



**STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION**

Docket No. DE 19-064

Liberty Utilities (Granite State Electric) Corp. d/b/a Liberty Utilities
Distribution Service Rate Case

REBUTTAL TESTIMONY

OF

JOHN COCHRANE

January 30, 2020

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TABLE OF CONTENTS

I.	INTRODUCTION AND BACKGROUND	1
II.	PURPOSE AND OVERVIEW OF TESTIMONY	1
III.	ISSUES COMMON TO OCA AND STAFF ROE TESTIMONY	3
	A. ROE Recommendation Range	3
	B. Market-to-Book Ratios	9
	C. Flotation Costs	12
	D. Size Premium	13
IV.	RESPONSE TO STAFF ROE TESTIMONY	17
	A. Constant Growth DCF Model	17
	B. Multi-stage DCF Model	23
	C. CAPM	26
	D. Capital Structure	31
V.	RESPONSE TO OCA ROE TESTIMONY	32
	A. Proxy Group Composition	33
	B. Constant Growth DCF Model	36
	C. CAPM	37
VI.	CONCLUSIONS AND RECOMMENDATIONS	40

ATTACHMENTS

Attachment	Title
JC-R-1	OCA Proxy Group Equity Duration

1 **I. INTRODUCTION AND BACKGROUND**

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

3 A. My name is John Cochrane. I am a Senior Managing Director and head of the Power &
4 Utilities practice at FTI Consulting, Inc. (“FTI”). My business address is 200 State St, 9th
5 Floor, Boston, Massachusetts.

6 **Q. On whose behalf are you submitting testimony?**

7 A. I am submitting testimony on behalf of Liberty Utilities (Granite State Electric) Corp.
8 d/b/a Liberty Utilities (“Granite State” or “the Company”).

9 **Q. Have you previously submitted testimony in this proceeding?**

10 A. Yes. I submitted prefiled testimony as part of the Company’s April 30, 2019, filing for
11 an increase in distribution rates. My educational background, professional background,
12 and qualifications are contained in that prior testimony.

13 **II. PURPOSE AND OVERVIEW OF TESTIMONY**

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

15 A. The purpose of my testimony is to respond to the direct testimony of Dr. Pradip
16 Chattopadhyay, who appears on behalf of the New Hampshire Office of Consumer
17 Advocate (“OCA”), and the direct testimony of Dr. J. Randall Woolridge, who appears
18 on behalf of the New Hampshire Public Utilities Commission Staff (“Staff”), regarding
19 Granite State’s proposed Return on Equity (“ROE”).

1 **Q. Please summarize your conclusions.**

2 A. For reasons I discuss in detail later in my testimony, I conclude that the arguments
3 proposed by Dr. Woolridge and Dr. Chattopadhyay are seriously flawed and that
4 acceptance of their recommendations would result in the establishment of an authorized
5 ROE for Granite State that is highly inconsistent with industry standards relevant to
6 electric utilities in New Hampshire or anywhere else in the United States. I also conclude
7 that my original recommended ROE range of 9.32% to 10.03% and point estimate of
8 10.00% for Granite State are each reasonable. Finally, I continue to find that the capital
9 structure proposed by Messrs. Greene and Simek, which consists of 55% equity and 45%
10 debt, is reasonable and consistent with other utility companies.

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

12 A. The remainder of my testimony is organized as follows:

- 13 • Section III contains my responses to issues common to both OCA and Staff
14 testimony;
- 15 • Section IV contains my response specific to Staff's Witness Dr. Woolridge;
- 16 • Section V contains my response specific to OCA's Witness Dr. Chattopadhyay;
- 17 • Section VI describes my conclusions and recommendations.

1 **III. ISSUES COMMON TO OCA AND STAFF ROE TESTIMONY**

2 **Q. What are the issues common to the testimony submitted by Dr. Chattopadhyay and**
3 **Dr. Woolridge that you address in this section of your testimony?**

4 A. In this section of my testimony, I (1) address the extraordinarily low authorized ROEs
5 and ranges proposed by Dr. Woolridge and Dr. Chattopadhyay and compare them to
6 ROEs authorized over the last roughly 40 years in New Hampshire and elsewhere to
7 demonstrate their extreme inconsistency with industry standards in any U.S. jurisdiction;
8 (2) identify the flaws in their proposal to utilize market-to-book ratios greater than unity;
9 (3) explain the appropriateness of a flotation cost adjustment I applied to my calculations;
10 and (4) explain the appropriateness of a small size risk premium I considered when
11 determining my point estimate.

