BEFORE THE
STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET **DE 23-039**

IN THE MATTER OF: Liberty Utilities (Granite State Electric) Corp.
d/b/a Liberty
Request for Change in Distribution Rates

DIRECT TESTIMONY

OF

Dr. Zhen Zhu

December 13, 2023

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I. INTRODUCTION

1

2 **Q. Please state your name, position, and business address.**

3 A. My name is Zhen Zhu. I am a Managing Consultant. My business address is 5555 North

4 Grand Blvd., Oklahoma City, Oklahoma 73112.

5 **Q. By whom are you employed?**

6 A. As a consultant, I am employed by C. H. Guernsey & Company. I am also the Dr. Michael

7 Metzger Chair Professor of Economics at the University of Central Oklahoma, and Adjunct

8 Professor of Energy Finance at the Mewbourne School of Petroleum and Geological

9 Engineering at the University of Oklahoma.

10 Guernsey is an employee-owned company of consultants, engineers, and architects,

11 providing engineering, architectural, economic, management consulting, environmental,

12 and construction management services to utilities, industries, and government agencies

13 throughout the United States and abroad. Guernsey has been involved in all stages of utility

14 rate cases to provide consultation services related to utility revenue analysis, rate design,

15 and cost of capital.

16 **Q. What is your educational background?**

17 A. I have a B.A. in Business Administration from Renmin University in China, an M.A. in

18 Economics from Bowling Green State University, and a Ph.D. in Economics from the

19 University of Michigan.

20 **Q. Please describe your professional background.**

21 A. From 2000 to present, I have been an Economist, Consultant, Senior Consultant, and

22 Managing Consultant with C.H. Guernsey & Company. From 1994 to 2000, I was an

23 Assistant Professor of Economics at the University of Oklahoma. From 2000 to present, I

1   have been an Assistant Professor, Associate Professor, Professor, Department Chairperson,

2   and the Dr. Michael Metzger Chair Professor of Economics at the University of Central

3   Oklahoma. I have also been an adjunct professor of Economics and Energy Finance at

4   University of Oklahoma. I have performed many academic and applied studies of the

5   energy market and of regulatory policy, along with studies of international financial

6   markets and commodity markets. Please refer to Attachment DOE-ZZ-1 for a list of my

7   most recent publications and studies.

8   **Q.**   **What is your regulatory experience?**

9   A.   As a consultant, I have performed a variety of research studies, provided direct testimony,

10   support, and engagement in many projects related to gas, electric, and water/wastewater

11   utility regulatory matters. I have provided support and testimony in gas, electric, and

12   water/wastewater cost of capital cases. I have also provided testimonies on issues related

13   to Integrated Resource Planning, natural gas prices, and load forecasts before a number of

14   regulatory bodies.

15   **Q.**   **Before what regulatory authorities have you testified as an expert witness?**

16   A.   I have testified before the Michigan Public Service Commission, Georgia Public Service

17   Commission, Oklahoma Corporation Commission, South Carolina Public Service

18   Commission, Ohio Public Utility Commission, Texas Public Utility Commission and

19   Vermont Public Utility Commission. I have been providing consultation services on cost

20   of capital issues on electric and gas transmission rate cases before the Federal Energy

21   Regulatory Commission (FERC) and have been retained as cost of capital consultant for

22   the Delaware Public Service Commission.

23

1 **Q.   Have you testified before the New Hampshire Public Utilities Commission (NH**

2 **PUC)?**

3 A.   No, I have not.

4 **Q.   What is the nature of your testimony in this case and on behalf of whom you are**

5 **testifying?**

6 A.   Liberty Utilities (Granite State Electric) (Liberty or the Company) filed an application to

7 increase its rates of service before the NH PUC. I have been asked by the New Hampshire

8 Department of Energy (DOE or the Department) to review the appropriateness of the

9 Company's proposed overall cost of capital including the capital structure, cost of debt,

10 and cost of equity. I discuss in detail Liberty's proposed cost of capital in this proceeding

11 and, in particular, the proposed return on equity. I recommend an ROE of 9.25% as

12 compared to the Company request of 10.35%. I also provide a critical review of the ROE

13 recommendation by the Company's cost of capital witnesses.

14 **Q.   Please describe the organization of your testimony.**

15 A.   First, I describe the standard in setting the cost of capital and the general principles in

16 calculating the cost of the capital. I also examine the current state of the economy and

17 capital markets because economic and capital market conditions set a global environment

18 for firms to operate, thus influencing the cost of capital. I then describe the capital structure

19 and cost of debt of the Company. I provide evidence to support my recommendations

20 regarding capital structure. Next, I detail the calculation of the cost of equity by using

21 several generally accepted methodologies. Specifically, I calculate the Company's cost of

22 equity by applying a two-step Constant Growth Discounted Cash Flow ("DCF") Model

23 and Capital Asset Pricing Model ("CAPM") to a group of proxy companies. I also provide

1   a form of Risk Premium ("RP") analysis using the past authorized ROE and long-term

2   interest rate. After carrying out these calculations, I provide my summary evaluations

3   regarding the Company's cost of capital and comment on the 10.35% ROE as requested by

4   the Company through its cost of capital witnesses, Ms. Ann E. Bulkley and Mr. Christopher

5   M. Wall (B&W).

6 **Q.**   **Please summarize how you developed your return on equity recommendation for**

7   **Liberty.**

8 A.   I reviewed the Company's financial conditions including the cost of debt and capital

9   structure. I calculated the cost of equity for a group of comparable companies based on

10   several different models. The models I used include a Constant Growth DCF Model. I used

11   a two-step methodology that considers a long-term Earnings Per Share ("EPS") growth rate

12   as represented by Gross Domestic Product ("GDP") growth rate. As the two-step DCF

13   Model relies on the weights attached to the 3 to 5-year analysts' projection of earnings

14   growth and the long-term growth rates to determine the constant growth rate, I have

15   selected a number of weights to form the composite growth rate as the input to the DCF

16   Model. In addition, I calculated the expected cost of capital based on the CAPM. In

17   applying the CAPM Model, I used a measure of Market Risk Premium obtained by

18   applying a two-step forward-looking DCF Model to dividend-paying companies in the

19   S&P 500 market index to generate expected market return, and then subtracting a long-

20   term interest rate from the expected market return to obtain the Market Risk Premium.

21   Then I obtained the ROE by adding a long-term risk-free interest rate to the adjusted risk

22   premium, which is the product of company's beta and Market Risk Premium. Again,

23   different weights on growth rates were employed to obtain the forward-looking Market

1   Risk Premium. Finally, I used a form of bond yield plus RP Model to produce another

2   measurement of ROE to support my cost of capital recommendation.

3 **Q.   Please summarize your testimony and recommendations.**

4 A.   My calculations, based on sound economic principles, indicate that the Company's

5   required cost of equity, or the opportunity cost of equity, is approximately 9.12% to 9.40%

6   based on the average value of means and medians (see Table 1 below)[1]. I recommend an

7   ROE of 9.25%. My calculation suggests that the Company's proposed ROE of 10.35% is

8   significantly higher than the market expected ROE numbers generated from economic

9   models applied to the current market conditions.

10

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[1] Strictly speaking, the results are based on the average or median of DCF and CAPM models, as the RP model only generates a one-point estimate of ROE.

1

Table 1: Summary of ROE Estimation			
Model		**Growth Rate Weights**	
DCF	1/3 and 2/3	1/5 and 4/5	1/10 and 9/10
6-Month Stock Price			
Mean	8.86%	9.04%	9.17%
Median	9.00%	9.19%	9.34%
3-Month Stock Price			
Mean	9.02%	9.09%	9.24%
Median	9.12%	9.31%	9.46%
Average of Mean and Median	9.00%	9.16%	9.30%
CAPM			
6-Month Average Interest Rate			
Mean	8.60%	8.76%	9.15%
Median	8.68%	8.84%	9.24%
3-Month Average Interest Rate			
Mean	8.66%	8.82%	9.21%
Median	8.73%	8.90%	9.30%
Average of Mean and Median	8.67%	8.83%	9.23%
RP	9.68%	9.68%	9.68%
Average of Three Models	9.12%	9.22%	9.40%

The weights refer to the weights on GDP and analysts' 3-5 year projections in the two-step DCF modeling.

2

3   The Company's weighted average long-term debt cost is as follows:[2]

Cost of Debt as Filed	
Test Year (2022)	5.97%
Interim (2023/2024)	6.03%
2024/2025	6.14%
2025/2026	5.84%

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[2] Attachment KMJ/DSD-1, Schedule RR-5

1   I accept these embedded costs of debt. The Company also requested a hypothetical capital

2   structure of 55% equity and 45% long-term debt. The overall cost of capital as requested

3   by the Company is 8.38%. Based on my analysis of capital structure of comparable

4   companies, I believe the Company requested equity ratio is too high and it will put unjust

5   and unreasonable burdens on New Hampshire rate payers. I recommend an equity ratio of

6   50%. Therefore, given the capital structure, cost of debts (5.97% for the test year), and cost

7   of equity, my recommended overall cost of capital for the test year is 7.61%, similar to the

8   7.6% cost of capital authorized for the Company in the last rate case. Table 2 below shows

9   the summary of recommended overall cost of capital.

Table 2: Cost of Capital			
Company Request	Capital Structure	Cost	Weighted Cost
Long-term debt	45.00%	5.97%	2.69%
Equity	55.00%	10.35%	5.69%
WACC			8.38%
OCC Recommendation	Capital Structure	Cost	Weighted Cost
Long-term debt	50.00%	5.97%	2.99%
Equity	50.00%	9.25%	4.63%
WACC			7.61%

10

11   **Q.   Are you sponsoring any exhibits?**

12   A.   Yes, I am sponsoring the following Exhibits:

13   Exhibit DOE-ZZ-1: Dr. Zhen Zhu's resume

14   Exhibit DOE-ZZ-2: Long-term and short-term interest rates

15   Exhibit DOE-ZZ-3: Capital structure

1   Exhibit DOE-ZZ-4: Projected earnings growth

2   Exhibit DOE-ZZ-5: Nominal GDP growth

3   Exhibit DOE-ZZ-6: Constant growth DCF Model

4   Exhibit DOE-ZZ-7: Beta determination

5   Exhibit DOE-ZZ-8: Market risk premium

6   Exhibit DOE-ZZ-9: CAPM model

7   Exhibit DOE-ZZ-10: Risk premium model

8 **Q.** **Did you or someone under your direct supervision prepare these Exhibits?**

9 A.   Yes.

II. REGULATORY STANDARD AND METHODOLOGY

11 **Q.** **What is the purpose of establishing a rate of return when setting a utility's rates?**

12 A.   The purpose of a rate of return, also commonly called "cost of capital" or "opportunity cost

13   of capital," is to compensate investors who have committed capital to finance the plant and

14   equipment necessary for utility service to customers. Investors commit these funds in

15   anticipation of earning a return on their investment that is consistent with that of other

16   investment alternatives with comparable risks. This regulatory standard is well-recognized

17   and was addressed by the U.S. Supreme Court in the cases of *Bluefield Water Works &*

18   *Improvement Co.* (1923) and *Hope Natural Gas Co.* (1944). It provides the utility an

19   opportunity to earn a rate of return sufficient to: (1) fairly compensate capital currently

20   invested in the utility; (2) enable the utility to attract new capital on reasonable terms; and

21   (3) maintain the utility's financial integrity.

22 **Q.** **Does the regulatory standard include guidelines on setting a company's rates?**

1   A.   Yes. Utilities are a natural monopoly. If left unregulated, companies in the utility industry

2   have every incentive to charge customers prices that maximize the company's profit. The

3   amount of product that a utility would provide to the customers would be at a level that is

4   lower than socially optimum, and the price will be higher than the price level of a perfectly

5   competitive industry. Thus, utility firms are typically regulated by jurisdictional

6   authorities. The jurisdictional authorities set rules to make sure that customers will be able

7   to obtain services at reasonable rates and customers will not be charged too high a price.

8   In the meantime, utilities would still earn a fair return for their investors, and they can make

9   investments for the long-term benefit of the consumers. The Commission stated in Order

10   No. 26.376 that:[3]

11   "In determining whether rates are just and reasonable, the Commission
12   must balance the customers' interest in paying no higher rates than are
13   required against the investors' interest in obtaining a reasonable return on
14   their investment."

15
16   Standards have been set from these guidelines:

17   1. The most important factor in determining the required ROE of a utility is risk.

18   Utilities face smaller degrees of risk compared to most other businesses; a utility's return,

19   therefore, should be lower than other riskier businesses.

20   2. Utilities should earn returns comparable to other businesses with similar degrees

21   of risk in order to maintain their financial soundness, including maintaining their credit

22   standing, and attracting capital for investment.

23   3. Consumers should not pay more than the minimum return required by the market

24   on utilities' investment.

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[3] State of New Hampshire Public Utilities Commission, Order No. 26.376, page 10, June 30, 2020.

1   These guidelines ensure that utility customers receive adequate service at a

2   reasonable price and companies make reasonable returns on their investment.

3   **Q.   Is your estimation of required return based on these standards?**

4   A.   Yes, my estimation of the required ROE is based on these standards. I recommend the

5   Commission approve an ROE based on the required market return so the Company can

6   maintain its financial integrity and utility customers can obtain service at a reasonable cost.

7   **Q.   What analytical methodology do you employ in this case to analyze Liberty's cost of**

8   **capital?**

9   A.   Liberty is not an independent, publicly traded company. It is a wholly owned subsidiary of

10   Liberty Utilities Company, which is a wholly owned subsidiary of Algonquin Power and

11   Utilities Corporation (APUC). APUC is publicly traded. Liberty is an operating

12   distribution utility engaged primarily in the electric distribution to its roughly 46,000 NH

13   customers. This means that Liberty's financial condition, separate from APUC, is not

14   regularly reported to the market in detail. However, the standard cost of capital analysis

15   still applies. Potential investors will consider the expected financial returns on an

16   investment in comparison to the market returns on other available alternatives. Liberty

17   operates in the general economic and industry environment; thus, its financial

18   performances are also related to the overall economic and industry performances. For this

19   reason, my analysis was broad in scope. I studied the underlying economic environment,

20   Federal Reserve policy, the investors' likely expectation of future returns, and the utility

21   industry's expected returns in the current market.

22   **Q.   How did you take market risks into account when performing the cost of capital**

23   **analysis for Liberty?**

1   A.   I utilized standard DCF, CAPM, and RP methodologies to evaluate a group of comparable

2   companies. In particular, the CAPM Model and the RP Model take the market risk

3   explicitly into consideration. Financial theory suggests that investors are compensated for

4   bearing systematic market risks, but not individual company risks. Even though it can be

5   argued that Liberty may face some unique risks, as every company does, it is the systematic

6   market risk (such as risks associated with market-wide environmental policies, regulations,

7   general capital market, economic conditions, etc.) Liberty faces that should be taken into

8   consideration. This risk-reward principle is the basis for the analysis of required cost of

9   capital for the company, as in other industries. In addition, the RP methodology recognizes

10   a relationship between interest rate and a risk premium based on the utilities' past

11   authorized ROE and market interest rate. I will go over the detailed methodologies in later

12   sections.

13   **Q.   Do you believe any of the models you used are better than the others?**

14   A.   Economic models are theories describing the real world. The models have their underlying

15   assumptions and focus more on specific aspects of the markets than others. As market

16   conditions are complicated, it is difficult for any single economic/financial model to

17   capture all aspects of the expected returns of the investors. In this sense, a combination of

18   models gives a better measurement of the expected returns of the investors. The recent

19   Federal Energy Regulatory Commission ("FERC") Opinion No. 569-A clearly recognizes

20   this need to incorporate more than one model to determine the expected ROE: "We

21   continue to find that ROE determinations should consider multiple models, both to capture

1   the variety of models used by investors and to mitigate model risk."[4] I agree with FERC's

2   policy statement.

3   In the past, this Commission has mainly considered the evidence on ROE presented

4   by the DCF and CAPM models. I also provide a Risk Premium model to check against the

5   outcomes of the DCF and CAPM models. I average the estimates from the three models to

6   make an ROE recommendation, Due to some issues facing the RP model as I will explain

7   below, I believe my recommended f ROE of 9.25% based on the equal weighting of the

8   model outcomes represents the upper bound on the market required return.

9 **Q.   Did you select a proxy group for the estimation of the Company's return on equity?**

10 A.   Yes, Liberty is a subsidiary of APUC, and it is not separately publicly traded. A

11   conventional approach to modeling ROE for companies like Liberty is to select a proxy

12   group of comparable companies, which would enable a reliable analysis that avoids the

13   potential bias associated with a small set of companies. Ideally, as Liberty is an electric

14   distribution company, the most appropriate comparable companies would be a group of

15   electric distribution companies. However, the publicly traded electric distribution

16   companies like Liberty are limited in number if they can be found at all. As practically it

17   is not possible to find a group of perfectly matching companies to Liberty, following

18   conventional practices, I have selected a group of electric utility companies that share

19   similar operational and financial characteristics in a very broad sense.

20 **Q.   What criteria did you rely on to select the group of comparable companies when you**

21   **performed the analysis of the cost of capital for Liberty?**

---

[4] FERC Opinion No. 569-A, Order on Rehearing at para. 43 (May 21, 2020).

1   A.   Liberty is an electric distribution utility. I selected electric utilities that are best

2   representative of the risk characteristics of Liberty. I selected companies that are publicly

3   traded and whose main business is electric distribution and selling to end-users. The

4   starting list is comprised of the electric utility companies by Value Line.

5   I have excluded companies that do not have investment grade credit ratings from

6   either Moody's or S&P Global. A more ideal criterion is to choose companies with similar

7   credit ratings as credit rating is a good measurement of overall operating and financial risks

8   of a company. However, Liberty does not have a credit rating even though its parent

9   company does, so I considered all companies in the Value Line electric utility group that

10   have investment grade credit ratings.

11   Generally, I avoid companies that were involved in mergers as the stocks of those

12   companies may be evaluated by investors differently than under normal market conditions.

13   Analysts typically would exclude companies that had reduced or halted dividend payment

14   and companies that have negative dividend growth projections for the DCF analysis. In

15   addition, to ensure that companies have similar operating characteristics, I have included

16   companies deriving around 60% or more income in the business of regulated electric

17   utilities. I used the same set of the companies for both the DCF and CAPM analysis.

18   **Q.**   **Why did you use Value Line-listed companies as a starting point for the selection of**

19   **comparable companies?**

20   A.   Value Line represents a respected, broadly available, and specialized source of financial

21   information. In addition, Value Line provides an independent source of information for the

22   investment community because it does not have any financial interest in the companies it

23   covers.

