	$20	$49	$28	$12	$0	[o] = See Sources and Notes.
Long-Term Debt	$278	$278	$237	$153	$139	$135	$133	[p]
Book Value of Long-Term Debt	$288	$288	$264	$209	$174	$153	$139	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$159	$159	$161	$103	$98	$85	$88	
Carrying Amount	$148	$148	$151	$101	$95	$83	$86	
Adjustment to Book Value of Long-Term Debt	$12	$12	$10	$1	$3	$2	$3	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$300	$300	$274	$210	$177	$155	$141	[s] = [q] + [r].
Market Value of Debt	$300	$300	$274	$210	$177	$155	$141	[t] = [s].
MARKET VALUE OF FIRM								
	$1,668	$1,566	$1,380	$1,089	$849	$848	$571	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	81.90%	80.72%	79.97%	80.48%	78.91%	81.47%	74.82%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.12%	0.13%	0.15%	0.22%	0.29%	0.29%	0.43%	[w] = [i] / [u].
Debt - Market Value Ratio	17.97%	19.15%	19.88%	19.29%	20.80%	18.25%	24.76%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
    Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel J: New Jersey Resources

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$1,698	$1,698	$1,828	$1,497	$1,348	$1,185	$1,144	[a]
Shares Outstanding (in millions) - Common	96	96	90	89	87	86	86	[b]
Price per Share - Common	$41	$35	$44	$48	$40	$36	$31	[c]
Market Value of Common Equity	$3,902	$3,338	$3,977	$4,241	$3,536	$3,119	$2,663	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$3,902	$3,338	$3,977	$4,241	$3,536	$3,119	$2,663	[f]= [d] + [e]
Market to Book Value of Common Equity	2.30	1.97	2.18	2.83	2.62	2.63	2.33	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$609	$609	$693	$1,050	$826	$815	$589	[j]
Current Liabilities	$519	$519	$806	$999	$991	$823	$575	[k]
Current Portion of Long-Term Debt	$31	$31	$26	$125	$166	$97	$11	[l]
Net Working Capital	$122	$122	($87)	$176	$1	$89	$25	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$134	$134	$391	$372	$373	$285	$211	[n]
Adjusted Short-Term Debt	$0	$0	$87	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$2,370	$2,370	$1,657	$1,185	$1,001	$1,027	$848	[p]
Book Value of Long-Term Debt	$2,401	$2,401	$1,770	$1,310	$1,167	$1,124	$859	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$2,455	$2,455	$984	$669	$673	$732	$584	
Carrying Amount	$2,103	$2,103	$893	$672	$672	$708	$583	
Adjustment to Book Value of Long-Term Debt	$352	$352	$91	($3)	$1	$24	$1	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,754	$2,754	$1,861	$1,307	$1,168	$1,147	$861	[s] = [q] + [r].
Market Value of Debt	$2,754	$2,754	$1,861	$1,307	$1,168	$1,147	$861	[t] = [s].
MARKET VALUE OF FIRM								
	$6,656	$6,091	$5,838	$5,548	$4,705	$4,266	$3,524	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	58.63%	54.79%	68.12%	76.45%	75.17%	73.11%	75.58%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	41.37%	45.21%	31.88%	23.55%	24.83%	26.89%	24.42%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel K: NiSource Inc.

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$4,872	$4,872	$5,107	$4,871	$4,320	$4,071	$3,844	[a]
Shares Outstanding (in millions) - Common	392	392	382	372	337	323	319	[b]
Price per Share - Common	$24	$22	$27	$26	$26	$22	$19	[c]
Market Value of Common Equity	$9,224	$8,793	$10,437	$9,805	$8,714	$7,144	$6,128	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$9,224	$8,793	$10,437	$9,805	$8,714	$7,144	$6,128	[f]= [d] + [e]
Market to Book Value of Common Equity	1.89	1.80	2.04	2.01	2.02	1.75	1.59	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$880	$880	$880	$880	$0	$0	$0	[h]
Market Value of Preferred Equity	$880	$880	$880	$880	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,659	$1,659	$1,854	$2,055	$1,763	$1,762	$1,577	[j]
Current Liabilities	$2,279	$2,279	$3,746	$4,037	$3,178	$3,452	$2,658	[k]
Current Portion of Long-Term Debt	$34	$34	$27	$50	$284	$363	$434	[l]
Net Working Capital	($586)	($586)	($1,865)	($1,931)	($1,131)	($1,327)	($647)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$503	$503	$1,773	$1,977	$1,206	$1,488	$567	[n]
Adjusted Short-Term Debt	$503	$503	$1,773	$1,931	$1,131	$1,327	$567	[o] = See Sources and Notes.
Long-Term Debt	$9,250	$9,250	$7,908	$7,313	$7,675	$6,058	$5,949	[p]
Book Value of Long-Term Debt	$9,786	$9,786	$9,708	$9,295	$9,090	$7,748	$6,950	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$11,034	$11,034	$8,764	$7,228	$8,603	$7,064	$6,976	
Carrying Amount	$9,243	$9,243	$7,870	$7,155	$7,797	$6,421	$6,382	
Adjustment to Book Value of Long-Term Debt	$1,791	$1,791	$895	$73	$807	$643	$594	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$11,577	$11,577	$10,602	$9,368	$9,897	$8,391	$7,543	[s] = [q] + [r].
Market Value of Debt	$11,577	$11,577	$10,602	$9,368	$9,897	$8,391	$7,543	[t] = [s].
MARKET VALUE OF FIRM								
	$21,681	$21,251	$21,919	$20,053	$18,611	$15,536	$13,671	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	42.54%	41.38%	47.61%	48.90%	46.82%	45.99%	44.82%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	4.06%	4.14%	4.01%	4.39%	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	53.40%	54.48%	48.37%	46.71%	53.18%	54.01%	55.18%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel L: Northwest Natural

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$889	$889	$866	$763	$743	$850	$781	[a]
Shares Outstanding (in millions) - Common	31	31	30	29	29	29	27	[b]
Price per Share - Common	$53	$48	$72	$63	$62	$60	$50	[c]
Market Value of Common Equity	$1,609	$1,459	$2,184	$1,832	$1,771	$1,726	$1,369	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$1,609	$1,459	$2,184	$1,832	$1,771	$1,726	$1,369	[f]= [d] + [e]
Market to Book Value of Common Equity	1.81	1.64	2.52	2.40	2.38	2.03	1.75	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$323	$323	$294	$296	$270	$288	$331	[j]
Current Liabilities	$627	$627	$482	$509	$382	$275	$478	[k]
Current Portion of Long-Term Debt	$96	$96	$77	$30	$97	$40	$25	[l]
Net Working Capital	($207)	($207)	($111)	($183)	($15)	$54	($122)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$305	$305	$149	$218	$54	$53	$270	[n]
Adjusted Short-Term Debt	$207	$207	$111	$183	$15	$0	$122	[o] = See Sources and Notes.
Long-Term Debt	$941	$941	$807	$706	$683	$679	$569	[p]
Book Value of Long-Term Debt	$1,245	$1,245	$995	$919	$795	$719	$716	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$920	$920	$920	$760	$853	$793	$667	
Carrying Amount	$917	$917	$844	$734	$780	$719	$602	
Adjustment to Book Value of Long-Term Debt	$3	$3	$76	$26	$73	$74	$65	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$1,247	$1,247	$1,071	$946	$869	$793	$782	[s] = [q] + [r].
Market Value of Debt	$1,247	$1,247	$1,071	$946	$869	$793	$782	[t] = [s].
MARKET VALUE OF FIRM								
	$2,856	$2,706	$3,256	$2,778	$2,640	$2,519	$2,151	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	56.34%	53.91%	67.10%	65.96%	67.09%	68.51%	63.65%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	43.66%	46.09%	32.90%	34.04%	32.91%	31.49%	36.35%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel M: ONE Gas Inc.

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$2,233	$2,233	$2,129	$2,043	$1,960	$1,888	$1,842	[a]
Shares Outstanding (in millions) - Common	53	53	53	53	52	52	52	[b]
Price per Share - Common	$75	$78	$92	$83	$75	$64	$49	[c]
Market Value of Common Equity	$3,998	$4,150	$4,876	$4,340	$3,904	$3,324	$2,577	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$3,998	$4,150	$4,876	$4,340	$3,904	$3,324	$2,577	[f]= [d] + [e]
Market to Book Value of Common Equity	1.79	1.86	2.29	2.12	1.99	1.76	1.40	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$540	$540	$506	$543	$589	$569	$483	[j]
Current Liabilities	$797	$797	$873	$699	$1,193	$444	$304	[k]
Current Portion of Long-Term Debt	$7	$7	$7	$300	$0	$0	$0	[l]
Net Working Capital	($250)	($250)	($360)	$144	($604)	$125	$179	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$418	$418	$517	$300	$357	$145	$13	[n]
Adjusted Short-Term Debt	$250	$250	$360	$0	$357	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$1,613	$1,613	$1,314	$1,285	$1,193	$1,192	$1,192	[p]
Book Value of Long-Term Debt	$1,870	$1,870	$1,681	$1,585	$1,550	$1,192	$1,192	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$2,000	$2,000	$1,500	$1,400	$1,300	$1,200	$1,200	
Carrying Amount	$1,600	$1,600	$1,286	$1,300	$1,200	$1,200	$1,200	
Adjustment to Book Value of Long-Term Debt	$400	$400	$214	$100	$100	$0	$0	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,270	$2,270	$1,894	$1,685	$1,650	$1,192	$1,192	[s] = [q] + [r].
Market Value of Debt	$2,270	$2,270	$1,894	$1,685	$1,650	$1,192	$1,192	[t] = [s].
MARKET VALUE OF FIRM								
	$6,269	$6,420	$6,771	$6,025	$5,555	$4,517	$3,768	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	63.78%	64.64%	72.02%	72.03%	70.29%	73.60%	68.38%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	36.22%	35.36%	27.98%	27.97%	29.71%	26.40%	31.62%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and ||m|| < [n].
   (3): [n] if [m] < 0 and ||m|| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel N: SJW Group

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$917	$917	$890	$889	$463	$422	$384	[a]
Shares Outstanding (in millions) - Common	29	29	28	28	21	20	20	[b]
Price per Share - Common	$61	$68	$71	$55	$64	$56	$30	[c]
Market Value of Common Equity	$1,739	$1,953	$2,013	$1,566	$1,304	$1,143	$602	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$1,739	$1,953	$2,013	$1,566	$1,304	$1,143	$602	[f]= [d] + [e]
Market to Book Value of Common Equity	1.90	2.13	2.26	1.76	2.81	2.71	1.57	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$127	$127	$122	$503	$67	$100	$73	[j]
Current Liabilities	$351	$351	$235	$164	$85	$64	$80	[k]
Current Portion of Long-Term Debt	$76	$76	$22	$0	$0	$0	$3	[l]
Net Working Capital	($147)	($147)	($90)	$339	($18)	$36	($3)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$175	$175	$117	$100	$25	$14	$35	[n]
Adjusted Short-Term Debt	$147	$147	$90	$0	$18	$0	$3	[o] = See Sources and Notes.
Long-Term Debt	$1,288	$1,288	$1,284	$431	$431	$433	$377	[p]
Book Value of Long-Term Debt	$1,511	$1,511	$1,396	$431	$449	$433	$383	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$1,571	$1,571	$1,396	$490	$538	$502	$500	
Carrying Amount	$1,288	$1,288	$1,284	$431	$431	$433	$381	
Adjustment to Book Value of Long-Term Debt	$283	$283	$112	$59	$107	$69	$119	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$1,794	$1,794	$1,509	$490	$556	$502	$503	[s] = [q] + [r].
Market Value of Debt	$1,794	$1,794	$1,509	$490	$556	$502	$503	[t] = [s].
MARKET VALUE OF FIRM	$3,534	$3,747	$3,521	$2,056	$1,860	$1,645	$1,105	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	49.23%	52.12%	57.16%	76.17%	70.09%	69.47%	54.51%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	50.77%	47.88%	42.84%	23.83%	29.91%	30.53%	45.49%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
 Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
 (1): 0 if [m] > 0.
 (2): The absolute value of [m] if [m] < 0 and ||m|| < [n].
 (3): [n] if [m] < 0 and ||m|| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel O: South Jersey Inds.

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$1,661	$1,661	$1,424	$1,267	$1,192	$1,289	$1,038	[a]
Shares Outstanding (in millions) - Common	101	101	92	86	80	79	71	[b]
Price per Share - Common	$24	$22	$32	$29	$32	$34	$23	[c]
Market Value of Common Equity	$2,409	$2,232	$2,965	$2,473	$2,516	$2,719	$1,648	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$2,409	$2,232	$2,965	$2,473	$2,516	$2,719	$1,648	[f]= [d] + [e]
Market to Book Value of Common Equity	1.45	1.34	2.08	1.95	2.11	2.11	1.59	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$507	$507	$653	$663	$439	$473	$431	[j]
Current Liabilities	$1,164	$1,164	$1,732	$1,581	$883	$953	$832	[k]
Current Portion of Long-Term Debt	$143	$143	$469	$734	$64	$232	$29	[l]
Net Working Capital	($513)	($513)	($610)	($184)	($380)	($247)	($372)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$596	$596	$849	$271	$346	$296	$432	[n]
Adjusted Short-Term Debt	$513	$513	$610	$184	$346	$247	$372	[o] = See Sources and Notes.
Long-Term Debt	$2,778	$2,778	$2,071	$2,107	$1,123	$808	$997	[p]
Book Value of Long-Term Debt	$3,435	$3,435	$3,150	$3,025	$1,533	$1,287	$1,399	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$1,197	$1,197	$915	$895	$839	$1,081	$1,079	
Carrying Amount	$1,069	$1,069	$965	$893	$822	$1,047	$1,036	
Adjustment to Book Value of Long-Term Debt	$128	$128	($50)	$2	$17	$33	$43	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$3,562	$3,562	$3,100	$3,026	$1,550	$1,321	$1,442	[s] = [q] + [r].
Market Value of Debt	$3,562	$3,562	$3,100	$3,026	$1,550	$1,321	$1,442	[t] = [s].
MARKET VALUE OF FIRM								
	$5,971	$5,794	$6,065	$5,500	$4,066	$4,039	$3,090	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	40.34%	38.52%	48.88%	44.97%	61.88%	67.30%	53.34%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	59.66%	61.48%	51.12%	55.03%	38.12%	32.70%	46.66%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
 Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel P: Southwest Gas

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$2,675	$2,675	$2,506	$2,252	$1,815	$1,663	$1,594	[a]
Shares Outstanding (in millions) - Common	57	57	55	53	48	47	47	[b]
Price per Share - Common	$67	$61	$76	$79	$81	$76	$53	[c]
Market Value of Common Equity	$3,853	$3,516	$4,161	$4,200	$3,889	$3,606	$2,528	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$3,853	$3,516	$4,161	$4,200	$3,889	$3,606	$2,528	[f]= [d] + [e]
Market to Book Value of Common Equity	1.44	1.31	1.66	1.86	2.14	2.17	1.59	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$871	$871	$860	$840	$657	$533	$558	[j]
Current Liabilities	$912	$912	$1,080	$939	$816	$628	$535	[k]
Current Portion of Long-Term Debt	$51	$51	$187	$33	$25	$50	$19	[l]
Net Working Capital	$10	$10	($33)	($66)	($134)	($45)	$43	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$107	$107	$211	$152	$215	$0	$18	[n]
Adjusted Short-Term Debt	$0	$0	$33	$66	$134	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$2,810	$2,810	$2,375	$2,107	$1,799	$1,550	$1,551	[p]
Book Value of Long-Term Debt	$2,861	$2,861	$2,595	$2,206	$1,957	$1,600	$1,571	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$2,628	$2,628	$2,628	$2,173	$1,849	$1,600	$1,571	
Carrying Amount	$2,732	$2,732	$2,300	$2,107	$1,799	$1,550	$1,551	
Adjustment to Book Value of Long-Term Debt	($105)	($105)	$327	$66	$51	$50	$19	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,756	$2,756	$2,922	$2,272	$2,008	$1,650	$1,590	[s] = [q] + [r].
Market Value of Debt	$2,756	$2,756	$2,922	$2,272	$2,008	$1,650	$1,590	[t] = [s].
MARKET VALUE OF FIRM								
	$6,609	$6,272	$7,083	$6,472	$5,897	$5,256	$4,118	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	58.30%	56.06%	58.75%	64.89%	65.95%	68.60%	61.39%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	41.70%	43.94%	41.25%	35.11%	34.05%	31.40%	38.61%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel Q: Spire Inc.

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$2,345	$2,345	$2,344	$2,285	$2,079	$1,797	$1,600	[a]
Shares Outstanding (in millions) - Common	52	52	51	51	48	46	43	[b]
Price per Share - Common	$74	$64	$82	$76	$76	$64	$58	[c]
Market Value of Common Equity	$3,803	$3,323	$4,190	$3,859	$3,677	$2,935	$2,533	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$3,803	$3,323	$4,190	$3,859	$3,677	$2,935	$2,533	[f]= [d] + [e]
Market to Book Value of Common Equity	1.62	1.42	1.79	1.69	1.77	1.63	1.58	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$242	$242	$242	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$242	$242	$242	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$770	$770	$776	$905	$853	$816	$636	[j]
Current Liabilities	$1,547	$1,547	$1,253	$1,563	$1,211	$1,342	$848	[k]
Current Portion of Long-Term Debt	$111	$111	$45	$175	$106	$250	$0	[l]
Net Working Capital	($666)	($666)	($431)	($483)	($253)	($277)	($212)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$696	$696	$519	$626	$584	$506	$377	[n]
Adjusted Short-Term Debt	$666	$666	$431	$483	$253	$277	$212	[o] = See Sources and Notes.
Long-Term Debt	$2,518	$2,518	$2,484	$1,992	$2,030	$1,821	$1,852	[p]
Book Value of Long-Term Debt	$3,294	$3,294	$2,961	$2,650	$2,389	$2,348	$2,063	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$3,120	$3,120	$2,373	$2,074	$2,210	$2,257	$1,944	
Carrying Amount	$2,628	$2,628	$2,123	$2,076	$2,095	$2,084	$1,852	
Adjustment to Book Value of Long-Term Debt	$491	$491	$251	($2)	$115	$173	$93	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$3,785	$3,785	$3,211	$2,649	$2,504	$2,521	$2,156	[s] = [q] + [r].
Market Value of Debt	$3,785	$3,785	$3,211	$2,649	$2,504	$2,521	$2,156	[t] = [s].
MARKET VALUE OF FIRM								
	$7,830	$7,351	$7,643	$6,507	$6,181	$5,456	$4,688	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	48.56%	45.21%	54.82%	59.30%	59.49%	53.79%	54.02%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	3.09%	3.29%	3.17%	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	48.34%	51.50%	42.02%	40.70%	40.51%	46.21%	45.98%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and ||[m]|| < [n].
    (3): [n] if [m] < 0 and ||[m]|| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel R: York Water Co. (The)

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$143	$143	$134	$126	$119	$114	$109	[a]
Shares Outstanding (in millions) - Common	13	13	13	13	13	13	13	[b]
Price per Share - Common	$49	$47	$46	$33	$34	$39	$25	[c]
Market Value of Common Equity	$634	$619	$597	$427	$441	$496	$318	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$634	$619	$597	$427	$441	$496	$318	[f]= [d] + [e]
Market to Book Value of Common Equity	4.42	4.32	4.45	3.38	3.70	4.35	2.92	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$16	$16	$9	$9	$9	$13	$12	[j]
Current Liabilities	$12	$12	$15	$11	$9	$8	$6	[k]
Current Portion of Long-Term Debt	$0	$0	$7	$0	$0	$0	$0	[l]
Net Working Capital	$4	$4	$1	($2)	($0)	$4	$5	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$1	$1	$0	$0	[n]
Adjusted Short-Term Debt	$0	$0	$0	$1	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$124	$124	$95	$93	$90	$85	$85	[p]
Book Value of Long-Term Debt	$124	$124	$101	$94	$91	$85	$85	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$151	$151	$115	$105	$108	$99	$102	
Carrying Amount	$127	$127	$104	$96	$93	$87	$88	
Adjustment to Book Value of Long-Term Debt	$24	$24	$11	$9	$15	$12	$14	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$148	$148	$112	$103	$106	$96	$99	[s] = [q] + [r].
Market Value of Debt	$148	$148	$112	$103	$106	$96	$99	[t] = [s].
MARKET VALUE OF FIRM								
	$782	$767	$709	$531	$547	$592	$417	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	81.06%	80.70%	84.21%	80.50%	80.66%	83.75%	76.26%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	18.94%	19.30%	15.79%	19.50%	19.34%	16.25%	23.74%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
    Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-4

Sample

Capital Structure Summary of the Sample

Company	DCF Capital Structure			5-Year Average Capital Structure		
	Common Equity - Value Ratio	Preferred Equity - Value Ratio	Debt - Value Ratio	Common Equity - Value Ratio	Preferred Equity - Value Ratio	Debt - Value Ratio
	[1]	[2]	[3]	[4]	[5]	[6]
Amer. States Water	0.79	0.00	0.21	0.82	0.00	0.18
Amer. Water Works	0.67	0.00	0.33	0.66	0.00	0.34
Artesian Res Corp	0.66	0.00	0.34	0.70	0.00	0.30
Atmos Energy	0.66	0.00	0.34	0.71	0.00	0.29
California Water	0.68	0.00	0.32	0.70	0.00	0.30
Chesapeake Utilities	0.74	0.00	0.26	0.72	0.00	0.28
Essential Utilities	0.65	0.00	0.35	0.73	0.00	0.27
Global Water Resources Inc	0.75	0.00	0.25	0.66	0.00	0.34
Middlesex Water	0.82	0.00	0.18	0.80	0.00	0.19
New Jersey Resources	0.59	0.00	0.41	0.70	0.00	0.30
NiSource Inc.	0.43	0.04	0.53	0.46	0.03	0.51
Northwest Natural	0.56	0.00	0.44	0.65	0.00	0.35
ONE Gas Inc.	0.64	0.00	0.36	0.71	0.00	0.29
SJW Group	0.49	0.00	0.51	0.65	0.00	0.35
South Jersey Inds.	0.40	0.00	0.60	0.52	0.00	0.48
Southwest Gas	0.58	0.00	0.42	0.63	0.00	0.37
Spire Inc.	0.49	0.03	0.48	0.55	0.01	0.44
York Water Co. (The)	0.81	0.00	0.19	0.82	0.00	0.18
Combined Sample Average	0.63	0.00	0.36	0.68	0.00	0.32
Water Sample Average	0.70	0.00	0.30	0.73	0.00	0.27
Gas Sample Average	0.56	0.01	0.43	0.63	0.00	0.37

Sources and Notes:

[1], [4]:Workpaper #1 to Schedule No. BV-4.

[2], [5]:Workpaper #2 to Schedule No. BV-4.

[3], [6]:Workpaper #3 to Schedule No. BV-4.

Values in this table may not add up exactly to 1.0 because of rounding.

Schedule No. BV-5

Sample

Estimated Growth Rates of the Sample

Company	Thomson Reuters IBES Estimate		Value Line			Combined Growth Rate
	Long-Term Growth Rate	Number of Estimates	EPS Year 2020 Estimate	EPS Year 2023-2025 Estimate	Annualized Growth Rate	
	[1]	[2]	[3]	[4]	[5]	[6]
Amer. States Water	4.6%	1	2.40	3.05	6.2%	5.4%
Amer. Water Works	8.6%	1	4.25	5.50	6.7%	7.6%
Artesian Res Corp	4.0%	1	n/a	n/a	n/a	4.0%
Atmos Energy	7.0%	3	5.00	6.50	6.8%	6.9%
California Water	10.8%	2	1.90	2.25	4.3%	8.6%
Chesapeake Utilities	4.7%	1	4.25	5.75	7.8%	6.3%
Essential Utilities	6.4%	1	1.65	1.90	3.6%	5.0%
Global Water Resources Inc	15.0%	1	n/a	n/a	n/a	15.0%
Middlesex Water	2.7%	1	2.25	2.70	4.7%	3.7%
New Jersey Resources	6.0%	1	1.65	2.45	10.4%	8.2%
NiSource Inc.	4.4%	1	1.40	2.30	13.2%	8.8%
Northwest Natural	3.1%	1	2.50	3.10	5.5%	4.3%
ONE Gas Inc.	5.0%	1	3.80	5.00	7.1%	6.1%
SJW Group	5.5%	1	2.55	3.65	9.4%	7.4%
South Jersey Inds.	4.4%	1	1.70	2.50	10.1%	7.3%
Southwest Gas	4.0%	1	4.45	6.50	9.9%	7.0%
Spire Inc.	5.7%	2	3.85	5.15	7.5%	6.3%
York Water Co. (The)	4.9%	1	1.35	1.65	5.1%	5.0%

Sources and Notes:

[1] - [2]: Thomson Reuters as of March 31, 2021.

[3] - [4]: From Valueline Investment Analyzer as of March 31, 2021.

[5]: ([4] / [3]) ^ (1/4) - 1.

[6]: ([1] x [2] + [5]) / ([2] + 1).

    Weighted average growth rate. If information is missing from one source, the weighted average is based solely on the other source.

Schedule No. BV-6

DCF Cost of Equity of the Sample

Panel A: Simple DCF Method (Quarterly)

Company	Stock Price	Most Recent Dividend	Quarterly Dividend Yield	Combined Long-Term Growth Rate	Quarterly Growth Rate	DCF Cost of Equity
	[1]	[2]	[3]	[4]	[5]	[6]
Amer. States Water	$73.79	$0.34	0.46%	5.4%	1.3%	7.3%
Amer. Water Works	$142.65	$0.55	0.39%	7.6%	1.9%	9.3%
Artesian Res Corp	$40.16	$0.26	0.65%	4.0%	1.0%	6.7%
Atmos Energy	$94.85	$0.63	0.67%	6.9%	1.7%	9.8%
California Water	$54.57	$0.23	0.43%	8.6%	2.1%	10.4%
Chesapeake Utilities	$117.33	$0.44	0.38%	6.3%	1.5%	7.9%
Essential Utilities	$43.53	$0.25	0.58%	5.0%	1.2%	7.4%
Global Water Resources In	$16.97	$0.02	0.15%	15.0%	3.6%	15.7%
Middlesex Water	$78.19	$0.27	0.35%	3.7%	0.9%	5.1%
New Jersey Resources	$40.59	$0.33	0.84%	8.2%	2.0%	11.8%
NiSource Inc.	$23.54	$0.22	0.95%	8.8%	2.1%	12.9%
Northwest Natural	$52.60	$0.48	0.92%	4.3%	1.1%	8.2%
ONE Gas Inc.	$75.20	$0.58	0.78%	6.1%	1.5%	9.4%
SJW Group	$60.91	$0.34	0.57%	7.4%	1.8%	9.9%
South Jersey Inds.	$23.95	$0.30	1.29%	7.3%	1.8%	12.8%
Southwest Gas	$67.37	$0.57	0.86%	7.0%	1.7%	10.6%
Spire Inc.	$73.61	$0.65	0.90%	6.3%	1.5%	10.1%
York Water Co. (The)	$48.51	$0.19	0.39%	5.0%	1.2%	6.7%

Sources and Notes:
[1]: Workpaper #1 to Schedule No. BV-6.
[2]: Workpaper #2 to Schedule No. BV-6.
[3]: ([2] / [1]) x (1 + [5]).
[4]: Schedule No. BV-5, [6].
[5]: {(1 + [4]) ^ (1/4)} - 1.
[6]: {([3] + [5] + 1) ^ 4} - 1.