12 **A. ROE Recommendation Range**

13 **Q. What are the ROE recommendations and ranges proposed by Drs. Chattopadhyay**
14 **and Woolridge?**

15 A. Dr. Chattopadhyay recommends an ROE of 8.23% within a range of 8.15% and 8.35%.¹
16 Dr. Woolridge recommends an ROE of 8.25% within a range of 6.9% and 8.25%.²

17 **Q. To what extent are their proposed ROEs out of line with recent industry standards?**

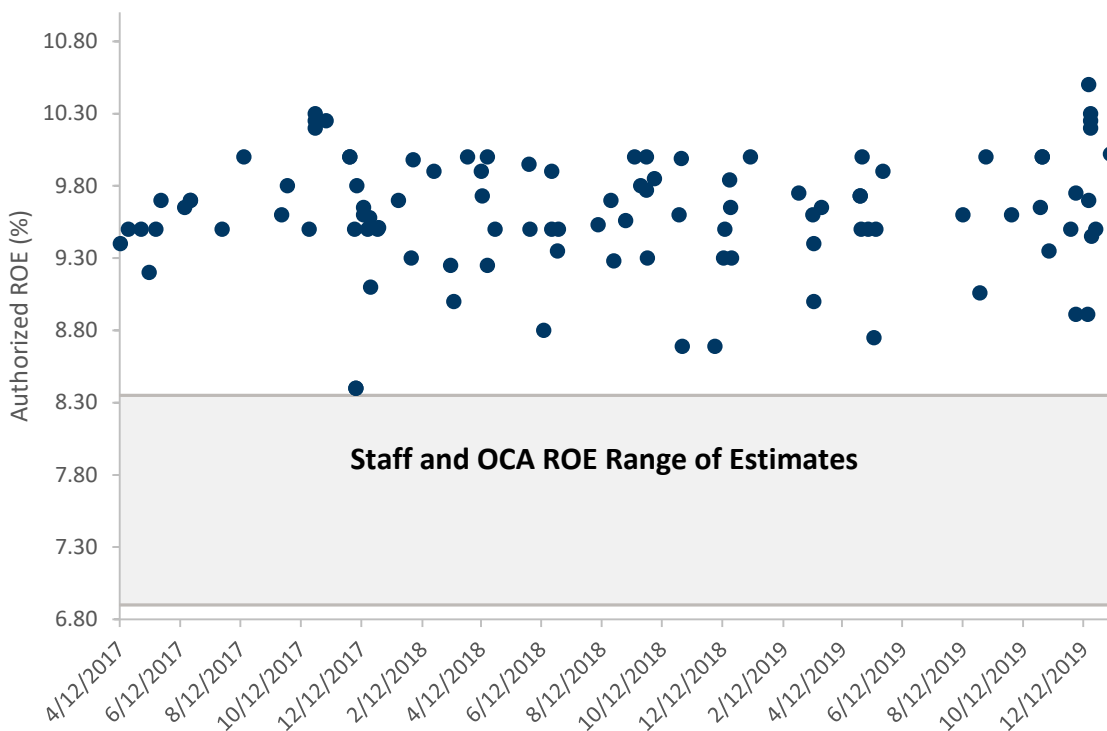
18 A. Egregiously. Drs. Woolridge and Chattopadhyay propose to set Granite State's ROE at a
19 level that is not only lower than the lowest authorized ROE for any electric utility

¹ New Hampshire Public Utilities Commission, Docket No. DE 19-064, Direct Testimony of Dr. Pradip Chattopadhyay, December 6, 2019 ("Chattopadhyay Direct") at page 7.

² New Hampshire Public Utilities Commission, Docket No. DE 19-064, Direct Testimony of Dr. J. Randall Woolridge, December 6, 2019 ("Woolridge Direct") at page 6.

anywhere in the United States since at least 1980, but that is also over 100 basis points below the Company's current authorized ROE. Figure 1 below shows the authorized returns for 85 utilities, which are based on decisions made by 45 different commissions, in the last 21 months, the amount of time since Granite State's last authorized return. Not a single utility was authorized a return that falls anywhere in what Drs. Chattopadhyay and Woolridge conclude is a reasonable range.