1 **Q. Please list the group of electric distribution utilities that you identified for the proxy**

2 **group.**

3 A. I selected the following 25 regulated electric utilities:

Central	Zhu Proxy	B&W Proxy
Allete	Y	Y
Alliant Energy	Y	Y
Ameren	Y	Y
American Electric Power	Y	Y
CMS Energy Corp	Y	
DTE Energy Co	Y	
Entergy Corp	Y	Y
Evergy	Y	Y
Fortis	Y	
MGE Energy Inc	Y	
OGE Energy Corp		Y
Otter Tail Corp		Y
WEC Energy Group	Y	
East		
Consolidated Edison	Y	
Duke Energy	Y	Y
Eversource Energy	Y	Y
NextEra Energy	Y	Y
PPL Corp	Y	
P.S. Enterprise Group	Y	
Southern Company	Y	
West		
Avista	Y	Y
Edison International	Y	Y
IDACORP	Y	Y
Northwestern	Y	Y
Portland General	Y	Y
Sempra Energy	Y	
Xcel Energy	Y	Y

4

5 The Company proxy group differs from my selection. The Company electric utility

6 group contains 17 companies. Of these 17, I have included 15 in my sample group and

7 excluded 2 (Otter Tail and OG&E) from my group. OG&E is excluded because of a

1   negative earnings growth from IBES, and I excluded Otter Tail because it has low incomes

2   from regulated utilities in recent years.

3

4   **III. THE GENERAL ECONOMIC CONDITION**

5   **Q.   Could you explain how economic conditions can affect the cost of capital of Liberty**

6   **at the present time?**

7   A.   As a capital intensive industry, the public utility industry is characterized by large capital

8   investment. The most relevant economic variables to the cost of capital are interest rates

9   and expected inflation, as both are critical factors considered by investors to set their

10   expected returns when making investment decisions. As in standard economic theory, what

11   matters to investors is the real return. Both the interest rate and expected inflation influence

12   the real return on investment.

13   In the current economic environment, interest rates (especially the short-term

14   interest rate) and expected inflation are influenced by Federal Reserve economic policies

15   and the accompanying actions in the financial market to achieve its set objectives, even

16   though the economic variables can be influenced to different degrees. However, it is the

17   long-term interest rate that matters most to utility investors.

18 **Q.   What are the Federal Reserve's objectives and actions in the current economic**

19 **conditions?**

20 A.   In the past, at the onset of and during a recession, the Federal Reserve provided mostly

21   short-term credit to add liquidity to the market to counteract the effect of a recession. In

22   the early period of recovery from the 2008-2009 recession, the Federal Reserve continued

23   its accommodative monetary policy, as the unemployment level was still higher than the

1   objective set by the Federal Reserve. For example, the Federal Reserve stated in its July

2   2013 Monetary Policy Report:[5]

3   With unemployment still well above normal levels and inflation below its
4   longer-run objective, the Federal Open Market Committee ("FOMC") has
5   continued its highly accommodative monetary policy this year by
6   maintaining its forward guidance with regard to the target for the federal
7   funds rate and continuing its program of large-scale asset purchases.
8
9   The Federal Reserve's monetary easing has injected a large amount of liquidity to the

10   financial market.

11   The Federal Reserve started to scale back its quantitative easing, or accommodative

12   monetary policy, due to improvement in labor market conditions in 2014. As the U.S.

13   economy continued to cruise through expansion, the Federal Reserve changed its policy

14   stance from being accommodative to tightening. In 2019, however, the Federal Reserve cut

15   interest rates three times to fend off possible slowdowns in the U.S. economy brought on

16   by trade wars between China and the United States.

17   Then the COVID-19 pandemic changed the economic landscape significantly. The

18   U.S. economy slid into an unprecedented recession with GDP declining by more than 30%

19   in the second quarter of 2020. Many other economic variables have been affected

20   significantly as well. Monetary policy responded to the new economic condition. Since the

21   beginning of the pandemic, some economic variables have returned to pre-pandemic levels,

22   but some others have been sluggish in returning to those levels.

23   **Q.   How has the Federal Reserve responded to COVID-19?**

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[5] http://www.federalreserve.gov/monetarypolicy/mpr_20130717_part2.htm

1   A.   Since its outbreak in China on December 31, 2019, and subsequent identification, the

2   COVID-19 virus has caused a tremendous amount of damage to human life and to

3   economies all over the world.

4   The impact of the pandemic on U.S. financial markets has been severe. Since all-

5   time highs in February 2020, the Dow Jones Industrial Average, NASDAQ Composite,

6   and S&P 500 Index declined approximately 27%, 25%, and 30%, respectively, within a

7   matter of months. As a result, the U.S. equity markets lost $11.5 trillion in capitalization

8   since peaking in February 2020. In April 2020, the U.S. unemployment rate reached 14.7%,

9   followed by gradual declines in subsequent months (see Figure 1 below). At present, the

10   unemployment rate has recovered to pre-pandemic levels. In fact, the latest U.S. job market

11   report puts the September 2023 unemployment rate at 3.8%

Figure 1: Unemployment Rate in the U.S.
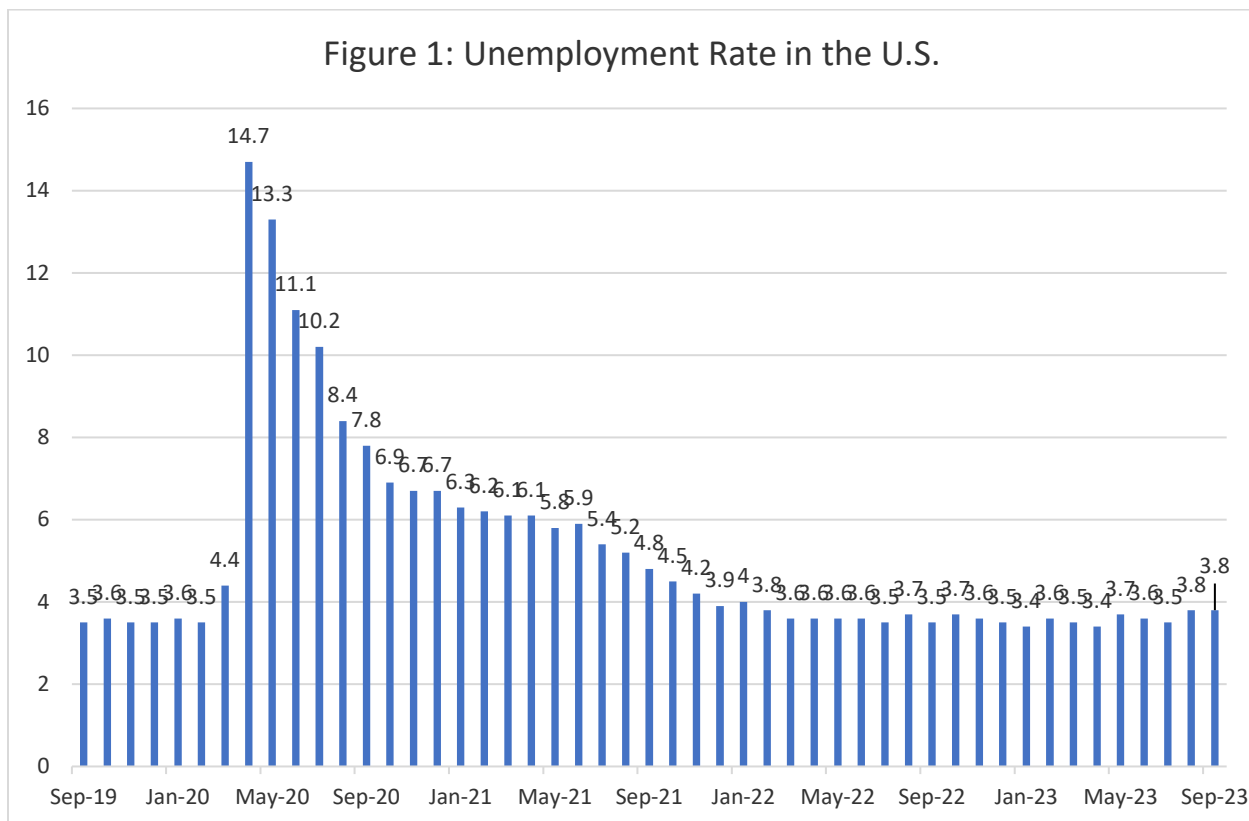
12

1   Due to the pandemic, the U.S. economy suffered with steep GDP declines. The

2   GDP declined in the second quarter of 2020 at an annual rate of 32.9%, as restaurants and

3   retailers closed their doors in a desperate effort to slow the spread of the virus. This decline

4   was more than three times as sharp as the previous record of 10% in 1958 and nearly four

5   times more than the worst quarter during the Great Recession.

6   On March 15, 2020, in response to COVID-19 virus risk, the Federal Reserve Open

7   Market Committee decided to lower the target range for the federal funds rate to 0% -

8   0.25%.

9   In addition, supply chain problems caused a shortage of supplies in many sectors

10 of the economy. Along with the quantitative easing, the U.S. inflation rate started to

11 increase to a 40-year high. The annual inflation rate in the U.S. increased to 7.9% in

12 February of 2022, the highest since January of 1982. As the market was expecting inflation

13 to be peaking, Russia's invasion of Ukraine pushed up energy prices to the highest level in

14 several years. This geopolitical event, along with continued supply constraints, strong

15 demand, and labor shortages, pushed up the general price level to 9.1% in June 2022.

16   In the face of the higher inflation rate, the Federal Reserve has switched to monetary

17 tightening, with the first increase in short term rate target announced on March 16, 2022:

18   The Committee seeks to achieve maximum employment and inflation at the rate
19   of 2 percent over the longer run. With appropriate firming in the stance of
20   monetary policy, the Committee expects inflation to return to its 2 percent
21   objective and the labor market to remain strong. In support of these goals, the
22   Committee decided to raise the target range for the federal funds rate to 1/4 from
23   1/2 percent and anticipates that ongoing increases in the target range will be
24   appropriate. In addition, the Committee expects to begin reducing its holdings
25   of Treasury securities and agency debt and agency mortgage-backed securities
26   at a coming meeting.

1   The above message suggests that the Federal Reserve still maintains its long-term objective

2   of employment and price stability. The long-term inflation rate was still targeted at 2%. To

3   achieve this objective, in the presence of a high and sticky inflation rate, the Federal

4   Reserve has engaged in a series of interest rate increases. The Fed has raised its benchmark

5   interest rate 11 times in slightly more than 1 and a half years, to about 5.5%, the highest

6   level in more than 20 years. The following table shows the increases in Federal Funds Rate

7   target by the Federal Reserve:

| Table 3. Changes in Federal Funds Rate Target		
FOMC Meeting Date	Rate Change (bps)	Federal Funds Rate
1-Nov-23	0	5.25% to 5.50%
20-Sep-23	0	5.25% to 5.50%
26-Jul-23	25	5.25% to 5.50%
3-May-23	25	5.00% to 5.25%
22-Mar-23	25	4.75% to 5.00%
1-Feb-23	25	4.50% to 4.75%
14-Dec-22	50	4.25% to 4.50%
2-Nov-22	75	3.75% to 4.00%
21-Sep-22	75	3.00% to 3.25%
27-Jul-22	75	2.25% to 2.50%
16-Jun-22	75	1.50% to 1.75%
5-May-22	50	0.75% to 1.00%
17-Mar-22	25	0.25% to 0.50%

8

9   In its November 1, 2023, statement[6], the Federal Reserve Open Market Committee

10   stated that:

11   Economic activity expanded at a strong pace in the third quarter. Job gains have
12   moderated since earlier in the year but remain strong, and the unemployment
13   rate has remained low. Inflation remains elevated…. The Committee seeks to
14   achieve maximum employment and inflation at the rate of 2 percent over the
15   longer run…….The Committee is strongly committed to returning inflation to its
16   2 percent objective.

[6]https://www.federalreserve.gov/newsevents/pressreleases/monetary20231101a.htm#:~:text=Recent%20indicators%
20suggest%20that%20economic,Inflation%20remains%20elevated..

1   Figure 2 shows that the inflation rate has declined from the high of 9.06% to 4.05% for

2   May 2023 and to 2.97% for June 2023, lower than the long-term average of 3.28%, before

3   rebounding to 3.7%.[7] The October 2023 inflation rate was 3.24%, lower than market

4   expected, and was heading in the right direction. However, it is still higher than the 2%

5   target. I am confident the Federal Reserve will continue its policy to achieve maximum

6   employment and low inflation objectives.

7

Figure 2: Inflation Rate
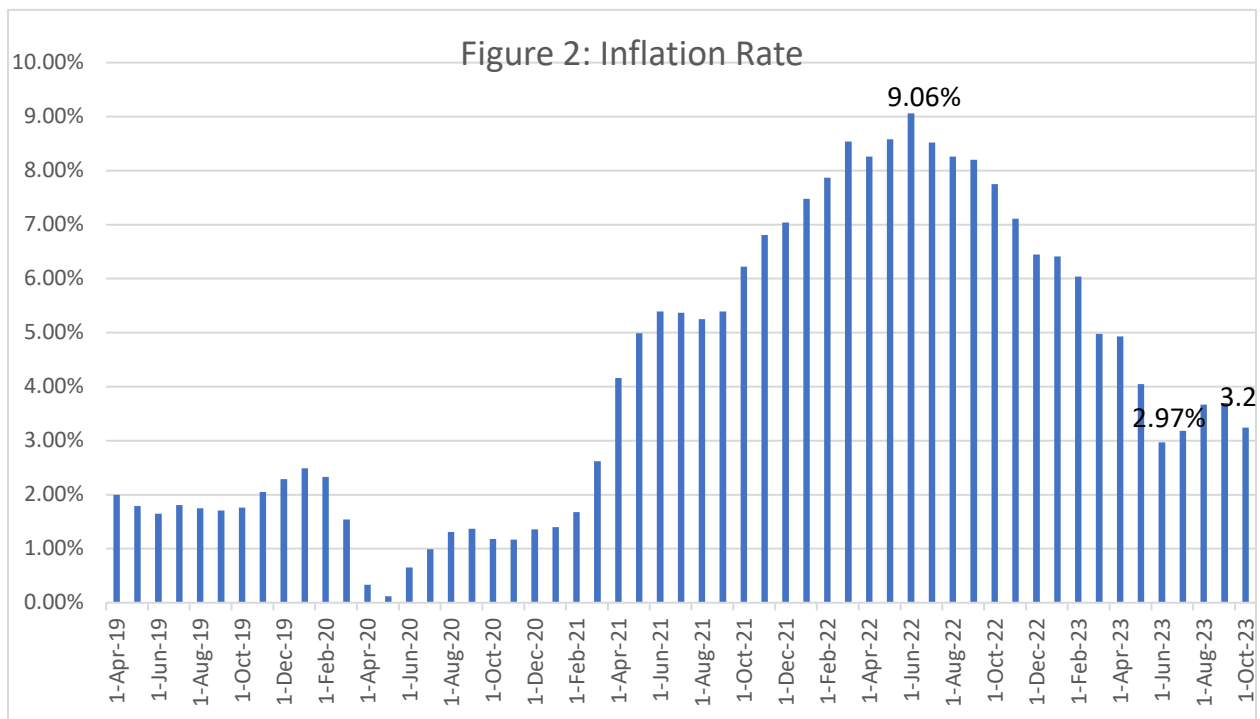
8

9   With respect to the assessment of future inflation, B&W cited the Federal Reserve's policy

10   statement that inflation is expected to moderate towards the Federal Reserve's inflation

11   target of 2% as they did not dispute Fed's statement.[8] The decline in the inflation rate is

12   expected to lead to lower long-term interest rates. For example, when the news of this lower

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[7]https://ycharts.com/indicators/us_inflation_rate#:~:text=US%20Inflation%20Rate%20(I%3AUSIR)&text=US%20I
nflation%20Rate%20is%20at,long%20term%20average%20of%203.28%25.
[8] B&W Testimony, pages 15 and 16.

1   inflation rate hit the market on November 14, 2023, CNBC reported that "the 10-year

2   Treasury yield, which shocked stock investors by leaping over 5% in October, tumbled

3   below 4.5% following the soft inflation report."[9]

4 **Q.   What are some of the major consequences of the Federal Reserve's recent policies?**

5 A.   The injection of a large amount of liquidity into the financial market before 2019 caused

6   short-term interest rates to fall to a historically low level. The recent monetary tightening

7   has pushed up short-term interest rates, significantly. Over a long period in the past, the

8   short-term interest rate has been very cyclical, as it responds to the Federal Reserve's

9   monetary policy manipulations. But the long-term interest rate is significantly less cyclical.

10   I illustrate this in Exhibit DOE-ZZ-2.

11   Exhibit DOE-ZZ-2 shows that the short-term interest rate, in this case the 3-month

12   Treasury bill yield, fluctuated in response to business cycle and monetary policy change.

13   For example, at the onset of the Great Recession (December 2007 – June 2009), when the

14   Federal Reserve adopted Quantitative Easing ("QE"), the short-term interest rate dropped

15   precipitously to a level that was almost zero; however, the long-term interest rate, in this

16   case the 30-year Treasury bond yield, continued its downward trend without immediately

17   responding to the QE. One can hardly see its cyclical behavior. However, through its up

18   and down movements, a downward trend in the long-term interest rate is clearly

19   observable. Up until 2019, the Federal Reserve started to relax its QE policy, the short-

20   term interest rate responded by going up from almost 0.0% to over 2% before declining

21   again as the Federal Reserve started to cut interest rates to offset the impact of COVID-19

22   on the U.S. economy. However, the long-term interest rate shows no obvious sign of

---

[9] https://www.cnbc.com/2023/11/13/stock-market-today-live-updates.html

1   responding to the Federal Reserve's monetary policy changes in the previous cycles. In the

2   last several years, since the beginning of the pandemic, the long-term interest rate has

3   started to increase gradually, well before the short-term interest rate increased. In addition,

4   the magnitude of long-term interest rate increase is much less than the increase in the short-

5   term interest rate.

6 **Q.** **How will the consequences of the Federal Reserve's policy concern investors?**

7 A.   Investors are concerned about their investment returns. The Federal Reserve increased the

8   money supply to add liquidity to the financial market, and it decreased the money supply

9   to drain the liquidity and reduce inflation pressure. A reduction in the money supply will

10   cause short-term interest rates to increase, as is the case for the period of late 2015 until

11   late 2019. This is also reflected in Exhibit DOE-ZZ-2. But the long-term interest rate does

12   not respond much to the Federal Reserve's anti-inflation policy with the exception of this

13   round of monetary tightening. The long-term interest rate is the focus of investors, and it

14   remains to be seen whether the long-term interest rate will follow the long-term declining

15   trend and remain low.