Schedule No. BV-6

DCF Cost of Equity of the Sample

Panel B: Multi-Stage DCF (Using Blue Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company	Stock Price	Most Recent Dividend	Combined Long-Term Growth Rate	Growth Rate: Year 6	Growth Rate: Year 7	Growth Rate: Year 8	Growth Rate: Year 9	Growth Rate: Year 10	GDP Long-Term Growth Rate	DCF Cost of Equity
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Amer. States Water	$73.79	$0.34	5.4%	5.1%	4.9%	4.6%	4.4%	4.1%	3.9%	6.0%
Amer. Water Works	$142.65	$0.55	7.6%	7.0%	6.4%	5.8%	5.1%	4.5%	3.9%	6.0%
Artesian Res Corp	$40.16	$0.26	4.0%	4.0%	4.0%	4.0%	3.9%	3.9%	3.9%	6.6%
Atmos Energy	$94.85	$0.63	6.9%	6.4%	5.9%	5.4%	4.9%	4.4%	3.9%	7.3%
California Water	$54.57	$0.23	8.6%	7.8%	7.0%	6.3%	5.5%	4.7%	3.9%	6.3%
Chesapeake Utilities	$117.33	$0.44	6.3%	5.9%	5.5%	5.1%	4.7%	4.3%	3.9%	5.7%
Essential Utilities	$43.53	$0.25	5.0%	4.8%	4.6%	4.4%	4.3%	4.1%	3.9%	6.5%
Global Water Resources Inc	$16.97	$0.02	15.0%	13.2%	11.3%	9.5%	7.6%	5.8%	3.9%	5.2%
Middlesex Water	$78.19	$0.27	3.7%	3.7%	3.8%	3.8%	3.8%	3.9%	3.9%	5.3%
New Jersey Resources	$40.59	$0.33	8.2%	7.5%	6.8%	6.0%	5.3%	4.6%	3.9%	8.4%
NiSource Inc.	$23.54	$0.22	8.8%	8.0%	7.2%	6.3%	5.5%	4.7%	3.9%	9.2%
Northwest Natural	$52.60	$0.48	4.3%	4.2%	4.2%	4.1%	4.0%	4.0%	3.9%	7.8%
ONE Gas Inc.	$75.20	$0.58	6.1%	5.7%	5.3%	5.0%	4.6%	4.3%	3.9%	7.6%
SJW Group	$60.91	$0.34	7.4%	6.9%	6.3%	5.7%	5.1%	4.5%	3.9%	6.8%
South Jersey Inds.	$23.95	$0.30	7.3%	6.7%	6.1%	5.6%	5.0%	4.5%	3.9%	10.4%
Southwest Gas	$67.37	$0.57	7.0%	6.5%	5.9%	5.4%	4.9%	4.4%	3.9%	8.2%
Spire Inc.	$73.61	$0.65	6.3%	5.9%	5.5%	5.1%	4.7%	4.3%	3.9%	8.2%
York Water Co. (The)	$48.51	$0.19	5.0%	4.8%	4.6%	4.5%	4.3%	4.1%	3.9%	5.6%

Sources and Notes:
[1]: Workpaper #1 to Schedule No. BV-6.
[2]: Workpaper #2 to Schedule No. BV-6.
[3]: Schedule No. BV-5, [6].
[4]: [3] - {([3] - [9])/ 6}.
[5]: [4] - {([3] - [9])/ 6}.
[6]: [5] - {([3] - [9])/ 6}.
[7]: [6] - {([3] - [9])/ 6}.
[8]: [7] - {([3] - [9])/ 6}.
[9]: BlueChip Economic Indicators, March 2021 This number is assumed to be the perpetual growth rate.
[10]: Workpaper #3 to Schedule No. BV-6.

Schedule No. BV-7

Overall After-Tax DCF Cost of Capital of the Sample

Panel A: Simple DCF Method (Quarterly)

Company	4th Quarter, 2020 S&P Bond Rating	4th Quarter, 2020 Preferred Equity Rating	DCF Cost of Equity	DCF Common Equity to Market Value Ratio	Cost of Preferred Equity	DCF Preferred Equity to Market Value Ratio	DCF Cost of Debt	DCF Debt to Market Value Ratio	Portland General Electric's Representative Income Tax Rate	Overall Weighted After-Tax Cost of Capital
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Amer. States Water	A	-	7.3%	0.79	-	0.00	3.4%	0.21	27.0%	6.3%
Amer. Water Works	A	-	9.3%	0.67	-	0.00	3.4%	0.33	27.0%	7.1%
Artesian Res Corp	A	-	6.7%	0.66	-	0.00	3.4%	0.34	27.0%	5.2%
Atmos Energy	A	-	9.8%	0.66	-	0.00	3.4%	0.34	27.0%	7.3%
California Water	A	-	10.4%	0.68	-	0.00	3.4%	0.32	27.0%	7.9%
Chesapeake Utilities	A	-	7.9%	0.74	-	0.00	3.4%	0.26	27.0%	6.5%
Essential Utilities	A	-	7.4%	0.65	-	0.00	3.4%	0.35	27.0%	5.7%
Global Water Resources Inc	A	-	15.7%	0.75	-	0.00	3.4%	0.25	27.0%	12.3%
Middlesex Water	A	A	5.1%	0.82	3.4%	0.00	3.4%	0.18	27.0%	4.6%
New Jersey Resources	A	-	11.8%	0.59	-	0.00	3.4%	0.41	27.0%	7.9%
NiSource Inc.	BBB	BBB	12.9%	0.43	3.7%	0.04	3.7%	0.53	27.0%	7.1%
Northwest Natural	BBB	-	8.2%	0.56	-	0.00	3.7%	0.44	27.0%	5.8%
ONE Gas Inc.	A	-	9.4%	0.64	-	0.00	3.4%	0.36	27.0%	6.9%
SJW Group	A	-	9.9%	0.49	-	0.00	3.4%	0.51	27.0%	6.1%
South Jersey Inds.	BBB	-	12.8%	0.40	-	0.00	3.7%	0.60	27.0%	6.8%
Southwest Gas	BBB	-	10.6%	0.58	-	0.00	3.7%	0.42	27.0%	7.3%
Spire Inc.	A	A	10.1%	0.49	3.4%	0.03	3.4%	0.48	27.0%	6.2%
York Water Co. (The)	A	-	6.7%	0.81	-	0.00	3.4%	0.19	27.0%	5.9%
Simple Combined Sample Average			9.6%	0.63	3.5%	0.00	3.4%	0.36	27.0%	6.8%
Simple Gas Sample Average			10.4%	0.56	3.5%	0.01	3.5%	0.43	27.0%	6.9%
Simple Water Sample Average			8.7%	0.70	3.4%	0.00	3.4%	0.30	27.0%	6.8%

Sources and Notes:
[1]: Bloomberg as of March 31, 2021.
[2]: Preferred ratings were assumed equal to debt rating
[3]: Schedule No. BV-6; Panel A, [6].
[4]: Schedule No. BV-4, [1].
[5]: Workpaper #2 to Schedule No. BV-11, Panel C.
[6]: Schedule No. BV-4, [2].
[7]: Workpaper #2 to Schedule No. BV-11, Panel B.
[8]: Schedule No. BV-4, [3].
[9]: Provided by Portland General Electric.
[10]: ([3] x [4]) + ([5] x [6]) + {[7] x [8] x (1 - [9])}. A strikethrough indicates the utility was excluded from the full sample average calculation as a result of its cost of equity not exceeding its cost of debt by 150 basis points

Schedule No. BV-7

Overall After-Tax DCF Cost of Capital of the Sample

Panel B: Multi-Stage DCF (Using Blue Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company	4th Quarter, 2020 S&P Bond Rating	4th Quarter, 2020 Preferred Equity Rating	DCF Cost of Equity	DCF Common Equity to Market Value Ratio	Cost of Preferred Equity	DCF Preferred Equity to Market Value Ratio	DCF Cost of Debt	DCF Debt to Market Value Ratio	Portland General Electric's Representative Income Tax Rate	Overall Weighted After-Tax Cost of Capital
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Amer. States Water	A	-	6.0%	0.79	-	0.00	3.4%	0.21	27.0%	5.3%
Amer. Water Works	A	-	6.0%	0.67	-	0.00	3.4%	0.33	27.0%	4.8%
Artesian Res Corp	A	-	6.6%	0.66	-	0.00	3.4%	0.34	27.0%	5.2%
Atmos Energy	A	-	7.3%	0.66	-	0.00	3.4%	0.34	27.0%	5.6%
California Water	A	-	6.3%	0.68	-	0.00	3.4%	0.32	27.0%	5.1%
Chesapeake Utilities	A	-	5.7%	0.74	-	0.00	3.4%	0.26	27.0%	4.9%
Essential Utilities	A	-	6.5%	0.65	-	0.00	3.4%	0.35	27.0%	5.1%
Global Water Resources Inc	A	-	5.2%	0.75	-	0.00	3.4%	0.25	27.0%	4.5%
Middlesex Water	A	A	5.3%	0.82	3.4%	0.00	3.4%	0.18	27.0%	4.8%
New Jersey Resources	A	-	8.4%	0.59	-	0.00	3.4%	0.41	27.0%	5.9%
NiSource Inc.	BBB	BBB	9.2%	0.43	3.7%	0.04	3.7%	0.53	27.0%	5.5%
Northwest Natural	BBB	-	7.8%	0.56	-	0.00	3.7%	0.44	27.0%	5.6%
ONE Gas Inc.	A	-	7.6%	0.64	-	0.00	3.4%	0.36	27.0%	5.7%
SJW Group	A	-	6.8%	0.49	-	0.00	3.4%	0.51	27.0%	4.6%
South Jersey Inds.	BBB	-	10.4%	0.40	-	0.00	3.7%	0.60	27.0%	5.8%
Southwest Gas	BBB	-	8.2%	0.58	-	0.00	3.7%	0.42	27.0%	5.9%
Spire Inc.	A	A	8.2%	0.49	3.4%	0.03	3.4%	0.48	27.0%	5.3%
York Water Co. (The)	A	-	5.6%	0.81	-	0.00	3.4%	0.19	27.0%	5.0%
Multi-Stage Combined Sample Average			7.1%	0.63	3.5%	0.00	3.4%	0.36	27.0%	5.3%
Multi-Stage Gas Sample Average			8.1%	0.56	3.5%	0.01	3.5%	0.43	27.0%	5.6%
Multi-Stage Water Sample Average			6.0%	0.70	3.4%	0.00	3.4%	0.30	27.0%	4.9%

Sources and Notes:

[1]: Bloomberg as of March 31, 2021.
[2]: Preferred ratings were assumed equal to debt rating
[3]: Schedule No. BV-6, Panel B, [10].
[4]: Schedule No. BV-4, [1].
[5]: Workpaper #2 to Schedule No. BV-11, Panel C.

[6]: Schedule No. BV-4, [2].
[7]: Workpaper #2 to Schedule No. BV-11, Panel B.
[8]: Schedule No. BV-4, [3].
[9]: Provided by Portland General Electric.
[10]: ([3] x [4]) + ([5] x [6]) + {[7] x [8] x (1 - [9])}. A strikethrough indicates the utility was excluded from the full sample average calculation as a result of its cost of equity not exceeding its cost of debt by 150 basis points

Schedule No. BV-8

DCF Cost of Equity at Portland General Electric's Proposed Capital Structure

Sample

	Overall After-Tax Cost of Capital	Portland General Electric's Representative Regulatory % Debt	Representative Cost of BBB Rated Utility Debt	Portland General Electric's Representative Income Tax Rate	Portland General Electric's Representative Regulatory % Equity	Estimated Return on Equity
	[1]	[2]	[3]	[4]	[5]	[6]
Combined Sample						
Simple DCF Quarterly	6.8%	50.0%	3.7%	27.0%	50.0%	10.9%
Multi-Stage DCF - Using the Blue Chip Economic Indicator Long-Term GDP Growth Forecast as the Perpetual Rate	5.3%	50.0%	3.7%	27.0%	50.0%	7.8%
Electric Sample						
Simple DCF Quarterly	6.8%	50.0%	3.7%	27.0%	50.0%	10.9%
Multi-Stage DCF - Using the Blue Chip Economic Indicator Long-Term GDP Growth Forecast as the Perpetual Rate	4.9%	50.0%	3.7%	27.0%	50.0%	7.1%
Gas Sample						
Simple DCF Quarterly	6.9%	50.0%	3.7%	27.0%	50.0%	11.0%
Multi-Stage DCF - Using the Blue Chip Economic Indicator Long-Term GDP Growth Forecast as the Perpetual Rate	5.6%	50.0%	3.7%	27.0%	50.0%	8.5%

Sources and Notes:

[1]: Schedule No. BV-7; Panels A-B, [10].

[2]: Provided by Portland General Electric.

[3]: Based on a BBB rating. Yield from Bloomberg as of March 31, 2021.

[4]: Provided by Portland General Electric.

[5]: Provided by Portland General Electric.

[6]: {[1] - ([2] x [3] x (1 - [4]))} / [5].

Schedule No. BV-9 Risk-Free Rates

BCEI Forecast of 10 year U.S. Treasury Yield	**[a]**	**2.10%**
Long-run Average of 20 year U.S. Treasury Yield	[b]	5.01%
Long-run Average of 10 year U.S. Treasury Yield	[c]	4.53%
Maturity Premium	**[d] = [b] - [c]**	**0.50%**
Base Projection of 20 year U.S. Treasury Yield	**[e] = [a] + [d]**	**2.60%**

Sources and Notes:

[a]: Blue Chip Economic Indicators, March 2021. Average projection of 2022 and 2023 Yiel

[b], [c]: Bloomberg as of 3/31/2021, see Workpaper #1 to Schedule No. BV-9.

Schedule No. BV-10

Risk Positioning Cost of Equity of the Sample (Using Value Line Betas)

Panel A: Scenario 1 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%

Company	Long-Term Risk-Free Rate	Value Line Betas	Long-Term Market Risk Premium	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
Amer. States Water	2.80%	0.65	7.25%	7.5%	8.0%
Amer. Water Works	2.80%	0.85	7.25%	9.0%	9.2%
Artesian Res Corp	2.80%	0.75	7.25%	8.2%	8.6%
Atmos Energy	2.80%	0.80	7.25%	8.6%	8.9%
California Water	2.80%	0.65	7.25%	7.5%	8.0%
Chesapeake Utilities	2.80%	0.80	7.25%	8.6%	8.9%
Essential Utilities	2.80%	0.95	7.25%	9.7%	9.8%
Global Water Resources Inc	2.80%	0.75	7.25%	8.2%	8.6%
Middlesex Water	2.80%	0.70	7.25%	7.9%	8.3%
New Jersey Resources	2.80%	0.95	7.25%	9.7%	9.8%
NiSource Inc.	2.80%	0.85	7.25%	9.0%	9.2%
Northwest Natural	2.80%	0.80	7.25%	8.6%	8.9%
ONE Gas Inc.	2.80%	0.80	7.25%	8.6%	8.9%
SJW Group	2.80%	0.85	7.25%	9.0%	9.2%
South Jersey Inds.	2.80%	1.05	7.25%	10.4%	10.3%
Southwest Gas	2.80%	0.95	7.25%	9.7%	9.8%
Spire Inc.	2.80%	0.85	7.25%	9.0%	9.2%
York Water Co. (The)	2.80%	0.80	7.25%	8.6%	8.9%

Sources and Notes:
[1], [3]: Villadsen Direct Testimony.
[2]: From Valueline Investment Analyzer as of March 31, 2021.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-10

Risk Positioning Cost of Equity of the Sample (Using Value Line Betas)

Panel B: Scenario 2 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%

Company	Long-Term Risk-Free Rate	Value Line Betas	Long-Term Market Risk Premium	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
Amer. States Water	2.80%	0.65	8.00%	8.0%	8.5%
Amer. Water Works	2.80%	0.85	8.00%	9.6%	9.8%
Artesian Res Corp	2.80%	0.75	8.00%	8.8%	9.2%
Atmos Energy	2.80%	0.80	8.00%	9.2%	9.5%
California Water	2.80%	0.65	8.00%	8.0%	8.5%
Chesapeake Utilities	2.80%	0.80	8.00%	9.2%	9.5%
Essential Utilities	2.80%	0.95	8.00%	10.4%	10.5%
Global Water Resources Inc	2.80%	0.75	8.00%	8.8%	9.2%
Middlesex Water	2.80%	0.70	8.00%	8.4%	8.9%
New Jersey Resources	2.80%	0.95	8.00%	10.4%	10.5%
NiSource Inc.	2.80%	0.85	8.00%	9.6%	9.8%
Northwest Natural	2.80%	0.80	8.00%	9.2%	9.5%
ONE Gas Inc.	2.80%	0.80	8.00%	9.2%	9.5%
SJW Group	2.80%	0.85	8.00%	9.6%	9.8%
South Jersey Inds.	2.80%	1.05	8.00%	11.2%	11.1%
Southwest Gas	2.80%	0.95	8.00%	10.4%	10.5%
Spire Inc.	2.80%	0.85	8.00%	9.6%	9.8%
York Water Co. (The)	2.80%	0.80	8.00%	9.2%	9.5%

Sources and Notes:

[1], [3]: Villadsen Direct Testimony.

[2]: From Valueline Investment Analyzer as of March 31, 2021.

[4]: [1] + ([2] x [3]).

[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-11

Overall After-Tax Risk Positioning Cost of Capital of the Sample (Using Value Line Betas)

Panel A: CAPM Cost of Equity Scenario 1 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%

Company	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity	5-Year Average Common Equity to Market Value Ratio	Weighted - Average Cost of Preferred Equity	5-Year Average Preferred Equity to Market Value Ratio	Weighted- Average Cost of Debt	5-Year Average Debt to Market Value Ratio	Electric's Representative Income Tax Rate	Overall After-Tax Cost of Capital (CAPM)	Overall After-Tax Cost of Capital (ECAPM 1.5%)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Amer. States Water	7.5%	8.0%	0.82	-	0.00	3.4%	0.18	27.0%	6.6%	7.0%
Amer. Water Works	9.0%	9.2%	0.66	-	0.00	3.4%	0.34	27.0%	6.7%	6.9%
Artesian Res Corp	8.2%	8.6%	0.70	-	0.00	3.4%	0.30	27.0%	6.5%	6.8%
Atmos Energy	8.6%	8.9%	0.71	-	0.00	3.4%	0.29	27.0%	6.8%	7.0%
California Water	7.5%	8.0%	0.70	-	0.00	3.4%	0.30	27.0%	6.0%	6.4%
Chesapeake Utilities	8.6%	8.9%	0.72	-	0.00	3.4%	0.28	27.0%	6.9%	7.1%
Essential Utilities	9.7%	9.8%	0.73	-	0.00	3.4%	0.27	27.0%	7.7%	7.8%
Global Water Resources Inc	8.2%	8.6%	0.66	-	0.00	3.4%	0.34	27.0%	6.3%	6.5%
Middlesex Water	7.9%	8.3%	0.80	3.4%	0.00	3.4%	0.19	27.0%	6.8%	7.2%
New Jersey Resources	9.7%	9.8%	0.70	-	0.00	3.4%	0.30	27.0%	7.5%	7.5%
NiSource Inc.	9.0%	9.2%	0.46	3.7%	0.03	3.7%	0.51	27.0%	5.6%	5.7%
Northwest Natural	8.6%	8.9%	0.65	-	0.00	3.7%	0.35	27.0%	6.5%	6.7%
ONE Gas Inc.	8.6%	8.9%	0.71	-	0.00	3.4%	0.29	27.0%	6.8%	7.0%
SJW Group	9.0%	9.2%	0.65	-	0.00	3.4%	0.35	27.0%	6.7%	6.8%
South Jersey Inds.	10.4%	10.3%	0.52	-	0.00	3.7%	0.48	27.0%	6.7%	6.7%
Southwest Gas	9.7%	9.8%	0.63	-	0.00	3.7%	0.37	27.0%	7.1%	7.1%
Spire Inc.	9.0%	9.2%	0.55	3.4%	0.01	3.4%	0.44	27.0%	6.0%	6.1%
York Water Co. (The)	8.6%	8.9%	0.82	-	0.00	3.4%	0.18	27.0%	7.5%	7.7%
Combined Sample Average	8.8%	9.0%	0.68	3.5%	0.00	3.4%	0.32	27.0%	6.7%	6.9%
Gas Sample Average	9.1%	9.3%	0.63	3.5%	0.00	3.5%	0.37	27.0%	6.7%	6.8%
Water Sample Average	8.4%	8.7%	0.73	3.4%	0.00	3.4%	0.27	27.0%	6.8%	7.0%

Sources and Notes:
[1]: Schedule No. BV-10; Panel A, [4].
[2]: Schedule No. BV-10; Panel A, [5].
[3]: Schedule No. BV-4, [4].
[4]: Workpaper #2 to Schedule No. BV-11, Panel C.
[5]: Schedule No. BV-4, [5].
[6]: Workpaper #2 to Schedule No. BV-11, Panel B.
[7]: Schedule No. BV-4, [6].
[8]: Provided by Portland General Electric.
[9] = [1] x [3] + [4] x [5] + [6] x [7] x (1 - [8])
[10] = [2] x [3] + [4] x [5] + [6] x [7] x (1 - [8])

Schedule No. BV-11

Overall After-Tax Risk Positioning Cost of Capital of the Sample (Using Value Line Betas)

Panel B: CAPM Cost of Equity Scenario 2 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%

Company	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity	5-Year Average Common Equity to Market Value Ratio	Weighted - Average Cost of Preferred Equity	5-Year Average Preferred Equity to Market Value Ratio	Weighted- Average Cost of Debt	5-Year Average Debt to Market Value Ratio	Electric's Representative Income Tax Rate	Overall After-Tax Cost of Capital (CAPM)	Overall After-Tax Cost of Capital (ECAPM 1.5%)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Company	capmlt	ecapmlt2	capm_equity_ratio	average	capm_pref_ratio	average	capm_debt_ratio		CAPM	ECAPM2
Amer. States Water	8.0%	8.5%	0.82	-	0.00	3.4%	0.18	27.0%	7.0%	7.4%
Amer. Water Works	9.6%	9.8%	0.66	-	0.00	3.4%	0.34	27.0%	7.1%	7.3%
Artesian Res Corp	8.8%	9.2%	0.70	-	0.00	3.4%	0.30	27.0%	6.9%	7.2%
Atmos Energy	9.2%	9.5%	0.71	-	0.00	3.4%	0.29	27.0%	7.2%	7.4%
California Water	8.0%	8.5%	0.70	-	0.00	3.4%	0.30	27.0%	6.3%	6.7%
Chesapeake Utilities	9.2%	9.5%	0.72	-	0.00	3.4%	0.28	27.0%	7.3%	7.5%
Essential Utilities	10.4%	10.5%	0.73	-	0.00	3.4%	0.27	27.0%	8.2%	8.3%
Global Water Resources Inc	8.8%	9.2%	0.66	-	0.00	3.4%	0.34	27.0%	6.7%	6.9%
Middlesex Water	8.4%	8.9%	0.80	3.4%	0.00	3.4%	0.19	27.0%	7.2%	7.6%
New Jersey Resources	10.4%	10.5%	0.70	-	0.00	3.4%	0.30	27.0%	8.0%	8.0%
NiSource Inc.	9.6%	9.8%	0.46	3.7%	0.03	3.7%	0.51	27.0%	5.9%	6.0%
Northwest Natural	9.2%	9.5%	0.65	-	0.00	3.7%	0.35	27.0%	6.9%	7.1%
ONE Gas Inc.	9.2%	9.5%	0.71	-	0.00	3.4%	0.29	27.0%	7.2%	7.4%
SJW Group	9.6%	9.8%	0.65	-	0.00	3.4%	0.35	27.0%	7.1%	7.2%
South Jersey Inds.	11.2%	11.1%	0.52	-	0.00	3.7%	0.48	27.0%	7.2%	7.1%
Southwest Gas	10.4%	10.5%	0.63	-	0.00	3.7%	0.37	27.0%	7.5%	7.6%
Spire Inc.	9.6%	9.8%	0.55	3.4%	0.01	3.4%	0.44	27.0%	6.4%	6.5%
York Water Co. (The)	9.2%	9.5%	0.82	-	0.00	3.4%	0.18	27.0%	8.0%	8.2%
Combined Sample Average	9.4%	9.6%	0.68	3.5%	0.00	3.4%	0.32	27.0%	7.1%	7.3%
Gas Sample Average	9.8%	10.0%	0.63	3.5%	0.00	3.5%	0.37	27.0%	7.1%	7.2%
Water Sample Average	9.0%	9.3%	0.73	3.4%	0.00	3.4%	0.27	27.0%	7.2%	7.4%

Sources and Notes:
[1]: Schedule No. BV-10; Panel B, [4].
[2]: Schedule No. BV-10; Panel B, [5].
[3]: Schedule No. BV-4, [4].
[4]: Workpaper #2 to Schedule No. BV-11, Panel C.
[5]: Schedule No. BV-4, [5].
[6]: Workpaper #2 to Schedule No. BV-11, Panel B.
[7]: Schedule No. BV-4, [6].
[8]: Provided by Portland General Electric.
[9] = [1] x [3] + [4] x [5] + [6] x [7] x (1 - [8])
[10] = [2] x [3] + [4] x [5] + [6] x [7] x (1 - [8])

Schedule No. BV-12

Risk Positioning Cost of Equity at Portland General Electric's Proposed Capital Structure

Sample

Using Value Line Betas

	Overall After-Tax Cost of Capital (Scenario 1)	Overall After-Tax Cost of Capital (Scenario 2)	Portland General Electric's Representative Regulatory % Debt	Representative Cost of BBB-Rated Utility Debt	Portland General Electric's Representative Income Tax Rate	Portland General Electric's Regulatory % Preferred Equity	Portland General Electric's Cost of Preferred Equity	Portland General Electric's Representative Regulatory % Equity	Estimated Return on Equity (Scenario 1)	Estimated Return on Equity (Scenario 2)
	[1]	[2]	[3]	[4]	[5]			[6]	[7]	[8]
Combined Sample										
CAPM using Value Line Betas	6.7%	7.1%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	10.7%	11.5%
ECAPM (1.50%) using Value Line Betas	6.9%	7.3%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	11.1%	11.9%
Water Sample										
CAPM using Value Line Betas	6.8%	7.2%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	10.8%	11.6%
ECAPM (1.50%) using Value Line Betas	7.0%	7.4%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	11.3%	12.1%
Gas Sample										
CAPM using Value Line Betas	6.7%	7.1%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	10.6%	11.4%
ECAPM (1.50%) using Value Line Betas	6.8%	7.2%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	10.8%	11.7%

Sources and Notes:

[1]: Schedule No. BV-11; Panel A, [9] - [10].

[2]: Schedule No. BV-11; Panel B, [9] - [10].

[3]: Provided by Portland General Electric.

[4]: Based on a BBB rating. Yield from Bloomberg as of March 31, 2021.

[5]: Provided by Portland General Electric.

[6]: Provided by Portland General Electric.