Figure 1. Authorized ROEs for Electric Utilities, April 2017 - Present



Source: Regulatory Research Associates; S&P Global Market Intelligence.

Q. Does your data include decisions made by this Commission?

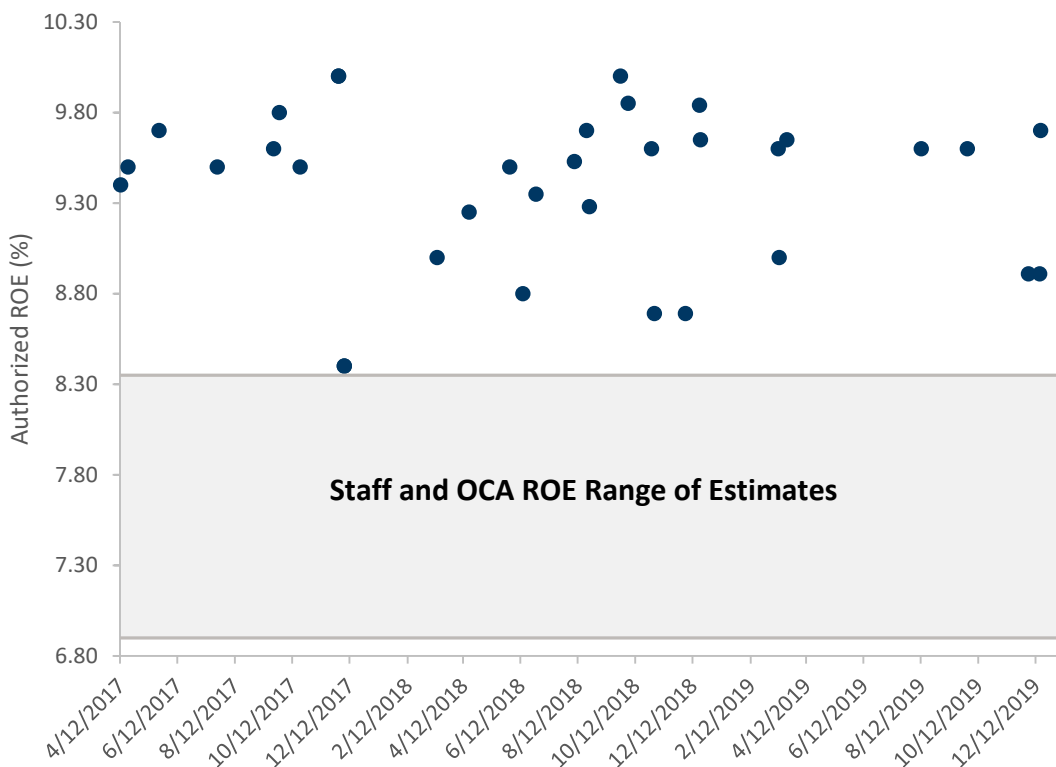
A. Yes, it includes the decisions made by this Commission in Docket Nos. DE 16-383 (Granite State) and DE-16-384 (Unitil).

1 **Q. Your data includes both vertically-integrated and distribution-only utilities. Are the**
2 **ROEs authorized for distribution only utilities like Granite State significantly lower**
3 **than their vertically-integrated peers?**

4 A. No, despite Dr. Woolridge's claims that distribution-only utilities are typically awarded
5 lower ROEs, the data do not show a significant difference.³ Figure 2, below, shows the
6 authorized returns for the 23 distribution-only utilities in 14 different states for whom an
7 ROE was established in the last approximately two years. Over this period, ROEs ranged
8 from 8.4% to 10.0%, with an average ROE of 9.38% and a median ROE of 9.5% for
9 distribution-only utilities. Over the same period, ROEs for all electric utilities (including
10 vertically-integrated companies) ranged from 8.4% to 11.95%, with average and median
11 ROEs of 9.62% and 9.6% respectively.

³ Docket No. DE 19-064, Direct Testimony of Dr. J. Randall Woolridge, December 6, 2019, ("Woolridge Direct") at page 15.

Figure 2. Authorized ROEs for Distribution-Only Electric Utilities, April 2017 - Present



Source: Regulatory Research Associates; S&P Global Market Intelligence.