16 **Q.** **When the Federal Reserve tightens money supply and short-term interest rate**

17   **increases, do the required returns for investors increase?**

18 A.   Not necessarily. In the case of determining required returns for investors, it is the long-

19   term interest rates that matter. Investors in the utility industry face long-term rather than

20   short-term investment decisions. Thus, how the short-term interest rates fare is less relevant

21   to investors.

22   As the Federal Reserve tightens the money supply, interest rates generally will

23   increase; however, the Federal Reserve policies that are used to counteract business cycles

1   are generally considered short-term policies and they mainly influence short-term interest

2   rates. As I discussed above, the short-term interest rates are very responsive to the Federal

3   Reserve policy, while the long-term interest rates (such as 30-year Treasury-bond yield)

4   are not very responsive to the QE policy or tightening monetary policy. For this reason, the

5   monetary policy stance on fighting inflation will not have the same effect on long-term

6   interest rates, and thus the required return on capital, as that monetary policy will have on

7   short-term interest rates.

8   **Q.**   **Do you believe the current long-term interest rates are affected by the Federal**

9   **Reserve anti-inflation policy?**

10 A.   It is possible that the current long-term interest rates are temporarily affected by the

11   monetary tightening to fight inflation, but if so, the magnitude of the impact is much

12   smaller than the policy impact on short-term interest rate. In addition, as I mentioned

13   earlier, the long-term interest rates had already started to move up before the Federal

14   Reserve started to raise the short-term interest rate.

15   It is also possible that the increase in long-term interest rates in early 2020 was in

16   response to higher expected inflation. If this is the reason, then as long as inflation stays

17   high for a long period, the long-term interest rate will likely stay high as well. It is important

18   to point out that inflation has declined over the last year from the high of 9.06% (June

19   2022) to the current rate of 3.24% (October 2023). Even though the prospect for future

20   inflation is uncertain, it is important to recognize that the Federal Reserve's monetary

21   policy is to return the inflation rate to 2%. The Federal Reserve has not wavered in this

22   policy stance, as evidenced by every policy statement in at least the last several years.

1   It is also critically important to note that long-term interest rates have been

2   declining, irrespective of the monetary policy during the business cycles. Therefore, the

3   current monetary policy, or the future monetary policy that targets short-term economic

4   fluctuations, should have little effect on the required return on equity. In my opinion, it is

5   erroneous to argue that an increase in short-term interest rates brought about by the short-

6   term stabilization policy of the Federal Reserve would necessarily lead to higher required

7   cost of capital.

8   **Q.** **Are there any reasons for the steady decline in long-term interest rates in the last 40**

9   **years?**

10 A. Yes, many economic factors have contributed to the long-term decline of long-term interest

11   rates. Professors and economists Obstfeld and Tesar, in an article they wrote when they

12   were serving on the Council of Economic Advisers under President Obama, have

13   summarized these factors succinctly. They named the following factors whose effects on

14   interest rates are likely to be transitory:

15   • Fiscal, monetary, and exchange rate policies;

16   • Inflation risk and the term premium; and

17   • Private-sector deleveraging.

18   They also named some factors that are likely longer-lived:

19   • Lower long-run growth in output and productivity;

20   • Shifting demographics;

21   • The global saving glut;

22   • Shortage of safe assets; and

23   • Tail risks and "unknown unknowns".

1   In conclusion, they suggest "there is no definitive answer to how long current long-term

2   interest rates will persist and whether they will settle at levels below those previously

3   expected. Most factors, however, suggest that long-term interest rates will be lower in the

4   long run compared with their levels before the financial crisis."[10]

5 **Q.   How has COVID-19 and more recent economic conditions impacted the capital**

6   **market and the required returns on equity of utility companies?**

7 A.   The utility industry and the capital market in general have been affected significantly by

8   the COVID-19 virus and recent economic conditions. There are at least several changes

9   that have impacted the required returns on capital.

10   The utility bond yield and spread increased noticeably at the breakout of the

11   pandemic. The following chart shows that both the yields and the spread increased

12   significantly in March of 2020; however, the bond market stabilized at the beginning of

13   2022, as both the utility bond yield and spread have declined to pre-pandemic levels (see

14   Figure 3 below). Despite the increase in bond yields since February 2022, the spread—the

15   measure of relative risks between the bonds of different grades—has stayed generally

16   steady, signaling the recognition of a more stable market by investors, at least compared to

17   the period of the pandemic.

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[10] Maurice Obstfeld and Linda Tesar, "The decline in long-term interest rate," whitehouse.gov, 2015 available at
https://obamawhitehouse.archives.gov/blog/2015/07/14/decline-long-term-interest-
rates#:~:text=The%20decline%20in%20interest%20rates,other%20factors%20are%20at%20work.
https://obamawhitehouse.archives.gov/blog/2015/07/14/decline-long-term-interest-rates.

1.

2. In addition, utility stock prices have declined and rebounded since March 2020.

3. Figure 4 below shows the Dow Jones utility index for the last several years. There was a

4. sharp decline in utility stock prices in March of 2020, followed by volatility, with the index

5. hovering around 800. However, prices of the utility stocks have recovered the loss incurred

6. during the pandemic and climbed higher before moving down to 800 again in more recent
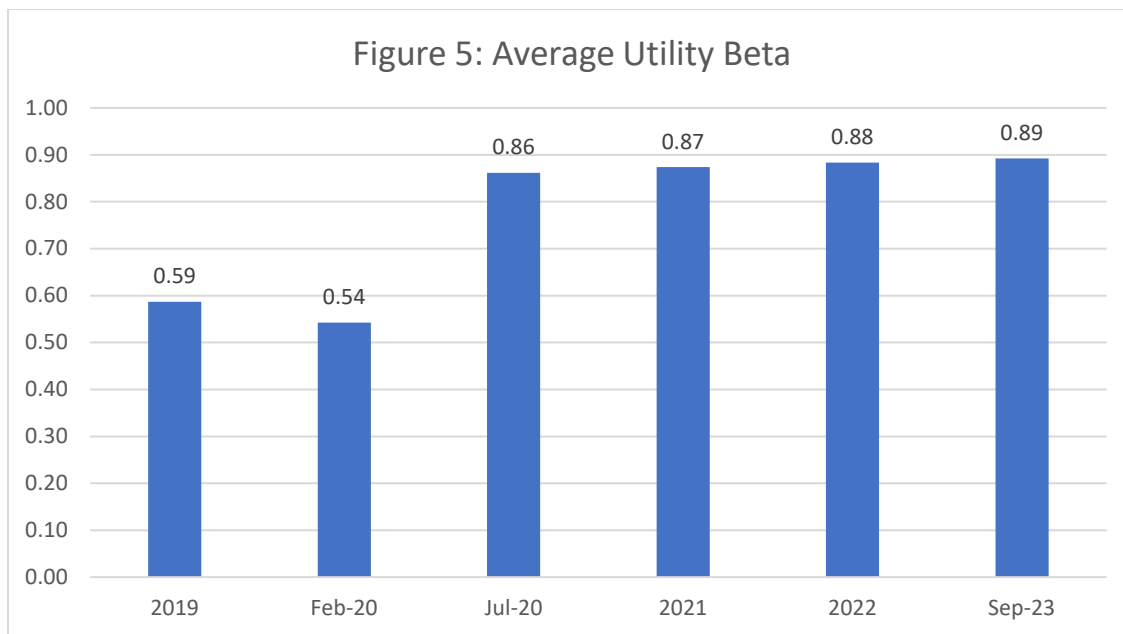
7. months.

Figure 3: Utility Bond Yields and Spread

Figure 4: Dow Jones Utility Index
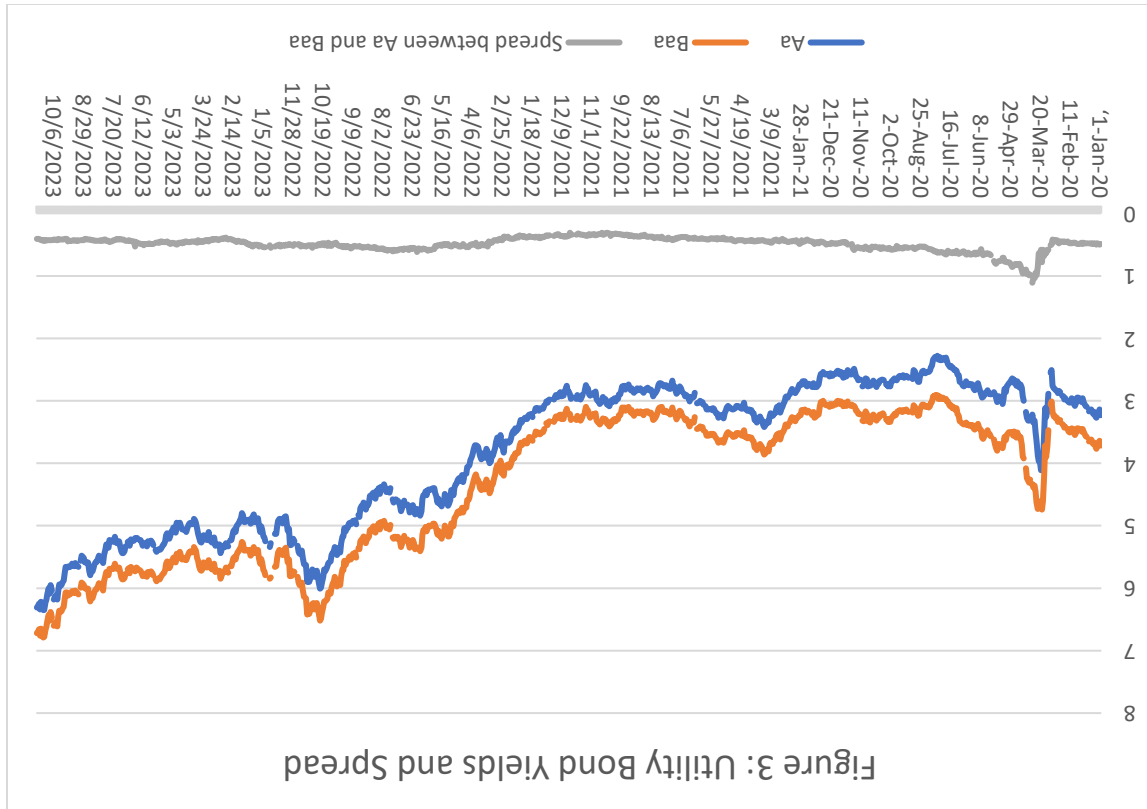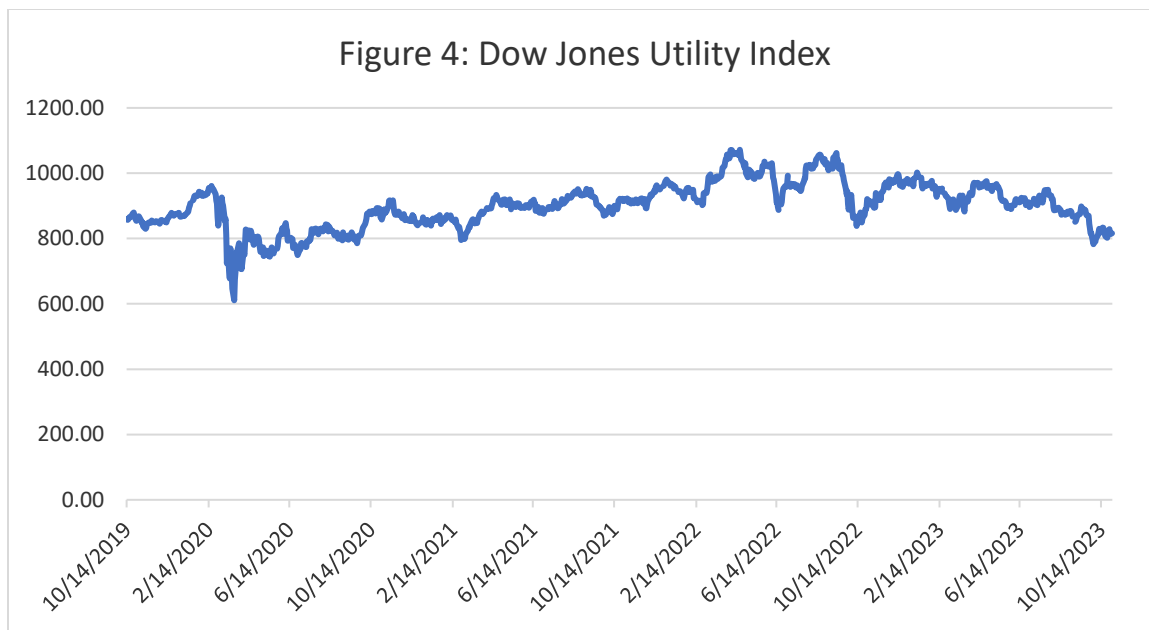
1

2 **Q.** **Do you think the market risks faced by the utility industry have increased as well?**

3 A. One measure of utility company stock price risk is the association of its stock price

4 fluctuation with market price movement; this is the so-called beta. Figure 5 shows the beta

5 value change for each electric utility company in my Value Line proxy group before and

6 after the pandemic. The average value of beta before the pandemic was 0.54 as of February

7 2020, while the average value around June 2020 was 0.86, a substantial increase in the risk

8 of the utility stocks with respect to the market index as measured by the betas. The high

9 Value Line betas also remained stable in the last several years, at least seen from the values

10 in Figure 5. However, as I will illustrate in later sections, the high beta values after the

11 pandemic as reported by Value Line were largely the artifact of 5-year regression including

12 the 2020 pandemic market data. The beta values obtained without the 2020 data are actually

13 smaller than the 0.87-0.89 values, suggesting that the beta risks for years 2021 to 2023 are

14 not as high as suggested by these Value Line figures in Figure 5. This has a strong

15 implication regarding the estimated market required return for the utilities.

Figure 5: Average Utility Beta

Year	Beta
2019	0.59
Feb-20	0.54
Jul-20	0.86
2021	0.87
2022	0.88
Sep-23	0.89

2 **Q.** **Does the increase in beta value suggest that the required return on equity has to be**

3 **higher for utilities now?**

4 A. Not necessarily. Beta only measures the stock price risk of the utilities with respect to the

5 market price movement. When beta increases, it means that, for a given amount of change

6 in market price index, the utility stock price will change more than at the time when the

7 beta is smaller. It does not necessarily lead to increases in the required return on equity. As

8 illustrated in the section below discussing the ROE obtained by the CAPM Model, the

9 market required return on equity depends on three factors: a risk-free rate, beta, and the

10 Market Risk Premium (MRP). An interest rate increase may raise the ROE as utility beta

11 is typically smaller than 1.0. However, the market return may decline at the time when beta

12 is higher due to the decline in the expected future growth prospect of the businesses.

13 Therefore, a beta value increase does not necessarily lead to an increase in ROE.

1   If the MRP does not change, then an increase in beta will lead to an increase in

2   market required return. However, there is no guarantee that MRP will remain the same at

3   the time when beta changes.

4   **Q.** **Can you summarize the implication of the current economic and market conditions**

5   **on regulated utilities' required return?**

6   A.   Yes. In the last several years, the COVID-19 pandemic has wreaked havoc on the U.S.

7   economy, leading to a volatile stock market, declined economic activity, higher

8   unemployment, and higher inflation rate. The Federal Reserve has adopted an anti-inflation

9   policy to achieve lower unemployment rates and lower inflation rates. We have observed

10   a decline in the unemployment rates to pre-pandemic levels, recovery in the utility index

11   and economic activity, increase in both short-term and long-term interest rates, and a high

12   but declining inflation rate.

13   The effect of these economic and capital market conditions on required return is

14   not entirely straightforward, as many factors that influence the ROE can be affected in

15   different directions and magnitudes, thus requiring a careful study of the required return

16   using various economic and financial models, and in many cases, professional judgment.

17   For this reason, I have employed three models (DCF, CAPM, and RP Models) to gauge the

18   impact of various factors on the ROE in the changed economic and financial conditions.

19

20   **IV. CAPITAL STRUCTURE AND COST OF DEBT**

21   **Q.** **What is Liberty's proposed capital structure?**

22   A.   The Company proposed a hypothetical capital structure of 55% equity and 45% long-term

23   debt.

1   **Q.**   **Do you agree with the Company's proposed capital structure?**

2   A.   I have studied the capital structure of comparable companies. Attachment DOE-ZZ-3

3   presents the equity ratio of the companies in the proxy group for the past 10 years as well

4   as the expected equity ratio by Value Line. The equity ratio of 55% is significantly higher

5   than the average equity ratio of the comparable companies. The equity ratios for most of

6   the proxy group companies are in the range of 40 to 50% with the average and median

7   around 45%. For a comparison, B&W' proxy of electric utilities yielded an average equity

8   ratio of around 46% as well.

9   I also looked at the authorized equity ratios for the distribution electric utilities in

10   the last 20 years. Table 4 below shows the average authorized equity ratio for the 20-year

11   span is 48.39%. In light of these facts, the Company request of 55% equity ratio is too

12   high.

Table 4. Authorized Equity Ratio for Distribution Electric Utilities	
Year	Average of Common Equity to Total Capital (%)
2002	47.0
2003	43.7
2004	46.9
2006	47.1
2007	47.0
2008	47.3
2009	47.7
2010	47.4
2011	47.0
2012	48.9
2013	48.9
2014	48.9
2015	48.8
2016	49.8
2017	48.9
2018	50.0
2019	50.3
2020	49.7
2021	49.6
2022	51.1
2023	48.5
Average	48.4

Based on the facts I have reviewed, I recommend an equity ratio of 50% for Liberty.

I believe this equity ratio is just and reasonable to the New Hampshire customers of Liberty.

Q.   What is the cost of debt?

A.   Liberty's cost of long-term debt is 5.97% for the rate year 2022, 6.03% for the rate year

2023/2024, 6.14% for the rate year 2024/2025 and 5.84% for the rate year 2025/2026.[11]

As these are the costs of the debt of the Company at the filing date, I accept this embedded

debt cost for purposes of my analysis.

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[11] Attachment KMI/DSD-1, Schedule RR-5.

1   **V. COST OF COMMON STOCK OR EQUITY**

2 **Q.** **What measures of cost of common stock or equity have you used to calculate the**

3   **company's cost of capital?**

4 A. I used three common methods of cost of equity calculations, namely, the DCF method, the

5   CAPM, and the RP Model. The first two methods examine an individual company's

6   financial information. I also used the RP method to obtain the equity premium for the

7   distribution electric utility capital market to corroborate with the ROE estimates from the

8   DCF and CAPM models.

9   The DCF method is based on anticipation of a company's future earnings and

10   growth opportunities, so one requirement for the selection of the company is that the

11   company needs to pay dividends to equity owners. The CAPM Model is based on the risk

12   premium concept. Both the DCF and CAPM Models take into account the investors'

13   understanding and expectation of the economic environment, at present and in the future,

14   and the current industry and company-specific information. The RP Model utilizes the

15   negative empirical relationship between interest rate and the expected risk premium which

16   is the difference between the expected return (one representation is the firm's authorized

17   ROE) and interest rate.

18 **Q.** **Do you have any comments on the appropriateness of the RP method in determining**

19   **the ROE?**

20 A. While the DCF and CAPM models are market based, RP model is not entirely based on

21   the market information except that the interest rate is market based and forward looking.