[7]: {[1] - ([3] x [4] x (1 - [5])}/ [6]

[8]: {[2] - ([3] x [4] x (1 - [5]))}/ [6]

Scenario 1: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%.

Scenario 2: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%.

Schedule No. BV-13

Hamada Adjustment to Obtain Unlevered Asset Beta

Company		Value Line Betas	Debt Beta	5-Year Average Common Equity to Market Value Ratio	5-Year Average Preferred Equity to Market Value Ratio	5-Year Average Debt to Market Value Ratio	Portland General Electric's Representative Income Tax Rate	Asset Beta: Without Taxes	Asset Beta: With Taxes
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Amer. States Water	*	0.65	0.05	0.82	0.00	0.18	27.0%	0.54	0.57
Amer. Water Works	*	0.85	0.05	0.66	0.00	0.34	27.0%	0.58	0.63
Artesian Res Corp	*	0.75	0.05	0.70	0.00	0.30	27.0%	0.54	0.58
Atmos Energy	*	0.80	0.05	0.71	0.00	0.29	27.0%	0.58	0.63
California Water	*	0.65	0.05	0.70	0.00	0.30	27.0%	0.47	0.51
Chesapeake Utilities	*	0.80	0.05	0.72	0.00	0.28	27.0%	0.59	0.63
Essential Utilities	*	0.95	0.05	0.73	0.00	0.27	27.0%	0.70	0.76
Global Water Resources Inc	*	0.75	0.05	0.66	0.00	0.34	27.0%	0.51	0.56
Middlesex Water	*	0.70	0.05	0.80	0.00	0.19	27.0%	0.57	0.60
New Jersey Resources	*	0.95	0.05	0.70	0.00	0.30	27.0%	0.68	0.73
NiSource Inc.	*	0.85	0.10	0.46	0.03	0.51	27.0%	0.45	0.50
Northwest Natural	*	0.80	0.10	0.65	0.00	0.35	27.0%	0.55	0.60
ONE Gas Inc.	*	0.80	0.05	0.71	0.00	0.29	27.0%	0.58	0.62
SJW Group	*	0.85	0.05	0.65	0.00	0.35	27.0%	0.57	0.62
South Jersey Inds.	*	1.05	0.10	0.52	0.00	0.48	27.0%	0.60	0.67
Southwest Gas	*	0.95	0.10	0.63	0.00	0.37	27.0%	0.63	0.69
Spire Inc.	*	0.85	0.05	0.55	0.01	0.44	27.0%	0.49	0.55
York Water Co. (The)	*	0.80	0.05	0.82	0.00	0.18	27.0%	0.66	0.70
Combined Sample Average		0.82	0.06	0.68	0.00	0.32	0.27	0.57	0.62
Gas Sample Average		0.87	0.07	0.63	0.00	0.37	0.27	0.57	0.63
Water Sample Average		0.77	0.05	0.73	0.00	0.27	0.27	0.57	0.61

Sources and Notes:

[1]: Workpaper # 1 to Schedule No. BV-10, [1].
[2]: Workpaper #1 to Schedule No. BV-13, [7].
[3]: Schedule No. BV-4, [4].
[4]: Schedule No. BV-4, [5].

[5]: Schedule No. BV-4, [6].
[6]: Portland General Electric's Representative Tax Rate.
[7]: [1]*[3] + [2]*([4] + [5]).
[8]: {[1]*[3] + [2]*([4]+[5]*(1-[6]))} / {[3] + [4] + [5]*(1 -[6])}.

Schedule No. BV-14

Sample Average Asset Beta Relevered at Portland General Electric's Proposed Capital Structure

	Asset Beta	Assumed Debt Beta	Portland General Electric's Representative Regulatory % Debt	Portland General Electric's Representative Income Tax Rate	Portland General Electric's Representative Regulatory % Equity	Estimated Equity Beta
	[1]	[2]	[3]	[4]	[5]	[6]
Combined Sample						
Asset Beta Without Taxes	0.57	0.10	50.0%	27.0%	50.0%	1.04
Asset Beta With Taxes	0.62	0.10	50.0%	27.0%	50.0%	1.00
Water Sample						
Asset Beta Without Taxes	0.57	0.10	50.0%	27.0%	50.0%	1.05
Asset Beta With Taxes	0.61	0.10	50.0%	27.0%	50.0%	0.99
Gas Sample						
Asset Beta Without Taxes	0.57	0.10	50.0%	27.0%	50.0%	1.04
Asset Beta With Taxes	0.63	0.10	50.0%	27.0%	50.0%	1.01

Sources and Notes:

[1]: Schedule No. BV-13, [7] - [8].

[2]: Villadsen Testimony.

[3]: Provided by Portland General Electric.

[4]: Portland General Electric's Representative Tax Rate.

[5]: Provided by Portland General Electric.

[6]: [1] + [3]/[5]*([1] - [2]) without taxes, [1] + [3]*(1 - [4])/[5]*([1] - [2]) with taxes.

Schedule No. BV-15

Risk-Positioning Cost of Equity using Hamada-Adjusted Betas

Panel A: Scenario 1 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%

Company	Long-Term Risk-Free Rate	Hamada Adjusted Equity Betas	Long-Term Market Risk	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
Combined Sample					
Asset Beta Without Taxes	2.80%	1.04	7.25%	10.4%	10.3%
Asset Beta With Taxes	2.80%	1.00	7.25%	10.0%	10.0%
Water Sample					
Asset Beta Without Taxes	2.80%	1.05	7.25%	10.4%	10.3%
Asset Beta With Taxes	2.80%	0.99	7.25%	10.0%	10.0%
Gas Sample					
Asset Beta Without Taxes	2.80%	1.04	7.25%	10.4%	10.3%
Asset Beta With Taxes	2.80%	1.01	7.25%	10.1%	10.1%

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Schedule No. BV-14, [6].
[3]: Villadsen Direct Testimony.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-15

Risk-Positioning Cost of Equity using Hamada-Adjusted Betas

Panel B: Scenario 2 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%

Company	Long-Term Risk-Free Rate	Hamada Adjusted Equity Betas	Long-Term Market Risk	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
Combined Sample					
Asset Beta Without Taxes	2.80%	1.04	8.00%	11.2%	11.1%
Asset Beta With Taxes	2.80%	1.00	8.00%	10.8%	10.8%
Water Sample					
Asset Beta Without Taxes	2.80%	1.05	8.00%	11.2%	11.1%
Asset Beta With Taxes	2.80%	0.99	8.00%	10.7%	10.7%
Gas Sample					
Asset Beta Without Taxes	2.80%	1.04	8.00%	11.1%	11.1%
Asset Beta With Taxes	2.80%	1.01	8.00%	10.9%	10.9%

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Schedule No. BV-14, [6].
[3]: Villadsen Direct Testimony.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-2

Sample

Classification of Companies by Assets

Company	Company Category
Amer. States Water	R
Amer. Water Works	R
Artesian Res Corp	R
Atmos Energy	R
California Water	R
Chesapeake Utilities	R
Essential Utilities	R
Global Water Resources Inc	R
Middlesex Water	R
New Jersey Resources	MR
NiSource Inc.	R
Northwest Natural	R
ONE Gas Inc.	R
SJW Group	R
South Jersey Inds.	R
Southwest Gas	R
Spire Inc.	R
York Water Co. (The)	R

Sources and Notes:
Calculations based on EEI definitions and Company 10K filings:
  R = Regulated (greater than 80 percent of total assets are regulated).
  MR = Mostly Regulated (Less than 80 percent of total assets are regulated).

Schedule No. BV-3

Market Value of the Sample

Panel A: Amer. States Water

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$642	$642	$602	$558	$530	$494	$466	[a]
Shares Outstanding (in millions) - Common	37	37	37	37	37	37	37	[b]
Price per Share - Common	$74	$78	$87	$67	$56	$45	$42	[c]
Market Value of Common Equity	$2,722	$2,874	$3,189	$2,466	$2,055	$1,662	$1,533	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$2,722	$2,874	$3,189	$2,466	$2,055	$1,662	$1,533	[f]= [d] + [e]
Market to Book Value of Common Equity	4.24	4.48	5.30	4.42	3.88	3.36	3.29	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$157	$157	$122	$131	$155	$167	$133	[j]
Current Liabilities	$119	$119	$116	$147	$157	$178	$124	[k]
Current Portion of Long-Term Debt	$2	$2	$2	$40	$0	$0	$0	[l]
Net Working Capital	$41	$41	$9	$25	($1)	($11)	$10	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$5	$0	$59	$90	$28	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$1	$11	$0	[o] = See Sources and Notes.
Long-Term Debt	$584	$584	$493	$377	$321	$321	$321	[p]
Book Value of Long-Term Debt	$587	$587	$495	$417	$322	$332	$321	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$560	$560	$376	$388	$424	$424	$404	
Carrying Amount	$444	$444	$285	$325	$325	$326	$326	
Adjustment to Book Value of Long-Term Debt	$115	$115	$91	$63	$99	$98	$78	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$702	$702	$586	$480	$421	$430	$399	[s] = [q] + [r].
Market Value of Debt	$702	$702	$586	$480	$421	$430	$399	[t] = [s].
MARKET VALUE OF FIRM								
	$3,424	$3,576	$3,775	$2,946	$2,476	$2,091	$1,933	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	79.50%	80.37%	84.48%	83.71%	83.00%	79.44%	79.34%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	20.50%	19.63%	15.52%	16.29%	17.00%	20.56%	20.66%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel B: Amer. Water Works

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$6,454	$6,454	$6,121	$5,864	$5,385	$5,218	$5,049	[a]
Shares Outstanding (in millions) - Common	181	181	181	181	178	178	178	[b]
Price per Share - Common	$143	$150	$121	$93	$91	$73	$59	[c]
Market Value of Common Equity	$25,862	$27,177	$21,963	$16,789	$16,150	$12,972	$10,497	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$25,862	$27,177	$21,963	$16,789	$16,150	$12,972	$10,497	[f]= [d] + [e]
Market to Book Value of Common Equity	4.01	4.21	3.59	2.86	3.00	2.49	2.08	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,906	$1,906	$1,285	$781	$720	$784	$657	[j]
Current Liabilities	$2,881	$2,881	$2,045	$2,094	$2,325	$2,392	$1,533	[k]
Current Portion of Long-Term Debt	$342	$342	$42	$71	$322	$574	$54	[l]
Net Working Capital	($633)	($633)	($718)	($1,242)	($1,283)	($1,034)	($822)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$1,282	$1,282	$786	$964	$905	$849	$628	[n]
Adjusted Short-Term Debt	$633	$633	$718	$964	$905	$849	$628	[o] = See Sources and Notes.
Long-Term Debt	$9,414	$9,414	$8,733	$7,576	$6,498	$5,760	$5,874	[p]
Book Value of Long-Term Debt	$10,389	$10,389	$9,493	$8,611	$7,725	$7,183	$6,556	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$11,807	$11,807	$9,770	$7,921	$7,643	$7,044	$6,757	
Carrying Amount	$9,656	$9,656	$8,664	$7,638	$6,809	$6,320	$5,914	
Adjustment to Book Value of Long-Term Debt	$2,151	$2,151	$1,106	$283	$834	$724	$843	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$12,540	$12,540	$10,599	$8,894	$8,559	$7,907	$7,399	[s] = [q] + [r].
Market Value of Debt	$12,540	$12,540	$10,599	$8,894	$8,559	$7,907	$7,399	[t] = [s].
MARKET VALUE OF FIRM								
	$38,402	$39,717	$32,562	$25,683	$24,709	$20,879	$17,896	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	67.35%	68.43%	67.45%	65.37%	65.36%	62.13%	58.65%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	32.65%	31.57%	32.55%	34.63%	34.64%	37.87%	41.35%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel C: Artesian Res Corp

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$169	$169	$160	$153	$147	$139	$132	[a]
Shares Outstanding (in millions) - Common	9	9	9	9	9	9	9	[b]
Price per Share - Common	$40	$38	$37	$36	$38	$32	$27	[c]
Market Value of Common Equity	$376	$354	$346	$329	$353	$294	$245	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$376	$354	$346	$329	$353	$294	$245	[f]= [d] + [e]
Market to Book Value of Common Equity	2.22	2.09	2.16	2.15	2.41	2.11	1.85	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$18	$18	$14	$16	$19	$15	$14	[j]
Current Liabilities	$44	$44	$26	$38	$28	$19	$22	[k]
Current Portion of Long-Term Debt	$2	$2	$2	$2	$1	$1	$1	[l]
Net Working Capital	($24)	($24)	($10)	($20)	($8)	($3)	($7)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$27	$27	$8	$16	$10	$7	$11	[n]
Adjusted Short-Term Debt	$24	$24	$8	$16	$8	$3	$7	[o] = See Sources and Notes.
Long-Term Debt	$143	$143	$145	$116	$106	$102	$104	[p]
Book Value of Long-Term Debt	$169	$169	$154	$134	$115	$107	$112	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$171	$171	$158	$117	$111	$112	$120	
Carrying Amount	$144	$144	$146	$118	$107	$104	$105	
Adjustment to Book Value of Long-Term Debt	$27	$27	$12	($1)	$4	$8	$15	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$196	$196	$166	$133	$119	$115	$127	[s] = [q] + [r].
Market Value of Debt	$196	$196	$166	$133	$119	$115	$127	[t] = [s].
MARKET VALUE OF FIRM								
	$572	$550	$511	$462	$471	$409	$372	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	65.70%	64.34%	67.60%	71.21%	74.83%	71.83%	65.85%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	34.30%	35.66%	32.40%	28.79%	25.17%	28.17%	34.15%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel D: Atmos Energy

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$7,213	$7,213	$6,128	$5,348	$4,564	$3,699	$3,272	[a]
Shares Outstanding (in millions) - Common	128	128	122	117	111	105	102	[b]
Price per Share - Common	$95	$96	$109	$95	$88	$74	$63	[c]
Market Value of Common Equity	$12,156	$12,274	$13,387	$11,090	$9,729	$7,778	$6,398	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$12,156	$12,274	$13,387	$11,090	$9,729	$7,778	$6,398	[f]= [d] + [e]
Market to Book Value of Common Equity	1.69	1.70	2.18	2.07	2.13	2.10	1.96	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,192	$1,192	$812	$913	$779	$979	$863	[j]
Current Liabilities	$798	$798	$845	$1,455	$959	$1,950	$1,515	[k]
Current Portion of Long-Term Debt	$0	$0	$30	$575	$0	$250	$0	[l]
Net Working Capital	$395	$395	($3)	$32	($181)	($720)	($652)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$0	$337	$941	$763	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$181	$720	$652	[o] = See Sources and Notes.
Long-Term Debt	$5,125	$5,125	$4,528	$3,085	$3,067	$2,314	$2,455	[p]
Book Value of Long-Term Debt	$5,125	$5,125	$4,558	$3,660	$3,248	$3,285	$3,107	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$6,295	$6,295	$4,216	$3,162	$3,382	$2,845	$2,669	
Carrying Amount	$5,160	$5,160	$3,560	$3,085	$3,085	$2,460	$2,460	
Adjustment to Book Value of Long-Term Debt	$1,135	$1,135	$656	$77	$297	$385	$209	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$6,260	$6,260	$5,214	$3,736	$3,545	$3,670	$3,317	[s] = [q] + [r].
Market Value of Debt	$6,260	$6,260	$5,214	$3,736	$3,545	$3,670	$3,317	[t] = [s].
MARKET VALUE OF FIRM								
	$18,416	$18,534	$18,602	$14,827	$13,274	$11,448	$9,715	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	66.01%	66.23%	71.97%	74.80%	73.29%	67.95%	65.86%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	33.99%	33.77%	28.03%	25.20%	26.71%	32.05%	34.14%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and ||m|| < [n].
   (3): [n] if [m] < 0 and ||m|| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel E: California Water

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$921	$921	$780	$730	$699	$659	$642	[a]
Shares Outstanding (in millions) - Common	50	50	49	48	48	48	48	[b]
Price per Share - Common	$55	$53	$51	$47	$44	$34	$23	[c]
Market Value of Common Equity	$2,747	$2,672	$2,472	$2,266	$2,097	$1,641	$1,116	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$2,747	$2,672	$2,472	$2,266	$2,097	$1,641	$1,116	[f]= [d] + [e]
Market to Book Value of Common Equity	2.98	2.90	3.17	3.10	3.00	2.49	1.74	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$266	$266	$185	$189	$228	$142	$128	[j]
Current Liabilities	$589	$589	$359	$321	$491	$250	$148	[k]
Current Portion of Long-Term Debt	$7	$7	$23	$105	$16	$26	$6	[l]
Net Working Capital	($316)	($316)	($151)	($28)	($247)	($82)	($14)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$370	$370	$175	$65	$275	$97	$34	[n]
Adjusted Short-Term Debt	$316	$316	$151	$28	$247	$82	$14	[o] = See Sources and Notes.
Long-Term Debt	$795	$795	$800	$710	$516	$532	$508	[p]
Book Value of Long-Term Debt	$1,118	$1,118	$974	$842	$779	$640	$528	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$944	$944	$873	$850	$607	$631	$600	
Carrying Amount	$786	$786	$809	$815	$532	$558	$519	
Adjustment to Book Value of Long-Term Debt	$158	$158	$64	$35	$76	$73	$82	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$1,276	$1,276	$1,038	$877	$855	$712	$610	[s] = [q] + [r].
Market Value of Debt	$1,276	$1,276	$1,038	$877	$855	$712	$610	[t] = [s].
MARKET VALUE OF FIRM								
	$4,022	$3,948	$3,509	$3,143	$2,952	$2,353	$1,725	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	68.28%	67.68%	70.43%	72.09%	71.05%	69.73%	64.65%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	31.72%	32.32%	29.57%	27.91%	28.95%	30.27%	35.35%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel F: Chesapeake Utilities

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$697	$697	$562	$518	$486	$446	$358	[a]
Shares Outstanding (in millions) - Common	17	17	16	16	16	16	15	[b]
Price per Share - Common	$117	$107	$96	$86	$79	$68	$56	[c]
Market Value of Common Equity	$2,049	$1,869	$1,569	$1,403	$1,293	$1,104	$851	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$2,049	$1,869	$1,569	$1,403	$1,293	$1,104	$851	[f]= [d] + [e]
Market to Book Value of Common Equity	2.94	2.68	2.79	2.71	2.66	2.48	2.38	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$136	$136	$135	$192	$179	$141	$112	[j]
Current Liabilities	$329	$329	$423	$528	$413	$334	$280	[k]
Current Portion of Long-Term Debt	$15	$15	$47	$12	$9	$12	$9	[l]
Net Working Capital	($177)	($177)	($241)	($325)	($225)	($181)	($159)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$176	$176	$247	$294	$251	$210	$173	[n]
Adjusted Short-Term Debt	$176	$176	$241	$294	$225	$181	$159	[o] = See Sources and Notes.
Long-Term Debt	$518	$518	$450	$316	$197	$137	$149	[p]
Book Value of Long-Term Debt	$709	$709	$739	$622	$432	$330	$317	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$549	$549	$505	$324	$215	$162	$165	
Carrying Amount	$523	$523	$487	$327	$205	$146	$154	
Adjustment to Book Value of Long-Term Debt	$26	$26	$18	($3)	$10	$16	$11	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$735	$735	$757	$619	$442	$345	$328	[s] = [q] + [r].
Market Value of Debt	$735	$735	$757	$619	$442	$345	$328	[t] = [s].
MARKET VALUE OF FIRM								
	$2,784	$2,604	$2,326	$2,022	$1,735	$1,450	$1,180	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	73.60%	71.78%	67.45%	69.38%	74.53%	76.17%	72.17%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	26.40%	28.22%	32.55%	30.62%	25.47%	23.83%	27.83%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
 Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel G: Essential Utilities

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$4,684	$4,684	$3,881	$2,009	$1,958	$1,850	$1,726	[a]
Shares Outstanding (in millions) - Common	245	245	221	178	178	177	177	[b]
Price per Share - Common	$44	$47	$46	$34	$38	$30	$30	[c]
Market Value of Common Equity	$10,681	$11,431	$10,168	$6,127	$6,795	$5,345	$5,248	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$10,681	$11,431	$10,168	$6,127	$6,795	$5,345	$5,248	[f]= [d] + [e]
Market to Book Value of Common Equity	2.28	2.44	2.62	3.05	3.47	2.89	3.04	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$380	$380	$2,015	$147	$131	$129	$128	[j]
Current Liabilities	$604	$604	$323	$399	$284	$302	$193	[k]
Current Portion of Long-Term Debt	$92	$92	$106	$145	$114	$151	$36	[l]
Net Working Capital	($132)	($132)	$1,798	($107)	($39)	($22)	($29)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$122	$122	$37	$24	$25	$7	$17	[n]
Adjusted Short-Term Debt	$122	$122	$0	$24	$25	$7	$17	[o] = See Sources and Notes.
Long-Term Debt	$5,563	$5,563	$2,955	$2,398	$2,008	$1,738	$1,720	[p]
Book Value of Long-Term Debt	$5,778	$5,778	$3,061	$2,567	$2,147	$1,895	$1,773	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$0	$0	$0	$0	$0	$0	$0	
Carrying Amount	$0	$0	$0	$0	$0	$0	$0	
Adjustment to Book Value of Long-Term Debt	$0	$0	$0	$0	$0	$0	$0	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$5,778	$5,778	$3,061	$2,567	$2,147	$1,895	$1,773	[s] = [q] + [r].
Market Value of Debt	$5,778	$5,778	$3,061	$2,567	$2,147	$1,895	$1,773	[t] = [s].
MARKET VALUE OF FIRM								
	$16,459	$17,209	$13,229	$8,694	$8,942	$7,240	$7,021	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	64.90%	66.43%	76.86%	70.47%	75.99%	73.83%	74.75%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	35.10%	33.57%	23.14%	29.53%	24.01%	26.17%	25.25%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and ||m|| < [n].
   (3): [n] if [m] < 0 and ||m|| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel H: Global Water Resources Inc

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$32	$32	$25	$28	$15	$15	$20	[a]
Shares Outstanding (in millions) - Common	23	23	22	22	20	20	18	[b]
Price per Share - Common	$17	$15	$13	$10	$9	$9	N/A	[c]
Market Value of Common Equity	$383	$334	$279	$218	$182	$174	N/A	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$383	$334	$279	$218	$182	$174	N/A	[f]= [d] + [e]
Market to Book Value of Common Equity	11.91	10.39	11.31	7.81	12.26	11.60	N/A	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$23	$23	$12	$17	$10	$25	$19	[j]
Current Liabilities	$12	$12	$10	$10	$9	$11	$11	[k]
Current Portion of Long-Term Debt	$2	$2	$0	$0	$0	$0	$2	[l]
Net Working Capital	$13	$13	$2	$8	$1	$14	$10	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$0	$0	$0	$0	[n]
Adjusted Short-Term Debt	$0	$0	$0	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$113	$113	$115	$115	$114	$114	$102	[p]
Book Value of Long-Term Debt	$115	$115	$115	$115	$114	$114	$104	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$128	$128	$121	$108	$116	$108	$117	
Carrying Amount	$113	$113	$115	$115	$114	$115	$105	
Adjustment to Book Value of Long-Term Debt	$15	$15	$6	($7)	$1	($7)	$12	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$130	$130	$121	$108	$116	$108	$116	[s] = [q] + [r].
Market Value of Debt	$130	$130	$121	$108	$116	$108	$116	[t] = [s].
MARKET VALUE OF FIRM								
	$513	$464	$400	$326	$298	$282	N/A	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	74.72%	72.04%	69.70%	66.86%	61.14%	61.74%	N/A	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	N/A	[w] = [i] / [u].
Debt - Market Value Ratio	25.28%	27.96%	30.30%	33.14%	38.86%	38.26%	N/A	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel I: Middlesex Water

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$346	$346	$324	$249	$229	$218	$207	[a]
Shares Outstanding (in millions) - Common	17	17	17	16	16	16	16	[b]
Price per Share - Common	$78	$72	$63	$53	$41	$42	$26	[c]
Market Value of Common Equity	$1,366	$1,264	$1,104	$876	$670	$691	$428	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$1,366	$1,264	$1,104	$876	$670	$691	$428	[f]= [d] + [e]
Market to Book Value of Common Equity	3.95	3.65	3.41	3.52	2.92	3.16	2.07	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$2	$2	$2	$2	$2	$2	$2	[h]
Market Value of Preferred Equity	$2	$2	$2	$2	$2	$2	$2	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$34	$34	$29	$31	$29	$27	$24	[j]
Current Liabilities	$57	$57	$65	$94	$65	$47	$28	[k]
Current Portion of Long-Term Debt	$8	$8	$8	$7	$7	$6	$6	[l]
Net Working Capital	($15)	($15)	($28)	($56)	($28)	($14)	$2	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$2	$2	$20	$49	$28	$12	$3	[n]
Adjusted Short-Term Debt	$2	$2	$20	$49	$28	$12	$0	[o] = See Sources and Notes.
Long-Term Debt	$278	$278	$237	$153	$139	$135	$133	[p]
Book Value of Long-Term Debt	$288	$288	$264	$209	$174	$153	$139	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$159	$159	$161	$103	$98	$85	$88	
Carrying Amount	$148	$148	$151	$101	$95	$83	$86	
Adjustment to Book Value of Long-Term Debt	$12	$12	$10	$1	$3	$2	$3	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$300	$300	$274	$210	$177	$155	$141	[s] = [q] + [r].
Market Value of Debt	$300	$300	$274	$210	$177	$155	$141	[t] = [s].
MARKET VALUE OF FIRM								
	$1,668	$1,566	$1,380	$1,089	$849	$848	$571	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	81.90%	80.72%	79.97%	80.48%	78.91%	81.47%	74.82%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	0.12%	0.13%	0.15%	0.22%	0.29%	0.29%	0.43%	[w] = [i] / [u].
Debt - Market Value Ratio	17.97%	19.15%	19.88%	19.29%	20.80%	18.25%	24.76%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
    Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel J: New Jersey Resources

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$1,698	$1,698	$1,828	$1,497	$1,348	$1,185	$1,144	[a]
Shares Outstanding (in millions) - Common	96	96	90	89	87	86	86	[b]
Price per Share - Common	$41	$35	$44	$48	$40	$36	$31	[c]
Market Value of Common Equity	$3,902	$3,338	$3,977	$4,241	$3,536	$3,119	$2,663	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$3,902	$3,338	$3,977	$4,241	$3,536	$3,119	$2,663	[f]= [d] + [e]
Market to Book Value of Common Equity	2.30	1.97	2.18	2.83	2.62	2.63	2.33	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$609	$609	$693	$1,050	$826	$815	$589	[j]
Current Liabilities	$519	$519	$806	$999	$991	$823	$575	[k]
Current Portion of Long-Term Debt	$31	$31	$26	$125	$166	$97	$11	[l]
Net Working Capital	$122	$122	($87)	$176	$1	$89	$25	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$134	$134	$391	$372	$373	$285	$211	[n]
Adjusted Short-Term Debt	$0	$0	$87	$0	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$2,370	$2,370	$1,657	$1,185	$1,001	$1,027	$848	[p]
Book Value of Long-Term Debt	$2,401	$2,401	$1,770	$1,310	$1,167	$1,124	$859	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$2,455	$2,455	$984	$669	$673	$732	$584	
Carrying Amount	$2,103	$2,103	$893	$672	$672	$708	$583	
Adjustment to Book Value of Long-Term Debt	$352	$352	$91	($3)	$1	$24	$1	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,754	$2,754	$1,861	$1,307	$1,168	$1,147	$861	[s] = [q] + [r].
Market Value of Debt	$2,754	$2,754	$1,861	$1,307	$1,168	$1,147	$861	[t] = [s].
MARKET VALUE OF FIRM								
	$6,656	$6,091	$5,838	$5,548	$4,705	$4,266	$3,524	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	58.63%	54.79%	68.12%	76.45%	75.17%	73.11%	75.58%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	41.37%	45.21%	31.88%	23.55%	24.83%	26.89%	24.42%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and ||m|| < [n].
    (3): [n] if [m] < 0 and ||m|| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel K: NiSource Inc.