Q. Have authorized ROEs gone down since the Company's last rate case?

A. No, they have not. The data in Figure 1 and Figure 2 encompass the period since Granite State's last rate case (DE 16-383) was filed with the Commission. Over that period, there is no discernible trend, as the slope of the trendline for authorized ROEs for distribution-only electric utilities over this period is effectively zero (-0.0002). Moreover, none of the ROEs shown in Figure 1 nor those shown in Figure 2 that were authorized during this time period fall within the range that Drs. Woolridge and Chattopadhyay propose as being reasonable and consistent with industry norms.

1 **Q. When was the last time that authorized ROEs for the electric industry fell within the**
2 **reasonable range proposed by Drs. Chattopadhyay and Woolridge?**

3 A. I do not know. I reviewed data compiled by RRA that shows the result of all 1,615
4 electric utility rate cases adjudicated in the United States since 1980. Of these, in only
5 fourteen instances (roughly 0.9%) were the utilities authorized ROEs of less than 9%, and
6 no cases resulted in authorized ROEs as low as Dr. Woolridge's recommended 8.25% or
7 Dr. Chattopadhyay's recommended 8.23%.⁴ In other words, Drs. Chattopadhyay and
8 Woolridge propose that the Company's authorized ROE be the lowest in effect in the
9 United States and the lowest of any American utility company in the last roughly 40
10 years.

11 **Q. Has New Hampshire set an authorized ROE below 9% for any electric utility during**
12 **that same period?**

13 A. No, of the fourteen instances⁵ in which this Commission has established an authorized
14 ROE for an electric utility since 1980, the single lowest result was 9.4%.⁶ In
15 recommending both their reasonable range and their point estimates, Dr. Chattopadhyay
16 or Dr. Woolridge would seem to be recommending that the Commission establish a
17 benchmark for utility returns in the state that dramatically diverges from both history in
18 New Hampshire and typical practices in other jurisdictions.

⁴ Regulatory Research Associates data reported by S&P Global Market Intelligence.

⁵ Regulatory Research Associates only covers rate cases in which the company has requested a rate change of at least \$5 million or has authorized a rate change of at least \$3 million.

⁶ Regulatory Research Associates data reported by S&P Global Market Intelligence.

1 **Q. Do Drs. Chattopadhyay and Woolridge explain what fundamental changes have**
2 **occurred in the utility industry or the New Hampshire economy to cause such a**
3 **marked departure from historical norms?**

4 A. No, they do not.

5 **Q. Do Drs. Chattopadhyay and Woolridge explain the apparent fundamental**
6 **differences they find between Granite State and every other electric utility in the**
7 **country that would support the establishment of the Company's ROE at a level**
8 **unprecedented in the last roughly forty years?**

9 A. No, they do not.

10 **Q. Why is it important to establish authorized ROEs that are consistent with industry**
11 **standards?**

12 A. The purpose of allowing a regulated utility to earn a return is so that it can attract the
13 capital required for the safe and efficient operation of its system. Granite State, like
14 every other utility, must compete for investors' capital, and investors weigh the risks of
15 the investments they make against the returns they can earn. This is the reason why
16 ROEs are analyzed based on a proxy group of similar companies with comparable risk
17 profiles. If the Commission were to authorize Granite State's ROE at a level inconsistent
18 with industry standards, particularly at a level that is so far below the ROEs authorized
19 for every other utility company in the country, the Company would be placed at a severe
20 disadvantage in its ability to attract investments, jeopardizing its ability to deliver to its
21 customers reliable service at a reasonable cost.

1 **B. Market-to-Book Ratios**

2 **Q. Please summarize Dr. Woolridge’s and Dr. Chattopadhyay’s claims regarding**
3 **market-to-book ratios for electric utilities.**

4 A. Dr. Woolridge and Dr. Chattopadhyay both claim that the fact that electric utility market-
5 to-book ratios have exceeded unity indicates that the expected ROE by investors exceeds
6 the true cost of equity.⁷

7 **Q. Do you agree with the claim that market-to-book ratios in excess of unity reflect an**
8 **overstated ROE?**

9 A. No, I do not. Market-to-book value is equal to the price per share divided by the book
10 value per share. Several factors can cause the market-to-book ratio to deviate from unity
11 without resulting in an overstated cost of equity, such as “diversification into
12 nonregulated fields...even though the profitability of the regulated portion is restricted.”⁸
13 Additionally, “even if all the firm’s activities are regulated, if assets are excluded from
14 rate base, or if Construction Work in Progress (CWIP) does not appear in rate base and
15 no Allowance for Funds Used During Construction (AFUDC) is allowed on CWIP, rate
16 base will not equal net book value, and the M/B will not equal 1.0.”⁹

17 Morin notes in *New Regulatory Finance* that:

18 “Historically, it has been highly unusual for utility stock prices to equal
19 book value. Stock prices above book value are common for utility stocks,

⁷ Chattopadhyay Direct at page 8 and Woolridge Direct at page 22.