22   The RP method relies on the negative empirical relationship between the risk premium and

23   interest rate derived from historical data. One issue is related to the derivation of risk

1   premium. Even though many methods have been proposed by analysts to derive the risk

2   premium including employing the difference between market returns and interest rates, I

3   believe the most appropriate measure of the risk premium is obtained by utilizing the past

4   authorized ROE by the jurisdictional authorities as it represents the expected ROE more

5   closely than other measures. Using the actual market return measures the actual or ex post

6   risk premium, not the anticipated or ex ante risk premium. In addition, the RP model gauges

7   the past empirical relationship between risk premium and interest rate, not necessarily

8   reflecting the expected future relationship. It also employs information on a set of

9   companies that may not closely represent the company under consideration. To avoid this

10   issue as much as possible, in my adaptation of the RP method, I only selected cases on

11   distribution electric utilities which I believe are the closest to Liberty in terms of

12   operational characteristics and risk profiles. But due to many issues associated with the RP

13   model we discussed here, we need to interpret the ROE estimate from the RP model in a

14   more careful manner.

15 **Q.**   **Please define and explain the DCF methodology for measuring the cost of common**

16   **equity.**

17 A.   The DCF method calculates the required return for an investor as follows:

$$K = \frac{D}{P} + g$$

18
19
20   where: $K =$ cost of common equity;
21                   $D =$ expected next-period dividend per share;
22                   $P =$ price per share; and
23                   $g =$ growth rate of dividends, or alternatively, common stock earnings.

24   In the equation, "K" is the required rate of return on investment by investors. It is also the

25   discount rate that is used to convert the future cash flows from the investment into the

26   present value. "D" is the expected next-period amount of dividend paid to equity holders.

1   "P" is the current market price of the common stock, representing the current valuation of

2   the company by the market. So "D/P" is the expected next-period dividend yield on the

3   company's common stock, and "g" is the expected growth rate of the dividend or earnings.

4   **Q.   What does the cost of equity calculated from DCF represent?**

5   A.   The DCF method, as cited in the most common form, generates an estimate of the return

6   required for an investor to measure against alternative investment opportunities. This

7   represents the minimal return in order for a company to attract and maintain investment in

8   the company's common equity. It represents the investor's expectation based on available

9   current market information.

10   **Q.   What forms of the DCF Model have you used in calculating the cost of equity?**

11   A.   When the DCF Model is used to calculate required return on equity, the appropriate EPS

12   growth rate must be used because the model looks at the perpetual EPS growth rate. The

13   constant growth DCF Model is a standard DCF Model used in practically all cost of capital

14   proceedings. The correct use of the growth rate is essential to the correct valuation of the

15   required return. I used a two-step DCF Model to estimate the ROE, which I explain more

16   in the next section.

17

18   **VI. CONSTANT GROWTH DCF MODEL**

19   **Q.   What stock price did you use in your constant growth DCF Model?**

20   A.   I have reviewed and used the three-month and six-month average of stock prices. Stock

21   price varies on a daily basis. The use of a 3-month or 6-month average reduces the impact

22   of price volatility and reasonably represents the normal market condition concerning the

23   value of the stock. As the market price can be volatile on a daily basis, I first calculated the

1   average of monthly highs and lows as the monthly price. A three-month or six-month stock

2   price average limits the impact of abnormal stock price fluctuations. The sample period I

3   used for the stock prices runs from April 1, 2023, through September 30, 2023, for the 6-

4   month average, and July 1 through September 30, 2023, for the 3-month average.

5   **Q.   How did you calculate dividend yield?**

6   A.   The dividend yield is calculated as the ratio of expected dividend at the end of the first

7   period to the stock price at the beginning of the period. I collected the quarterly dividend

8   for the same three-month/six-month period with the ending date matching the ending date

9   of the stock price. I annualized the quarterly dividend by multiplying the quarterly dividend

10   by four. Then for each month, I calculated the dividend yield by dividing the annual

11   dividend by the monthly stock price. The dividend yield for the three-month/six-month

12   period is the average of the monthly dividend yield during the period. In the DCF Model,

13   dividend yield is the expected next-period dividend. I multiplied the dividend yield by one

14   half of the expected dividend growth rate to reflect the fact that the dividend is paid

15   quarterly, and different companies adjust dividends at different times throughout the year.

16   **Q.   What growth rate information did you use in the calculation of the ROE?**

17   A.   The stock price and dividend information are known to investors; however, the expected

18   dividend growth rates are not directly observable and need to be estimated. Investors

19   project the dividend growth rate based on all available information; therefore, I have

20   chosen the projected five-year EPS growth rate by Institutional Brokers Estimate System

21   ("IBES") as provided at finance.yahoo.com. The IBES provides some of the most

22   comprehensive financial information in business investment. In addition, I have utilized

23   the projected earnings growth rates from Zacks and Value Line if the IBES growth rate

1   projection is way out of line with both. For example, PPL Corp has an IBES estimate of

2   17.21%, several magnitudes higher than the Zacks estimate (7.42%) and Value Line

3   estimate (8%). Thus, I averaged the Zacks and Value Line estimates to obtain the estimate

4   for PPL in my analysis. For a comparison of growth rate estimates between my proxy

5   companies and B&W proxy companies, I averaged Zacks and Value Line estimates for

6   OG&E to replace OG&E's negative projected earnings growth rate of -12.34%. The

7   average earnings growth rates are reported in Attachment DOE-ZZ-4. The average

8   earnings growth rate for my proxy group is 5.65% compared to 5.64% for the Company

9   proxy group.

10   **Q.   Did you use the IBES projected EPS growth rates as the final form of earnings growth**

11   **rate in the DCF Model?**

12   A.   No, I did not adopt the analysts' earnings forecast as the only and final estimate of the

13   earnings growth rate as the constant growth rate for the DCF Model, but I did use that in

14   projecting the expected dividend yield at the end of the first period. As the earnings forecast

15   is typically not very long-term, 3 to 5 years maximum, I also used the long-term growth

16   rate to correctly calculate the expected earnings growth rate for the long term, which is the

17   required input to the DCF Model. This practice is usually called the Two-Step DCF

18   method. The two-step DCF method is expected to overcome the issue of analysts' earnings

19   growth forecasts overestimating the long-term growth of the companies, a well-

20   documented empirical finding.

21   **Q.   Can you elaborate more on the two-step DCF method?**

22   A.   In the two-step method, relatively short-term earnings growth forecasts, such as the

23   analysts' projections, are obtained first. In the second step, the constant growth rate (g) is

1   augmented by a measure of the long-term growth, and then the overall earnings growth

2   rate is the weighted average of relatively short-term analysts' growth rate projections and

3   the long-term growth projections. This approach assumes that the initial growth rate can

4   be high or low but eventually the growth rate will approach a growth rate that is sustainable

5   in the long-term steady state. This two-step procedure can generate similar results to a

6   multistage DCF Model that analysts sometimes use.

7 **Q.   What is the long-term growth rate you used and how did you determine the weights?**

8 A.   I have used the GDP growth rate as the measure of the long-term growth rate. In perpetuity,

9   the value of the stock market should grow at the same rate as the economy grows. Research

10   by McKinsey & Company has shown that "the long-term earnings growth for the market

11   as a whole is unlikely to differ significantly from growth in GDP."[12]

12   The two sources of the expected GDP growth I used are: (1) Energy Information

13   Administration, Annual Energy Outlook (AEO) 2023, and (2) Social Security

14   Administration, 2023 OASDI Trustees Report. These two sources are frequently cited in

15   cost of capital proceedings. For example, FERC requires the calculation of the EPS growth

16   rate incorporating these two sources of long-term economic projections in addition to the

17   projections by IHS Global Insight. The detailed calculation of the long-term growth rate is

18   shown in Attachment DOE-ZZ-5. My assessment of the long-term economic growth, based

19   on most recent available information from these sources, is 4.18%.

20   When calculating the expected future earnings growth rate, I used several different

21   weights to gauge the impact of long-term growth: 1/3 and 2/3, 1/5 and 4/5, and 1/10 and

22   9/10, with the first weight being on GDP growth rate and the second being on projected

---

[12] Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, "Equity Analysts, Still Too Bullish," McKinsey on Finance, pp. 17, (Spring 2010).

1   growth rate of the analysts. The weighting scheme has been utilized in a couple of places

2   in the modeling. The first application is in the derivation of DCF ROE estimate, and the

3   second is in the derivation of market return employing the DCF method to S&P 500

4   dividend paying companies.

5 **Q.**   **Please summarize your ROE result based on the constant growth DCF Model.**

6 A.   Attachment DOE-ZZ-6 shows the calculation of the ROE by the DCF Model, and Table 5

7   below summarizes the result of the DCF Model.

8   After adding the expected dividend yield to expected earnings growth rate for the

9   two-step DCF Model, I obtained an ROE of 9.02%/9.18% (median/average) and

10   9.12%/9.30% (median/average) based on 6-month and 3-month average stock price,

11   respectively.

Table 5: ROE Estimate by DCF				
	1/3 and 2/3 weights	1/5 and 4/5 weights	1/10 and 9/10 weights	Average
6-Month Stock Prics				
Min	6.99%	6.92%	6.88%	
Max	11.59%	12.11%	12.50%	
Median	8.86%	9.04%	9.17%	9.02%
Average	9.00%	9.19%	9.34%	9.18%
St Dev	1.15%	1.32%	1.44%	
3-Month Stock Prices				
Min	7.11%	7.05%	7.00%	
Max	11.81%	12.33%	12.73%	
Median	9.02%	9.09%	9.24%	9.12%
Average	9.12%	9.31%	9.46%	9.30%
St Dev	1.18%	1.34%	1.47%	

The weights refer to the weights on GDP and analysts' 3-5 year projections in the two-step DCF modeling.

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3 **VII. THE CAPM METHOD**

4 **Q.** **Please describe the CAPM method in the calculation of the cost of common equity.**

5 A. The CAPM method is based on the analysis of risks. There are two types of risks to

6 consider: one is the kind of risk that investors can diversify away or reduce by combining

7 different investments into a portfolio, and the other is the market risk an investor cannot

8 reduce by diversification. Therefore, the CAPM method is a risk premium model based on

9 the calculation of the risk differential between investments on the market portfolio and the

10 individual stock. The calculation of the required rate of return on a company's stock is as

11 follows:

12 $$K = R_F + \beta\ (R_M - R_F)$$
13
14 Where: $K =$ the required return;
15                $R_F =$ the risk-free rate;
16                $R_M =$ the required overall market return; and
17                $\beta =$ beta, a measure of a given security's risk relative to that of the
18   overall market.
19
20 The idea of calculating the required return on the individual investment from CAPM is to

21 find the equivalent return for an investor based on the relative risk of the investment, as

22 compared to the alternative investment opportunities. Here, the alternative investment

23 opportunity is usually assumed as the market portfolio. This is a model that suggests

24 investors should be compensated for bearing risks. Typically, the risk-free rate is a

25 benchmark investment on which investors can be compensated for not bearing any risks.

26 The benchmark risk-free rates are typically Treasury security yields. The market return is

27 the return on all other available investment alternatives to the investor. This is typically a

28 rate generated from a relevant market index. The risk of the firm's common stock is

1   reflected in the beta of the company, which measures the relative stock price volatility of

2   the company compared to the overall market.

3   The CAPM Model has two general components for the required return on ROE:

4   one is the risk-free rate and the other is the company's equity risk. The equity risk premium

5   of the company reflects the needed compensation of investors for holding the risky asset

6   of equity as compared to holding the less risky or "risk-free" bonds. The company's equity

7   risk premium is related to its risk relative to the overall market movement and is

8   represented by the product of the company's beta and Market Risk Premium (βxMRP).

9   The MRP represents the risk of holding a market portfolio as compared to holding

10   the less risky or risk-free bonds. As the company stock's risk is proportional to the market

11   risk (the degree of that correspondence is measured by the beta), and the compensation for

12   holding risky company stock is the market risk adjusted by the beta, according to the

13   CAPM theory.

14   The Market Risk Premium (MRP) is the difference between the market return and

15   the risk-free rate (R_M - R_F). There are two versions of MRP: expected or ex-ante MRP, and

16   realized or ex-post MRP. The ex-ante RPM reflects what the investors think about the risk

17   premium at the time of making investment decisions and it is forward looking. The ex-post

18   MRP reflects the actual, realized MRP, and it is historical or backward looking.

19   Determining utility ROE requires estimation of ex-ante MRP, which is the approach I take

20   in this testimony. I explain the details of obtaining the ex-ante MRP in later sections.

21   **Q.   Please explain your CAPM calculations.**

1   A.   I used the 30-year Treasury bond yield as the benchmark risk-free rate. I obtained the betas

2   for the comparable companies from Value Line. Finally, I developed a measure of Market

3   Risk Premium based on the DCF Model applied to S&P 500 dividend paying companies.

4   **Q.   Please describe the risk-free rate.**

5   A.   I used the three-month/six-month average yield on 30-year Treasury bonds to correspond

6   to the time period of my DCF study. As utility investments are usually long term, a longer-

7   term Treasury bond would reflect the market condition better for the investments. The yield

8   reflects all market information known to investors at the time, including the possibility of

9   future interest rate increase. Thus, a long-term bond yield such as the 30-year Treasury

10   bond yield is a reasonable measure of the required return on risk-free instrument.

11   **Q.   Please explain the beta of the comparable companies.**

12   A.   Betas measure the connection between the company's stock volatilities and the overall

13   market volatilities. Many professional financial services, including Value Line, provide an

14   estimate of company beta. As it is generally known that a raw beta obtained from the

15   regression of company stock returns on market returns tends to move toward 1, Value Line

16   has adjusted its estimated betas accordingly (the Blume Adjustment). The Value Line beta

17   values are appropriately estimated to measure a company's stock price variations compared

18   to the overall market index in normal economic conditions. Therefore, the product of a

19   company's beta and MRP is supposed to produce the company's risk premium.

20   **Q.   Do you believe the beta estimated currently by Value Line reflects the normal**

21   **economic condition and thus correctly represents a company's risk profile with**

22   **respect to the overall market?**

1   A.   No, I do not believe so. I believe and will present evidence below to show that the currently

2   available high beta values provided by Value Line are an artifact of the pandemic condition

3   in 2020. The Value Line beta should be adjusted to reflect the true risk, which is lower than

4   currently shown by the Value Line beta, of the company stocks, as the unadjusted beta

5   values overestimate the beta value under the current and normal market condition.

6   **Q.**   **What is the implication of the increase in beta value in determining the utilities'**

7   **ROE?**

8   A.   Financial theory suggests that investors are compensated for bearing risks. Beta is an

9   accepted measurement of risk. When beta values are higher during the pandemic, the ROE

10   estimated by the CAPM Model may be higher. I argue that the currently high beta values

11   by Value Line reflect the abnormal market conditions during the pandemic and I will show

12   the evidence that beta values as estimated by Value Line will decline when the pandemic

13   period rolls out of the Value Line estimation period. In other words, I expect the Value

14   Line beta values to return to more normal levels when the initial effect of the pandemic is

15   not included in the estimation period as the true risk of the utility stocks has declined after

16   the pandemic. Therefore, the currently reported Value Line betas overestimate the true

17   riskiness of the utility stocks with respect to the overall market at the current time and

18   should be adjusted when applied in the CAPM model to estimate the return on equity.

19   **Q.**   **Why do you suggest that the higher beta values provided by Value Line overestimate**

20   **the true riskiness of the utility stocks with respect to the market?**

21   A.   The COVID-19 pandemic is an unprecedented episode in many ways. As I discussed

22   earlier, the pandemic increased the risks of electric utilities as shown by increased yield

23   spread and decreased stock prices of both utility firms and other companies in general, at

1   the onset of the pandemic. I have also shown that, since then, the utility yield spread has

2   returned to pre-pandemic levels (Figure 3) and the utility stock index has returned and

3   surpassed pre-pandemic levels (Figure 4). This suggests that the increased riskiness of

4   utility stocks should have declined. However, the average beta value of electric utility

5   stocks today as estimated and provided by Value Line remains elevated at about the same

6   level as existed in October 2020 (Figure 5).

7   The continued elevated beta values, as estimated by Value Line, are the result of

8   the estimation period employed. In my view, excluding the abnormal conditions of the

9   pandemic year 2020 in the regression changes the beta values and better reflects the current

10   market condition.

11   **Q.   How does Value Line estimate the beta?**

12   A.   Value Line derives the beta coefficient from a regression analysis of the relationship

13   between weekly percentage changes in the price of a stock and weekly percentage changes

14   in the NYSE Composite Index over a period of five years. To replicate the Value Line

15   estimation of beta, I downloaded stock price data for the electric utilities in my proxy group

16   and the NYSE Composite Index for the period of January 1, 1975, to the end of September

17   2023. I then calculated the weekly percentage changes of the stock prices (returns) and ran

18   a regression of the stock returns on the composite index return. I ran the regression for a

19   five-year period with the period ending on December 31 of each year, and I ran the

20   regression once a year for the period of 1978 to 2021 for each company. Therefore, in my

21   analysis, the beta for 2021 is the beta value at the beginning of 2022 or at the end of 2021,

22   obtained from the regression using the sample data for the period of January 1, 2017, to

1   December 31, 2021. The rest of the beta values were obtained the same way. The "raw"

2   beta values are then adjusted through the Blume Adjustment method.

3 **Q.   Why do you say that the currently high beta values are the artifact of the Value Line**

4   **regression?**

5 A.   The currently elevated beta value is higher than 0.85, much higher than the pre-pandemic

6   beta values of the same electric utility companies. Even though now the pandemic is over,

7   and the abnormal market condition of the pandemic has ended, the data from that 2020

8   period is still in the regression, influencing the regression coefficients. As I explained

9   above, the Value Line regression coefficients are obtained by running a five-year

10   regression. The inclusion of the highly volatile period of 2020 in the regression has

11   influenced the beta estimate significantly. Although the risk of utilities has declined from

12   the initial high-level seen upon the impact of the pandemic in 2020, the beta values remain

13   high today. The high beta values are the result of including the 2020 time period in the

14   regression.