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$4,872	$4,872	$5,107	$4,871	$4,320	$4,071	$3,844	[a]
Shares Outstanding (in millions) - Common	392	392	382	372	337	323	319	[b]
Price per Share - Common	$24	$22	$27	$26	$26	$22	$19	[c]
Market Value of Common Equity	$9,224	$8,793	$10,437	$9,805	$8,714	$7,144	$6,128	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$9,224	$8,793	$10,437	$9,805	$8,714	$7,144	$6,128	[f]= [d] + [e]
Market to Book Value of Common Equity	1.89	1.80	2.04	2.01	2.02	1.75	1.59	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$880	$880	$880	$880	$0	$0	$0	[h]
Market Value of Preferred Equity	$880	$880	$880	$880	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$1,659	$1,659	$1,854	$2,055	$1,763	$1,762	$1,577	[j]
Current Liabilities	$2,279	$2,279	$3,746	$4,037	$3,178	$3,452	$2,658	[k]
Current Portion of Long-Term Debt	$34	$34	$27	$50	$284	$363	$434	[l]
Net Working Capital	($586)	($586)	($1,865)	($1,931)	($1,131)	($1,327)	($647)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$503	$503	$1,773	$1,977	$1,206	$1,488	$567	[n]
Adjusted Short-Term Debt	$503	$503	$1,773	$1,931	$1,131	$1,327	$567	[o] = See Sources and Notes.
Long-Term Debt	$9,250	$9,250	$7,908	$7,313	$7,675	$6,058	$5,949	[p]
Book Value of Long-Term Debt	$9,786	$9,786	$9,708	$9,295	$9,090	$7,748	$6,950	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$11,034	$11,034	$8,764	$7,228	$8,603	$7,064	$6,976	
Carrying Amount	$9,243	$9,243	$7,870	$7,155	$7,797	$6,421	$6,382	
Adjustment to Book Value of Long-Term Debt	$1,791	$1,791	$895	$73	$807	$643	$594	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$11,577	$11,577	$10,602	$9,368	$9,897	$8,391	$7,543	[s] = [q] + [r].
Market Value of Debt	$11,577	$11,577	$10,602	$9,368	$9,897	$8,391	$7,543	[t] = [s].
MARKET VALUE OF FIRM								
	$21,681	$21,251	$21,919	$20,053	$18,611	$15,536	$13,671	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	42.54%	41.38%	47.61%	48.90%	46.82%	45.99%	44.82%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	4.06%	4.14%	4.01%	4.39%	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	53.40%	54.48%	48.37%	46.71%	53.18%	54.01%	55.18%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
    Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
    (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel L: Northwest Natural

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$889	$889	$866	$763	$743	$850	$781	[a]
Shares Outstanding (in millions) - Common	31	31	30	29	29	29	27	[b]
Price per Share - Common	$53	$48	$72	$63	$62	$60	$50	[c]
Market Value of Common Equity	$1,609	$1,459	$2,184	$1,832	$1,771	$1,726	$1,369	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$1,609	$1,459	$2,184	$1,832	$1,771	$1,726	$1,369	[f]= [d] + [e]
Market to Book Value of Common Equity	1.81	1.64	2.52	2.40	2.38	2.03	1.75	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$323	$323	$294	$296	$270	$288	$331	[j]
Current Liabilities	$627	$627	$482	$509	$382	$275	$478	[k]
Current Portion of Long-Term Debt	$96	$96	$77	$30	$97	$40	$25	[l]
Net Working Capital	($207)	($207)	($111)	($183)	($15)	$54	($122)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$305	$305	$149	$218	$54	$53	$270	[n]
Adjusted Short-Term Debt	$207	$207	$111	$183	$15	$0	$122	[o] = See Sources and Notes.
Long-Term Debt	$941	$941	$807	$706	$683	$679	$569	[p]
Book Value of Long-Term Debt	$1,245	$1,245	$995	$919	$795	$719	$716	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$920	$920	$920	$760	$853	$793	$667	
Carrying Amount	$917	$917	$844	$734	$780	$719	$602	
Adjustment to Book Value of Long-Term Debt	$3	$3	$76	$26	$73	$74	$65	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$1,247	$1,247	$1,071	$946	$869	$793	$782	[s] = [q] + [r].
Market Value of Debt	$1,247	$1,247	$1,071	$946	$869	$793	$782	[t] = [s].
MARKET VALUE OF FIRM								
	$2,856	$2,706	$3,256	$2,778	$2,640	$2,519	$2,151	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	56.34%	53.91%	67.10%	65.96%	67.09%	68.51%	63.65%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	43.66%	46.09%	32.90%	34.04%	32.91%	31.49%	36.35%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
  (1): 0 if [m] > 0.
  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
  (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel M: ONE Gas Inc.

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$2,233	$2,233	$2,129	$2,043	$1,960	$1,888	$1,842	[a]
Shares Outstanding (in millions) - Common	53	53	53	53	52	52	52	[b]
Price per Share - Common	$75	$78	$92	$83	$75	$64	$49	[c]
Market Value of Common Equity	$3,998	$4,150	$4,876	$4,340	$3,904	$3,324	$2,577	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$3,998	$4,150	$4,876	$4,340	$3,904	$3,324	$2,577	[f]= [d] + [e]
Market to Book Value of Common Equity	1.79	1.86	2.29	2.12	1.99	1.76	1.40	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$540	$540	$506	$543	$589	$569	$483	[j]
Current Liabilities	$797	$797	$873	$699	$1,193	$444	$304	[k]
Current Portion of Long-Term Debt	$7	$7	$7	$300	$0	$0	$0	[l]
Net Working Capital	($250)	($250)	($360)	$144	($604)	$125	$179	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$418	$418	$517	$300	$357	$145	$13	[n]
Adjusted Short-Term Debt	$250	$250	$360	$0	$357	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$1,613	$1,613	$1,314	$1,285	$1,193	$1,192	$1,192	[p]
Book Value of Long-Term Debt	$1,870	$1,870	$1,681	$1,585	$1,550	$1,192	$1,192	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$2,000	$2,000	$1,500	$1,400	$1,300	$1,200	$1,200	
Carrying Amount	$1,600	$1,600	$1,286	$1,300	$1,200	$1,200	$1,200	
Adjustment to Book Value of Long-Term Debt	$400	$400	$214	$100	$100	$0	$0	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,270	$2,270	$1,894	$1,685	$1,650	$1,192	$1,192	[s] = [q] + [r].
Market Value of Debt	$2,270	$2,270	$1,894	$1,685	$1,650	$1,192	$1,192	[t] = [s].
MARKET VALUE OF FIRM								
	$6,269	$6,420	$6,771	$6,025	$5,555	$4,517	$3,768	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	63.78%	64.64%	72.02%	72.03%	70.29%	73.60%	68.38%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	36.22%	35.36%	27.98%	27.97%	29.71%	26.40%	31.62%	[x] = [t] / [u].

Sources and Notes:

Bloomberg as of March 31, 2021

Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.

The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.

  Prices are reported in Workpaper #1 to Schedule No. BV-6.

[e] = Market Value of GP equity is not estimated here.

[o] =

  (1): 0 if [m] > 0.

  (2): The absolute value of [m] if [m] < 0 and ||m|| < [n].

  (3): [n] if [m] < 0 and ||m|| > [n].

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel N: SJW Group

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$917	$917	$890	$889	$463	$422	$384	[a]
Shares Outstanding (in millions) - Common	29	29	28	28	21	20	20	[b]
Price per Share - Common	$61	$68	$71	$55	$64	$56	$30	[c]
Market Value of Common Equity	$1,739	$1,953	$2,013	$1,566	$1,304	$1,143	$602	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$1,739	$1,953	$2,013	$1,566	$1,304	$1,143	$602	[f]= [d] + [e]
Market to Book Value of Common Equity	1.90	2.13	2.26	1.76	2.81	2.71	1.57	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$127	$127	$122	$503	$67	$100	$73	[j]
Current Liabilities	$351	$351	$235	$164	$85	$64	$80	[k]
Current Portion of Long-Term Debt	$76	$76	$22	$0	$0	$0	$3	[l]
Net Working Capital	($147)	($147)	($90)	$339	($18)	$36	($3)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$175	$175	$117	$100	$25	$14	$35	[n]
Adjusted Short-Term Debt	$147	$147	$90	$0	$18	$0	$3	[o] = See Sources and Notes.
Long-Term Debt	$1,288	$1,288	$1,284	$431	$431	$433	$377	[p]
Book Value of Long-Term Debt	$1,511	$1,511	$1,396	$431	$449	$433	$383	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$1,571	$1,571	$1,396	$490	$538	$502	$500	
Carrying Amount	$1,288	$1,288	$1,284	$431	$431	$433	$381	
Adjustment to Book Value of Long-Term Debt	$283	$283	$112	$59	$107	$69	$119	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$1,794	$1,794	$1,509	$490	$556	$502	$503	[s] = [q] + [r].
Market Value of Debt	$1,794	$1,794	$1,509	$490	$556	$502	$503	[t] = [s].
MARKET VALUE OF FIRM								
	$3,534	$3,747	$3,521	$2,056	$1,860	$1,645	$1,105	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	49.23%	52.12%	57.16%	76.17%	70.09%	69.47%	54.51%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	50.77%	47.88%	42.84%	23.83%	29.91%	30.53%	45.49%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel O: South Jersey Inds.

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$1,661	$1,661	$1,424	$1,267	$1,192	$1,289	$1,038	[a]
Shares Outstanding (in millions) - Common	101	101	92	86	80	79	71	[b]
Price per Share - Common	$24	$22	$32	$29	$32	$34	$23	[c]
Market Value of Common Equity	$2,409	$2,232	$2,965	$2,473	$2,516	$2,719	$1,648	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$2,409	$2,232	$2,965	$2,473	$2,516	$2,719	$1,648	[f]= [d] + [e]
Market to Book Value of Common Equity	1.45	1.34	2.08	1.95	2.11	2.11	1.59	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$507	$507	$653	$663	$439	$473	$431	[j]
Current Liabilities	$1,164	$1,164	$1,732	$1,581	$883	$953	$832	[k]
Current Portion of Long-Term Debt	$143	$143	$469	$734	$64	$232	$29	[l]
Net Working Capital	($513)	($513)	($610)	($184)	($380)	($247)	($372)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$596	$596	$849	$271	$346	$296	$432	[n]
Adjusted Short-Term Debt	$513	$513	$610	$184	$346	$247	$372	[o] = See Sources and Notes.
Long-Term Debt	$2,778	$2,778	$2,071	$2,107	$1,123	$808	$997	[p]
Book Value of Long-Term Debt	$3,435	$3,435	$3,150	$3,025	$1,533	$1,287	$1,399	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$1,197	$1,197	$915	$895	$839	$1,081	$1,079	
Carrying Amount	$1,069	$1,069	$965	$893	$822	$1,047	$1,036	
Adjustment to Book Value of Long-Term Debt	$128	$128	($50)	$2	$17	$33	$43	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$3,562	$3,562	$3,100	$3,026	$1,550	$1,321	$1,442	[s] = [q] + [r].
Market Value of Debt	$3,562	$3,562	$3,100	$3,026	$1,550	$1,321	$1,442	[t] = [s].
MARKET VALUE OF FIRM								
	$5,971	$5,794	$6,065	$5,500	$4,066	$4,039	$3,090	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	40.34%	38.52%	48.88%	44.97%	61.88%	67.30%	53.34%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	59.66%	61.48%	51.12%	55.03%	38.12%	32.70%	46.66%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
 Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
 (1): 0 if [m] > 0.
 (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
 (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel P: Southwest Gas

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$2,675	$2,675	$2,506	$2,252	$1,815	$1,663	$1,594	[a]
Shares Outstanding (in millions) - Common	57	57	55	53	48	47	47	[b]
Price per Share - Common	$67	$61	$76	$79	$81	$76	$53	[c]
Market Value of Common Equity	$3,853	$3,516	$4,161	$4,200	$3,889	$3,606	$2,528	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$3,853	$3,516	$4,161	$4,200	$3,889	$3,606	$2,528	[f]= [d] + [e]
Market to Book Value of Common Equity	1.44	1.31	1.66	1.86	2.14	2.17	1.59	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$871	$871	$860	$840	$657	$533	$558	[j]
Current Liabilities	$912	$912	$1,080	$939	$816	$628	$535	[k]
Current Portion of Long-Term Debt	$51	$51	$187	$33	$25	$50	$19	[l]
Net Working Capital	$10	$10	($33)	($66)	($134)	($45)	$43	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$107	$107	$211	$152	$215	$0	$18	[n]
Adjusted Short-Term Debt	$0	$0	$33	$66	$134	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$2,810	$2,810	$2,375	$2,107	$1,799	$1,550	$1,551	[p]
Book Value of Long-Term Debt	$2,861	$2,861	$2,595	$2,206	$1,957	$1,600	$1,571	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$2,628	$2,628	$2,628	$2,173	$1,849	$1,600	$1,571	
Carrying Amount	$2,732	$2,732	$2,300	$2,107	$1,799	$1,550	$1,551	
Adjustment to Book Value of Long-Term Debt	($105)	($105)	$327	$66	$51	$50	$19	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$2,756	$2,756	$2,922	$2,272	$2,008	$1,650	$1,590	[s] = [q] + [r].
Market Value of Debt	$2,756	$2,756	$2,922	$2,272	$2,008	$1,650	$1,590	[t] = [s].
MARKET VALUE OF FIRM								
	$6,609	$6,272	$7,083	$6,472	$5,897	$5,256	$4,118	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	58.30%	56.06%	58.75%	64.89%	65.95%	68.60%	61.39%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	41.70%	43.94%	41.25%	35.11%	34.05%	31.40%	38.61%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
   Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
   (1): 0 if [m] > 0.
   (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].
   (3): [n] if [m] < 0 and |[m]| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel Q: Spire Inc.

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$2,345	$2,345	$2,344	$2,285	$2,079	$1,797	$1,600	[a]
Shares Outstanding (in millions) - Common	52	52	51	51	48	46	43	[b]
Price per Share - Common	$74	$64	$82	$76	$76	$64	$58	[c]
Market Value of Common Equity	$3,803	$3,323	$4,190	$3,859	$3,677	$2,935	$2,533	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$3,803	$3,323	$4,190	$3,859	$3,677	$2,935	$2,533	[f]= [d] + [e]
Market to Book Value of Common Equity	1.62	1.42	1.79	1.69	1.77	1.63	1.58	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$242	$242	$242	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$242	$242	$242	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$770	$770	$776	$905	$853	$816	$636	[j]
Current Liabilities	$1,547	$1,547	$1,253	$1,563	$1,211	$1,342	$848	[k]
Current Portion of Long-Term Debt	$111	$111	$45	$175	$106	$250	$0	[l]
Net Working Capital	($666)	($666)	($431)	($483)	($253)	($277)	($212)	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$696	$696	$519	$626	$584	$506	$377	[n]
Adjusted Short-Term Debt	$666	$666	$431	$483	$253	$277	$212	[o] = See Sources and Notes.
Long-Term Debt	$2,518	$2,518	$2,484	$1,992	$2,030	$1,821	$1,852	[p]
Book Value of Long-Term Debt	$3,294	$3,294	$2,961	$2,650	$2,389	$2,348	$2,063	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$3,120	$3,120	$2,373	$2,074	$2,210	$2,257	$1,944	
Carrying Amount	$2,628	$2,628	$2,123	$2,076	$2,095	$2,084	$1,852	
Adjustment to Book Value of Long-Term Debt	$491	$491	$251	($2)	$115	$173	$93	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$3,785	$3,785	$3,211	$2,649	$2,504	$2,521	$2,156	[s] = [q] + [r].
Market Value of Debt	$3,785	$3,785	$3,211	$2,649	$2,504	$2,521	$2,156	[t] = [s].
MARKET VALUE OF FIRM								
	$7,830	$7,351	$7,643	$6,507	$6,181	$5,456	$4,688	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	48.56%	45.21%	54.82%	59.30%	59.49%	53.79%	54.02%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	3.09%	3.29%	3.17%	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	48.34%	51.50%	42.02%	40.70%	40.51%	46.21%	45.98%	[x] = [t] / [u].

Sources and Notes:
Bloomberg as of March 31, 2021
Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.
The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.
  Prices are reported in Workpaper #1 to Schedule No. BV-6.
[e] = Market Value of GP equity is not estimated here.
[o] =
    (1): 0 if [m] > 0.
    (2): The absolute value of [m] if [m] < 0 and ||[m]|| < [n].
    (3): [n] if [m] < 0 and ||[m]|| > [n].
[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-3

Market Value of the Sample

Panel R: York Water Co. (The)

($MM)

	DCF Capital Structure	Year End, 2020	Year End, 2019	Year End, 2018	Year End, 2017	Year End, 2016	Year End, 2015	Notes
MARKET VALUE OF COMMON EQUITY								
	DCF Capital Structure	12/31/20	12/31/19	12/31/18	12/31/17	12/31/16	12/31/15	
Book Value, Common Shareholder's Equity	$143	$143	$134	$126	$119	$114	$109	[a]
Shares Outstanding (in millions) - Common	13	13	13	13	13	13	13	[b]
Price per Share - Common	$49	$47	$46	$33	$34	$39	$25	[c]
Market Value of Common Equity	$634	$619	$597	$427	$441	$496	$318	[d] = [b] x [c].
Market Value of GP Equity	$0	$0	$0	$0	$0	$0	$0	[e] = See Sources and Notes.
Total Market Value of Equity	$634	$619	$597	$427	$441	$496	$318	[f]= [d] + [e]
Market to Book Value of Common Equity	4.42	4.32	4.45	3.38	3.70	4.35	2.92	[g] = [f] / [a].
MARKET VALUE OF PREFERRED EQUITY								
Book Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[h]
Market Value of Preferred Equity	$0	$0	$0	$0	$0	$0	$0	[i] = [h].
MARKET VALUE OF DEBT								
Current Assets	$16	$16	$9	$9	$9	$13	$12	[j]
Current Liabilities	$12	$12	$15	$11	$9	$8	$6	[k]
Current Portion of Long-Term Debt	$0	$0	$7	$0	$0	$0	$0	[l]
Net Working Capital	$4	$4	$1	($2)	($0)	$4	$5	[m] = [j] - ([k] - [l]).
Notes Payable (Short-Term Debt)	$0	$0	$0	$1	$1	$0	$0	[n]
Adjusted Short-Term Debt	$0	$0	$0	$1	$0	$0	$0	[o] = See Sources and Notes.
Long-Term Debt	$124	$124	$95	$93	$90	$85	$85	[p]
Book Value of Long-Term Debt	$124	$124	$101	$94	$91	$85	$85	[q] = [l] + [o] + [p].
Unadjusted Market Value of Long Term Debt	$151	$151	$115	$105	$108	$99	$102	
Carrying Amount	$127	$127	$104	$96	$93	$87	$88	
Adjustment to Book Value of Long-Term Debt	$24	$24	$11	$9	$15	$12	$14	[r] = See Sources and Notes.
Market Value of Long-Term Debt	$148	$148	$112	$103	$106	$96	$99	[s] = [q] + [r].
Market Value of Debt	$148	$148	$112	$103	$106	$96	$99	[t] = [s].
MARKET VALUE OF FIRM								
	$782	$767	$709	$531	$547	$592	$417	[u] = [f] + [i] + [t].
DEBT AND EQUITY TO MARKET VALUE RATIOS								
Common Equity - Market Value Ratio	81.06%	80.70%	84.21%	80.50%	80.66%	83.75%	76.26%	[v] = [f] / [u].
Preferred Equity - Market Value Ratio	-	-	-	-	-	-	-	[w] = [i] / [u].
Debt - Market Value Ratio	18.94%	19.30%	15.79%	19.50%	19.34%	16.25%	23.74%	[x] = [t] / [u].

Sources and Notes:

Bloomberg as of March 31, 2021

Capital structure from Year End, 2020 calculated using respective balance sheet information and 15-day average prices ending at period end.

The DCF Capital structure is calculated using 4th Quarter, 2020 balance sheet information and a 15-trading day average closing price ending on 3/31/2021.

  Prices are reported in Workpaper #1 to Schedule No. BV-6.

[e] = Market Value of GP equity is not estimated here.

[o] =

  (1): 0 if [m] > 0.

  (2): The absolute value of [m] if [m] < 0 and |[m]| < [n].

  (3): [n] if [m] < 0 and |[m]| > [n].

[r]: Difference between fair value of Long-Term debt and carrying amount of Long-Term debt per company 10-K. Data for adjustment is from 2015 to 2019 10-Ks.

Schedule No. BV-4

Sample

Capital Structure Summary of the Sample

Company	DCF Capital Structure			5-Year Average Capital Structure		
	Common Equity - Value Ratio	Preferred Equity - Value Ratio	Debt - Value Ratio	Common Equity - Value Ratio	Preferred Equity - Value Ratio	Debt - Value Ratio
	[1]	[2]	[3]	[4]	[5]	[6]
Amer. States Water	0.79	0.00	0.21	0.82	0.00	0.18
Amer. Water Works	0.67	0.00	0.33	0.66	0.00	0.34
Artesian Res Corp	0.66	0.00	0.34	0.70	0.00	0.30
Atmos Energy	0.66	0.00	0.34	0.71	0.00	0.29
California Water	0.68	0.00	0.32	0.70	0.00	0.30
Chesapeake Utilities	0.74	0.00	0.26	0.72	0.00	0.28
Essential Utilities	0.65	0.00	0.35	0.73	0.00	0.27
Global Water Resources Inc	0.75	0.00	0.25	0.66	0.00	0.34
Middlesex Water	0.82	0.00	0.18	0.80	0.00	0.19
New Jersey Resources	0.59	0.00	0.41	0.70	0.00	0.30
NiSource Inc.	0.43	0.04	0.53	0.46	0.03	0.51
Northwest Natural	0.56	0.00	0.44	0.65	0.00	0.35
ONE Gas Inc.	0.64	0.00	0.36	0.71	0.00	0.29
SJW Group	0.49	0.00	0.51	0.65	0.00	0.35
South Jersey Inds.	0.40	0.00	0.60	0.52	0.00	0.48
Southwest Gas	0.58	0.00	0.42	0.63	0.00	0.37
Spire Inc.	0.49	0.03	0.48	0.55	0.01	0.44
York Water Co. (The)	0.81	0.00	0.19	0.82	0.00	0.18
Combined Sample Average	0.63	0.00	0.36	0.68	0.00	0.32
Water Sample Average	0.70	0.00	0.30	0.73	0.00	0.27
Gas Sample Average	0.56	0.01	0.43	0.63	0.00	0.37

Sources and Notes:

[1], [4]:Workpaper #1 to Schedule No. BV-4.

[2], [5]:Workpaper #2 to Schedule No. BV-4.

[3], [6]:Workpaper #3 to Schedule No. BV-4.

Values in this table may not add up exactly to 1.0 because of rounding.

Schedule No. BV-5

Sample

Estimated Growth Rates of the Sample

	Thomson Reuters IBES Estimate		Value Line			
Company	Long-Term Growth Rate	Number of Estimates	EPS Year 2020 Estimate	EPS Year 2023-2025 Estimate	Annualized Growth Rate	Combined Growth Rate
	[1]	[2]	[3]	[4]	[5]	[6]
Amer. States Water	4.6%	1	2.40	3.05	6.2%	5.4%
Amer. Water Works	8.6%	1	4.25	5.50	6.7%	7.6%
Artesian Res Corp	4.0%	1	n/a	n/a	n/a	4.0%
Atmos Energy	7.0%	3	5.00	6.50	6.8%	6.9%
California Water	10.8%	2	1.90	2.25	4.3%	8.6%
Chesapeake Utilities	4.7%	1	4.25	5.75	7.8%	6.3%
Essential Utilities	6.4%	1	1.65	1.90	3.6%	5.0%
Global Water Resources Inc	15.0%	1	n/a	n/a	n/a	15.0%
Middlesex Water	2.7%	1	2.25	2.70	4.7%	3.7%
New Jersey Resources	6.0%	1	1.65	2.45	10.4%	8.2%
NiSource Inc.	4.4%	1	1.40	2.30	13.2%	8.8%
Northwest Natural	3.1%	1	2.50	3.10	5.5%	4.3%
ONE Gas Inc.	5.0%	1	3.80	5.00	7.1%	6.1%
SJW Group	5.5%	1	2.55	3.65	9.4%	7.4%
South Jersey Inds.	4.4%	1	1.70	2.50	10.1%	7.3%
Southwest Gas	4.0%	1	4.45	6.50	9.9%	7.0%
Spire Inc.	5.7%	2	3.85	5.15	7.5%	6.3%
York Water Co. (The)	4.9%	1	1.35	1.65	5.1%	5.0%

Sources and Notes:

[1] - [2]: Thomson Reuters as of March 31, 2021.

[3] - [4]: From Valueline Investment Analyzer as of March 31, 2021.

[5]: ([4] / [3]) ^ (1/4) - 1.

[6]: ([1] x [2] + [5]) / ([2] + 1).

    Weighted average growth rate. If information is missing from one source, the weighted average is based solely on the other source.

Schedule No. BV-6

DCF Cost of Equity of the Sample

Panel A: Simple DCF Method (Quarterly)

Company	Stock Price	Most Recent Dividend	Quarterly Dividend Yield	Combined Long-Term Growth Rate	Quarterly Growth Rate	DCF Cost of Equity
	[1]	[2]	[3]	[4]	[5]	[6]
Amer. States Water	$73.79	$0.34	0.46%	5.4%	1.3%	7.3%
Amer. Water Works	$142.65	$0.55	0.39%	7.6%	1.9%	9.3%
Artesian Res Corp	$40.16	$0.26	0.65%	4.0%	1.0%	6.7%
Atmos Energy	$94.85	$0.63	0.67%	6.9%	1.7%	9.8%
California Water	$54.57	$0.23	0.43%	8.6%	2.1%	10.4%
Chesapeake Utilities	$117.33	$0.44	0.38%	6.3%	1.5%	7.9%
Essential Utilities	$43.53	$0.25	0.58%	5.0%	1.2%	7.4%
Global Water Resources Ir	$16.97	$0.02	0.15%	15.0%	3.6%	15.7%
Middlesex Water	$78.19	$0.27	0.35%	3.7%	0.9%	5.1%
New Jersey Resources	$40.59	$0.33	0.84%	8.2%	2.0%	11.8%
NiSource Inc.	$23.54	$0.22	0.95%	8.8%	2.1%	12.9%
Northwest Natural	$52.60	$0.48	0.92%	4.3%	1.1%	8.2%
ONE Gas Inc.	$75.20	$0.58	0.78%	6.1%	1.5%	9.4%
SJW Group	$60.91	$0.34	0.57%	7.4%	1.8%	9.9%
South Jersey Inds.	$23.95	$0.30	1.29%	7.3%	1.8%	12.8%
Southwest Gas	$67.37	$0.57	0.86%	7.0%	1.7%	10.6%
Spire Inc.	$73.61	$0.65	0.90%	6.3%	1.5%	10.1%
York Water Co. (The)	$48.51	$0.19	0.39%	5.0%	1.2%	6.7%

Sources and Notes:
[1]: Workpaper #1 to Schedule No. BV-6.
[2]: Workpaper #2 to Schedule No. BV-6.
[3]: ([2] / [1]) x (1 + [5]).
[4]: Schedule No. BV-5, [6].
[5]: {(1 + [4]) ^ (1/4)} - 1.
[6]: {([3] + [5] + 1) ^ 4} - 1.