⁸ Dr. Roger Morin, *New Regulatory Finance*, Public Utilities Reports, Inc., 2006 (“Morin 2006”) at page 362.

⁹ *Ibid.* Dr. Morin also notes that market-to-book ratios are functions of several other variables such as the expected return on book equity, expected dividend growth, dividend yield, standard deviation, proxies for earnings quality, regulatory climate, accounting convention, and risk measures such as the equity ratio, beta, CWIP treatment, regulatory climate ranking, and the relative importance of construction expenditure (see Morin 2006 at page 366).

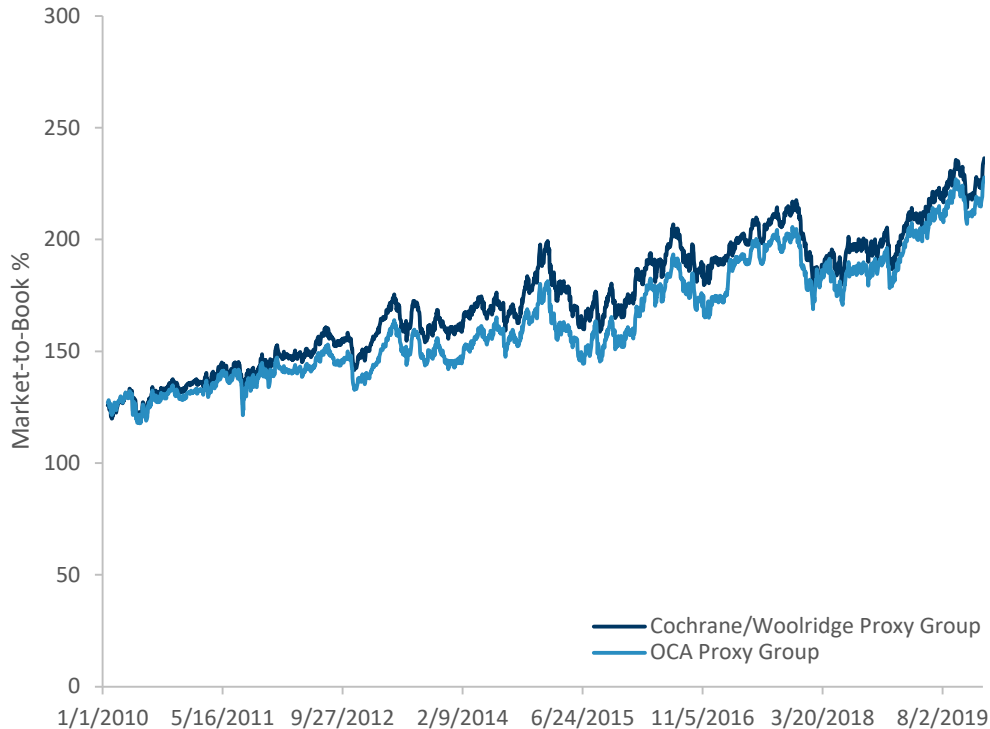
1 and indeed for all of the major market indexes. It is obvious that regulators,
2 through their rate case decisions, and investors do not subscribe to the
3 notion that utilities that have market prices above book value are over-
4 earning. Otherwise, regulators would not grant rate increases for any utility
5 whose stock price was above book value, and investors would never bid up
6 the price of stock above book value. It is very difficult to accept the notion
7 that, in a free-market economy with rampant competition, the vast majority
8 of all publicly traded stocks are earning well in excess of their cost of
9 capital.”¹⁰

10 **Q. Have market-to-book ratios for electric utilities exceeded unity in the past?**

11 A. Consistently. Figure 3 below shows that the average market-to-book ratios for Dr.
12 Chattopadhyay’s proxy group and Dr. Woolridge’s proxy group have traded above unity
13 over the last decade.

¹⁰ Morin 2006 at page 378.