15 **Q.   How would the data from a specific time period affect the regression coefficient?**

16 A.   Regression is a statistical method that estimates an average relationship between/among

17   variables, in this case, the average relationship between the stock return of a utility

18   company and the stock return of a market index. Just like calculating the average value[13],

19   a large value in a dataset can influence the average value significantly. The large value will

20   have a smaller influence on the average value, if the number of observations in the dataset

21   is large. To dilute the impact of a large value (or an abnormal time period), beta regressions

22   are done on a longer time period such as five years. However, the drawback of this

---

[13] Strictly speaking, obtaining the coefficients through regression is not the same as calculating an average. But the analogy should still illustrate the point.

1   approach is that the impact of the large value on the average value will not disappear unless

2   the large value is no longer included in the dataset.

3   Similarly, the pandemic in 2020 is a special event that lasted longer than just a few

4   days. It has influenced the beta estimate very significantly in the same way a large value in

5   a data set would influence an average value. Including a period of five-years in the

6   regression is expected to dampen the impact of an anomaly event year, at least better than

7   a regression with a shorter time period that contains the event. However, unless the

8   abnormal period of the 2020 pandemic rolls out of the regression period, estimated beta

9   values will be high even if the risk of utility stocks has returned to a more normal level.

10   The strong influence of the 2020 pandemic skews the estimation result. A regression with

11   a shorter sample period excluding the event year would reflect the true beta values better.

12   In this case, the beta values should be obtained by utilizing the data from the period after

13   the pandemic to reflect the current market conditions.

14 **Q.**   **Can you show how the sample period affects the beta estimation?**

15 A.   Yes, I can. I have performed regressions with different lengths of the sample period to

16   show the impact of the 2020 pandemic on the beta estimate. Figure 6 shows the impact of

17   inclusion of the 2020 data in each regression. The first group of five beta values are the

18   average beta values obtained from the five-year regressions (2015-2019, 2016-2020, 2017-

19   2021, 2018-2022, and 2019-2023). Without the 2020 pandemic data, the average beta value

20   from the regression for the period ending December 2019 is only 0.53. The average beta

21   values for the years ending 2020 through 2023 increased to 0.84 or higher, when the time

22   period includes year 2020.

1   When I ran the two-year regression, the second group of five numbers show a

2   distinctive pattern: the beta values obtained from the period that contained the 2020 data

3   (0.97 and 0.96) are significantly higher than the others (0.51, 0.72 and 0.74) that did not

4   contain the 2020 data, while the 2022 and 2023 regressions (without 2020 data) generated

5   smaller beta values (0.72 and 0.74) than the two years (2020 and 2021 regressions) that

6   contained the 2020 data. When I ran the one-year regression, year 2020 represented a

7   uniquely high value (1.01), while the beta values for other years are generally smaller. The

8   average beta value for the year ending 2021 dropped significantly, to 0.55 from 1.01 for

9   2020, when the 2020 pandemic period was not included in the regression.

Figure 6. Beta - 5-year, 2-year and 1-year Regressions
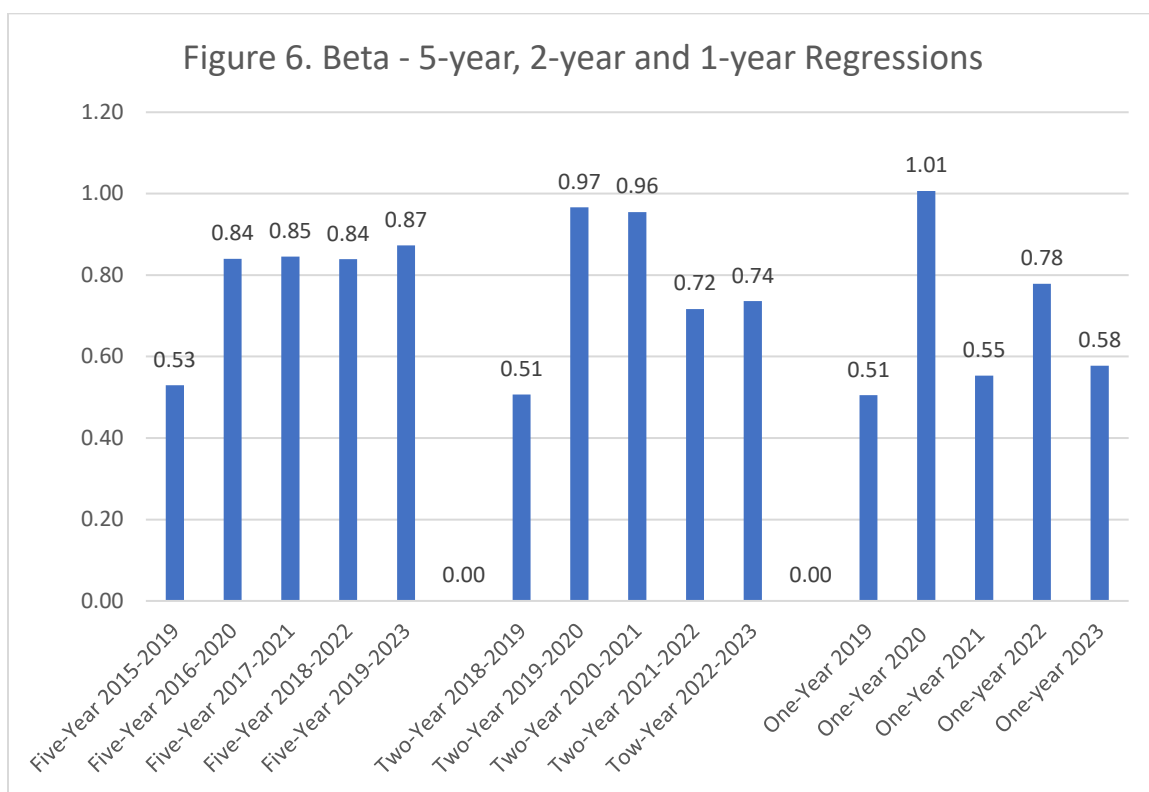
11   This suggests that the unsettling market condition of year 2020, right after the

12   breakout of the COVID-19 virus, was extremely abnormal and distorted the normal

13   relationship between utility stocks and the overall market. It seems to indicate that the

1   market risk of the utility stocks increased substantially as the estimated beta value increased

2   significantly. However, the increase in risk is only transitory, with the impact occurring

3   only for 2020. The market has since started to return to more normal conditions, but the

4   five-year regression by Value Line still contains the 2020 data, thus "contaminating" the

5   beta estimate through the regression relationship. The Value Line's use of a five-year

6   regression, instead of a regression with a shorter sample period, was intended to lessen the

7   influence of anomalies in the data during the sample period (to create a more stable

8   coefficient). However, in this case, that approach has created an undesirable adverse effect

9   of inflated beta values for later years due to the presence of an extreme abnormality, which

10   caused the high-beta effect to last longer than it actually does.

11   The decline in the measured one-year beta value to the level much closer to the pre-

12   pandemic level is proof that the utility stock risks have declined from the year 2020 level.

13   This drop in the beta value right after the pandemic may reflect the market's perception of

14   a utility's ability to deal with the impact of the pandemic. For instance, utilities can manage

15   the risk associated with the pandemic through existing recovery mechanisms. Rate cases

16   and the creation of deferred regulatory assets can be expected to collect the lost cash flows.

17   **Q.   What adjustment is needed to correctly reflect the risk of the electric utility industry**

18   **under the current market conditions?**

19   A.   I believe it is very important to mitigate the impact of the Value Line beta's incorrect

20   measure of the riskiness of utilities under the current market conditions. The current values

21   of the beta reported by information providers, including Value Line, are biased upward in

22   measuring current utility risks, if the sample period they used to obtain the beta value

23   include the year 2020 data. Accordingly, I correct the bias by averaging the beta value

1   before the pandemic and the beta value as reported today. The average beta value calculated

2   this way is 0.74 (see Exhibit DOE-ZZ-7), which is still slightly higher than the 2019

3   average beta value of 0.58, reflecting some increases in the risk level of the companies.

4   Incidentally, the value of 0.74 is very close to the beta values obtained from the two-year

5   regressions for 2022 and 2023 in Figure 6 above. B&W's 10-year historical average of beta

6   is similar as well at 0.76.[14]

7 **Q.   Please describe your analysis of Market Risk Premium.**

8 A.   As the CAPM Model estimates the expected return on equity, the MRP should be the

9   expected equity market return over the risk-free rate. The estimate of the MRP or market

10   Equity Risk Premium is perhaps the most contentious issue for the financial market;

11   however, there are generally accepted ways to estimate the Equity Risk Premium. One

12   method is to obtain the expected market return via the DCF method. Many jurisdictional

13   authorities, including FERC, accept the market return calculated using a DCF method. A

14   very important feature of this methodology is that it is forward-looking, and market based.

15 **Q.   Please explain what market index you have used.**

16 A.   I have used the S&P 500 index to represent the overall equity market. After obtaining the

17   name of the companies included in the market index, I have excluded companies that do

18   not pay dividends and companies that have negative adjusted earnings growth rates and

19   growth rates higher than 20%. If a company has a negative earnings growth rate, it will not

20   be sustainable in the long run. Similarly, it is not possible for a company to have an earnings

21   growth rate of 20% forever; therefore, I have eliminated those companies from the list. The

---

[14] Attachment AEB/CMW-8, page 1.

1   final sample included more than 300 companies, which is large enough to represent the

2   broad spectrum of businesses in the U.S. economy.

3 **Q.   Why did you exclude non-dividend paying companies from the calculations?**

4 A.   I have excluded companies in the S&P 500 index that do not pay dividends or have negative

5   dividend growth rates. The DCF Model is based on the premise that a company's value is

6   based on future dividends to the investors. The model breaks down if no dividend is issued

7   to the investors. In other words, the DCF Model cannot be applied to companies that do

8   not issue dividends. The expected market return is then the weighted average of individual

9   company returns (ROE derived from the DCF Model) with the share of the company

10   market capitalization in total market capitalization being the weight.

11 **Q.   Did you use a one-step DCF Model or a two-step DCF Model to obtain the individual**

12   **company's ROE?**

13 A.   I used a two-step DCF Model to calculate the ROE of an individual company. A weighted

14   growth rate by the short-term and long-term growth rate can better capture the nature and

15   the dynamics of the expected dividend growth in the long term. I used the IBES projected

16   earnings growth rates as the short-term expected earnings growth rate and the weighted

17   value of the projected earnings growth and expected GDP growth rate as the growth rate

18   in the DCF Model, with 2/3 and 1/3, 4/5 and 1/5, and 9/10, and 1/10 weights, respectively.

19   To obtain the risk premium, I subtracted the 3-month and 6-month average of 30-year T-

20   bond yield from the expected market return.

21 **Q.   What is your estimated Market Risk Premium?**

22 A.   My average estimated expected market returns are 10.67%, with the average MPR 6.65%

23   and 6.43% based on 6-month and 3-month T-bond yields respectively. These results are

1   presented in Attachment DOE-ZZ-7 and summarized in Table 6 below:

Table 5. Market Risk Premium - 6-Month Average Yield			
	Market Return	30-year T-Bond Yield	Risk Premium
6-Month T-Bond Yiled			
1/3 and 2/3 weights	10.34	4.02	6.32
1/5 and 4/5 weights	10.56	4.02	6.54
1/10 and 9/10 weights	11.10	4.02	7.08
Average	10.67	4.02	6.65
3-Month T-Bond Yiled			
1/3 and 2/3 weights	10.34	4.24	6.10
1/5 and 4/5 weights	10.56	4.24	6.32
1/10 and 9/10 weights	11.10	4.24	6.86
Average	10.67	4.24	6.43
Weights refer to the weights on earnings growth and GDP grpwth rates in DCF modeling.			

2

3 **Q.**   **Are your estimates of the Market Risk Premium reasonable?**

4 A.   Yes. My estimates of the MRP are reasonably based on the current market conditions and

5   are in line with or slightly higher than the other estimates, whether historical or forward

6   looking. For example, Statista suggested that the average MRP in the U.S. for 2011-2022

7   is 5.6%.[15] Professor Aswath Damodaran, a well-known expert in the study of Equity Risk

8   Premium at Stern School of Business at New York University, estimated that the market

9   expected return at the start of 2023 is 9.82%. With the use of the T-bond yield, the implied

10   Equity Risk Premium is 5.94%.[16] A survey of risk premiums used by professionals in 2023

11   by Professors Pablo Fernandez, Diego García and Javier F. Acin puts the U.S. risk premium

12   at 5.7%.[17] Duff and Phelps (now Kroll), a source that valuation experts frequently rely

13   upon, recommends U.S. market Equity Risk Premium or MRP to be 5.5%, effective

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[15] https://www.statista.com/statistics/664840/average-market-risk-premium-usa/.
[16] https://seekingalpha.com/article/4571595-data-update-2-for-2023-rocky-year-equities.
[17] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4407839.

1   September 2023.[18] These MRP estimates are largely consistent with what I have obtained

2   by studying the most recent U.S. equity market conditions.

3   **Q.**   **What is your estimated ROE based on the CAPM Model?**

4   A.   I used the following method to obtain the estimates of the ROE: I applied the MRP obtained

5   from the two-step DCF Model to each comparable company's beta to obtain the beta-

6   adjusted company risk premium and then added that to the risk-free rate. Then I calculated

7   the average and median of the individual company's ROE based on the CAPM Model. The

8   final result of ROE in Attachment DOE-ZZ-9 shows the application and the results of the

9   method. Table 7 below summarizes the CAPM Model result.

Table 6: ROE Estimate by CAPM				
6-Month Average Interest Rate				
Growth Rate Weight	1/3 and 2/3 weights	ROE by CAPM (1/5 and 4/5 weights)	ROE by CAPM (1/10 and 9/10 weights)	Average
Min	7.97%	8.11%	8.45%	
Max	9.71%	9.91%	10.39%	
Median	8.60%	8.76%	9.15%	8.84%
Average	8.68%	8.84%	9.24%	8.92%
3-Month Average Interest Rate				
Growth Rate Weight	1/3 and 2/3 weights	ROE by CAPM (1/5 and 4/5 weights)	ROE by CAPM (1/10 and 9/10 weights)	Average
Min	8.05%	8.19%	8.53%	
Max	9.73%	9.93%	10.41%	
Median	8.66%	8.82%	9.21%	8.90%
Average	8.73%	8.90%	9.30%	8.98%
The weights refer to the weights on analysts' 3-5 year projections and the long term growth rate by GDP in two-step DCF modeling of market return.				

10

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[18] https://www.kroll.com/en/insights/publications/cost-of-capital/duff-and-phelps-recommended-us-equity-risk-premium-decreased-december-2020.

1   The average median ROE from the calculations is 8.84%/8.90% and the average mean

2   ROE is 8.92%/8.98%, based on the 6-month and 3-month average T-bond yield,

3   respectively.

4   **VIII. THE RISK PREMIUM MODEL**

5   **Q.   Have you used any other method to estimate the ROE?**

6   A.   Yes. The other method that I used is the RP, or bond return plus expected utility Equity

7   Risk Premium Model, which is another risk-based model.

8   **Q.   Please describe the principal idea behind the RP Model.**

9   A.   The RP Model is based on the idea that equity owners or stockholders require higher

10   *expected* returns than the bond holders who simply hold less risky bonds. Therefore, this

11   risk-reward relationship reflects the basic principle in financial economics. The return on

12   equity is then equal to bond yield plus a form of expected risk premium, which is the

13   difference between expected returns of the stocks and bond yield.

14 **Q.   How can this model be estimated to generate expected ROE?**

15 A.   There are many versions of the RP Models, depending on the stock returns and interest

16   rates used. As I will point out in the review of the Company's risk premium models in a

17   later section, the market return to start with should be the expected return, not the actual or

18   realized return. The closest form to this requirement for the risk premium is measured by

19   the difference between a utility's authorized ROE (an expected or ex-ante return) and a

20   particular kind of long-term interest rate, frequently the 30-year bond yield. The

21   relationship between the expected utility equity risk premium and bond yield is empirically

22   obtained through the regression of expected risk premium on bond yield. Then, the

1   estimated regression equation coefficients are used to obtain the expected ROE given the

2   bond yield for the future period.

3   The expected ROE used in the regression needs to be relevant to the electric utility

4   industry, but the choice of long-term interest rate usually does not matter as long as it is

5   correlated with the expected ROE/risk premium and consistently applied in the estimation

6   process.

7 **Q.   Please explain how you obtained the expected risk premium data and how you**

8   **empirically estimated the relationship between the expected risk premium and**

9   **interest rate.**

10 A.   I used the authorized ROEs from past distribution electric utility rate cases since 2002 to

11   represent the expected returns and then subtracted the long-term interest rate, in this case,

12   the 30-year Treasury bond yield, to generate the expected risk premium. I included only

13   past (decision date from 2002 to 2023) rate cases of distribution electric utilities in my

14   sample as this group of companies, closely resemble the operational and financial risks of

15   Liberty. In the Regulatory Research Associate (RRA) database, rate cases include those for

16   transmission, distribution, and vertically integrated electric utilities. In my opinion,

17   transmission and vertically integrated electric utilities are not appropriate to represent

18   Liberty, thus, I have excluded those cases.[19] I included only fully litigated cases as settled

19   cases often involve other negotiated conditions thus rendering the ROE less representative

20   of the expected market returns.

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[19] I do realize that my proxy group companies (as well as B&W proxy group) for the DCF and CAPM analysis
include the vertically integrated utilities, but that is the best I (as well as other analysts) can do as financial
information from distribution electric utilities are generally not publicly available.

1   In the next step, I regressed the historical series of expected risk premium on

2   interest rate to obtain the relationship between the expected risk premium and the interest

3   rate. To capture the interest rate for a rate case as closely as possible, I averaged the 30-

4   year Treasury bond yield for the period of each rate case, i.e., from the filing date to the

5   decision date of the rate case. This estimated relationship has been utilized to estimate the

6   expected risk premium given the current interest rate. I have calculated the average length

7   of a typical rate case to be about 9 months. I then used the average Treasury bond yield

8   during the last 9 months (up to September 30, 2023) as the interest rate to estimate the

9   expected ROE. The estimated risk premium is then added to the interest rate to yield the

10   expected ROE.

11   **Q.**   **What is the estimated ROE using your RP Model?**

12   A.   Exhibit DOE-ZZ-10 shows the rate case data and interest rates, as well as the diagram

13   showing the relationship between the expected risk premium and interest rate, the

14   regression result, and the estimated ROE, which is shown to be 9.68%.