Schedule No. BV-6

DCF Cost of Equity of the Sample

Panel B: Multi-Stage DCF (Using Blue Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company	Stock Price	Most Recent Dividend	Combined Long-Term Growth Rate	Growth Rate: Year 6	Growth Rate: Year 7	Growth Rate: Year 8	Growth Rate: Year 9	Growth Rate: Year 10	GDP Long-Term Growth Rate	DCF Cost of Equity
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Amer. States Water	$73.79	$0.34	5.4%	5.1%	4.9%	4.6%	4.4%	4.1%	3.9%	6.0%
Amer. Water Works	$142.65	$0.55	7.6%	7.0%	6.4%	5.8%	5.1%	4.5%	3.9%	6.0%
Artesian Res Corp	$40.16	$0.26	4.0%	4.0%	4.0%	4.0%	3.9%	3.9%	3.9%	6.6%
Atmos Energy	$94.85	$0.63	6.9%	6.4%	5.9%	5.4%	4.9%	4.4%	3.9%	7.3%
California Water	$54.57	$0.23	8.6%	7.8%	7.0%	6.3%	5.5%	4.7%	3.9%	6.3%
Chesapeake Utilities	$117.33	$0.44	6.3%	5.9%	5.5%	5.1%	4.7%	4.3%	3.9%	5.7%
Essential Utilities	$43.53	$0.25	5.0%	4.8%	4.6%	4.4%	4.3%	4.1%	3.9%	6.5%
Global Water Resources Inc	$16.97	$0.02	15.0%	13.2%	11.3%	9.5%	7.6%	5.8%	3.9%	5.2%
Middlesex Water	$78.19	$0.27	3.7%	3.7%	3.8%	3.8%	3.8%	3.9%	3.9%	5.3%
New Jersey Resources	$40.59	$0.33	8.2%	7.5%	6.8%	6.0%	5.3%	4.6%	3.9%	8.4%
NiSource Inc.	$23.54	$0.22	8.8%	8.0%	7.2%	6.3%	5.5%	4.7%	3.9%	9.2%
Northwest Natural	$52.60	$0.48	4.3%	4.2%	4.2%	4.1%	4.0%	4.0%	3.9%	7.8%
ONE Gas Inc.	$75.20	$0.58	6.1%	5.7%	5.3%	5.0%	4.6%	4.3%	3.9%	7.6%
SJW Group	$60.91	$0.34	7.4%	6.9%	6.3%	5.7%	5.1%	4.5%	3.9%	6.8%
South Jersey Inds.	$23.95	$0.30	7.3%	6.7%	6.1%	5.6%	5.0%	4.5%	3.9%	10.4%
Southwest Gas	$67.37	$0.57	7.0%	6.5%	5.9%	5.4%	4.9%	4.4%	3.9%	8.2%
Spire Inc.	$73.61	$0.65	6.3%	5.9%	5.5%	5.1%	4.7%	4.3%	3.9%	8.2%
York Water Co. (The)	$48.51	$0.19	5.0%	4.8%	4.6%	4.5%	4.3%	4.1%	3.9%	5.6%

Sources and Notes:

[1]: Workpaper #1 to Schedule No. BV-6.

[2]: Workpaper #2 to Schedule No. BV-6.

[3]: Schedule No. BV-5, [6].

[4]: [3] - {([3] - [9])/ 6}.

[5]: [4] - {([3] - [9])/ 6}.

[6]: [5] - {([3] - [9])/ 6}.

[7]: [6] - {([3] - [9])/ 6}.

[8]: [7] - {([3] - [9])/ 6}.

[9]: BlueChip Economic Indicators, March 2021 This number is assumed to be the perpetual growth rate.

[10]: Workpaper #3 to Schedule No. BV-6.

Schedule No. BV-7

Overall After-Tax DCF Cost of Capital of the Sample

Panel A: Simple DCF Method (Quarterly)

Company	4th Quarter, 2020 S&P Bond Rating	4th Quarter, 2020 Preferred Equity Rating	DCF Cost of Equity	DCF Common Equity to Market Value Ratio	Cost of Preferred Equity	DCF Preferred Equity to Market Value Ratio	DCF Cost of Debt	DCF Debt to Market Value Ratio	Portland General Electric's Representative Income Tax Rate	Overall Weighted After-Tax Cost of Capital
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Amer. States Water	A	-	7.3%	0.79	-	0.00	3.4%	0.21	27.0%	6.3%
Amer. Water Works	A	-	9.3%	0.67	-	0.00	3.4%	0.33	27.0%	7.1%
Artesian Res Corp	A	-	6.7%	0.66	-	0.00	3.4%	0.34	27.0%	5.2%
Atmos Energy	A	-	9.8%	0.66	-	0.00	3.4%	0.34	27.0%	7.3%
California Water	A	-	10.4%	0.68	-	0.00	3.4%	0.32	27.0%	7.9%
Chesapeake Utilities	A	-	7.9%	0.74	-	0.00	3.4%	0.26	27.0%	6.5%
Essential Utilities	A	-	7.4%	0.65	-	0.00	3.4%	0.35	27.0%	5.7%
Global Water Resources Inc	A	-	15.7%	0.75	-	0.00	3.4%	0.25	27.0%	12.3%
Middlesex Water	A	A	5.1%	0.82	3.4%	0.00	3.4%	0.18	27.0%	4.6%
New Jersey Resources	A	-	11.8%	0.59	-	0.00	3.4%	0.41	27.0%	7.9%
NiSource Inc.	BBB	BBB	12.9%	0.43	3.7%	0.04	3.7%	0.53	27.0%	7.1%
Northwest Natural	BBB	-	8.2%	0.56	-	0.00	3.7%	0.44	27.0%	5.8%
ONE Gas Inc.	A	-	9.4%	0.64	-	0.00	3.4%	0.36	27.0%	6.9%
SJW Group	A	-	9.9%	0.49	-	0.00	3.4%	0.51	27.0%	6.1%
South Jersey Inds.	BBB	-	12.8%	0.40	-	0.00	3.7%	0.60	27.0%	6.8%
Southwest Gas	BBB	-	10.6%	0.58	-	0.00	3.7%	0.42	27.0%	7.3%
Spire Inc.	A	A	10.1%	0.49	3.4%	0.03	3.4%	0.48	27.0%	6.2%
York Water Co. (The)	A	-	6.7%	0.81	-	0.00	3.4%	0.19	27.0%	5.9%
Simple Combined Sample Average			9.6%	0.63	3.5%	0.00	3.4%	0.36	27.0%	6.8%
Simple Gas Sample Average			10.4%	0.56	3.5%	0.01	3.5%	0.43	27.0%	6.9%
Simple Water Sample Average			8.7%	0.70	3.4%	0.00	3.4%	0.30	27.0%	6.8%

Sources and Notes:
[1]: Bloomberg as of March 31, 2021.
[2]: Preferred ratings were assumed equal to debt rating
[3]: Schedule No. BV-6; Panel A, [6].
[4]: Schedule No. BV-4, [1].
[5]: Workpaper #2 to Schedule No. BV-11, Panel C.
[6]: Schedule No. BV-4, [2].
[7]: Workpaper #2 to Schedule No. BV-11, Panel B.
[8]: Schedule No. BV-4, [3].
[9]: Provided by Portland General Electric.
[10]: ([3] x [4]) + ([5] x [6]) + {[7] x [8] x (1 - [9])}. A strikethrough indicates the utility was excluded from the full sample average calculation as a result of its cost of equity not exceeding its cost of debt by 150 basis points

Schedule No. BV-7

Overall After-Tax DCF Cost of Capital of the Sample

Panel B: Multi-Stage DCF (Using Blue Chip Long-Term GDP Growth Forecast as the Perpetual Rate)

Company	4th Quarter, 2020 S&P Bond Rating	4th Quarter, 2020 Preferred Equity Rating	DCF Cost of Equity	DCF Common Equity to Market Value Ratio	Cost of Preferred Equity	DCF Preferred Equity to Market Value Ratio	DCF Cost of Debt	DCF Debt to Market Value Ratio	Portland General Electric's Representative Income Tax Rate	Overall Weighted After-Tax Cost of Capital
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Amer. States Water	A	-	6.0%	0.79	-	0.00	3.4%	0.21	27.0%	5.3%
Amer. Water Works	A	-	6.0%	0.67	-	0.00	3.4%	0.33	27.0%	4.8%
Artesian Res Corp	A	-	6.6%	0.66	-	0.00	3.4%	0.34	27.0%	5.2%
Atmos Energy	A	-	7.3%	0.66	-	0.00	3.4%	0.34	27.0%	5.6%
California Water	A	-	6.3%	0.68	-	0.00	3.4%	0.32	27.0%	5.1%
Chesapeake Utilities	A	-	5.7%	0.74	-	0.00	3.4%	0.26	27.0%	4.9%
Essential Utilities	A	-	6.5%	0.65	-	0.00	3.4%	0.35	27.0%	5.1%
Global Water Resources Inc	A	-	5.2%	0.75	-	0.00	3.4%	0.25	27.0%	4.5%
Middlesex Water	A	A	5.3%	0.82	3.4%	0.00	3.4%	0.18	27.0%	4.8%
New Jersey Resources	A	-	8.4%	0.59	-	0.00	3.4%	0.41	27.0%	5.9%
NiSource Inc.	BBB	BBB	9.2%	0.43	3.7%	0.04	3.7%	0.53	27.0%	5.5%
Northwest Natural	BBB	-	7.8%	0.56	-	0.00	3.7%	0.44	27.0%	5.6%
ONE Gas Inc.	A	-	7.6%	0.64	-	0.00	3.4%	0.36	27.0%	5.7%
SJW Group	A	-	6.8%	0.49	-	0.00	3.4%	0.51	27.0%	4.6%
South Jersey Inds.	BBB	-	10.4%	0.40	-	0.00	3.7%	0.60	27.0%	5.8%
Southwest Gas	BBB	-	8.2%	0.58	-	0.00	3.7%	0.42	27.0%	5.9%
Spire Inc.	A	A	8.2%	0.49	3.4%	0.03	3.4%	0.48	27.0%	5.3%
York Water Co. (The)	A	-	5.6%	0.81	-	0.00	3.4%	0.19	27.0%	5.0%
Multi-Stage Combined Sample Average			7.1%	0.63	3.5%	0.00	3.4%	0.36	27.0%	5.3%
Multi-Stage Gas Sample Average			8.1%	0.56	3.5%	0.01	3.5%	0.43	27.0%	5.6%
Multi-Stage Water Sample Average			6.0%	0.70	3.4%	0.00	3.4%	0.30	27.0%	4.9%

Sources and Notes:
[1]: Bloomberg as of March 31, 2021.
[2]: Preferred ratings were assumed equal to debt rating
[3]: Schedule No. BV-6, Panel B, [10].
[4]: Schedule No. BV-4, [1].
[5]: Workpaper #2 to Schedule No. BV-11, Panel C.
[6]: Schedule No. BV-4, [2].
[7]: Workpaper #2 to Schedule No. BV-11, Panel B.
[8]: Schedule No. BV-4, [3].
[9]: Provided by Portland General Electric.
[10]: ([3] x [4]) + ([5] x [6]) + {[7] x [8] x (1 - [9])}. A strikethrough indicates the utility was excluded from the full sample average calculation as a result of its cost of equity not exceeding its cost of debt by 150 basis points

Schedule No. BV-8

DCF Cost of Equity at Portland General Electric's Proposed Capital Structure

Sample

	Overall After -Tax Cost of Capital [1]	Portland General Electric's Representative Regulatory % Debt [2]	Representative Cost of BBB Rated Utility Debt [3]	Portland General Electric's Representative Income Tax Rate [4]	Portland General Electric's Representative Regulatory % Equity [5]	Estimated Return on Equity [6]
Combined Sample						
Simple DCF Quarterly	6.8%	50.0%	3.7%	27.0%	50.0%	10.9%
Multi-Stage DCF - Using the Blue Chip Economic Indicator Long-Term GDP Growth Forecast as the Perpetual Rate	5.3%	50.0%	3.7%	27.0%	50.0%	7.8%
Electric Sample						
Simple DCF Quarterly	6.8%	50.0%	3.7%	27.0%	50.0%	10.9%
Multi-Stage DCF - Using the Blue Chip Economic Indicator Long-Term GDP Growth Forecast as the Perpetual Rate	4.9%	50.0%	3.7%	27.0%	50.0%	7.1%
Gas Sample						
Simple DCF Quarterly	6.9%	50.0%	3.7%	27.0%	50.0%	11.0%
Multi-Stage DCF - Using the Blue Chip Economic Indicator Long-Term GDP Growth Forecast as the Perpetual Rate	5.6%	50.0%	3.7%	27.0%	50.0%	8.5%

Sources and Notes:

[1]: Schedule No. BV-7; Panels A-B, [10].

[2]: Provided by Portland General Electric.

[3]: Based on a BBB rating. Yield from Bloomberg as of March 31, 2021.

[4]: Provided by Portland General Electric.

[5]: Provided by Portland General Electric.

[6]: {[1] - ([2] x [3] x (1 - [4]))} / [5].

Schedule No. BV-9 Risk-Free Rates

BCEI Forecast of 10 year U.S. Treasury Yield	**[a]**	**2.10%**
Long-run Average of 20 year U.S. Treasury Yield	[b]	5.01%
Long-run Average of 10 year U.S. Treasury Yield	[c]	4.53%
Maturity Premium	**[d] = [b] - [c]**	**0.50%**
Base Projection of 20 year U.S. Treasury Yield	**[e] = [a] + [d]**	**2.60%**

Sources and Notes:

[a]: Blue Chip Economic Indicators, March 2021. Average projection of 2022 and 2023 Yiel

[b], [c]: Bloomberg as of 3/31/2021, see Workpaper #1 to Schedule No. BV-9.

Schedule No. BV-10

Risk Positioning Cost of Equity of the Sample (Using Value Line Betas)

Panel A: Scenario 1 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%

Company	Long-Term Risk-Free Rate	Value Line Betas	Long-Term Market Risk Premium	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
Amer. States Water	2.80%	0.65	7.25%	7.5%	8.0%
Amer. Water Works	2.80%	0.85	7.25%	9.0%	9.2%
Artesian Res Corp	2.80%	0.75	7.25%	8.2%	8.6%
Atmos Energy	2.80%	0.80	7.25%	8.6%	8.9%
California Water	2.80%	0.65	7.25%	7.5%	8.0%
Chesapeake Utilities	2.80%	0.80	7.25%	8.6%	8.9%
Essential Utilities	2.80%	0.95	7.25%	9.7%	9.8%
Global Water Resources Inc	2.80%	0.75	7.25%	8.2%	8.6%
Middlesex Water	2.80%	0.70	7.25%	7.9%	8.3%
New Jersey Resources	2.80%	0.95	7.25%	9.7%	9.8%
NiSource Inc.	2.80%	0.85	7.25%	9.0%	9.2%
Northwest Natural	2.80%	0.80	7.25%	8.6%	8.9%
ONE Gas Inc.	2.80%	0.80	7.25%	8.6%	8.9%
SJW Group	2.80%	0.85	7.25%	9.0%	9.2%
South Jersey Inds.	2.80%	1.05	7.25%	10.4%	10.3%
Southwest Gas	2.80%	0.95	7.25%	9.7%	9.8%
Spire Inc.	2.80%	0.85	7.25%	9.0%	9.2%
York Water Co. (The)	2.80%	0.80	7.25%	8.6%	8.9%

Sources and Notes:
[1], [3]: Villadsen Direct Testimony.
[2]: From Valueline Investment Analyzer as of March 31, 2021.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-10

Risk Positioning Cost of Equity of the Sample (Using Value Line Betas)

Panel B: Scenario 2 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%

Company	Long-Term Risk-Free Rate	Value Line Betas	Long-Term Market Risk Premium	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
Amer. States Water	2.80%	0.65	8.00%	8.0%	8.5%
Amer. Water Works	2.80%	0.85	8.00%	9.6%	9.8%
Artesian Res Corp	2.80%	0.75	8.00%	8.8%	9.2%
Atmos Energy	2.80%	0.80	8.00%	9.2%	9.5%
California Water	2.80%	0.65	8.00%	8.0%	8.5%
Chesapeake Utilities	2.80%	0.80	8.00%	9.2%	9.5%
Essential Utilities	2.80%	0.95	8.00%	10.4%	10.5%
Global Water Resources Inc	2.80%	0.75	8.00%	8.8%	9.2%
Middlesex Water	2.80%	0.70	8.00%	8.4%	8.9%
New Jersey Resources	2.80%	0.95	8.00%	10.4%	10.5%
NiSource Inc.	2.80%	0.85	8.00%	9.6%	9.8%
Northwest Natural	2.80%	0.80	8.00%	9.2%	9.5%
ONE Gas Inc.	2.80%	0.80	8.00%	9.2%	9.5%
SJW Group	2.80%	0.85	8.00%	9.6%	9.8%
South Jersey Inds.	2.80%	1.05	8.00%	11.2%	11.1%
Southwest Gas	2.80%	0.95	8.00%	10.4%	10.5%
Spire Inc.	2.80%	0.85	8.00%	9.6%	9.8%
York Water Co. (The)	2.80%	0.80	8.00%	9.2%	9.5%

Sources and Notes:

[1], [3]: Villadsen Direct Testimony.

[2]: From Valueline Investment Analyzer as of March 31, 2021.

[4]: [1] + ([2] x [3]).

[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-11

Overall After-Tax Risk Positioning Cost of Capital of the Sample (Using Value Line Betas)

Panel A: CAPM Cost of Equity Scenario 1 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%

Company	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity	5-Year Average Common Equity to Market Value Ratio	Weighted - Average Cost of Preferred Equity	5-Year Average Preferred Equity to Market Value Ratio	Weighted- Average Cost of Debt	5-Year Average Debt to Market Value Ratio	Electric's Representative Income Tax Rate	Overall After-Tax Cost of Capital (CAPM)	Overall After-Tax Cost of Capital (ECAPM 1.5%)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Amer. States Water	7.5%	8.0%	0.82	-	0.00	3.4%	0.18	27.0%	6.6%	7.0%
Amer. Water Works	9.0%	9.2%	0.66	-	0.00	3.4%	0.34	27.0%	6.7%	6.9%
Artesian Res Corp	8.2%	8.6%	0.70	-	0.00	3.4%	0.30	27.0%	6.5%	6.8%
Atmos Energy	8.6%	8.9%	0.71	-	0.00	3.4%	0.29	27.0%	6.8%	7.0%
California Water	7.5%	8.0%	0.70	-	0.00	3.4%	0.30	27.0%	6.0%	6.4%
Chesapeake Utilities	8.6%	8.9%	0.72	-	0.00	3.4%	0.28	27.0%	6.9%	7.1%
Essential Utilities	9.7%	9.8%	0.73	-	0.00	3.4%	0.27	27.0%	7.7%	7.8%
Global Water Resources Inc	8.2%	8.6%	0.66	-	0.00	3.4%	0.34	27.0%	6.3%	6.5%
Middlesex Water	7.9%	8.3%	0.80	3.4%	0.00	3.4%	0.19	27.0%	6.8%	7.2%
New Jersey Resources	9.7%	9.8%	0.70	-	0.00	3.4%	0.30	27.0%	7.5%	7.5%
NiSource Inc.	9.0%	9.2%	0.46	3.7%	0.03	3.7%	0.51	27.0%	5.6%	5.7%
Northwest Natural	8.6%	8.9%	0.65	-	0.00	3.7%	0.35	27.0%	6.5%	6.7%
ONE Gas Inc.	8.6%	8.9%	0.71	-	0.00	3.4%	0.29	27.0%	6.8%	7.0%
SJW Group	9.0%	9.2%	0.65	-	0.00	3.4%	0.35	27.0%	6.7%	6.8%
South Jersey Inds.	10.4%	10.3%	0.52	-	0.00	3.7%	0.48	27.0%	6.7%	6.7%
Southwest Gas	9.7%	9.8%	0.63	-	0.00	3.7%	0.37	27.0%	7.1%	7.1%
Spire Inc.	9.0%	9.2%	0.55	3.4%	0.01	3.4%	0.44	27.0%	6.0%	6.1%
York Water Co. (The)	8.6%	8.9%	0.82	-	0.00	3.4%	0.18	27.0%	7.5%	7.7%
Combined Sample Average	8.8%	9.0%	0.68	3.5%	0.00	3.4%	0.32	27.0%	6.7%	6.9%
Gas Sample Average	9.1%	9.3%	0.63	3.5%	0.00	3.5%	0.37	27.0%	6.7%	6.8%
Water Sample Average	8.4%	8.7%	0.73	3.4%	0.00	3.4%	0.27	27.0%	6.8%	7.0%

Sources and Notes:
[1]: Schedule No. BV-10; Panel A, [4].
[2]: Schedule No. BV-10; Panel A, [5].
[3]: Schedule No. BV-4, [4].
[4]: Workpaper #2 to Schedule No. BV-11, Panel C.
[5]: Schedule No. BV-4, [5].
[6]: Workpaper #2 to Schedule No. BV-11, Panel B.
[7]: Schedule No. BV-4, [6].
[8]: Provided by Portland General Electric.
[9] = [1] x [3] + [4] x [5] + [6] x [7] x (1 - [8])
[10] = [2] x [3] + [4] x [5] + [6] x [7] x (1 - [8])

Schedule No. BV-11

Overall After-Tax Risk Positioning Cost of Capital of the Sample (Using Value Line Betas)

Panel B: CAPM Cost of Equity Scenario 2 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%

Company	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity	5-Year Average Common Equity to Market Value Ratio	Weighted - Average Cost of Preferred Equity	5-Year Average Preferred Equity to Market Value Ratio	Weighted- Average Cost of Debt	5-Year Average Debt to Market Value Ratio	Electric's Representative Income Tax Rate	Overall After-Tax Cost of Capital (CAPM)	Overall After-Tax Cost of Capital (ECAPM 1.5%)
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Company	capmlt	ecapmlt2	capm_equity_ratio	average	capm_pref_ratio	average	capm_debt_ratio		CAPM	ECAPM2
Amer. States Water	8.0%	8.5%	0.82	-	0.00	3.4%	0.18	27.0%	7.0%	7.4%
Amer. Water Works	9.6%	9.8%	0.66	-	0.00	3.4%	0.34	27.0%	7.1%	7.3%
Artesian Res Corp	8.8%	9.2%	0.70	-	0.00	3.4%	0.30	27.0%	6.9%	7.2%
Atmos Energy	9.2%	9.5%	0.71	-	0.00	3.4%	0.29	27.0%	7.2%	7.4%
California Water	8.0%	8.5%	0.70	-	0.00	3.4%	0.30	27.0%	6.3%	6.7%
Chesapeake Utilities	9.2%	9.5%	0.72	-	0.00	3.4%	0.28	27.0%	7.3%	7.5%
Essential Utilities	10.4%	10.5%	0.73	-	0.00	3.4%	0.27	27.0%	8.2%	8.3%
Global Water Resources Inc	8.8%	9.2%	0.66	-	0.00	3.4%	0.34	27.0%	6.7%	6.9%
Middlesex Water	8.4%	8.9%	0.80	3.4%	0.00	3.4%	0.19	27.0%	7.2%	7.6%
New Jersey Resources	10.4%	10.5%	0.70	-	0.00	3.4%	0.30	27.0%	8.0%	8.0%
NiSource Inc.	9.6%	9.8%	0.46	3.7%	0.03	3.7%	0.51	27.0%	5.9%	6.0%
Northwest Natural	9.2%	9.5%	0.65	-	0.00	3.7%	0.35	27.0%	6.9%	7.1%
ONE Gas Inc.	9.2%	9.5%	0.71	-	0.00	3.4%	0.29	27.0%	7.2%	7.4%
SJW Group	9.6%	9.8%	0.65	-	0.00	3.4%	0.35	27.0%	7.1%	7.2%
South Jersey Inds.	11.2%	11.1%	0.52	-	0.00	3.7%	0.48	27.0%	7.2%	7.1%
Southwest Gas	10.4%	10.5%	0.63	-	0.00	3.7%	0.37	27.0%	7.5%	7.6%
Spire Inc.	9.6%	9.8%	0.55	3.4%	0.01	3.4%	0.44	27.0%	6.4%	6.5%
York Water Co. (The)	9.2%	9.5%	0.82	-	0.00	3.4%	0.18	27.0%	8.0%	8.2%
Combined Sample Average	9.4%	9.6%	0.68	3.5%	0.00	3.4%	0.32	27.0%	7.1%	7.3%
Gas Sample Average	9.8%	10.0%	0.63	3.5%	0.00	3.5%	0.37	27.0%	7.1%	7.2%
Water Sample Average	9.0%	9.3%	0.73	3.4%	0.00	3.4%	0.27	27.0%	7.2%	7.4%

Sources and Notes:
[1]: Schedule No. BV-10; Panel B, [4].
[2]: Schedule No. BV-10; Panel B, [5].
[3]: Schedule No. BV-4, [4].
[4]: Workpaper #2 to Schedule No. BV-11, Panel C.
[5]: Schedule No. BV-4, [5].
[6]: Workpaper #2 to Schedule No. BV-11, Panel B.
[7]: Schedule No. BV-4, [6].
[8]: Provided by Portland General Electric.
[9] = [1] x [3] + [4] x [5] + [6] x [7] x (1 - [8])
[10] = [2] x [3] + [4] x [5] + [6] x [7] x (1 - [8])

Schedule No. BV-12

Risk Positioning Cost of Equity at Portland General Electric's Proposed Capital Structure

Sample

Using Value Line Betas

	Overall After-Tax Cost of Capital (Scenario 1)	Overall After-Tax Cost of Capital (Scenario 2)	Portland General Electric's Representative Regulatory % Debt	Representative Cost of BBB-Rated Utility Debt	Portland General Electric's Representative Income Tax Rate	Portland General Electric's Regulatory % Preferred Equity	Portland General Electric's Cost of Preferred Equity	Portland General Electric's Representative Regulatory % Equity	Estimated Return on Equity (Scenario 1)	Estimated Return on Equity (Scenario 2)
	[1]	[2]	[3]	[4]	[5]			[6]	[7]	[8]
Combined Sample										
CAPM using Value Line Betas	6.7%	7.1%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	10.7%	11.5%
ECAPM (1.50%) using Value Line Betas	6.9%	7.3%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	11.1%	11.9%
Water Sample										
CAPM using Value Line Betas	6.8%	7.2%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	10.8%	11.6%
ECAPM (1.50%) using Value Line Betas	7.0%	7.4%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	11.3%	12.1%
Gas Sample										
CAPM using Value Line Betas	6.7%	7.1%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	10.6%	11.4%
ECAPM (1.50%) using Value Line Betas	6.8%	7.2%	50.0%	3.7%	27.0%	0.0%	3.7%	50.0%	10.8%	11.7%

Sources and Notes:

[1]: Schedule No. BV-11; Panel A, [9] - [10].