Figure 3. Proxy Group Market-to-Book %, 2010 – Present



If one were to accept Dr. Chattopadhyay’s and Dr. Woolridge’s claims that companies with market-to-book ratios in excess of unity are overearning on their true cost of capital, then one would also have to believe that the functioning, competitive market in which these publicly-traded firms compete for capital has allowed these companies to earn well in excess of their cost of capital for at least the last decade. I do not believe that, nor do Dr. Chattopadhyay or Dr. Woolridge suggest how that could be possible. Moreover, neither have provided any rationale or evidence as to why the current market-to-book ratios warrant a downward adjustment from Granite State’s ROE now, when the same condition held at the time of the Company’s last rate case, at which time the Commission

1 authorized an ROE more than 55-90 basis points over OCA's and Staff's
2 recommendations.

3 **C. Flotation Costs**

4 **Q. Please summarize Dr. Woolridge's and Dr. Chattopadhyay's positions on the**
5 **flotation cost adjustment you incorporated into your calculations.**

6 A. Dr. Woolridge asserts that a flotation cost adjustment is unnecessary since (1) there have
7 been no equity infusions into Granite State in the past five years; and (2) Granite State
8 has not paid any flotation costs in the past five years.¹¹ Dr. Chattopadhyay argues that
9 his recommended ROE adequately accounts for flotation costs as market-to-book ratios
10 greater than one result in overstated ROEs.¹²

11 **Q. Please address Dr. Chattopadhyay's concerns.**

12 A. As I explain above, market-to-book ratios above unity are a normal market condition and
13 in no way indicate distortion of ROEs of any kind.

14 **Q. Does Dr. Chattopadhyay claim that companies like Granite State do not incur**
15 **flotation costs?**

16 A. He does not. In fact, in his discussion of his ROE calculations in his direct testimony, he
17 notes that such costs are legitimately incurred.¹³

¹¹ Woolridge Direct at page 85.

¹² Chattopadhyay Direct at page 29.

¹³ *Ibid.*

1 **Q. Please address Dr. Woolridge's concerns.**

2 A. I disagree with the notion that a flotation cost adjustment is unnecessary simply because
3 Granite State has not received any equity infusion nor paid any flotation costs in the last
4 five years. A flotation cost adjustment is required "even if no further stock issues are
5 contemplated, the flotation adjustment is still permanently required to keep shareholders
6 whole and...flotation costs are only recovered if the rate of return is applied to total
7 equity, including retained earnings, in all future years, even if no future financing is
8 completed."¹⁴ Moreover, Granite State receives equity capital from its parent and thus
9 provides capital returns that roll up to the parent company level. Parent companies attract
10 capital based on the returns of their subsidiaries and denying the recovery of flotation
11 costs incurred in the course of providing equity to subsidiaries will only penalize existing
12 utility investors. Therefore, I do not agree that there should be no adjustment to account
13 for flotation costs.

14 **D. Size Premium**

15 **Q. Please summarize Dr. Woolridge's and Dr. Chattopadhyay's positions regarding the**
16 **small-size premium you included in your calculations.**

17 A. They argue against the inclusion of the premium for two reasons. *First*, Dr. Woolridge
18 believes that Granite State's credit ratings and those of the other proxy group companies
19 already account for size and that the small-size premium should therefore be excluded.¹⁵

¹⁴ Morin 2006 at page 329.

¹⁵ Woolridge Direct at pages 87-88.

1 *Second*, both claim that the small-size effect may not apply to regulated utility operations
2 and should therefore be excluded.

3 **Q. Do you agree with the first criticism, that company size is already accounted for in**
4 **the credit ratings of the proxy group?**

5 A. I do not. As I explain in my Direct Testimony, the proxy group is comprised of publicly-
6 traded companies whose financial results can be analyzed, from which inferences about
7 Granite State's ROE can be drawn.¹⁶ All of the companies in my proxy group are larger
8 than Granite State, measured by either revenues or by customers, and are holding
9 companies. Thus, the credit ratings established for the proxy group companies
10 necessarily reflect risks associated with firms that are larger and, in many cases,
11 geographically diverse. The argument, then, that the calculation of ROEs by analysis of
12 the proxy group companies fully captures the risks associated with Granite State, a
13 company that is significantly smaller than all of the proxy group companies and less
14 geographically diverse than most, is without merit. I would also note that the criticism
15 put forth on this topic in Dr. Woolridge's testimony is almost entirely without analytical
16 or theoretical support.