15   Q.   **What is your overall assessment of the appropriateness of the ROE obtained from the**

16   **RP model?**

17   A.   I have discussed some issues surrounding the RP model at the beginning of Section V in

18   this testimony. Due to those reasons, I believe that the ROE estimate of the 9.68% may not

19   be as appropriate as the estimates from the DCF and CAPM models to represent the market

20   required return on equity. My recommendation of ROE based on the average value of

21   ROEs incorporating the estimate from the RP model (9.25%) can best be viewed as the

22   upper bound of the market required return.

23

1   **IX. LIBERTY ROE AND CRITICAL REVIEW OF B&W RECOMMENDATION**

2   **Q.   What is the ROE that Liberty is seeking?**

3   A.   Liberty is seeking a 10.35% ROE.

4   **Q.   How did the Company cost of capital witnesses, Ms. Bulkley and Mr. Wall, estimate**

5   **the ROE?**

6   A.   B&W employed several different models, including a constant growth DCF (using analyst

7   earnings growth projections, and earnings and retention growth projections), CAPM

8   (conventional CAPM and Empirical CAPM (ECAPM)), and RP Models on a comparable

9   risk utility group, after reviewing capital market conditions and rate-making principles.

10   B&W recommended a range of ROE from 9.9% to 11.00%, and they chose 10.35% as the

11   point recommendation of ROE, lower than the midpoint of their range 10.45%. B&W did

12   not make specific adjustments to ROE based on some additional factors they considered

13   such as the Company's capital expenditure requirements, the regulatory environment, the

14   Company's automatic rate adjustment mechanism, flotation costs and the Company's

15   proposed capital structure compared to the capital structure of the proxy group companies.

16   However, they considered these factors when making the final recommendation on ROE.

17   **Q.   Did B&W recommend a capital structure for Liberty?**

18   A.   Yes, they did. They claim that the Company's proposed capital structure of 55% equity

19   and 45% debt is within the range of equity ratios for the proxy group. They also claimed

20   that the "proposed capital structure is reasonable considering that credit rating agencies

21   have identified the outlook for the utility sector as "negative" due to the negative effect on

22   the cash flows and credit metrics associated with increasing interest rates…..".[20] However,

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[20] Direct Testimony of Ann E. Bulkley and Christopher M. Wall, Docket No. DE 23-039, (B&W Testimony) page 8 of 79.

1   the credit rating agency's outlook, if correct and acceptable, pertains to the whole utility

2   industry, and it does not explain why Liberty's equity ratio is proposed to be significantly

3   higher than the mean (51.43%) and median (52.39%) equity ratios in their proxy group. As

4   a matter of fact, only three companies (Allete, Evergy, and NextEra) out of their 17

5   companies have equity ratios higher than Liberty's proposed equity ratio.[21]

6   As I have explained in my testimony earlier, an equity ratio of no more than 50%

7   equity for Liberty is appropriate.

8   **Q.   What is your overview of B&W's recommendation concerning Liberty's return on**

9   **equity?**

10   A.   B&W and I share the beliefs about the general principles in rate making and we utilized

11   three general models in estimating the ROE for Liberty; however, we differ in many aspects

12   of ROE modeling assumptions.

13   We both agree that the rate making process and result should adhere to the Bluefield

14   and Hope principles which seek to balance the interests of investors and consumers.

15   **Q.   Do you agree with their statement that "an authorized ROE significantly below**

16   **authorized ROEs for other utilities can inhibit the utility's ability to attract capital**

17   **for investment?"[22]**

18   A.   No, I do not agree with this statement. Utilities with similar risk profiles should earn ROEs

19   of similar magnitude. If B&W's statement is true, then all the utilities in the country should

20   earn the same ROE, which is against the Hope and Bluefield principles. However, no two

21   utilities are exactly alike. The required market return on equity for any utility needs to be

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[21] Ibid, Attachment AEB/CMW-16, page 1.
[22] Ibid, page 11, lines 2-4.

1   rigorously analyzed based on financial theories and economic principles, tied to their

2   specific risk profile.

3   **Q.**   **B&W provided Figure 4 in their testimony, listing the interest rate, T-bond yield,**

4   **inflation rate and authorized ROE for DE 19-064, but fell short of drawing any**

5   **implications.[23] What is your opinion regarding Figure 4?**

6   A.   A logical implication of Figure 4 is that B&W believe the ROE for this case should be

7   much higher than the last authorized ROE given the current inflation rate and interest rates

8   being higher than the inflation rate and interest rates at the time of last rate case.

9   **Q.**   **Do you agree with that implication?**

10 A.   No, I do not, for several reasons. One is that the inflation rates quoted by B&W in their

11 Figure 4 do not necessarily reflect the long-term inflation rates or in the interest rates

12 investors considered at the time of making the investment decisions and do not necessarily

13 reflect the inflation rate or interest rates the Commissions (and parties) considered when

14 authorizing (negotiating) the ROE. Utility investment decisions are long term and long

15 term expected rates are the only relevant ones. Even though the interest rates at the time of

16 the rate cases were 0.72% and 5.99% respectively, the inflation rate that investors and

17 decisions makers considered should be different from those rates. B&W quoted Federal

18 Reserve's policy statements regarding returning inflation rate to 2% and in nowhere they

19 disputed the Fed policy stance. I would take this position as they agree with the long-term

20 target of 2% inflation target being achievable in the foreseeable future. Another way of

21 looking at that is the real T-bond yield as quoted in Figure 4 would be negative as of

22 3/31/20023 (3.81%-5.99%) given the quoted inflation rate. It is not possible that the

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[23] Ibid, page 20.

1   investors with investment horizons of next 30-years were expecting the inflation rate

2   during the next 30-years to be as high as 5.99%.

3   The current level of T-bond yield is higher than the 1.47% T-bond yield at the time

4   of the last rate case decision; however, the currently higher interest rate does not necessarily

5   imply a much higher ROE as suggested. Any of the three models both B&W and I have

6   relied on would suggest a direct relationship between T-bond yield and ROE. As I have

7   stated before, the DCF model relies on projected dividend yield as well as projected

8   earnings growth rate. An interest rate increase leads to an increase in dividend yield due to

9   lower stock prices, but interest rate increase may lead to lower earnings growth rate as a

10   higher interest rate may dampen growth prospect. As far as the CAPM model is concerned,

11   an increase in interest rate will lead to the increase in the risk free rate component of the

12   expected returns, but the market risk premium may decrease again as the market return

13   may decline as the higher interest rate leads to lower stock market performances, as also

14   suggested by B&W.[24] As far as the RP model is concerned, an increase in interest rate will

15   lead to a decrease in risk premium, leading to an uncertain impact on overall return on

16   equity.

17   From these reasonings, we can see that there is no *guaranteed* direct relationship

18   between interest rate and the expected return on equity. I believe Figure 4 in B&W's

19   testimony is misleading.

20   **Q.   Do you have any general issues with B&W's proxy group selection?**

21   A.   B&W selected 17 electric utility companies from Value Line's base of 36 companies.

22   Majority of their proxy group companies are in my list as well except for a few.

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[24] Ibid, page 7, lines 6-9, and page 20.

1   Some of the differences in our proxy group selection are due to the study period

2   they have selected. Their data is based on information through the end of January 2023,

3   which is slightly outdated. I understand that the Company filed the rate case on May 5,

4   2023, so it is unavoidable that the Company's study period is not as updated as mine. The

5   outdated information in B&W analysis has led to some differences in the choice of proxy

6   groups. For example, I excluded OG&E in my sample (as the latest IBES projection of

7   OG&E earnings growth is negative) while B&W included the company.

8   The other differences may be due to the choice of the percentage of net income

9   from the electric utilities in total company income. Data discrepancies have led to the

10   inclusion/exclusion of several companies. For example, B&W excluded DTE Energy in

11   their proxy group presumably due to low-income share. However, I have included the

12   company as the financial information extracted from S&L Financial puts the utility income

13   share of the company as 73.72% for 2020 and 88.27% for 2022 (2021 data missing).

14   Another example is Otter Tail. B&W included the company in the proxy group, but I have

15   excluded the company as the percentage of net income derived from the electric utility for

16   Otter Tail is only 28.14% for 2022 with 68.25% of net income coming from the plastic

17   sector of the company, according to the SNL Financial information.

18   My proxy group is comprised of 25 companies, larger than the B&W group thus

19   providing more reliable estimates as there is less influence of more extreme estimates in a

20   larger group of companies.

21 **Q.   Can you list your major issues with B&W's ROE modeling and interpretation of the**

22   **results?**

1 A. I respectfully disagree with many of B&W's assumptions and methodologies in estimating

2   the return on common equity. These issues include but are not limited to the following:

3   1. Lack of an appropriate growth rate for the constant DCF Model and claim that

4   the DCF model underestimates the ROE for Liberty.

5   2. The use of forecasted interest rates in models where expected interest rate is an

6   input.

7   3. The use of unadjusted Value Line beta in the CAPM model.

8   4. The use of the analyst's short-term growth rate in estimating the market return

9   using the constant growth DCF model.

10   5. Various faulty assumptions related to the estimation of market risk premium.

11   6. The use of Empirical CAPM model.

12   7. The selection of cases for vertically integrated electric utilities in the RP model.

13   8. The size effect.

14   9. The flotation cost.

15   I will critically review each of the issues mentioned above. My decision not to

16   respond to or address every issue in B&W's testimony should not be interpreted as my

17   agreement with their positions on unaddressed issues, and I reserve the right to disagree

18   with their positions on any other issues.

19

20   **Discounted Cash Flow Model**

21 **Q. Do you have any comments on B&W's use of the DCF Model?**

22 A. B&W used a single stage Constant Growth DCF Model, or the DCF methodology based

23   on the Gordon Growth Model, which perceives the value or the stock price of a company

1   as the discounted value of an infinite series of dividends growing at a constant rate. They

2   used a period of 30-days, 90-days, 180-days as of January 31, 2023, to calculate the

3   dividend yield and stock price and then applied ½ of the growth rate to arrive at the end-

4   of-first-period dividend, D_1. B&W used the average of projected three-to-five-year

5   earnings growth rate from three sources: finance.yahoo.com, Zacks, and Value Line, for

6   both the earnings growth projections and earnings and retention growth projections. This

7   average earnings growth rate has been applied to the dividend yield to generate an adjusted

8   dividend yield at the end of the first period. However, B&W applied the analysts'

9   projections as the input into the DCF Model, without accounting for the fact that the

10   analysts' growth projection is only short term (three to five years), while the DCF operates

11   on an infinite time frame. It is well known that the analysts' short-term forecast (3-5 year)

12   overestimates the perpetual rate of growth.[25] The DCF Model assumes that a utility is a

13   going concern, and the life of the utility is infinite; the three- to five-year earnings growth

14   is rather short-term in this perspective. The conventional method is to adjust the relatively

15   short-term analysts' projections by the GDP growth rate, as in the long-term the growth

16   rate of the companies cannot exceed the GDP growth rate. Because the analysts'

17   projections are higher than the GDP growth rate, and the DCF Model is very sensitive to

18   the growth rate input, B&W's DCF model overestimates the ROE for Liberty.

19   **Q.   Do you have issues with B&W's use of retention growth estimates?**

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[25] There is a sizable literature documenting the optimistic and upward biased forecasts of the analysts' earnings growth forecasts, see, among others: Peter D. Easton & Gregory A. Sommers, "Effect of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts," 45 J. ACCT. RES. 983–1015 (2007); K. Chan, L., Karceski, J., & Lakonishok, J., "The Level and Persistence of Growth Rates," Journal of Finance pp. 643−684, (2003); R.D. Harris, "The Accuracy, Bias, and Efficiency of Analysts' Long Run Earnings Growth Forecasts," Journal of Business Finance & Accounting, pp. 725-55 (June/July 1999); P. DeChow, A. Hutton, and R. Sloan, "The Relation Between Analysts' Forecasts of Long-Term Earnings Growth and Stock Price Performance Following Equity Offerings," Contemporary Accounting Research (2000).

1   A.   Yes, I do. The objections to the use of this approach stem from two aspects. 1. This

2   methodology is circular – the final model estimate of ROE depends on another form of

3   ROE estimate as an input, and these two estimates are not consistent. 2. The expected return

4   on book equity (r) is not market based. The ROE is a market value-based concept. There

5   is no way for investors to purchase a stock that is based on book value; thus, the use of

6   book value return violates the basic requirement of market measured required return. For

7   this reason, B&W's method employing retention growth rate is inappropriate, and the ROE

8   obtained from that approach is not the true representation of market required return.

9   Q.   **Do you agree with B&W's claim that the result of DCF model is likely to understate**

10   **the cost of equity for Liberty as the model relies on current (or historical) utility share**

11   **price?**

12   A.   No, I do not agree with the claim. B&W made that claim[26] based on the argument that the

13   utility stock prices are likely to decline due to higher interest rate and possible

14   underperformance of the utility sector (due to customer affordability and prompt rate

15   recovery).[27] They did not explicitly explain the possible mechanism through which the

16   DCF model does not correctly reflect the current market conditions nor present any

17   empirical evidence, thus they have failed to explain why the DCF model *understates* the

18   market required ROE.

19   One place that reflects their argument is the sentence on page 25 of their testimony:

20   "the expected underperformance of utilities means that DCF models using recent historical

21   data likely underestimate investors' required return over the period that rates will be in

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[26] Direct Testimony of Ann E. Bulkley and Christopher M. Wall, Docket No. DE 23-039, page 7 of 79.
[27] Ibid.

1   effect".[28] In B&W's DCF modeling, the only place they have used historical information

2   pertains to the stock prices. They have used 180-day, 90-day, and 30-day average stock

3   prices to represent the latest information on stock prices[29]. Other elements in their DCF

4   models, including the growth rates, are projected or forward-looking values. If utility stock

5   prices are going to be lower as B&W argued by citing analysts' opinions, then the dividend

6   yields calculated utilizing the currently "high" stock prices compared to the low future

7   stock prices would be too low, rendering an "understated" ROE.

8   There is a critical logic missing in such an argument. That is, if the utility stock

9   prices are going to be lower in the next couple of years as the analysts implied, why then

10   are investors still holding the utility stocks while the current prices are higher than the

11   expected future prices? Investors should have sold the currently high-priced stocks before

12   prices get lower in the future, leading to immediately lower stock prices. So, the logical

13   explanation for prices not going any lower in the future is that the current stock prices

14   already reflect all known information including the analysts' assessment of the market, and

15   the current stock prices are the best estimates of the future stock prices. This is the concept

16   of the market efficiency well-accepted in the financial world. In another word, the so-called

17   underperformance of the utility sector, if it is perceived to be true, should have already

18   been reflected in the current stock prices thus there is no lower expected future stock prices.

19   Therefore, there is no understatement of ROE by DCF.

20   Another interpretation of the "underperformance" of the sector is provided by

21   B&W. B&W states: "Equity analysts project that utilities will underperform the broader

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[28] Ibid, page 25, lines 12-14.
[29] "current market data", in their original words; see B&W Testimony, page 34, line 17.

1   market given their high inflation and the recent increase in interest rates." [30] The

2   comparison is between the utility industry and the broader market and it` has nothing to do

3   with whether the current utility stocks are low or not compared to the future utility stocks.

4   B&W also mentions that the recent increase in interest rates may not be captured

5   in the DCF model at this time.[31] Even though the DCF model does not directly utilize the

6   interest rate information, the model still captures indirectly the latest market and economic

7   information including the current interest rate in stock prices and expected earnings growth

8   as the stock market is efficient.

9   In my opinion, current market condition change leading to changes in the ROE

10   estimate by the DCF model speaks to the ability of the DCF model, reflecting the market

11   required returns on investment, suggesting that the model is doing a good job to incorporate

12   currently known and available market information. As I have described before, the DCF

13   model has two components in ROE estimation: the first one is the expected dividend yield,

14   and the second is the expected dividend growth best represented by the earnings growth

15   projections (both the analysts projections and the GDP growth rate). When dividends

16   remain the same (which is the case for majority of the utilities), decline in stock price

17   actually leads to increases in dividend yield, leading higher ROE given the same growth

18   rate projections.

19   Whether DCF will lead to a higher or lower ROE estimate under the changing

20   market conditions does not suggest whether the DCF model overstates or understates the

21   market required return on equity. If the declining utility stock prices lead to increases in

22   dividend yield suggesting higher ROE, then the market sees the need for the investors to

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[30] B&W Testimony, page 21, lines 5-6.
[31] Ibid, page 33, lines 9-11.

1   be compensated more for investing in utilities. The same argument goes if lower growth

2   prospect lowers the ROE generated by the ROE model. The DCF model as modeled by

3   B&W overestimates the market required return as their perpetually growth rate is only a

4   short-term, non-sustainable growth rate.

5   In this sense, I am not convinced by B&W's argument that DCF understates the

6   cost of equity, and I believe the DCF model, if modeled appropriately, correctly reflects

7   the market required return on equity investments for the utility industry. Essentially all

8   jurisdictional authorities rely on the DCF model as the primary analytical tool for ROE

9   determination attests to the usefulness of the model in reflecting underlying market

10   conditions.

11   For these reasons, consideration of higher end result of DCF model by B&W[32] for

12   Liberty is not justified and will lead to unjust and unreasonable rates to the customers.

13

14   **Capital Asset Pricing Model**

15   **Q.   B&W also used the CAPM Model to estimate the ROE for Liberty. Can you provide**

16   **a review of his implementation of the CAPM Model?**

17   A.   B&W employed the traditional and empirical CAPM Model to the electric utility proxy

18   group, obtaining a range of 10.41% to 11.43% for the traditional CAPM model and a range

19   of 10.93% to 11.70% for the ECAPM model. [33]

20   In obtaining these estimates, they employed several measures of the risk-free rate:

21   1. The current 30-day average yield on 30-year T-bonds, 2. The average projected 30-year

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[32] Ibid, page 25, lines 14-16.
[33] Ibid, page 47 and Figure 9.

1   T-bond yield for the second quarter of 2023 through the second quarter of 2024, and 3. The

2   average projected 30-year T-bond yield for 2024 through 2028.

3   They utilized several measures of beta: 1. Beta values reported by Value Line,

4   which uses 5-year data for the regressions and is the same source that I used before I made

5   adjustments; 2. The Bloomberg beta which is obtained from the 10-year regression of the

6   weekly returns, and 3. 10-year Value Line average beta values for the companies in the

7   proxy group from the period of 2013 through 2022.

8   To obtain the market risk premium, B&W applied the constant DCF model to the

9   S&P 500 dividend paying companies. The resulting required market return is 12.5% and

10   the market risk premium ranges from 8.6% to 8.79%.

11   In addition, B&M employed a so-called ECAPM model based on the following

12   empirical relationship developed in Morin New Regulatory Finance in the following form:

13          $$k_e = r_f + 0.75\beta(r_m - r_f) + 0.25(r_m - r_f)$$

14   where k_e is the required return, r_f the risk-free rate, β the beta and r_m the required market

15   return.