[2]: Schedule No. BV-11; Panel B, [9] - [10].

[3]: Provided by Portland General Electric.

[4]: Based on a BBB rating. Yield from Bloomberg as of March 31, 2021.

[5]: Provided by Portland General Electric.

[6]: Provided by Portland General Electric.

[7]: {[1] - ([3] x [4] x (1 - [5])}/ [6]

[8]: {[2] - ([3] x [4] x (1 - [5]))}/ [6]

Scenario 1: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%.

Scenario 2: Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%.

Schedule No. BV-13

Hamada Adjustment to Obtain Unlevered Asset Beta

Company		Value Line Betas	Debt Beta	5-Year Average Common Equity to Market Value Ratio	5-Year Average Preferred Equity to Market Value Ratio	5-Year Average Debt to Market Value Ratio	Portland General Electric's Representative Income Tax Rate	Asset Beta: Without Taxes	Asset Beta: With Taxes
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Amer. States Water	*	0.65	0.05	0.82	0.00	0.18	27.0%	0.54	0.57
Amer. Water Works	*	0.85	0.05	0.66	0.00	0.34	27.0%	0.58	0.63
Artesian Res Corp	*	0.75	0.05	0.70	0.00	0.30	27.0%	0.54	0.58
Atmos Energy	*	0.80	0.05	0.71	0.00	0.29	27.0%	0.58	0.63
California Water	*	0.65	0.05	0.70	0.00	0.30	27.0%	0.47	0.51
Chesapeake Utilities	*	0.80	0.05	0.72	0.00	0.28	27.0%	0.59	0.63
Essential Utilities	*	0.95	0.05	0.73	0.00	0.27	27.0%	0.70	0.76
Global Water Resources Inc	*	0.75	0.05	0.66	0.00	0.34	27.0%	0.51	0.56
Middlesex Water	*	0.70	0.05	0.80	0.00	0.19	27.0%	0.57	0.60
New Jersey Resources	*	0.95	0.05	0.70	0.00	0.30	27.0%	0.68	0.73
NiSource Inc.	*	0.85	0.10	0.46	0.03	0.51	27.0%	0.45	0.50
Northwest Natural	*	0.80	0.10	0.65	0.00	0.35	27.0%	0.55	0.60
ONE Gas Inc.	*	0.80	0.05	0.71	0.00	0.29	27.0%	0.58	0.62
SJW Group	*	0.85	0.05	0.65	0.00	0.35	27.0%	0.57	0.62
South Jersey Inds.	*	1.05	0.10	0.52	0.00	0.48	27.0%	0.60	0.67
Southwest Gas	*	0.95	0.10	0.63	0.00	0.37	27.0%	0.63	0.69
Spire Inc.	*	0.85	0.05	0.55	0.01	0.44	27.0%	0.49	0.55
York Water Co. (The)	*	0.80	0.05	0.82	0.00	0.18	27.0%	0.66	0.70
Combined Sample Average		0.82	0.06	0.68	0.00	0.32	0.27	0.57	0.62
Gas Sample Average		0.87	0.07	0.63	0.00	0.37	0.27	0.57	0.63
Water Sample Average		0.77	0.05	0.73	0.00	0.27	0.27	0.57	0.61

Sources and Notes:
[1]: Workpaper # 1 to Schedule No. BV-10, [1].
[2]: Workpaper #1 to Schedule No. BV-13, [7].
[3]: Schedule No. BV-4, [4].
[4]: Schedule No. BV-4, [5].

[5]: Schedule No. BV-4, [6].
[6]: Portland General Electric's Representative Tax Rate.
[7]: [1]*[3] + [2]*([4] + [5]).
[8]: {[1]*[3] + [2]*([4]+[5]*(1-[6]))} / {[3] + [4] + [5]*(1 -[6])}.

Schedule No. BV-14

Sample Average Asset Beta Relevered at Portland General Electric's Proposed Capital Structure

	Asset Beta	Assumed Debt Beta	Portland General Electric's Representative Regulatory % Debt	Portland General Electric's Representative Income Tax Rate	Portland General Electric's Representative Regulatory % Equity	Estimated Equity Beta
	[1]	[2]	[3]	[4]	[5]	[6]
Combined Sample						
Asset Beta Without Taxes	0.57	0.10	50.0%	27.0%	50.0%	1.04
Asset Beta With Taxes	0.62	0.10	50.0%	27.0%	50.0%	1.00
Water Sample						
Asset Beta Without Taxes	0.57	0.10	50.0%	27.0%	50.0%	1.05
Asset Beta With Taxes	0.61	0.10	50.0%	27.0%	50.0%	0.99
Gas Sample						
Asset Beta Without Taxes	0.57	0.10	50.0%	27.0%	50.0%	1.04
Asset Beta With Taxes	0.63	0.10	50.0%	27.0%	50.0%	1.01

Sources and Notes:

[1]: Schedule No. BV-13, [7] - [8].

[2]: Villadsen Testimony.

[3]: Provided by Portland General Electric.

[4]: Portland General Electric's Representative Tax Rate.

[5]: Provided by Portland General Electric.

[6]: [1] + [3]/[5]*([1] - [2]) without taxes, [1] + [3]*(1 - [4])/[5]*([1] - [2]) with taxes.

Schedule No. BV-15

Risk-Positioning Cost of Equity using Hamada-Adjusted Betas

Panel A: Scenario 1 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 7.25%

Company	Long-Term Risk-Free Rate	Hamada Adjusted Equity Betas	Long-Term Market Risk	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
Combined Sample					
Asset Beta Without Taxes	2.80%	1.04	7.25%	10.4%	10.3%
Asset Beta With Taxes	2.80%	1.00	7.25%	10.0%	10.0%
Water Sample					
Asset Beta Without Taxes	2.80%	1.05	7.25%	10.4%	10.3%
Asset Beta With Taxes	2.80%	0.99	7.25%	10.0%	10.0%
Gas Sample					
Asset Beta Without Taxes	2.80%	1.04	7.25%	10.4%	10.3%
Asset Beta With Taxes	2.80%	1.01	7.25%	10.1%	10.1%

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Schedule No. BV-14, [6].
[3]: Villadsen Direct Testimony.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

Schedule No. BV-15

Risk-Positioning Cost of Equity using Hamada-Adjusted Betas

Panel B: Scenario 2 - Long-Term Risk Free Rate of 2.80%, Long-Term Market Risk Premium of 8.00%

Company	Long-Term Risk-Free Rate	Hamada Adjusted Equity Betas	Long-Term Market Risk	CAPM Cost of Equity	ECAPM (1.5%) Cost of Equity
	[1]	[2]	[3]	[4]	[5]
Combined Sample					
Asset Beta Without Taxes	2.80%	1.04	8.00%	11.2%	11.1%
Asset Beta With Taxes	2.80%	1.00	8.00%	10.8%	10.8%
Water Sample					
Asset Beta Without Taxes	2.80%	1.05	8.00%	11.2%	11.1%
Asset Beta With Taxes	2.80%	0.99	8.00%	10.7%	10.7%
Gas Sample					
Asset Beta Without Taxes	2.80%	1.04	8.00%	11.1%	11.1%
Asset Beta With Taxes	2.80%	1.01	8.00%	10.9%	10.9%

Sources and Notes:
[1]: Villadsen Direct Testimony.
[2]: Schedule No. BV-14, [6].
[3]: Villadsen Direct Testimony.
[4]: [1] + ([2] x [3]).
[5]: ([1] + 1.5%) + [2] x ([3] - 1.5%).

EXHIBIT 905: Technical Appendix to Cost of Equity Estimation

This technical appendix contains methodological details related to my implementations of the DCF and CAPM / ECAPM models. It also contains a discussion of both the basic finance principles and the specific standard formulations of the financial leverage adjustments employed to determine the cost of equity for a company with the level of financial risk inherent in Portland General's requested regulatory capital structure.

Table of Contents

I. DCF Models

A. DCF Estimation of Cost of Equity

The DCF method for estimating the cost of equity capital assumes that the market price of a stock is equal to the present value of the dividends that its owners expect to receive. The method also assumes that this present value can be calculated by the standard formula for the present value of a cash flow stream:

$$P_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \cdots + \frac{D_T}{(1+r)^T} \tag{1}$$

where P_0 is the current market price of the stock; D_t is the dividend cash flow expected at the end of period t; r is the cost of equity capital; and T is the last period in which a dividend cash flow is to be received. The formula simply says that the stock price is equal to the sum of the expected future dividends, each discounted for the time and risk between now and the time the dividend is expected to be received. Since the current market price is known, it is possible to infer the cost of equity that corresponds to that price and a forecasted pattern of expected future dividends. In terms of Equation (1), if P_0 is known and $D_1, D_2, \ldots D_T$ are estimated, an analyst can "solve for" the cost of equity capital r.

B. Details of the DCF Model

Perhaps the most widely known and used application of the DCF method assumes that the expected rate of dividend growth remains constant forever. In the so-called Gordon Growth Model, the relationship expressed in Equation (1) is such that the present value equation can be rearranged algebraically into a formula for estimating the cost of equity. Specifically, if investors expect a dividend stream that will grow forever at a steady rate, then the market price of the stock will be given by

$$P_0 = \frac{D_1}{r - g} \tag{2}$$

where D_1 is the dividend expected at the end of the first period, g is the perpetual growth rate, and P_0 and r are the market price and the cost of capital, as before. Equation (2) is a simplified version of Equation (1) that can be solved algebraically to yield the well-known "DCF formula" for the cost of equity capital,

$$r = \frac{D_1}{P_0} + g = \frac{D_0 \times (1 + g)}{P_0} + g \qquad (3)$$

There are other versions of the DCF model that relax this restrictive assumption and posit a more complex or nuanced pattern of expected future dividend payments. For example, if there is reason to believe that investors do *not* expect a company's dividends to grow at a steady rate forever, but rather have different growth rate expectations in the near term (e.g., over the next five or ten years), compared to the distant future (e.g., a period *starting* ten years from the present moment), a "multi-stage" growth pattern can be modeled in the present value formula (Equation (1)).

1.   Dividends, Cash Flows, and Share Repurchases

In addition to the DCF model described above, there are many alternative formulations. Notable among these are versions of the model that use cash flows rather than dividends in the present value formula (Equation (1)).[1]

Because investors are interested in cash flow, it is technically important to capture *all* cash flows that are distributed to shareholders when estimating the cost of equity using the DCF method. In some circumstances, investors may expect to receive cash in forms other than dividends. An important example concerns the fact that many companies distribute cash to shareholders through share buybacks in addition to dividends. To the extent such repurchases are expected by investors, but not captured in the forecasted pattern of future dividends; a dividend-based implementation of the DCF model will underestimate the cost of equity.

Similarly, if investors have reason to suspect that a company's dividend payments will not reflect a full distribution of its available cash free cash flows in the period they were generated, it may be appropriate replace the forecasted dividends with estimated free cash flows to equity in the present value formula (Equation (1)). Focusing on *available* cash rather than that actually distributed in the form of dividends can help account for instances when near-term investing and financing activities (e.g., capital expenditures or asset sales, debt issuances or retirements, or share repurchases) may cause dividend growth patterns to diverge from growth in earnings.

---

[1]   For an example in a regulatory context, the U.S. Surface Transportation Board uses a cash flow based model with three stages to estimate the cost of equity for the railroads. See Surface Transportation Board Decision, "STB Ex Parte No. 664 (Sub-No. 1)," Decided January 23, 2009. Confirmed in EP-664 (Sub-No. 2), October 31, 2016 and EP 664 (Sub-No. 4), June 23, 2020.

Many utility companies such as those included in my proxy group have long histories of paying a dividend. In fact, as mentioned in Section I of this Appendix, one of my standard requirements for inclusion in my proxy group is that a company pays dividends for 5-years without a gap or a dividend cut (on per share basis). Additionally, although some utility companies have engaged in share repurchase programs, the companies in my proxy group do not distribute substantial cash flows by means other than dividends.

C.   DCF MODEL INPUTS

1.   Dividends and Prices

As described above, DCF models are forward-looking, comparing the *current* price of a stock to its expected *future* dividends to estimate the required expected return demanded by the market for that stock (i.e., the cost of equity). Therefore, the models demand the current market price and currently prevailing forecasts of future dividends as inputs.

The stock price input I employ for each proxy group company is the average of the closing stock prices for the 15 trading days ending on the date of my analysis. This guards against biases that may arise on a single trading day, yet is consistent with using current stock prices.

2.   Company Specific Growth Rates

a.   Analysts' Forecasted Growth Rates

Finding the right growth rate(s) is usually the "hard part" of applying the DCF model, which is sometimes criticized due to what has been called "optimism bias" in the earnings growth rate forecasts of security analysts. Optimism bias is defined as tendency for analysts to forecast earnings growth rates that are higher than are actually achieved. Any optimism bias might be related to incentives faced by analysts that provide rewards not strictly based upon the accuracy of the forecasts. To the extent optimism bias is present in the analysts' earnings forecasts the cost of capital estimates from the DCF model would be too high.

While academic researchers during the 1990s as well as in early 2000s found evidence of analysts' optimism bias, there is some evidence that regulatory reforms have eliminated the issue. A more recent paper by Hovakimina and Saenyasiri (2010) found that recent efforts to curb analysts' incentive to provide optimistic forecasts have worked, so that "the median forecast bias essentially

disappeared."[2] Thus, some recent research indicates that the analyst bias may be a problem of the past.

The findings of several academic studies[3] show that analyst earnings forecasts turn out to be too optimistic for stocks that are more difficult to value, for instance, stocks of smaller firms, firms with high volatility or turnover, younger firms, or firms whose prospects are uncertain. Coincidentally, stocks with greater analyst disagreement have higher analyst optimism bias—all of these describe companies that are more volatile and/or less transparent—none of which is applicable to the majority of utility companies with wide analyst coverage and information transparency. Consequently, optimism bias is not expected to be an issue for utilities.

b.   *Sources for Forecasted Growth Rates*

For the reasons described above, I rely on analyst forecasts of earnings growth for the company-specific growth rate inputs to my implementations of the single- and multi-stage DCF models. Most companies in my proxy group have coverage from equity analysts reporting to Thomson Reuters IBES, so I use the consensus 3-5 year EPS growth rate provided by that service. I supplement these consensus values with growth rates based on EPS estimates from *Value Line*.[4]

II.   CAPM and ECAPM

A.   THE CAPITAL ASSET PRICING MODEL (CAPM)

The Capital Asset Pricing Model (CAPM) is a theoretical model stating that the collective investment decisions of investors in capital markets will result in equilibrium prices for all risky assets such that the returns investors expect to receive on their investments are commensurate with the risk of those assets relative to the market as a whole. The CAPM posits a risk-return relationship known as the Security Market Line (see Figure 3 in my Direct Testimony), in which

---

[2]   A. Hovakimian and E. Saenyasiri, "Conflicts of Interest and Analyst Behavior: Evidence from Recent Changes in Regulation," *Financial Analysts Journal*, vol. 66, 2010.

[3]   These studies include the following: (i) Hribar, P, McInnis, J. "Investor Sentiment and Analysts' Earnings Forecast Errors," *Management Science* Vol. 58, No. 2 (February 2012): pp. 293-307; (ii) Scherbina, A. (2004), "Analyst Disagreement, Forecast Bias and Stock Returns," downloaded from Harvard Business School Working Knowledge: http://hbswk.hbs.edu/item/5418.html; and (iii) Michel, J-S., Pandes J.A. (2012), "Are Analysts Really Too Optimistic?" downloaded from http://www.efmaefm.org.

[4]   Specifically, I compute the growth rate implied by *Value Line*'s current year EPS estimate and its projected 3-5 year EPS estimate. I then average this in with the IBES consensus estimate as an additional independent estimate, giving it a weight of 1 and weighting the IBES consensus according to the number of analysts who contributed estimates.

the required expected return on an asset is proportional to that asset's risk relative to the market as measured by its "beta". More precisely, the CAPM states that the cost of capital for an investment S (e.g., a particular common stock), is given by the following equation:

$$r_s = r_f + \beta_s \times MRP \tag{4}$$

where r_S is the required return on investment S;

r_f is the risk-free interest rate;

β_S is the beta risk measure for the investment S; and

MRP is the market equity risk premium.

The CAPM is based on portfolio theory, and recognizes two fundamental principles of finance: (1) investors seek to minimize the possible variance of their returns for a given level of expected returns (or alternatively, they demand higher *expected* returns when there is greater uncertainty about those returns), and (2) investors can reduce the variability of their returns by diversifying— constructing portfolios of many assets that do not all go up or down at the same time or to the same degree. Under the assumptions of the CAPM, the market participants will construct portfolios of risky investments that minimize risk for a given return so that the aggregate holdings of all investors represent the "market portfolio." The risk-return trade-off faced by investors then concerns their exposure to the risk inherent in the market portfolio, as they weight their investment capital between the portfolio of risky assets and the risk-free asset.

Because of the effects of diversification, the relevant measure of risk for an individual security is its *contribution* to the risk of the market portfolio. Therefore, beta (β) is defined to capture the sensitivity of the security's returns to the market's returns. Formally,

$$\beta_s = \frac{covariance(r_s, R_m)}{variance(R_m)} \tag{5}$$

where R_m is the return on the market portfolio.

Beta is usually calculated by statistically comparing (using regression analysis) the excess (positive or negative) of the return on the individual security over the government bond rate with the excess of the return on a market index such as the S&P 500 over a government bond rate.

The basic idea behind beta is the risk that cannot be diversified away in large portfolios is what matters to investors. Beta is a measure of the risks that *cannot* be eliminated by diversification. It is this non-diversifiable risk, or "systematic risk", for which investors require compensation in the

form of higher expected returns. By definition, a stock with a beta equal to 1.0 has average non-diversifiable risk; its returns vary to the same degree as those on the market as a whole. According to the CAPM, the required return demanded by investors (i.e., the cost of equity) for investing in that stock will match the expected return on the market as a whole. Similarly, stocks with betas above 1.0 have more than average risk, and so have a cost of equity greater than the expected market return; those with betas below 1.0 have less than average risk, and are expected to earn lower than market levels of return.

B.   INPUTS TO THE CAPM

1.   The Risk-free Interest Rate

The precise meaning of a "risk-free" asset according to the finance theory underlying the CAPM is an investment whose return is guaranteed, with no possibility that it will vary around its expected value in response to the movements of the broader market. (Equivalently, the CAPM beta of a risk-free asset is zero.) In developed economies like the U.S., government debt is generally considered have no default risk. In this sense they are "risk-free"; however, unless they are held to maturity, the rate of return on government bonds may in fact vary around their stated or expected yields.[5]

The theoretical CAPM is a single period model, meaning that it posits a relationship between risk and return over a single "holding period" of an investment. Because investors can rebalance their portfolios over short horizons, many academic studies and practical applications of the CAPM use the short-term government bond as the measure of the risk-free rate of return. However, regulators frequently use a version based on a measure of the long-term risk-free rate; e.g., a long-term government bond. I rely on a 20-year government bond. Specifically, I rely on a forecast of what Government bond yields will be mid-way through the 2022-2024 period. Relying on the May 2021 Blue Chip Economic Indicators ("BCEI") for 2022 and the March 2021 BCEI for 2023 and 2024, the estimated yield on 10-year U.S. Treasury bond yields will be 2.1% in 2022, 2.3% in 2023, and 2.5% in 2024, so I rely on the 2023 (midpoint) value of 2.3%.[6] I then adjust this value upwards

---

[5] This is due to interest rate fluctuations that can change the market value of previously issued debt in relation to the yield on new issuances.

[6] Wolters Kluwer Blue Chip Economic Indicators and PwC Analysis, Consensus Forecasts, March 2021, p. 3 and p. 14 and BCEI May 2021 p. 3.

by 50 basis points to reflect the historical maturity premium for the 20-year U.S. Treasury bond yield over the 10 U.S. Treasury bond yield.[7] This gives me a risk-free rate of 2.80%.[8]

2.   The Market Equity Risk Premium

a.   *Historical Average Market Risk Premium*

Like the cost of capital itself, the market risk premium is a forward-looking concept. It is by definition the premium above the risk-free interest rate that investors can *expect* to earn by investing in a value-weighted portfolio of all risky investments in the market. The premium is not directly observable, and must be inferred or forecasted based on known market information.

One commonly use method for estimating the MRP is to measure the historical average premium of market returns over the income returns on risk-free government bonds over some long historical period. When such a calculation is performed using the traditional industry standard Ibbotson data, the result is an arithmetic average of the annual observed premiums of U.S. stock market returns over income returns on long-term (approximate average maturity of 20-years) U.S. Treasury bonds from 1926 to the present is 7.15%.[9]

b.   *Forward Looking Market Equity Risk Premium*

An alternative approach to estimating the MRP eschews historical averages in favor of using current market information and forecasts to infer the expected return on the market as a whole, which can then be compared to prevailing government bond yields to estimate the equity risk premium. Bloomberg performs such estimates of country-specific MRPs by implementing the DCF model on the market as a whole—using forecast market-wide dividend yields and current level on market indexes; for the U.S. Bloomberg performs a multi-stage DCF using dividend-paying stocks in the S&P 500 to infer the expected market return.

When calculated relative to 20-year Treasury bond yields, Bloomberg's estimate of the forward-looking market-implied MRP over the two week period before April 30 was slightly above 8% This Bloomberg forward-looking MRP estimate is above the historical long-term average.

---

[7] This maturity premium is estimated by comparing the average excess yield on 20-year versus 10-year Government Bonds over the period 1990-2020, using data from Bloomberg.

[8] In prior proceedings I have adjusted for an elevated spread between utility bond yields and government bond yields. As there currently is no such elevated spread, I do not make any adjustments and do not discuss the issue further.

[9] Duff & Phelps, Cost of Capital Navigator, U.S. Cost of Capital Module 2020.

C. THE EMPIRICAL CAPM

1. Description of the ECAPM

Empirical research has shown that the CAPM tends to overstate the actual sensitivity of the cost of capital to beta: low-beta stocks tend to have higher risk premiums than predicted by the CAPM and high-beta stocks tend to have lower risk premiums than predicted. A number of variations on the original CAPM theory have been proposed to explain this finding, but the observation itself can also be used to estimate the cost of capital directly, using beta to measure relative risk by making a direct empirical adjustment to the CAPM.

The Empirical CAPM (ECAPM) makes use of these empirical findings. It estimates the cost of capital with the equation,

$$r_S = r_f + \alpha + \beta_S \times (MRP - \alpha) \tag{6}$$

where α is the "alpha" adjustment of the risk-return line, a constant, and the other symbols are defined as for the CAPM (see Equation (4)). The alpha adjustment has the effect of increasing the intercept but reducing the slope of the Security Market Line, which results in a Security Market Line that more closely matches the results of empirical tests. In other words, the ECAPM produces more accurate predictions of eventual realized risk premiums than does the CAPM.

Figure B-2
The Empirical Security Market Line
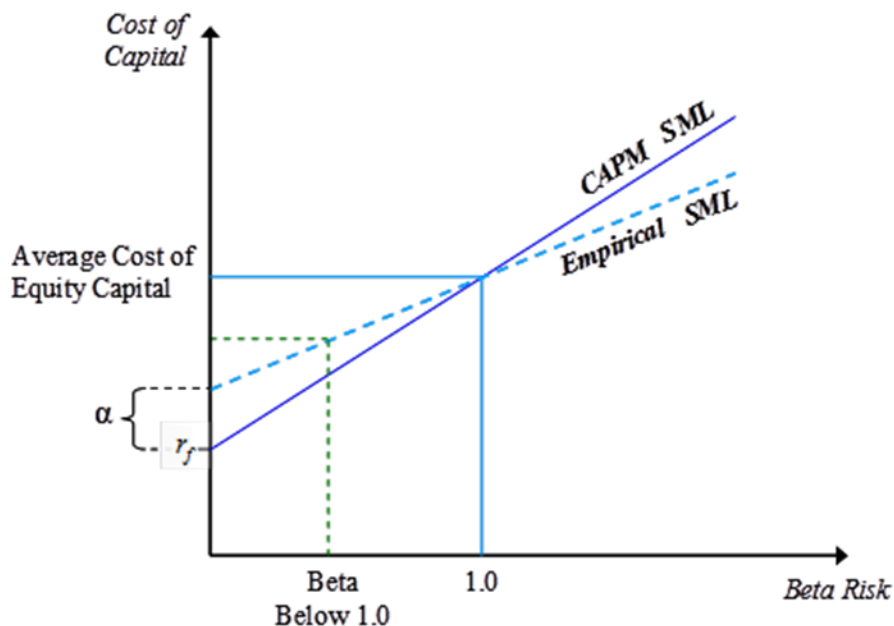
2.   Academic Evidence on the Alpha Term in the ECAPM

Figure B- below summarizes the empirical results of tests of the CAPM, including their estimates of the "alpha" parameter necessary to improve the accuracy of the CAPM's predictions of realized returns.

Figure B-3

EMPIRICAL EVIDENCE ON THE ALPHA FACTOR IN ECAPM[*]

AUTHOR	RANGE OF ALPHA	PERIOD RELIED UPON
Black (1993)[1]	1% for betas 0 to 0.80	1931-1991
Black, Jensen and Scholes (1972)[2]	4.31%	1931-1965
Fama and McBeth (1972)	5.76%	1935-1968
Fama and French (1992)[3]	7.32%	1941-1990
Fama and French (2004)[4]	N/A	
Litzenberger and Ramaswamy (1979)[5]	5.32%	1936-1977
Litzenberger, Ramaswamy and Sosin (1980)	1.63% to 3.91%	1926-1978
Pettengill, Sundaram and Mathur (1995)[6]	4.6%	1936-1990

[*]The figures reported in this table are for the longest estimation period available and, when applicable, use the authors' recommended estimation technique. Many of the articles cited also estimate alpha for sub-periods and those alphas may vary.

[1]Black estimates alpha in a one step procedure rather than in an un-biased two-step procedure.

[2]Estimate a negative alpha for the subperiod 1931-39 which contain the depression years 1931-33 and 1937-39.

[3]Calculated using Ibbotson's data for the 30-day treasury yield.

[4]The article does not provide a specific estimate of alpha; however, it supports the general finding that the CAPM underestimates returns for low-beta stocks and overestimates returns for high-beta stocks.

[5]Relies on Lizenberger and Ramaswamy's before-tax estimation results. Comparable after-tax alpha estimate is 4.4%.

[6]Pettengill, Sundaram and Mathur rely on total returns for the period 1936 through 1990 and use 90-day treasuries. The 4.6% figure is calculated using auction averages 90-day treasuries back to 1941 as no other series were found this far back.