16   **Q.   Do you have any issues with the assumptions and methodologies B&W utilized in the**

17   **CAPM models?**

18   A.   I have issues with the use of the 30-day average interest rate, the projected interest rate as

19   the risk-free rate in general, the use of the beta values and the form of DCF applied to the

20   S&P 500 companies, in addition to the use of the ECAPM model.

21   **Q.   Can you state your objections to the use of the 30-day average risk-free rate as a**

22   **measure of the interest rate?**

1   A.   B&W should also employ the 90-day and 180-day average interest rates to corresponding

2   to the time periods in his studies, in particular, the DCF model. I do agree with the use the

3   average interest rate as the expected future interest rate. As I will argue below, this form of

4   interest rate is the best predictor of future interest rate. And I agree with B&W, the 30-year

5   T-bond yield is the most appropriate measurement of risk-free rate.

6   **Q.**   **What is your opinion regarding B&W's use of projected interest rate as the expected**

7   **interest rate?**

8   A.   As utility investments are typically long term, only a long-term bond yield is appropriate

9   for matching the investment horizon. However, I disagree with the approach of using the

10   projected interest rate, as the current interest rate rather than the projected interest rate is

11   the more appropriate interest rate to be used in cost of capital analysis.

12 **Q.**   **Can you explain the reason(s) why you believe the current interest rate rather than**

13   **the projected interest rate should be used in cost of capital analysis?**

14 A.   Even though cost of capital models are forward looking and require the expected future

15   interest rate, in my opinion the best forecast of future interest rates are current interest rates.

16   Interest rates are extremely difficult to forecast and interest rate forecasts from the past

17   have been shown to perform poorly, as I show below. The alternative to an interest rate

18   forecast is to use the current market interest rates as indicative of what the market expects

19   about the future interest rates.

20   There is serious doubt that interest rate forecasts can outperform a simple forecast

21   of interest rates using current market interest rates. The bond markets are efficient; as a

22   result, the best expected future interest rate is the current market interest rate.

1 **Q. Please explain why current interest rates are the best forecasts of expected future**

2 **interest rates.**

3 A. Financial information comes into the marketplace randomly, and the interest rate goes up

4 or down with equal chances. No one can systematically get ahead by guessing what is going

5 to happen in the marketplace. This leads to a phenomenon called "random walk." When a

6 financial variable such as the interest rate follows a random walk, it implies that the best

7 forecast of its future behavior is its immediate past. In this case, the immediately past

8 available information is the latest interest rate or the current interest rate observable in the

9 market.

10 **Q. What support do you have for the claim that the best forecast of interest rate is the**

11 **current interest rate?**

12 A. There have been doubts about the predictability of long-term interest rates for a long

13 time. As early as 1979, Professor Pesando provided reasons why it is not surprising for

14 economic models to underperform the random walk forecast of interest rate.[34] The

15 random walk forecast of interest rate is the current market interest rate.

16   In a more recent study, Baghestani, Arzaghi, and Kaya (2015) documented

17 evidence of model blue chip predictions being inferior to random walk models.[35] In a more

18 extensive study of U.S. interest rate forecasts, Spiwoks, Bedke, and Hein (2008), after a

19 study of 136 forecasting series with 13,800 forecast data, showed empirical evidence that

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[34] James. E. Pesando, "On the random walk characteristics of short- and long-term interest rates in an efficient market," Journal of Money, Credit and Banking, 1979, vol. 11, 457–66.

[35] Hamid Baghestani, Mohammad Arzaghi and Ilker Kaya, "On the accuracy of Blue Chip forecasts of interest rates and country risk premiums," Applied Economics, 2015, Vol. 47, No. 2, 113–122, http://dx.doi.org/10.1080/00036846.2014.959656.
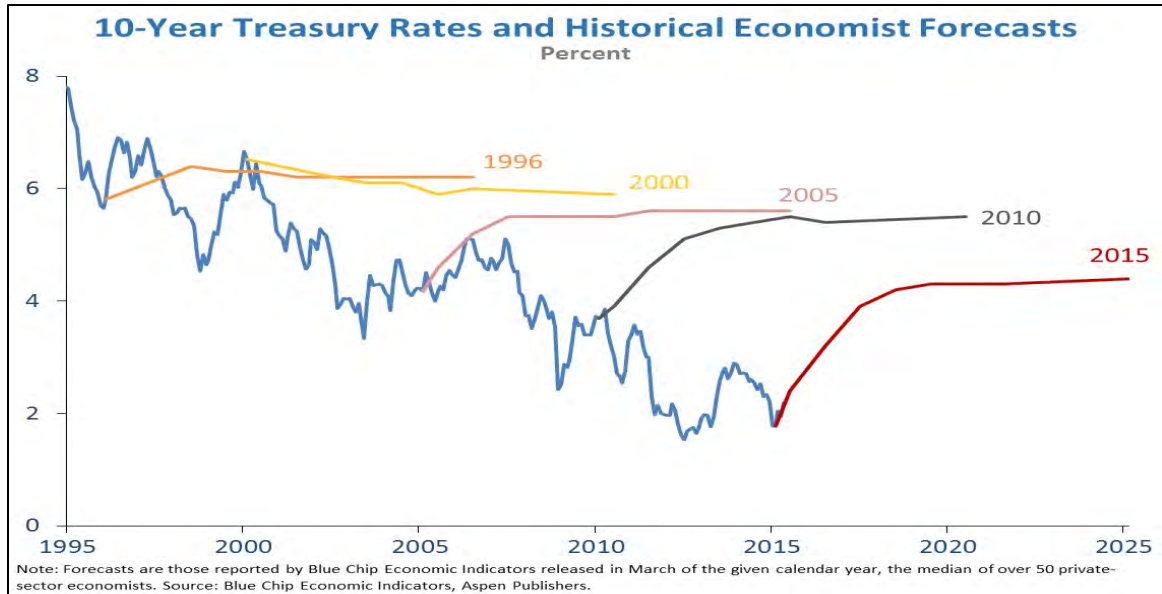
1   the random walk model dominated the forecast series.[36] In the article, they stated: "Not one

2   of the forecast time series proved to be unbiased. In most cases, information from the past

3   was not efficiently integrated into the forecasts. The sign accuracy is significantly better

4   than random walk forecasts in only a very few of the forecast time series." What this

5   passage suggests is that the professional forecast of interest rates systematically over- or

6   under-projected the movement of the interest rate ("not unbiased"). The majority of the

7   forecasts could not even predict the direction of movement correctly, not to mention the

8   magnitude of the interest rate movement.

9   **Q.**   **How has the past forecast of interest rate fared?**

10   A.   The long-term interest rate has been declining, so many would project that the interest rate

11   will eventually rise again. However, this kind of projection has not fared well. In 2015,

12   Obstfeld and Tesar[37] presented the chart below of 10-year Treasury rates and historical

13   forecasts, which showed consistently high interest rate forecasts despite that the interest

14   rate was declining over time.

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[36] Spiwoks, Markus; Bedke, Nils; Hein, Oliver, "Forecasting the Past: The Case of US Interest Rate Forecasts," Financial Markets and Portfolio Management Vol. 22, Iss. 4, (December 2008): 357-379.

[37] M. Obstfeld and L. Tesar, (2015)." The Decline in Long-Term Interest Rates." https://obamawhitehouse.archives.gov/blog/2015/07/14/decline-long-term-interest-rates.

10-Year Treasury Rates and Historical Economist Forecasts
Percent

Note: Forecasts are those reported by Blue Chip Economic Indicators released in March of the given calendar year, the median of over 50 private-sector economists. Source: Blue Chip Economic Indicators, Aspen Publishers.

1

2 **Q.** **Is it true the market expects the Federal Reserve to continue to tighten monetary**

3 **policy to fight high inflation, so the interest rate is expected to be higher in the future?**

4 A. First, I need to point out again that Federal Reserve monetary policy targets short-term

5 interest rates. It does not necessarily lead to changes in the long-term interest rate *trend*.

6 Second, if everyone is expecting the Federal Reserve to increase the interest rate in the

7 future, the market would have reacted to this expectation already. That is, the current

8 interest rate should have already incorporated the future rate increase information. If the

9 interest rate is meant to increase upon the expected monetary policy, it would have already

10 increased. This is similar to when an investor expects a stock price to increase in the future-

11 -she/he would have bought the stock upon her/his expectation. The action of buying would

12 have caused the stock price to increase already. It is unreasonable to assume the investor

13 would wait until later to buy the stock, at the time of actual price increase. This is

14 essentially the concept of market efficiency, which applies to the bond market as well.

15 It is generally understood that the U.S. financial markets, including the bond

16 markets where interest rates are determined, are very efficient. When bond markets are

1   efficient, only unexpected information flow would lead the interest rate to change, whether

2   the information be that the Federal Reserve will increase interest rates more times than the

3   market already expected due to the toughness of high inflation or increase interest rates

4   fewer times than the market expected because the recessionary effect of the monetary

5   tightening might be too fast and too large. Unfortunately, no one can precisely predict what

6   is going to happen to the interest rate in the future *systematically*. Interest rates could

7   increase, but they could decline as well.

8 **Q.**   **What is your opinion on B&W's use of three measures of the beta values?**

9 A.   B&W's use of three different measures of beta suggests that it is not reliable to just use the

10   current beta values as reported by Value Line to estimate market required returns. As I

11   have explained earlier in this testimony regarding the influence of year 2020 data on the

12   beta estimates, the longer time regression period tends to dampen the impact of the

13   abnormal events/time period on beta values. And this is verified indirectly by B&W's data.

14   The five-year regression of Value Line generated an average beta value of 0.88,[38] a value

15   very similar to my calculated value. The 10-year regression of Bloomberg generated the

16   average beta value of 0.81, still influenced by the inclusion of the 2020 data but the effect

17   now is smaller. The 10-year average of Value Line beta values shows the smallest influence

18   of the 2020 data, generating an average beta value of 0.76, which is very similar to my

19   average beta value of 0.75. In my opinion, even though we do not know the exact content

20   of the impact of the 2020 pandemic on the risk of the utility companies with respect to the

21   market price movement, my average of pre and after pandemic Value Line beta values is a

22   better estimate of the beta values for this case.

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[38] Ibid, Attachment AEB/CMW-7.

1 **Q. Do you have any comments regarding B&W's market return and market risk**

2 **premium estimates?**

3 A. I believe B&W's methodology in constructing market return is flawed and overestimates

4 the market return. B&W applied the constant growth DCF model to the S&P 500 dividend

5 paying companies. I agree with the general approach as the returns generated this way are

6 forward looking. However, when applying the DCF method, the perpetual growth rate of

7 the companies were again just the short-term earnings growth rate forecasts of analysts.

8 The analyst forecasts are overly optimistic and overestimate the growth rate as many

9 studies found to be the case.[39] A report[40] by McKinsey& Company concludes at the end of

10 their study of the past analysts' growth forecasts:

11 "Moreover, analysts have been persistently overoptimistic for the
12 past 25 years, with estimates ranging from 10 to 12 percent a year,
13 4 compared with actual earnings growth of 6 percent. Over this time
14 frame, actual earnings growth surpassed forecasts in only two
15 instances, both during the earnings recovery following a recession
16 (Exhibit 2). On average, analysts' forecasts have been almost 100
17 percent too high."
18
19 In addition, the growth rate in the DCF model should be the perpetual growth rate

20 but the analyst forecasts are relatively short term, of the 3–5-year nature. Clearly the

21 forecasts would overestimate the expected market return.

22

23 **Q. Are B&W's market return and market risk premium estimates reasonable?**

24 A. B&W obtained a market return of 12.50% and the risk premium in the range of 8.6% and

25 8.79%.[41] B&W also tried to show that their estimates are reasonable in historical

---

[39] See footnote 25.
[40] Marc H. Goedhart, Rishi Raj, and Abhishek Saxena, "Equity Analysts, Still Too Bullish," McKinsey
on Finance, pp. 16, (Spring 2010)
[41] B&W Testimony,, page 45.

1   perspective by saying that "in 50 out of the past 96 years (or roughly 52 percent of

2   observations), the realized equity market return was 12.50 percent or greater."[42] This

3   statement is misleading and does not provide any support to their high estimate of the

4   expected market return for at least two reasons: 1. They only looked at the best returns of

5   S&P index in the last 96 years, which is biased upward to represent the return for the whole

6   time period as many of the years during the period saw much lower annual returns. In one

7   instance, for example, the annual return was -40% and another close to -40% in a more

8   recent year, if one just looks at Figure 8 in their testimony.[43] 2. Figure 8 plotted arithmetic

9   means of the returns, which is not appropriate in calculation of the average returns for a

10   whole period as it is well-known that the arithmetic mean exaggerates the average return

11   for a period when there are significant variations in the arithmetic annual returns. Investors

12   are concerned with the overall return over the investment period, thus what happens each

13   year within the period is less important. It is well-known that the arithmetic average over-

14   states the growth rate as compared to the true growth rate calculated by geometric mean.

15   　　A simple example can be used to illustrate the difference between geometric mean

16   and arithmetic mean. Suppose a stock price at the beginning of the year is $100 and then

17   drops to $50 at the end of the first year before it recovers to $100 at the end of the second

18   year. The geometric mean would be 0% for the stock in the two-year period, but the

19   arithmetic mean would be the average of two annual returns: (-50% +100%)/2 = 25%). The

20   calculation of arithmetic mean shows the variation of the returns each year, but it

21   exaggerates the annual growth rate.

---

[42] Ibid, page 45, lines 11-12.
[43] Ibid, Figure 8, page 45.

1   No investors would believe that the average annual return is 25% in the above

2   example, even if they are concerned with the variability of the returns within the period.

3   Therefore, in my opinion, B&W's evidence using the historical S&P 500 index returns

4   does not provide any support to their overstated long-term market returns, and thus their

5   overstated market risk premium.

6   The correct way to calculate the average annual return is to use the geometric mean

7   and consider all stock price movement within the period, let it be a positive return or

8   negative return. I have calculated the S&P 500 market returns based on data from 1946 to

9   2023 and the results are shown in Table 8 below:

Table 8: S&P 500 and DJ Utility Index					
	Five-Year Return		Annual Return		Annualized 5-Year Return
	S&P 500	DJ Utility	S&P 500	DJ Utility	S&P 500	DJ Utility
Whole Sample 1946-2023	55.25%	31.20%	8.99%	5.45%	8.39%	5.21%
Last 30-Years 1994-2023	55.07%	29.78%	8.61%	5.45%	7.68%	4.62%

11   For the whole sample period of 1946 to 2023, the annual return for S&P 500 is 8.99% while

12   for the last 30 years, the average annual growth rate is 8.61%. These numbers are much

13   lower than the expected market returns calculated by B&W and suggest that the B&W

14   market return is very likely biased upward significantly. **Q. How does B&W's MRP**

15   **estimate compare to the MRP from other sources?**

16 A.   B&W estimated that the expected MRP is in the range of 8.6% to 8.79%, much higher than

17   my estimates and the other well-known and well-respected estimates that I have cited on

18   page 51 of this testimony.

1   In light of this evidence, I believe B&W's market return and MRP estimates are too

2   high, and adopting the ROEs based on these estimates will lead to unjust and unreasonable

3   rates for NH customers.

4   **Q.**   **Do you have any other criticisms of B&W's CAPM modeling?**

5   A.   Yes, I do. B&W also applied the so-called ECAPM model to estimate Liberty's ROE,

6   resulting in the ROE estimates in the range of 10.93% to 11.70%.

7   **Q.**   **Do you agree with B&W's use of the ECAPM?**

8   A.   No, I do not. B&W used a form of ECAPM model to estimate the ROE to address the so-

9   called issue of CAPM having a tendency of underestimating the cost of equity for

10   companies with low beta coefficients. They assigned a weight of 0.75 to the firm risk

11   premium and 0.25 to the market risk premium. The ECAPM model B&W employed

12   originated from Dr. Morin's New Regulatory Finance book; however, there is no indication

13   that these numbers are based on any serious economic studies of the electric or gas utilities,

14   so at best they are ad hoc and cannot be relied upon.

15   In contrast, a study by Dr. Knapp[44] of ECAPM on electric and gas utilities points

16   to the complete opposite. To my knowledge, this is the only study of the potential bias of

17   the CAPM Model in both the gas and electric utility industry, and the study suggests that

18   there was no underestimation of cost of equity by CAPM with low beta utilities. After

19   conducting careful empirical testing, Dr. Knapp says: [45]

20   "In stark contrast to the body of literature surrounding the empirical
21   CAPM, the alpha shift parameter does not appear to exist for the utility
22   industry. From the empirical evidence previously presented, the empirical
23   bias in the Capital Asset Pricing Model (CAPM) does not exist. While the
24   analysis acknowledges an alpha, it is negative and not statistically

[44] Michael Knapp, *Observations on the Empirical Capital Asset Pricing Model in Estimating A Public Utility's Cost of Equity Capital*, Dissertation, University of Oklahoma, 1998.
[45] Knapp at 84, ibid.

1   significant. This is true whether one examines the electric industry, the
2   regulated distribution of natural gas, or the utility industry overall."
3
4   Please note that the alpha shift parameter refers to the coefficient before the market risk

5   premium in the ECAPM Model. Clearly, the empirical evidence suggests that the ECAPM

6   adjustment of the traditional CAPM estimation is invalid. Thus, B&W's ECAPM result

7   should not be considered.

8   A further piece of evidence is provided by a study cited by B&W – Chretien and

9   Coggins (2011).[46] In the study of the U.S. and Canadian gas utilities, they found that the

10   alpha shift parameter to be largely statistically insignificant after applying the Blume

11   adjustment to the beta. Both B&W and I used the Blume-adjusted beta values from Value

12   Line. Therefore, use of the ECAPM model is not warranted as it double counts the same

13   effects in the CAPM model, and it will lead to upward biased estimate of cost of equity.

14   **Risk Premium Models**

15   **Q.   Can you describe the approach that B&W took to model ROE with the RP or Bond**

16   **Yield plus Risk Premium Model?**

17   A.   B&W used a form of bond yield plus risk premium model or RP model. The bond yield is

18   the 30-year T-bond yield. The risk premium was obtained by the difference between the

19   authorized ROEs from the past electric rate cases and the interest rate. Historically, there

20   is a strong negative relationship between risk premium and interest rate. So, B&W

21   employed this relationship estimated by the regression of risk premium on interest rate for

22   the period of 1992 through January 2023 to generate a predicted risk premium utilizing the

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[46] Chretien, Stephane, and Frank Coggins. "Cost of equity for energy utilities: Beyond the CAPM," Energy Studies Review, Vol. 18, No. 2, 2011.

1   projected interest rate and then add to the interest rate to obtain the expected return on

2   equity (the projected authorized ROE for an average utility).

3

4 **Q.   Is their approach similar to your RP approach?**

5 A.   Yes, their approach is similar to mine except for several major differences. 1. They used

6   average ROEs and interest rate for the rate cases determined in each calendar quarter; 2.

7   They selected rate cases for all electric utilities including both the vertically integrated

8   electric utilities and distribution utilities; and 3. They used the projected interest rates. I

9   have argued against using the projected interest rate in the modeling of ROE for the CAPM

10   model, and as a general principle, projected interest rate should not be used as the input in

11   the models.

12   Using the average ROE authorized in each calendar quarter and the corresponding

13   quarterly average interest rate mismatches the rate case and interest rate considerations for

14   each case. Rate case durations can be as short as 1 month and as long as more than 20

15   months.[47] The correct way of modeling the interest rate is to match the interest rate for

16   each rate case as I have done.

17   B&W considered all electric utility rate cases including fully litigated and settled

18   cases for distribution electric utilities and vertically integrated electric utilities. As settled

19   cases may involve settlement at the global scale and may involve compromises on other

20   rate issues, ROEs in settled cases may not fully reflect the true market required return.

21   Therefore, it is more appropriate to use the ROEs from the fully litigated cases.

---

[47] See, for example, Rate Case History, Attachment DOE-1-1.27.xlsx.

1   Liberty is a distribution electric utility. Therefore, the matching cases should be the

2   ones for distribution electric utilities, not the cases for vertically integrated companies.

3   Therefore, B&W should have selected the cases for distribution electric utilities only.

4   **Q.**   **Is there a precedence in which only relevant cases are selected for the Risk Premium**
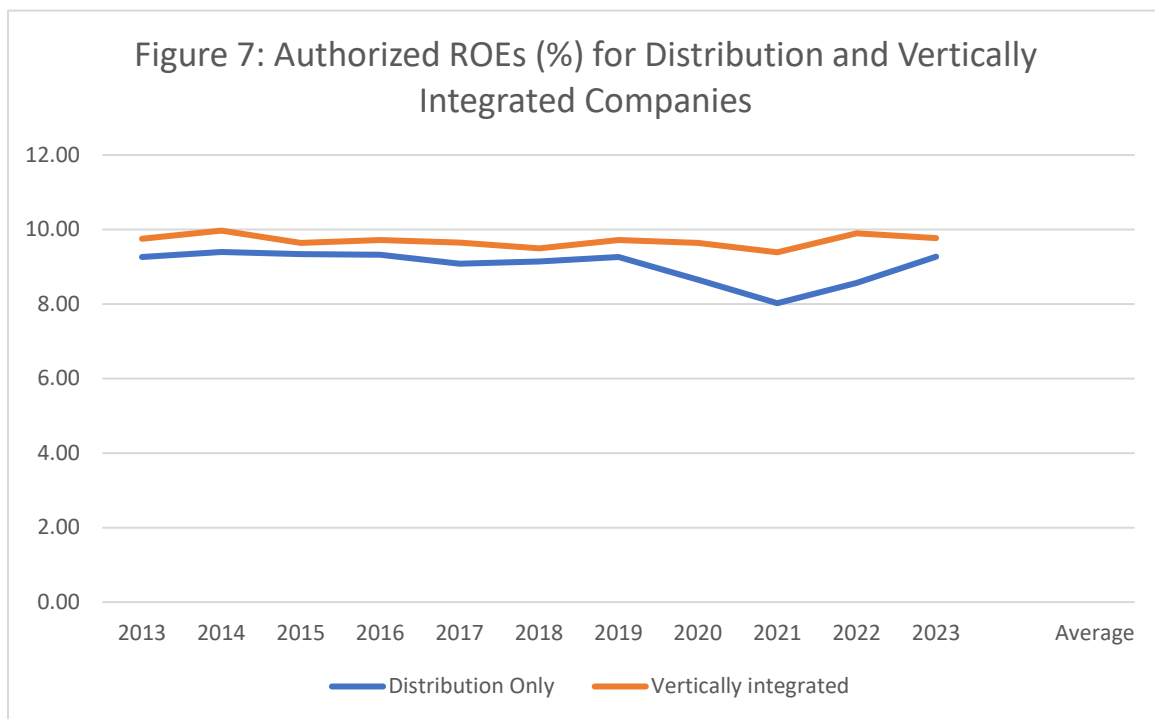
5   **model analysis?**

6   A.   Yes, when FERC implements the Risk Premium model, it only selects the transmission

7   rate cases before the Commission.[48] It extracts the risk premium from the returns

8   authorized in the transmission rate cases as these returns are the most relevant ones. Also,

9   note that FERC selects proxy group companies for the DCF and CAPM models based on

10   Value Line electric utilities (mostly vertically integrated utilities), which is similar to the

11   approach I have adopted for this analysis.

12   Q.   Is it reasonable for your ROE estimate based on distribution companies to be lower than

13   the B&W's estimated ROE based on all companies including vertically integrated

14   companies?

15   A.   Yes, it is reasonable. Liberty is a distribution only utility, and distribution only utility does

16   not own or operate generation facilities that are riskier for the vertically integrated

17   companies. The jurisdictional authorities realize this risk distinction and typically award

18   lower ROEs to distribution only utilities such as Liberty. Figure 7 below, shows the average

19   awarded ROEs for the two types of utilities for the past ten years (only litigated cases). In

20   general, the authorized ROEs for the distribution only utilities are at least 35 basis points

21   lower compared to the authorized ROEs for the vertically integrated electric utilities.

---

[48] FERC, Opinion No. 569-A, Order on Rehearing, Issued May 21, 2020, pages 117-122.

1

Figure 7: Authorized ROEs (%) for Distribution and Vertically Integrated Companies

[Line chart titled "Figure 7: Authorized ROEs (%) for Distribution and Vertically Integrated Companies" with y-axis from 0.00 to 12.00 and x-axis years 2013 through 2023 and Average. Two series: Distribution Only (blue) and Vertically integrated (orange).]

2

3   **Q.   Do you have any other comments regarding the ROE estimate from the RP model?**

4   A.   Yes, I do. I have several general comments regarding the RP model. The RP model projects

5   the future risk premium based on the estimation of the relationship between risk premium

6   and interest rate using historical data. In this sense, it is not a fully forward-looking model

7   even if the current interest rate is used to project the risk premium. It is possible that the

8   past relationship between the risk premium and interest rate may change; thus, the

9   estimated historical relationship may not be valid in generating the future risk premium. In

10   addition, even if the distribution electric cases are selected, the companies in the sample

11   may not be representative of the company under consideration, in this case, Liberty.

12   Therefore, the RP model may not be as appropriate as the DCF and CAPM models

13   in measuring market required returns. We need to understand the result of the RP model in

14   comparison to the estimates from DCF and CAPM models. If the result of the RP estimated

1   ROE is significantly different from the ROE estimates from other models, we should place

2   less weight on the RP model outcome. For Liberty, my estimate of ROE using the RP

3   model appears to be higher than the ROE estimates from the DCF and CAPM models both

4   of which generated similar results. Therefore, the equally weighted average using the

5   estimates of all three models should be viewed as the upper bound of the market required

6   return as the true market required return on equity should be lower than the average.

7

8   **Other adjustments**

9   **Q.   After reaching an indicated range of ROE for Liberty, did B&W make any**

10   **adjustments?**

11   A.   B&W considered several additional factors that could affect the Company's ROE

12   according to them: capital expenditure, regulatory risk, small size premium and flotation

13   cost. However, B&W did not recommend any specific adjustments, but they do recommend

14   a ROE towards the upper end of the range of the estimates from their models, based on the

15   consideration of these additional factors.

16   **Q.   Can you describe the capital expenditure issue as stated by B&W?**

17   A.   B&W claims that Liberty has high ratio of projected future capital expenditure to net utility

18   plant and there is a high business risk associated with the high ratio and if the capital

19   expenditure cannot be recovered on time.

20   Upon examining the data provided by B&W, I believe Liberty's capital expenditure

21   ratio is comparable to that of the proxy group. Liberty's capital expenditure ratio is 53.50%

22   while the average for the group is 52.45%.[49] I consider that to be sufficiently close, to the

---

[49] Ibid, Attachment AEB/CMW-11.

1   capital expenditure ratio of a typical company, thus, the risk associated with the capital

2   expenditure for Liberty is similar to the average for the proxy group.

3 **Q.** **What is your view of Liberty's regulatory risk?**

4 A.   I agree that the regulatory risk is an important risk faced by utilities that face regulations

5   by the jurisdictional authorities. Investors do consider the regulatory risk when they make

6   investment decisions. The RRA rating of the New Hampshire Public Utilities Commission

7   is an Average/2, which is the average of all commission ratings (ranked 5 out of a total of

8   9 ratings). Therefore, I agree with B&W that "the Company's regulatory risk is generally

9   consistent with the proxy group."[50]

10 **Q.** **B&W made arguments for size effect. Do you agree with the adjustments for size?**

11 A.   I do not. The size premium relied on historical data, and it has many known problems

12   applied to the utility industry. First, there is a survival bias in the data. Only successful

13   companies (companies that survive) are included in the dataset. Performance-poor

14   companies that may not survive are excluded, which leads to exaggerated market returns.

15   Furthermore, there is no evidence that the size premium, if there is any, could be

16   found in the electric utility industry. In a study of the utility size premium versus industrial

17   firm size premium, Professor Annie Wong[51] failed to find any significant size effect for

18   utility stocks, while she found some size effect for the industrial companies. She also

19   explained the findings based on the characteristics of the utility and industrial firms.

20   Contrary to industrials, utilities have a similar information environment. Regardless of size

21   they are heavily regulated and follow similar accounting procedures. In addition, a utility's

[50] Ibid, page 62, lines 18-19.
[51] Annie Wong, "Utility stocks and the size effect: an empirical analysis," Journal of Midwest Finance Association, 1993, pp 95-101.

1   earnings are predetermined to a certain degree. Her findings and explanations are

2   reasonable, given that the size premium of smaller companies usually hinges on the fact

3   that investors often have less publicly available information on smaller firms as opposed

4   to larger firms. While a size premium may make sense in the industrial industry, it is not

5   appropriate in the utility industry where the information environment is different. For this

6   reason, I believe there is no justification for the size premium added to the ROE for Liberty.

7   The addition of a small firm premium inappropriately biases the ROE upward and should

8   not be allowed.

9   **Q.   Did B&W cite the Zepp (2003) article to rebut the Wong study?**

10   Y.   Yes, B&W cited the Zepp article[52] to argue that "Wong's concluding remarks should be

11   re-examined and placed in perspective."[53]

12   **Q.   What is your opinion regarding the Zepp article and its conclusion?**

13   A.   In my opinion, the Zepp study does not provide any credible evidence against the Wong

14   conclusion for several reasons. The first is that Zepp did not provide any of his own study

15   of the similar magnitude and scope for the electric utility to that of the Wong study. He

16   only discussed the results of two non-academic studies of water utilities. The studies are

17   not comparable to the Wong study in any aspects. Second, the studies cited by Zepp have

18   serious drawbacks in their design and were not based on market information. In the first

19   cited study by Zepp, as many small water utilities were not publicly traded, the "CPUC

20   Staff study addressed that concern by computing proxies for beta risk estimated with

21   accounting data".[54] Beta measures the correlation of company stock to the market index

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[52] B&W Testimony, page 65-66.
[53] Thomas Zepp, "Utility stocks and the size effect – revisited," Quarterly Review of Economics and Finance, Vol. 43, No. 3, 2003, pp 578-582.
[54] Ibid, page 580.

1   and should be based on the market information. Any measure other than that is not the true

2   measure of the riskiness of the stocks. The second study Zepp cited utilized a DCF model

3   to estimate the required returns. However, the market expected growth rates were not

4   available, the study utilized the actual earnings growth in the modeling. This casts serious

5   doubt on the validity of the DCF results for those water utilities.

6   **Q.   Did B&W also cite the study of Chretien and Coggins (2011) to support the size**

7   **premium?**

8   A.   Yes, they did.[55] But the cited study does not support the size premium; instead, the Chretien

9   and Coggins study provided evidence to suggest that there is no need to adjust for size.

10   **Q.   Can you explain how you arrived at the conclusion that the Chretien and Coggins**

11   **study does not support the size premium?**

12   A.   First, Chretien and Coggins provided evidence of unadjusted CAPM model

13   underestimating the risk premium of U.S. and Canadian gas companies (both index and

14   asset portfolio). Then they made adjustments to the CAPM estimation, and the

15   underestimation largely disappeared.

16   Their first adjustment is the estimation of the CAPM model by adding two more

17   variables in addition to the market risk premium: a size variable and a value variable. Their

18   estimation results suggest that the size variable is a statistically significant variable and the

19   underestimation of the risk premium disappeared mostly once this version of the model is

20   estimated. B&W took the significantly positive coefficient estimate to the size variable as

21   the evidence to support the size effect.

---

[55] B&W Testimony, page 66.

1 **Q.** **Do you agree with the conclusion that the significant size coefficient estimate implies**

2 **the positive size effect?**

3 A. No, I do not agree with that conclusion. The size variable in the Chretien and Coggins study

4 is the difference in returns of a portfolio of large companies and a portfolio of small

5 companies. These portfolios are comprised of companies in the overall equity market. The

6 significance of the size variable merely suggested that the return difference from two

7 different portfolios of market equities may be a candidate to explain the risk premium of

8 the gas utilities (large or small). Put it in a slightly different way, the Chretien and Coggins

9 "size effect" measures how the large-small equity return difference is related to the risk

10 premium of utility companies (both large and small). The size premium, if it does exist at

11 all, means that the risk premium of the utility is related to the size of the utility company.

12 The empirical evidence of the so-called size effect in the Chretien and Coggins study has

13 nothing to do with the size of the utility company as there is no utility company size

14 involved directly at all. It is not a true measure of the utility size effect.

15 **Q.** **What is the other adjustment that Chretien and Coggins employed?**

16 A, Chretien and Coggins adjusted the beta by the so-called Blume adjustment and then re-

17 estimated the risk premium of the gas equity index and portfolio. They found that the

18 underestimation largely disappeared after such an adjustment, just like in the first

19 adjustment. This provides evidence supporting no adjustment for size premium.

20 **Q.** **Why do you state the Chretien and Coggins results with the second adjustment**

21 **provide support for no size adjustment.**

22 A. The second adjustment Chretien and Coggins adopted to the beta in their estimation is the

23 Blume adjustment, which is the method Value Line and other professional services

1   employed to adjust their raw betas. B&W adopted the Value Line beta, just like I did. This

2   simply means that with the use of the adjusted beta, there is no need to further adjust for

3   any other factors (including size). Therefore, this empirical evidence suggests that further

4   adjusting for other effect such as size will overestimate the market required return on

5   equity.

6 **Q.   Do you agree with B&W that Liberty should be entitled to flotation cost?**

7 A.   No, I do not agree with B&W.

8   Flotation costs are the costs related to the sale of new issues of company common

9   stocks, including the preparation, filing, underwriting of the new issuance, and other related

10   costs. There are several reasons why flotation costs should not be included to increase the

11   return on equity of a subsidiary such as Liberty. The simplest reason is that Liberty does

12   not issue stocks and there is no floatation cost to measure. This has been a basis for rejecting

13   flotation cost. For example, Texas Public Utility Commission (TPUC) rejected the flotation

14   cost as "a flotation cost adjustment to the ROE would not be appropriate as it is not known

15   and measurable."[56] The NHPUC also takes the same position as the TPUC by arguing that

16   "lacking any evidence of actual or planned issuances, such costs should not be

17   compensated." [57]

18   Liberty's ratepayers should not bear the burden of Liberty's parent company's

19   previous issuance of stocks. If the parent company has experienced flotation costs, it would

20   already be included in the company's expense schedule. Furthermore, even if it has not

21   been included in the expense schedule, capital market should have already factored in the

---

[56] *Application of Southwestern Electric Power Company for Authority to Change Rates and Reconcile Fuel Costs*,
PUC Docket No. 40443, Order at 10 (Oct. 10, 2013).
[57] See Re: Pennichuck Water Works, Inc. 70 NH PUC 850, 8636 (1985, 70 NH PUC 862).

1   transaction costs as the underwriting fees are known to the investors.[58] Investors should

2   have already considered this information when pricing the stocks, they are purchasing, and

3   they should not be compensated twice.

4 **Q.**   **Please explain the double leverage issue related to the flotation cost of the parent**

5   **company.**

6 A.   Liberty does not issue its own equity, but it can have paid-in capital from its parent as

7   equity. The source of paid-in capital from its parent company cannot be clearly

8   distinguished from either an equity issuance or a debt issuance directly. Even if the parent

9   company directly issues equity for the equity infusion into the subsidiary, one still cannot

10   exclusively bind the infusion with the equity issuance due to the inseparability of capital.

11   When a parent company issues debt and then uses the proceeds from the debt

12   issuance as the paid-in capital to the subsidiary, a double leverage issue arises. The debt

13   investors are compensated at a lower rate of return compared to the equity investors; thus,

14   the parent company will receive return on equity from the subsidiary for their debt. If

15   double leverage is allowed, then ratepayers will pay a higher than required return on equity,

16   when the underlying capital is originated from the issuance of debt.

17 **Q.**   **Can you state your recommendations regarding the effect of these four factors that**

18   **B&W discussed?**

19 A.   Even though B&W did not recommend any specific adjustment to ROE based on these

20   additional factors, but they did suggest considering the ROE to be in the upper end of their

21   model estimates. However, I do not believe setting the ROE recommendation in the upper

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[58] But it is still unknown and not measurable to a subsidiary.

1   range of their model estimates is valid as either Liberty is an average risk company or there

2   is a no valid foundation for the inclusion of the size effect and/or flotation cost.

3

4

5   **X. CONCLUSIONS**

6   **Q.   What is your recommendation of ROE and capital structure for Liberty?**

7   A.   My recommendation of ROE for Liberty is 9.25% and the debt/equity ratio is 50% for each.

8   **Q.   What is your recommendation regarding B&W's recommendation of 10.35% ROE**

9   **for Liberty?**

10   A.   I have shown in this testimony that there are numerous problems with B&W's analysis and

11   estimation of the ROE by different models. Their 10.35% ROE estimate overstates the

12   required return on equity for Liberty under the current market conditions, and it is not just

13   nor reasonable. Therefore, I recommend the Commission not grant the requested high

14   ROE.

15   **Q.   Does this conclude your direct testimony?**

16   A.   Yes, it does. However, I reserve the right to incorporate new information that may

17   subsequently become available. I also reserve the right to supplement my testimony in the

18   event Liberty or other parties submit new or corrected information in connection with this

19   proceeding.