Sources:
Black, Fischer. 1993. Beta and Return. *The Journal of Portfolio Management* 20 (Fall): 8-18.
Black, F., Michael C. Jensen, and Myron Scholes. 1972. The Capital Asset Pricing Model: Some Empirical Tests, from Studies in the theory of Capital Markets. In *Studies in the Theory of Capital Markets*, edited by Michael C. Jensen, 79-121. New York: Praeger.
Fama, Eugene F. and James D. MacBeth. 1972. Risk, Returns and Equilibrium: Empirical Tests. *Journal of Political Economy* 81 (3): 607-636.
Fama, Eugene F. and Kenneth R. French. 1992. The Cross-Section of Expected Stock Returns. *Journal of Finance* 47 (June): 427-465.
Fama, Eugene F. and Kenneth R. French. 2004. The Capital Asset Pricing Model: Theory and Evidence. *Journal of Economic Perspectives* 18 (3): 25-46.
Litzenberger, Robert H. and Krishna Ramaswamy. 1979. The Effect of Personal Taxes and Dividends on Capital Asset Prices, Theory and Empirical Evidence. *Journal of Financial Economics* XX (June): 163-195.
Litzenberger, Robert H. and Krishna Ramaswamy and Howard Sosin. 1980. On the CAPM Approach to Estimation of a Public Utility's Cost of Equity Capital. *The Journal of Finance* 35 (2): 369-387.

III. Financial Risk and the Cost of Equity

A common issue in regulatory proceedings is how to apply data from a benchmark set of comparable securities when estimating a fair return on equity for the target/regulated company.[10] It may be tempting to simply estimate the cost of equity capital for each of the proxy companies (using one of the above approaches) and average them. After-all, the companies were chosen to be comparable in their business risk characteristics, so why would an investor necessarily prefer equity in one to the other (on average)?

The problem with this argument is that it ignores the fact that underlying asset risk (i.e., the risk inherent in the lines of business in which the firm invests its assets) for each company is typically divided between debt and equity holders. The firm's debt and equity are therefore financial derivatives of the underlying asset return, each offering a differently structured claim on the cash flows generated by those assets. Even though the risk of the underlying assets may be comparable, a different capital structure splits that risk differently between debt and equity holders. The relative structures of debt and equity claims are such that higher degrees of debt financing increase the variability of returns on equity, *even when the variability of asset returns remains constant*. As a consequence, otherwise identical firms with different capital structures will impose different levels of risk on their equity holders. Stated differently, increased leverage adds financial risk to a company's equity.[11]

A.   THE EFFECT OF FINANCIAL LEVERAGE ON THE COST OF EQUITY

To develop an intuition for the manner in which financial leverage affects the risk of equity, it is helpful to consider a concrete example. Figure B-4 and Figure B-5 below demonstrate the impact of leverage on the risk and return for equity by comparing equity's risk when a company uses no debt to finance its assets, and when it uses a 50-50 capital structure (i.e., it finances 50 percent of its assets with equity, 50 percent with debt). For illustrative purposes, the figures assume that the cash flows will be either $5 or $15 and that these two possibilities have the same chance of occurring (e.g., the chance that either occurs is ½).

---

[10]   This is also a common valuation problem in general business contexts.

[11]   I refer to this effect in terms of *financial risk* because the additional risk to equity holders stems from how the company chooses to finance its assets. In this context financial risk is distinct from and independent of the *business risk* associated with the manner in which the firm deploys its cash flow generating assets. The impact of leverage on risk is conceptually no different than that faced by a homeowner who takes out a mortgage. The equity of a homeowner who finances his home with 90% debt is much riskier than the equity of one who only finances with 50% debt.

Figure B-4: All Equity Capital Structure

	Asset Cash Flow	Debt Service	Equity Dividend	ROE	
½	$15	$0	$15	15/100 =	15%
$100					
½	$5	$0	$5	5/100 =	5%
				E(ROE)=	10%
				σ(ROE)=	5%

Figure B-5: 50/50 Capital Structure

	Asset cash flow	Debt Service	Equity Dividend	ROE	
½	$15	$2.50	$12.50	12.50/50 =	25%
$100					
½	$5	$2.50	$2.50	2.50/50 =	5%
				E(ROE)=	15%
				σ(ROE)=	10%

In the figures, E(ROE) indicates the mean return and σ(ROE) represents the standard deviation. This simple example illustrates that the introduction of debt increases both the mean (expected) return to equity holders and the variance of that return, even though the firm's expected cash flows—which are a property of the line of business in which its assets are invested—are unaffected by the firm's financing choices. The "magic" of financial leverage is not magic at all—leveraged equity investors can only earn a higher return because they take on greater risk.

B. METHODS TO ACCOUNT FOR FINANCIAL RISK

1. Cost of Equity Implied by the Overall Cost of Capital

If the companies in a proxy group are truly comparable in terms of the systematic risks of the underlying assets, then the overall cost of capital of each company should be about the same across companies (except for sampling error), so long as they do not use extreme leverage or no leverage. The intuition here is as follows. A firm's asset value (and return) is allocated between equity and debt holders.[12] The expected return to the underlying asset is therefore equal to the value weighted

---

[12] Other claimants can be added to the weighted average if they exist. For example, when a firm's capital structure contains preferred equity, the term $\frac{P}{V} \times r_p$ is added to the expression for the overall cost of capital shown in Equation (7), where P refers to the market value of preferred equity, r_p is the cost of preferred equity and $V = E + D + P$. In my analysis, I attribute the same implied yield to the cost of preferred equity as to the cost of debt.

average of the expected returns to equity and debt holders – which is the overall cost of capital (r^*), or the expected return on the assets of the firm as a whole.[13]

$$r^* = \frac{E}{V} \times r_E + \frac{D}{V} \times r_D(1 - \tau_c) \tag{7}$$

where r_D is the market cost of debt,

r_E is the market cost of equity,

τ_c is the corporate income tax rate,

D is the market value of the firm's debt,

E is the market value of the firm's equity, and

$V = E + D$ is the total market value of the firm.

Since the overall cost of capital is the cost of capital for the underlying asset risk, and this is comparable across companies, it is reasonable to believe that the overall cost of capital of the underlying companies should also be comparable, so long as capital structures do not involve unusual leverage ratios compared to other companies in the industry.[14]

The notion that the overall cost of capital is constant across a broad middle range of capital structures is based upon the Modigliani-Miller theorem that choice of financing does not affect the firm's value. Franco Modigliani and Merton Miller eventually won Nobel Prizes in part for their work on the effects of debt.[15] Their 1958 paper made what is in retrospect a very simple point: if there are no taxes and no risk to the use of excessive debt, use of debt will have no effect on a company's operating cash flows (i.e., the cash flows to investors as a group, debt and equity combined). If the operating cash flows are the same regardless of whether the company finances mostly with debt or mostly with equity, then the value of the firm cannot be affected at all by the

---

[13]   As this is on an after-tax basis, the cost of debt reflects the tax value of interest deductibility. Note that the precise formulation of the weighted average formula representing the required return on the firm's *assets* independent of financing (sometimes called the *unlevered* cost of capital) depends on specific assumptions made regarding the value of tax shields from tax-deductible corporate debt, the role of personal income tax, and the cost of financial distress. See Taggart, Robert A., "Consistent Valuation and Cost of Capital Expressions with Corporate and Personal Taxes," *Financial Management*, 1991; 20(3) for a detailed discussion of these assumptions and formulations. Equation (7) represents the overall weighted average cost of capital to the firm, which can be assumed to be constant across a relatively broad range of capital structures.

[14]   Empirically, companies within the same industry tend to have similar capital structures, while typical capital structures may vary between industries, so whether a leverage ratio is "unusual" depends upon the company's line of business.

[15]   Franco Modigliani and Merton H. Miller (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment," *American Economic Review*, 48, pp. 261-297.

debt ratio. In cost of capital terms, this means the overall cost of capital is constant regardless of the debt ratio, too.

Obviously, the simple and elegant Modigliani-Miller theorem makes some counterfactual assumptions: no taxes and no cost of financial distress from excessive debt. However, subsequent research, including some by Modigliani and Miller,[16] showed that while taxes and costs to financial distress affect a firm's incentives when choosing its capital structure as well as its overall cost of capital,[17] the latter can still be shown to be constant across a broad range of capital structures.[18]

This reasoning suggests that one could compute the overall cost of capital for each of the proxy companies and then average to produce an estimate of the overall cost of capital associated with the underlying asset risk. Assuming that the overall cost of capital is constant, one can then re-arrange the overall cost of capital formula to estimate what the implied cost of equity is at the target company's capital structure on a book value basis.[19]

2. Unlevering and Relevering Betas in the CAPM (Hamada Adjustment)

An alternative approach to account for the impact of financial risk is to examine the impact of leverage on beta. Notice that this means working within the CAPM framework as the methodology cannot be applied directly to the DCF models.

---

[16] Franco Modigliani and Merton H. Miller (1963), "Corporate Income Taxes and the Cost of Capital: A Correction," *American Economic Review*, 53, pp. 433-443.

[17] When a company uses a high level of debt financing, for example, there is significant risk of bankruptcy and all the costs associated with it. The so called costs of financial distress that occurs when a company is over-leveraged can increase its cost of capital. In contrast a company can generally decrease its cost of capital by taking on reasonable levels of debt, owing in part to the deductibility of interest from corporate taxes.

[18] This is a simplified treatment of what is generally a complex and on-going area of academic investigation. The roles of taxes, market imperfections and constraints, etc. are areas of on-going research and differing assumptions can yield subtly different formulations for how to formulate the weighted average cost of capital that is constant over all (or most) capital structures.

[19] Market value capital structures are used in estimating the overall cost of capital for the proxy companies.

Recognizing that under general conditions, the value of a firm can be decomposed into its value with and without a tax shield, I obtain:[20]

$$V = V_U + PV(ITS) \qquad (8)$$

where $V = E + D$ is the total value of the firm as in Equation (7),

V_U is the "unlevered" value of the firm—its value if financed entirely by equity

$PV(ITS)$ represents the present value of the interest tax shields associated with debt

For a company with a fixed book-value capital structure and no additional costs to leverage, it can be shown that the formula above implies:

$$r_E = r_U + \frac{D}{E}(1 - \tau_c)(r_U - r_D) \qquad (9)$$

where r_U is the "unlevered cost of capital"—the required return on assets if the firm's assets were financed with 100% equity and zero debt—and the other parameters are defined as in Equation (7).

Replacing each of these returns by their CAPM representation and simplifying them gives the following relationship between the "levered" equity beta β_L for a firm (i.e., the one observed in market data as a consequence of the firm's actual market value capital structure) and the "unlevered" beta β_U that would be measured for the same firm if it had no debt in its capital structure:

$$\beta_L = \beta_U + \frac{D}{E}(1 - \tau_c)(\beta_U - \beta_D) \qquad (10)$$

where β_D is the beta on the firm's debt. The unlevered beta is assumed to be constant with respect to capital structure, reflecting as it does the systematic risk of the firm's assets. Since the beta on

---

[20] This follows development in Fernandez (2003). Other standard papers in this area include Hamada (1972), Miles and Ezzell (1985), Harris and Pringle (1985), Fernandez (2006). (See Fernandez, P., "Levered and Unlevered Beta," IESE Business School Working Paper WP-488, University of Navarra, Jan 2003 (rev. May 2006); Hamada, R.S., "The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stock," *Journal of Finance*, 27, May 1972, pp. 435-452; Miles, J.A. and J.R. Ezzell, "Reformulating Tax Shield Valuation: A Note," *Journal of Finance*, XL5, Dec 1985, pp. 1485-1492; Harris, R.S. and J.J. Pringle, "Risk-Adjusted Discount Rates Extensions form the Average-Risk Case," *Journal of Financial Research*, Fall 1985, pp. 237-244; Fernandez, P., "The Value of Tax Shields Depends Only on the Net Increases of Debt," IESE Business School Working Paper WP-613, University of Navarra, 2006.) Additional discussion can be found in Brealey, Myers, and Allen (2014).

an investment grade firm's debt is much lower than the beta of its assets (i.e., $\beta_D < \beta_U$), this equation embodies the fact that increasing financial leverage (and thereby increasing the debt to equity ratio) increases the systematic risk of *levered* equity (β_L).

An alternative formulation derived by Harris and Pringle (1985) provides the following equation that holds when the market value capital structures (rather than book value) are assumed to be held constant:

$$\beta_L = \beta_U + \frac{D}{E}(\beta_U - \beta_D) \tag{11}$$

Unlike Equation (10), Equation (11) does not include an adjustment for the corporate tax deduction. However, both equations account for the fact that increased financial leverage increases the systematic risk of equity that will be measured by its market beta. And both equations allow an analyst to adjust for differences in financial risk by translating back and forth between β_L and β_U. In principal, Equation (10) is more appropriate for use with regulated utilities, which are typically deemed to maintain a fixed book value capital structure. However, I employ both formulations when adjusting my CAPM estimates for financial risk, and consider the results as sensitivities in my analysis.

It is clear that the beta of debt needs to be determined as an input to either Equation (10), or Equation (11). Rather than estimating debt betas, I rely on the standard financial textbook of Professors Berk & DeMarzo, who report a debt beta of 0.05 for A rated debt and a beta of 0.10 for BBB rated debt.[21]

Once a decision on debt betas is made, the levered equity beta of each proxy company can be computed (in this case by Value Line) from market data and then translated to an unlevered beta at the company's market value capital structure. The unlevered betas for the proxy companies are comparable on an "apples to apples" basis, since they reflect the systematic risk inherent in the assets of the proxy companies, independent of their financing. The unlevered betas are averaged to produce an estimate of the industry's unlevered beta. To estimate the cost of equity for the regulated target company, this estimate of unlevered beta can be "re-levered" to the regulated company's capital structure, and CAPM reapplied with this levered beta, which reflects both the business and financial risk of the target company.

---

[21]   Berk, J. & DeMarzo, P., *Corporate Finance, 2nd Edition.* 2011 Prentice Hall, p. 389.

Hamada adjustment procedures—so-named for Professor Robert S. Hamada who contributed to their development[22]—are ubiquitous among finance practitioners when using the CAPM to estimate discount rates.

[22]   Hamada, R.S., "The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stock", *The Journal of Finance*, 27(2), 1971, pp. 435-452.

Dr. Bente Villadsen is a principal at The Brattle Group's Boston office. Her work concentrates in the areas of regulatory finance and accounting. Her recent work has focused on accounting issues, damages, cost of capital and regulatory finance. Dr. Villadsen has testified on cost of capital and accounting, analyzed credit issues in the utility industry, risk management practices as well the impact of regulatory initiatives such as energy efficiency and de-coupling on cost of capital and earnings. Among her recent advisory work is assisting entities in the acquisition of regulated utilities regarding issues such the return on equity, capital structure, recovery of costs and capital expenditures, growth opportunities, and regulatory environments as well as the precedence for regulatory approval in mergers or acquisitions. Dr. Villadsen's accounting work has pertained to disclosure issues and principles including impairment testing, fair value accounting, leases, accounting for hybrid securities, accounting for equity investments, cash flow estimation as well as overhead allocation. Dr. Villadsen has estimated damages in the U.S. as well as internationally for companies in the construction, telecommunications, energy, cement, and rail road industry. She has filed testimony and testified in federal and state court, in international and U.S. arbitrations and before state and federal regulatory commissions on accounting issues, damages, discount rates and cost of capital for regulated entities.

Dr. Villadsen holds a Ph.D. from Yale University's School of Management with a concentration in accounting. She has a joint degree in mathematics and economics (BS and MS) from University of Aarhus in Denmark. Prior to joining The Brattle Group, Dr. Villadsen was a faculty member at Washington University in St. Louis, University of Michigan, and University of Iowa.

She has taught financial and managerial accounting as well as econometrics, quantitative methods, and economics of information to undergraduate or graduate students. Dr. Villadsen serves as the president of the Society of Utility Regulatory Financial Analysts for 2016-2018.

AREAS OF EXPERTISE
- Regulatory Finance
    - Cost of Capital
    - Cost of Service (including prudence)
    - Energy Efficiency, De-coupling and the Impact on Utilities Financials
    - Relationship between regulation and credit worthiness
    - Risk Management
    - Regulatory Advisory in Mergers & Acquisitions
- Accounting and Corporate Finance
    - Application of Accounting Standards
    - Disclosure Issues
    - Forensics
    - Credit Issues in the Utility Industry
- Damages and Valuation (incl. international arbitration)

- Utility valuation
- Lost Profit for construction, oil&gas, utilities
- Valuation of construction contract
- Damages from the choice of inaccurate accounting methdology

EXPERIENCE

Regulatory Finance

- Dr. Villadsen has testified on cost of capital and capital structure for many regulated entities including electric and gas utilities, pipelines, railroads, water utilities and barges in many jurisdictions including at the FERC, the Surface Transportation Board, the states of Alaska, Arizona, California, Hawaii, Illinois, Michigan, New Mexico, New York, Oregon, and Washington as well as in the provinces of Alberta and Ontario.

- On behalf of the Association of American Railroads, Dr. Villadsen appeared as an expert before the Surface Transportation Board (STB) and submitted expert reports on the determination of the cost of equity for U.S. freight railroads. The STB agreed to continue to use two estimation methods with the parameters suggested.

- On behalf of two taxpayers, Dr. Villadsen has testified on the methodology used to estimate the discount rate for the income approach to property valuation in Utah district court.

- For several electric, gas and transmission utilities as well as pipelines in Alberta, Canada, Dr. Villadsen filed evidence and appeared as an expert on the cost of equity and appropriate capital structure for 2015-17. Her evidence was heard by the Alberta Utilities Commission.

- Dr. Villadsen has estimated the cost of capital and recommended an appropriate capital structure for natural gas and liquids pipelines in Canada, Mexico, and the US. using the jurisdictions' preferred estimation technique as well as other standard techniques. This work has been used in negotiations with shippers as well as before regulators.

- For the Ontario Energy Board Staff, Dr. Villadsen submitted evidence on the appropriate capital structure for a power generator that is engaged in a nuclear refurbishment program.

- Dr. Villadsen has advised many acquirers and potential acquirers of regulated utilities regarding the return on equity, capital structure, recovery of costs and capital expenditures, growth opportunities, and regulatory environments as well as the precedence for regulatory approval in mergers or acquisitions. Her work has pertained to many jurisdiction in the U.S.

and Canada including more than 20 states and three provinces as well as the Federal Energy Regulatory Commission.

- She has estimated the cost of equity on behalf of entities such as Anchorage Municipal Light and Power, Arizona Public Service, Portland General Electric, Anchorage Water and Wastewater, NW Natural, Nicor, Consolidated Edison, Southern California Edison, American Water, California Water, and EPCOR in state regulatory proceedings. She has also submitted testimony before the FERC on behalf of electric transmission and natural gas pipelines as well as Bonneville Power Authority. Much of her testimony involves not only cost of capital estimation but also capital structure, the impact on credit metrics and various regulatory mechanisms such as revenue stabilization, riders and trackers.

- In Australia, she has submitted led and co-authored a report on cost of equity and debt estimation methods for the Australian Pipeline Industry Association. The equity report was filed with the Australian Energy Regulator as part of the APIA's response to the Australian Energy Regulator's development of rate of return guidelines and both reports were filed with the Economic Regulation Authority by the Dampier Bunbury Pipeline. She has also submitted a report on aspects of the WACC calculation for Aurizon Network to the Queensland Competition Authority.

- In Canada, Dr. Villadsen has co-authored reports for the British Columbia Utilities Commission and the Canadian Transportation Agency regarding cost of capital methodologies. Her work consisted partly of summarizing and evaluating the pros and cons of methods and partly of surveying Canadian and world-wide practices regarding cost of capital estimation.

- Dr. Villadsen worked with utilities to estimate the magnitude of the financial risk inherent in long-term gas contracts. In doing so, she relied on the rating agency of Standard & Poor's published methodology for determining the risk when measuring credit ratios.

- She has worked on behalf of infrastructure funds, pension funds, utilities and others on understanding and evaluating the regulatory environment in which electric, natural gas, or water utilities operate for the purpose of enhancing investors ability to understand potential investments. She has also provided advise and testimony in the approval phase of acquisitions.

- On behalf of utilities that are providers of last resort, she has provided estimates of the proper compensation for providing the state-mandated services to wholesale generators.

- In connection with the AWC Companies application to construct a backbone electric transmission project off the Mid-Atlantic Coast, Dr. Villadsen submitted testimony before the Federal Energy Regulatory Commission on the treatment the accounting and regulatory treatment of regulatory assets, pre-construction costs, construction work in progress, and capitalization issues.

- On behalf of ITC Holdings, she filed testimony with the Federal Energy Regulatory Commission regarding capital structure issues.

- For a FERC-regulated entity, Dr. Villadsen undertook an assessment of the company's classification of specific long-term commitments, leases, regulatory assets, asset retirement obligations, and contributions / distributions to owners in the company's FERC Form 1.

- Testimony on the impact of transaction specific changes to pension plans and other rate base issues on behalf of Balfour Beatty Infrastructure Partners before the Michigan Public Service Commission.

- On behalf of financial institutions, Dr. Villadsen has led several teams that provided regulatory guidance regarding state, provincial or federal regulatory issues for integrated electric utilities, transmission assets and generation facilities. The work was requested in connection with the institutions evaluation of potential investments.

- For a natural gas utility facing concerns over mark to market losses on long term gas hedges, Dr. Villadsen helped develop a program for basing a portion of hedge targets on trends in market volatility rather than on just price movements and volume goals. The approach was refined and approved in a series of workshops involving the utility, the state regulatory staff, and active intervener groups. These workshops evolved into a forum for quarterly updates on market trends and hedging positions.

- She has advised the private equity arm of three large financial institutions as well as two infrastructure companies, a sovereign fund and pension fund in connection with their acquisition of regulated transmission, distribution or integrated electric assets in the U.S. and Canada. For these clients, Dr. Villadsen evaluated the regulatory climate and the treatment of acquisition specific changes affecting the regulated entity, capital expenditures, specific cost items and the impact of regulatory initiatives such as the FERC's incentive return or specific states' approaches to the recovery of capital expenditures riders and trackers. She has also reviewed the assumptions or worked directly with the acquirer's financial model.

- On behalf of a provider of electric power to a larger industrial company, Dr. Villadsen assisted in the evaluation of the credit terms and regulatory provisions for the long-term power contract.

- For several large electric utility, Dr. Villadsen reviewed the hedging strategies for electricity and gas and modeled the risk mitigation of hedges entered into. She also studies the prevalence and merits of using swaps to hedge gas costs. This work was used in connection with prudence reviews of hedging costs in Colorado, Oregon, Utah, West Virginia, and Wyoming.

- She estimated the cost of capital for major U.S. and Canadian utilities, pipelines, and railroads. The work has been used in connection with the companies' rate hearings before the Federal Energy Regulatory Commission, the Canadian National Energy Board, the Surface Transportation Board, and state and provincial regulatory bodies. The work has been performed for pipelines, integrated electric utilities, non-integrated electric utilities, gas distribution companies, water utilities, railroads and other parties. For the owner of Heathrow and Gatwick Airport facilities, she has assisted in estimating the cost of capital of U.K. based airports. The resulting report was filed with the U.K. Competition Commission.

- For a Canadian pipeline, Dr. Villadsen co-authored an expert report regarding the cost of equity capital and the magnitude of asset retirement obligations. This work was used in arbitration between the pipeline owner and its shippers.

- In a matter pertaining to regulatory cost allocation, Dr. Villadsen assisted counsel in collecting necessary internal documents, reviewing internal accounting records and using this information to assess the reasonableness of the cost allocation.

- She has been engaged to estimate the cost of capital or appropriate discount rate to apply to segments of operations such as the power production segment for utilities.

- In connection with rate hearings for electric utilities, Dr. Villadsen has estimated the impact of power purchase agreements on the company's credit ratings and calculated appropriate compensation for utilities that sign such agreements to fulfill, for example, renewable energy requirements.

- Dr. Villadsen has been part of a team assessing the impact of conservation initiatives, energy efficiency, and decoupling of volumes and revenues on electric utilities financial performance. Specifically, she has estimated the impact of specific regulatory proposals on the affected utilities earnings and cash flow.

- On behalf of Progress Energy, she evaluated the impact of a depreciation proposal on an electric utility's financial metric and also investigated the accounting and regulatory precedent for the proposal.

- For a large integrated utility in the U.S., Dr. Villadsen has for several years participated in a large range of issues regarding the company's rate filing, including the company's cost of capital, incentive based rates, fuel adjustment clauses, and regulatory accounting issues pertaining to depreciation, pensions, and compensation.

- Dr. Villadsen has been involved in several projects evaluating the impact of credit ratings on electric utilities. She was part of a team evaluating the impact of accounting fraud on an energy company's credit rating and assessing the company's credit rating but-for the accounting fraud.

- For a large electric utility, Dr. Villadsen modeled cash flows and analyzed its financing decisions to determine the degree to which the company was in financial distress as a consequence of long-term energy contracts.

- For a large electric utility without generation assets, Dr. Villadsen assisted in the assessment of the risk added from offering its customers a price protection plan and being the provider of last resort (POLR).

- For several infrastructure companies, Dr. Villadsen has provided advice regarding the regulatory issues such as the allowed return on equity, capital structure, the determination of rate base and revenue requirement, the recovery of pension, capital expenditure, fuel, and other costs as well as the ability to earn the allowed return on equity. Her work has spanned 12 U.S. states as well as Canada, Europe, and South America. She has been involved in the electric, natural gas, water, and toll road industry.

Accounting and Corporate Finance

- For an electric utility subject to international arbitration, Dr. Villadsen submitted expert testimony on the application of IFRS as it pertains to receivables, the classification of liabilities and contingencies.

- In international arbitration, she submitted an expert report on IFRS' requirements regarding carve out financials, impairment, the allocation of costs to segments, and disclosure issues.

- On behalf of a construction company in arbitration with a sovereign, Dr. Villadsen filed an expert report report quantifying damages in the form of lost profit and consequential damages.

- In arbitration before the International Chamber of Commerce Dr. Villadsen testified regarding the true-up clauses in a sales and purchase agreement, she testified on the distinction between

accruals and cash flow measures as well as on the measurement of specific expenses and cash flows.

- On behalf of a taxpayer, Dr. Villadsen recently testified in federal court on the impact of discount rates on the economic value of alternative scenarios in a lease transaction.

- On behalf of a taxpayer, Dr. Villaden has provided an expert report on the nature of the cost of equity used in regulatory proceedings as well as the interest rate regine in 2014.

- In an arbitration matter before the International Centre for Settlement of Investment Disputes, she provided expert reports and oral testimony on the allocation of corporate overhead costs and damages in the form of lost profit. Dr. Villadsen also reviewed internal book keeping records to assess how various inter-company transactions were handled.

- Dr. Villadsen provided expert reports and testimony in an international arbitration under the International Chamber of Commerce on the proper application of US GAAP in determining shareholders' equity. Among other accounting issues, she testified on impairment of long-lived assets, lease accounting, the equity method of accounting, and the measurement of investing activities.

- In a proceeding before the International Chamber of Commerce, she provided expert testimony on the interpretation of certain accounting terms related to the distinction of accruals and cash flow.

- In an arbitration before the American Arbitration Association, she provided expert reports on the equity method of accounting, the classification of debt versus equity and the distinction between categories of liabilities in a contract dispute between two major oil companies. For the purpose of determining whether the classification was appropriate, Dr. Villadsen had to review the company's internal book keeping records.

- In U.S. District Court, Dr. Villadsen filed testimony regarding the information required to determine accounting income losses associated with a breach of contract and cash flow modeling.

- Dr. Villadsen recently assisted counsel in a litigation matter regarding the determination of fair values of financial assets, where there was a limited market for comparable assets. She researched how the designation of these assets to levels under the FASB guidelines affect the value investors assign to these assets.

- She has worked extensively on litigation matters involving the proper application of mark-to-market and derivative accounting in the energy industry. The work relates to the proper valuation of energy contracts, the application of accounting principles, and disclosure requirements regarding derivatives.

- Dr. Villadsen evaluated the accounting practices of a mortgage lender and the mortgage industry to assess the information available to the market and ESOP plan administrators prior to the company's filing for bankruptcy. A large part of the work consisted of comparing the company's and the industry's implementation of gain-of-sale accounting.

- In a confidential retention matter, Dr. Villadsen assisted attorneys for the FDIC evaluate the books for a financial investment institution that had acquired substantial Mortgage Backed Securities. The dispute evolved around the degree to which the financial institution had impaired the assets due to possible put backs and the magnitude and estimation of the financial institution's contingencies at the time of it acquired the securities.

- In connection with a securities litigation matter she provided expert consulting support and litigation consulting on forensic accounting. Specifically, she reviewed internal documents, financial disclosure and audit workpapers to determine (1) how the balance's sheets trading assets had been valued, (2) whether the valuation was following GAAP, (3) was properly documented, (4) was recorded consistently internally and externally, and (5) whether the auditor had looked at and documented the valuation was in accordance with GAAP.

- In a securities fraud matter, Dr. Villadsen evaluated a company's revenue recognition methods and other accounting issues related to allegations of improper treatment of non-cash trades and round trip trades.

- For a multi-national corporation with divisions in several countries and industries, Dr. Villadsen estimated the appropriate discount rate to value the divisions. She also assisted the company in determining the proper manner in which to allocate capital to the various divisions, when the company faced capital constraints.

- Dr. Villadsen evaluated the performance of segments of regulated entities. She also reviewed and evaluated the methods used for overhead allocation.

- She has worked on accounting issues in connection with several tax matters. The focus of her work has been the application of accounting principles to evaluate intra-company transactions,

the accounting treatment of security sales, and the classification of debt and equity instruments.

- For a large integrated oil company, Dr. Villadsen estimated the company's cost of capital and assisted in the analysis of the company's accounting and market performance.

- In connection with a bankruptcy proceeding, Dr. Villadsen provided litigation support for attorneys and an expert regarding corporate governance.

Damages and Valuation

- For the Alaska Industrial Development and Export Authority, Dr. Villadsen co-authored a report that estimated the range of recent acquisition and trading multiples for natural gas utilities.

- On behalf of a taxpayer, Dr. Villadsen testified on the economic value of alternative scenarios in a lease transaction regarding infrastructure assets.

- For a foreign construction company involved in an international arbitration, she estimated the damages in the form of lost profit on the breach of a contract between a sovereign state and a construction company. As part of her analysis, Dr. Villadsen relied on statistical analyses of cost structures and assessed the impact of delays.

- In an international arbitration, Dr. Villadsen estimated the damages to a telecommunication equipment company from misrepresentation regarding the product quality and accounting performance of an acquired company. She also evaluated the IPO market during the period to assess the possibility of the merged company to undertake a successful IPO.

- On behalf of pension plan participants, Dr. Villadsen used an event study estimated the stock price drop of a company that had engaged in accounting fraud. Her testimony conducted an event study to assess the impact of news regarding the accounting misstatements.

- In connection with a FINRA arbitration matter, Dr. Villadsen estimated the value of a portfolio of warrants and options in the energy sector and provided support to counsel on finance and accounting issues.

- She assisted in the estimation of net worth of individual segments for firms in the consumer product industry. Further, she built a model to analyze the segment's vulnerability to additional fixed costs and its risk of bankruptcy.

- Dr. Villadsen was part of a team estimating the damages that may have been caused by a flawed assumption in the determination of the fair value of mortgage related instruments. She provided litigation support to the testifying expert and attorneys.

- For an electric utility, Dr. Villadsen estimated the loss in firm value from the breach of a power purchase contract during the height of the Western electric power crisis. As part of the assignment, Dr. Villadsen evaluated the creditworthiness of the utility before and after the breach of contract.

- Dr. Villadsen modeled the cash flows of several companies with and without specific power contract to estimate the impact on cash flow and ultimately the creditworthiness and value of the utilities in question.

BOOKS

"*Risk and Return for Regulated Industries*," (with Michael J. Vilbert, Dan Harris, and A. Lawrence Kolbe) Elsevier, May 2017.

PUBLICATIONS AND REPORTS

"A Review of International Approaches to Regulated Rates of Return," (with J. Anthony, T. Brown, L. Figurelli, D. Harris, and N. Nguyen) published by the *Australian Energy Regulator*, September 2020.

"Global Impacts and Implications of COVID-19 on Utility Finance," (with R. Mudge, F. Graves, J. Figueroa, T. Counts, L. Mwalenga, and S. Pant), *The Brattle Group*, July 2020.

"Impact of New Tax Law on Utilities' Deferred Taxes," (with Mike Tolleth and Elliott Metzler), *CRRI 37'th Annual Eastern Conference*, June, 2018.

"Implications of the New Tax Law for Regulated Utilities," The Brattle Group, January 2018.

"Using Electric and Gas Forwards to Manage Market Risks: When a power purchase agreement with a utility is not possible, standard forward contracts can act as viable hedging instruments*," North American Windpower*, May 2017, pp. 34-37.

"*Managing Price Risk for Merchant Renewable Investments: Role of Market Interactions and Dynamics on Effective Hedging Strategies*," (with Onur Aydin and Frank Graves), Brattle Whitepaper, January 2017.

"Aurizon Network 2016 Access Undertaking: Aspects of the WACC," (with Mike Tolleth), filed with the *Queensland Competition Authority*, Australia, November 2016.

"Report on Gas LDC multiples," with Michael J. Vilbert, *Alaska Industrial Development and Export Authority*, May 2015.

"Aurizon Network 2014 Draft Access Undertaking: Comments on Aspects of the WACC," prepared for Aurizon Network and submitted to the *Queensland Competition Authority*, December 2014

"*Brattle Review of AE Planning Methods and Austin Task Force Report.*" (with Frank C. Graves) September 24, 2014.

Report on "Cost of Capital for Telecom Italia's Regulated Business" with Stewart C. Myers and Francesco Lo Passo before the *Communications Regulatory Authority of Italy* ("AGCOM"), March 2014. *Submitted in Italian.*

"Alternative Regulation and Ratemaking Approaches for Water Companies: Supporting the Capital Investment Needs of the 21st Century," (with J. Wharton and H. Bishop), prepared for the *National Association of Water Companies*, October 2013.

"Estimating the Cost of Debt," (with T. Brown), prepared for the Dampier Bunbury Pipeline and filed with the *Economic Regulation Authority*, Western Australia, March 2013.

"Estimating the Cost of Equity for Regulated Companies," (with P.R. Carpenter, M.J. Vilbert, T. Brown, and P. Kumar), prepared for the Australian Pipeline Industry Association and filed with the *Australian Energy Regulator* and the *Economic Regulation Authority*, Western Australia, February 2013.

"Calculating the Equity Risk Premium and the Risk Free Rate," (with Dan Harris and Francesco LoPasso), prepared for *NMa and Opta, the Netherlands*, November 2012.

"Shale Gas and Pipeline Risk: Earnings Erosion in a More Competitive World," (with Paul R. Carpenter, A. Lawrence Kolbe, and Steven H. Levine), *Public Utilities Fortnightly*, April 2012.

"Survey of Cost of Capital Practices in Canada," (with Michael J. Vilbert and Toby Brown), prepared for *British Columbia Utilities Commission*, May 2012.

"Public Sector Discount Rates" (with rank Graves, Bin Zhou), *Brattle* white paper, September 2011

"FASB Accounting Rules and Implications for Natural Gas Purchase Agreements," (with Fiona Wang), *American Clean Skies Foundation*, February 2011.

"IFRS and You: How the New Standards Affect Utility Balance Sheets," (with Amit Koshal and Wyatt Toolson), *Public Utilities Fortnightly*, December 2010.

"Corporate Pension Plans: New Developments and Litigation," (with George Oldfield and Urvashi Malhotra), Finance Newsletter, Issue 01, *The Brattle Group*, November 2010.

"Review of Regulatory Cost of Capital Methodologies," (with Michael J. Vilbert and Matthew Aharonian), *Canadian Transportation Agency*, September 2010.

"Building Sustainable Efficiency Businesses: Evaluating Business Models," (with Joe Wharton and Peter Fox-Penner), *Edison Electric Institute*, August 2008.

"Understanding Debt Imputation Issues," (with Michael J. Vilbert and Joe Wharton and *The Brattle Group* listed as an author), *Edison Electric Institute*, June 2008.

"Measuring Return on Equity Correctly: Why current estimation models set allowed ROE too low," *Public Utilities Fortnightly*, August 2005 (with A. Lawrence Kolbe and Michael J. Vilbert).

"The Effect of Debt on the Cost of Equity in a Regulatory Setting," (with A. Lawrence Kolbe and Michael J. Vilbert, and with "*The Brattle Group*" listed as author), *Edison Electric Institute,* April 2005.

"Communication and Delegation in Collusive Agencies," *Journal of Accounting and Economics*, Vol. 19, 1995.

"Beta Distributed Market Shares in a Spatial Model with an Application to the Market for Audit Services" (with M. Hviid), *Review of Industrial Organization*, Vol. 10, 1995.

SELECTED PRESENTATIONS

"FERC's new ROE methodology for pipelines and electric transmission," (with Michael J. Vilbert) *UBS Fireside Chat*, June 24, 2020.

"Managing Price Risk for Merchant Renewable Investments," (with Onur Aydin) *EIA Electricity Pricing Workgroup* (webinar), April 30, 2019.

"Decoupling and its Impact on Cost of Capital" presented to *SURFA Members and Friends*, February 27, 2019.

"Current Issues in Cost of Capital" presented to *EEI Members*, July, 2018-19.

"Introduction to Capital Structure & Liability Management", *the American Gas Association/Edison Electric Institute "Introduction and Advanced Public Utility Accounting Courses",* August 2018-2019.

"Lessons from the U.S. and Australia" presented at *Seminar on the Cost of Capital in Regulated Industries: Time for a Fresh Perspective?* Brussels, October 2017.

"Should Regulated Utilities Hedge Fuel Cost and if so, How?" presented at *SURFA's 49 Financial Forum*, April 20-21, 2017.

"Transmission: The Interplay Between FERC Rate Setting at the Wholesale Level and Allocation to Retail Customers," (with Mariko Geronimo Aydin) presented at *Law Seminars International: Electric Utility Rate Cases*, March 16-17, 2017.

 "Capital Structure and Liability Management," *American Gas Association and Edison Electric Institute Public Utility Accounting Course*, August 2015-2017.

 "Current Issues in Cost of Capital," *Edison Electric Institute Advanced Rate School*, July 2013-2017.

 "Alternative Regulation and Rate Making Approaches for Water Companies," *Society of Depreciation Professionals Annual Conference*, September 2014.

 "Capital Investments and Alternative Regulation," *National Association of Water Companies Annual Policy Forum*, December 2013.

 "Accounting for Power Plant," *SNL's Inside Utility Accounting Seminar*, Charlotte, NC, October 2012.

 "GAAP / IFRS Convergence," *SNL's Inside Utility Accounting Seminar*, Charlotte, NC, October 2012.

 "International Innovations in Rate of Return Determination," *Society of Utility Financial and Regulatory Analysts' Financial Forum*, April 2012.

 "Utility Accounting and Financial Analysis: The Impact of Regulatory Initiatives on Accounting and Credit Metrics," 1.5 day seminar, EUCI, Atlanta, May 2012.

 "Cost of Capital Working Group Eforum," *Edison Electric Institute webinar*, April 2012.

 "Issues Facing the Global Water Utility Industry" Presented to Sensus' Executive Retreat, Raleigh, NC, July 2010.

 "Regulatory Issues from GAAP to IFRS," NASUCA *2009 Annual Meeting*, Chicago, November 2009.

 "Subprime Mortgage-Related Litigation: What to Look for and Where to Look," *Law Seminars International: Damages in Securities Litigation*, Boston, May 2008.

 "Evaluating Alternative Business / Inventive Models," (with Joe Wharton). *EEI Workshop, Making a Business of Energy Efficiency: Sustainable Business Models for Utilities*, Washington DC, December 2007.

 "Deferred Income Taxes and IRS's NOPR: Who should benefit?" *NASUCA Annual Meeting*, Anaheim, CA, November 2007.

 "Discussion of 'Are Performance Measures Other Than Price Important to CEO Incentives?'" *Annual Meeting of the American Accounting Association*, 2000.

 "Contracting and Income Smoothing in an Infinite Agency Model: A Computational Approach," (with R.T. Boylan) *Business and Management Assurance Services Conference*, Austin 2000.

TESTIMONY

Direct Testimony on Cost of Capital on behalf of California-American Water Company, *California Public Utilities Commission*, Application No. 21-05-___, May 2021.

Prefiled Direct Testimony on cost of equity on behalf of Southern Star Central Gas Pipeline, *Federal Energy Regulatory Commission*, Docket RP21-778-000, April 2021.

Direct Testimony re. the prospective excessive earnings test on behalf of Cleveland Electric Illuminating Company and the Toledo Edison Company, *Public Utilities Commission of Ohio*, Case Nos. 20-1034-EL UNC and 20-1476-EL-UNC, March 2021.

Rebuttal Testimony re. the discount rate for property valuation in tax assessment on behalf of Union Pacific Railroad, *Utah District Court*, Case No. 2:18-cv-00630-DAK_DBP (Union Pacific Railroad v. Utah State Tax Commission et al), February 2021.

Direct Testimony on the cost of equity on behalf of Orange & Rockland Utilities submitted to the *New York Department of Public Service*, Case No. 21-E-0074, January 2021.

Direct Testimony and Rebuttal Testimony on the cost of equity on behalf of Nicor Gas submitted to the *Illinois Commerce Commission*, Docket No. 21-0098, January 2021, June 2021.

Direct Testimony on the cost of equity and capital structure on behalf of Anchorage Water and Wastewater Utility submitted to the *Regulatory Commission of Alaska*, Matters TA168-122 and 168-126, December 2020.

Direct Testimony on the cost of equity on behalf of NW Natural submitted to the *Washington Transportation and Utilities Commission*, Docket No. UG-200994, December 2020.

Written Evidence in Review and Variance of Decision 22570-D01-2018 Stage 2 (AltaGas' capital structure) (joint with Paul R. Carpenter) on behalf of AltaGas Utilities Inc. Filed with the *Alberta Utilities Commission*, Proceeding 25031, January 2020.

Written Evidence on Cost of Equity and Capital Structure on behalf of ATCO, AltaGas and FortisAlberta in 2021-2022 Generic Cost of Capital Proceeding. Filed with the *Alberta Utilities Commission*, Proceeding No. 24110, January 2020.

Report on the Return Margin for the Alberta Bottle Depots on behalf of the Alberta Beverage Container Recycling Corporation, February 2020.

Verified Statement and Reply Verified Statement regarding Revisions to the Board's Methodology for Determining the Railroad Industry's Cost of Capital on behalf of the American Association of Railroads before the *Surface Transportation Board*, Docket No. EP 664 (Sub-No. 4), January, February 2020.

Affidavit regarding the creation of a regulatory asset for earthquake related costs on behalf of Anchorage Water and Wastewater submitted to the *Regulatory Commission of Alaska*, December 2019.

Expert Report and Hearing Appearance on Going Concern and Impairment, *American Arbitration Association*: International Engineering & Construction S.A., Greenville Oil & Gas Co. Ltd and GE Oil & Gas, Inc., November, December 2019.

Direct Testimony and Rebuttal Testimony on the cost of equity on behalf of DTE Gas submitted to the *Michigan Public Service Commission*, Docket No. U-20642, November 2019.

Expert Report on IFRS Issues and Forensics. *SIAC Arbitration* No. 44 of 2018, October 2019.

Expert Report, Reply Report and Hearing Appearance on IFRS issues. *ICC Arbitration* No. 23896/GSS, September 2019, September and November 2020.

Direct Testimony on the cost of debt and equity capital as well as capital structure on behalf of Young Brothers, LLC. submitted to the *Public Utilities Commission of the State of Hawaii*, Docket No. 2019-0117, September 2019.

Direct Testimony on Cost of Equity on behalf of DTE Gas submitted to the *Michigan Public Service Commission*, Docket No. U-20940, February 2021.

Expert Report on discount rates in property tax matter for Union Pacific Company in *Union Pacific Railroad Co. v. Utah State Tax Comm'n, et. al.*, Case No. 2:18-cv-00630-DAK-DBP, Utah August 2019.

Answering Testimony on the Cost of Equity on behalf of Northern Natural Gas Company submitted to the *Federal Energy Regulatory Commission*, Docket No. RP19-59-000, August 2019.

Direct Testimony, Rebuttal Testimony, and Hearing Appearance on Cost of Equity on behalf of DTE Electric Company submitted to the *Michigan Public Service Commission*, Docket No. U-20561, July, November, December 2019.

Prepared Direct Testimony on Cost of Capital for Northern Natural Gas Company submitted to the *Federal Energy Regulatory Commission*, Docket No. RP19-1353-000, July 2019.

Prepared Direct Testimony on Cost of Capital and Term Differentiated Rates for Paiute Pipeline Company submitted to the *Federal Energy Regulatory Commission*, Docket No. RP19-1291-000, May 2019.

Expert report, deposition, and oral trial testimony on behalf of PacifiCorp in the Matter of *PacifiCorp, Inc. v. Utah State Tax Comm'n*, Case No. 180903986 TX, *Utah District Court* April, May, September 2019.

Direct Testimony, Rebuttal Testimony, and hearing appearance on the cost of capital for Southern California Edison submitted to the *California Public Utilities Commission*, Docket No. A.19-04-014, April 2019, August 2019.

Prepared Direct Testimony on the cost of equity for Southern California Edison's transmission assets submitted to the *Federal Energy Regulatory Commission*, Docket No. ER19-1553, April 2019.

Direct and Rebuttal Testimony on cost of equity for Consolidated Edison of New York submitted to the *New York Public Service Commission*, Matter No. 19-00317, January, June 2019.

Direct Testimony on cost of capital and capital structure for Northwest Natural Gas Company submitted to the *Washington Utilities and Transportation Commission*, Docket No. 181053, December 2018.

Pre-filed Direct Testimony and Reply Testimony on cost of capital and capital structure for Anchorage Water Utility and Anchorage Wastewater Utility submitted to the *Regulatory Commission of Alaska*, TA163-122 and TA164-126, December 2018, October 2019.

Direct Testimony on cost of capital for Portland General Electric Company submitted to the *Oregon Public Utility Commission* on behalf of Portland General Electric Company (with Hager and Liddle), UE 335, February 2018.

Direct Testimony and Rebuttal Testimony on cost of capital for NW Natural submitted to the *Oregon Public Utility Commission* on behalf of NW Natural, UG 344, December 2017, May 2018.

Direct Pre-filed Testimony and Reply Pre-filed Testimony on cost of equity and capital structure for Anchorage Water and Wastewater Utilities before the *Regulatory Commission of Alaska*, TA161-122 and TA162-126, November 2017, September 2018.

Direct Testimony, Rebuttal Testimony, deposition, and hearing appearance on wholesale water rates for Petitioner Cities, *Texas Public Utility Commission*, PUC Docket 46662, SOAH Docket 473-17-4964.WS, November 2017, January, June, July, October 2018.

Affidavit on Lifting the Dividend Restriction for Anchorage Water Utility for AWWU, *Regulatory Commission of Alaska*, U-17-095, November 2017.

Written Evidence, Rebuttal Evidence and Hearing appearance on the Cost of Capital and Capital Structure for the ATCO Utilities and AUI, 2018-2020 Generic Cost of Capital Proceeding, *Alberta Utilities Commission*, October 2017, February – March 2018.

Written Evidence, Rebuttal Evidence, and Hearing Appearance on Regulatory Tax Treatment for the ATCO Utilities and AUI, 201802020 Generic Cost of Capital Proceeding, *Alberta Utilities Commission*, October 2017, February – March 2018.

Affidavit on the Creation of a Regulatory Assets for PRV Rebates for Anchorage Water Utility, submitted to the *Regulatory Commission of Alaska*, U-17-083, August 2017.

Direct and Rebuttal Testimony, Hearing Appearance on Cost of Capital for California-American Water Company for California-American Water submitted to the *California Public Utilities Commission*, Application 17-04-003, April, August, September 2017.

Direct, Rebuttal, Surrebuttal, Supplemental, Supplemental Rebuttal Testimony and Hearing Appearance on the Cost of Capital for Northern Illinois Gas Company submitted to the *Illinois Commerce Commission*, GRM #17-055, March, July, August, September, and November 2017.

Direct and Rebuttal Testimony on Cost of Capital for Portland General Electric Company submitted to the *Oregon Public Utility Commission* on behalf of Portland General Electric Company, Docket No. UE 319, February, July 2017.

Pre-filed Direct and Reply Testimony and Hearing Appearance on Cost of Equity and Capital Structure for Anchorage Municipal Light and Power, *Regulatory Commission of Alaska*, Docket No. TA357-121, December 2016, August and December 2017.

Expert report and Hearing Appearance regarding the Common Equity Ratio for OPG's Regulated Generation for OEB Staff, *Ontario Energy Board*, EB-2016-0152, November 2016, April 2017.

Pre-filed Direct Testimony on Cost of Equity and Capital Structure for Anchorage Municipal Wastewater Utility, *Regulatory Commission of Alaska*, Docket No. 158-126, November 2016.

Expert Report, Reply Expert Report and Hearing on damages (quantum) in exit arbitration (with Dan Harris), *International Center for the Settlement of Investment Disputes*, October 2016, October 2018, July 2019.

Direct Testimony on capital structure, embedded cost of debt, and income taxes for Detroit Thermal, Michigan Public Service Commission, Docket No. UE-18131, July 2016.

Direct Testimony on return on equity for Arizona Public Service Company, Arizona Corporation Commission, Docket E-01345A-16-0036, June 2016.

Written evidence, rebuttal evidence and hearing appearance regarding the cost of equity and capital structure for Alberta-based utilities, the Alberta Utilities Commission, Proceeding No. 20622 on behalf of AltaGas Utilities Inc., ENMAX Power Corporation, FortisAlberta Inc., and The ATCO Utilities, February, May and June 2016.

Verified Statement, Verified Reply Statement, and Hearing Appearance regarding the cost of capital methodology to be applied to freight railroads, the *Surface Transportation Board* on behalf of the Association of American Railroads, Docket No. EP 664 (Sub-No. 2), July 2015, September and November 2015.

Direct Testimony on cost of capital submitted to the Oregon Public Utility Commission on behalf of Portland General Electric, Docket No. UE 294, February 2015.

Supplemental Direct Testimony and Reply Testimony on cost of capital submitted to the *Regulatory Commission of Alaska* on behalf of Anchorage Water and Wastewater utilities, Docket U-13-202, September 2014, March 2015.

Expert Report and hearing appearance on specific accrual and cash flow items in a Sales and Purchase Agreement in international arbitration before the *International Chamber of Commerce*. Case No. 19651/TO, July and November 2014. (*Confidential*)

Rebuttal Testimony regarding Cost of Capital before the *Oregon Public Utility Commission* on behalf of Portland General Electric, Docket No. UE 283, July 2014.

Direct Testimony on the rate impact of the pension re-allocation and other items for Upper Peninsula Power Company in connection with the acquisition by BBIP before the *Michigan Public Service Commission* in Docket No. U-17564, March 2014.

Expert Report on cost of equity, non-recovery of operating cost and asset retirement obligations on behalf of oil pipeline in arbitration, April 2013. (with A. Lawrence Kolbe, Michael J. Vilbert, *Confidential*)

Direct Testimony on the treatment of goodwill before the *Federal Energy Regulatory Commission* on behalf of ITC Holdings Corp and ITC Midwest, LLC in Docket No. PA10-13-000, February 2012.

Direct and Rebuttal Testimony on cost of capital before the *Public Utilities Commission of the State of California* on behalf of California-American Water in Application No. 11-05, May 2011.

Direct Testimony, Rebuttal Testimony, and Hearing Appearance on cost of capital before the *New Mexico Public Regulation Commission* on behalf of New Mexico-American Water in Case No. 11-00196-UT, May 2011, November 2011, and December 2011.

Direct Testimony on regulatory assets and FERC accounting before the *Federal Energy Regulatory Commission* on behalf of AWC Companies, EL11-13-000, December 2010.

Expert Report and deposition in Civil Action No. 02-618 (GK/JMF) in the *United States District Court for the District of Columbia*, November 2010, January 2011. (*Confidential*)

Direct Testimony, Rebuttal Testimony, and Rejoinder Testimony on the cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-10-0448, November 2010, July 2011, and August 2011.

Direct Testimony on the cost of capital before *the New Mexico Public Regulation Commission* on behalf of New Mexico-American Water in Docket No. 09-00156-UT, August 2009.

Direct and Rebuttal Testimony and Hearing Appearance on the cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-09-0343, July 2009, March 2010 and April 2010.

Rebuttal Expert Report, Deposition and Oral Testimony re. the impact of alternative discount rate assumptions in tax litigation. *United States Court of Federal Claims*, Case No. 06-628 T, January, February, April 2009. (*Confidential*)

Direct Testimony, Rebuttal Testimony and Hearing Appearance on cost of capital before the *New Mexico Public Regulation Commission* on behalf of New Mexico-American Water in Docket No. 08-00134-UT, June 2008 and January 2009.

Direct Testimony on cost of capital and carrying charge on damages, U.S. Department of Energy, *Bonneville Power Administration*, BPA Docket No. WP-07, March 2008.

Direct Testimony, Rebuttal Testimony, Rejoinder Testimony and Hearing Appearance on cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-08-0227, April 2008, February 2009, March 2009.

Expert Report, Supplemental Expert Report, and Hearing Appearance on the allocation of corporate overhead and damages from lost profit. *The International Centre for the Settlement of Investment Disputes*, Case No. ARB/03/29, February, April, and June 2008 (*Confidential*).

Expert Report on accounting information needed to assess income. *United States District Court* for the District of Maryland (Baltimore Division), Civil No. 1:06cv02046-JFM, June 2007 (*Confidential*)

Expert Report, Rebuttal Expert Report, and Hearing Appearance regarding investing activities, impairment of assets, leases, shareholder' equity under U.S. GAAP and valuation. *International Chamber of Commerce* (ICC), Case No. 14144/CCO, May 2007, August 2007, September 2007. (Joint with Carlos Lapuerta, *Confidential*)

Direct Testimony, Rebuttal Testimony, and Hearing Appearance on cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-06-0491, July 2006, July 2007.

Direct Testimony, Rebuttal Testimony, Rejoinder Testimony, Supplemental Rejoinder Testimony and Hearing Appearance on cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-06-0403, June 2006, April 2007, May 2007.

Direct Testimony, Rebuttal Testimony, Rejoinder Testimony, and Hearing Appearance on cost of capital before *the Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-06-0014, January 2006, October 2006, November 2006.

Expert report, rebuttal expert report, and deposition on behalf of a major oil company regarding the equity method of accounting and classification of debt and equity, *American Arbitration Association*, August 2004 and November 2004. (*Confidential*).