17 **Q. Do you agree with the second criticism, that the small-size premium does not apply**
18 **to regulated utility companies?**

19 A. I do not. There is a large body of literature to support the consideration of a premium to
20 account for Granite State's size and analysis of the Company's market capitalization and

¹⁶ New Hampshire Public Utilities Commission, Docket No. DE 19-064, Direct Testimony of John Cochrane, April 30, 2019 ("Cochrane Direct") at page 7.

1 trading volumes compared to the utilities in the proxy group clearly indicate that Granite
2 State meets the requisite criteria.

3 **Q. What is your response to the evidence provided by Dr. Woolridge and Dr.**
4 **Chattopadhyay in support of their shared assertion that a small size premium does**
5 **not apply to regulated utility companies?**

6 A. They both cite an article written by Professor Annie Wong, in which she concludes that
7 utility stocks do not exhibit a significant size premium.¹⁷ In my response to OCA's Data
8 Request No. 2-8, I provided an article published by Thomas M. Zepp that specifically
9 rebutted Professor Wong's article and provided new evidence that supports a small-size
10 effect in the utility sector.¹⁸ Another study undertaken by Michael Annin at Ibbotson
11 Associates provides additional support for the use of a small-size premium for regulated
12 utility companies.¹⁹

13 **Q. Can you provide additional support for the consideration of a small-size premium**
14 **for Granite State?**

15 A. Yes. Another risk factor related to firm size is that of liquidity risk. Dr. Morin writes:

16 "Investment risk increases as company size diminishes, all else remaining
17 constant. The size phenomenon is well-documented in the finance literature.
18 The size effect is likely the result of lack of marketability, whereby investors
19 in small stocks demand greater returns as compensation for the lack of
20 marketability and liquidity. Investors prefer high to low liquidity and

¹⁷ Woolridge Direct at page 88 and Chattopadhyay Direct at page 29.

¹⁸ Thomas M. Zepp, "Utility stocks and the size effect – revisited," *Quarterly Review of Economics and Finance*, Volume 43, 2003, pages 572-582.

¹⁹ Michael Annin, "Equity and Small Stock Effect," *Public Utilities Fortnightly*, October 15, 1995, pages 42-43.

demand higher returns from less liquid investments, holding other factors constant.”

As shown in Attachment JC-10 to my Direct Testimony, Granite State is significantly smaller than the proxy group companies when comparing market capitalization. Since Granite State is not publicly traded, the financial characteristics of its ultimate parent, Algonquin Power & Utilities Corp. (“Algonquin” or “AQN”) provide useful insight into its liquidity risk as liquidity can be measured by stock turnover or trading volume. Using data obtained from Value Line, Table 1 below shows the average market capitalization of the companies contained in my proxy group (the same as Dr. Woolridge’s proxy group) and in Dr. Chattopadhyay’s proxy group, compared to Algonquin’s market capitalization, as of January 2, 2020. Algonquin is approximately 32% the size of the average of both proxy groups based on market capitalization and trades at less than half of the average daily trading volume of the proxy group companies. The lower trading volume indicates lower liquidity as a result of Algonquin’s size, for which investors would require a premium in order to hold the stock. Thus, as I discussed in my Direct Testimony, it is appropriate to consider the effects of Granite State’s size when determining where the authorized return should fall within in the calculated range of reasonable ROEs.

Table 1. Market Capitalization and Trading Volume

	Market Capitalization (\$ Millions)	%	Average Daily Trading Volume	%
AQN	\$6,929		556,903	
Cochrane/Woolridge Proxy Group	\$22,936	31.6%	1,161,317	48.0%
OCA Proxy Group	\$22,713	30.5%	1,542,994	36.1%

1 **IV. RESPONSE TO STAFF ROE TESTIMONY**

2 **Q. Please summarize Dr. Woolridge's testimony and ROE recommendation.**

3 A. Dr. Woolridge recommends an ROE of 8.25% within a range of 6.9% and 8.25%, based
4 primarily on the results of his Constant Growth DCF model.²⁰ In addition, Dr.
5 Woolridge recommends a capital structure of 50% debt and 50% common equity.²¹

6 **Q. What are the main areas of disagreement between you and Dr. Woolridge?**

7 A. In addition to the aforementioned areas of disagreement common to both witnesses, I
8 disagree with Dr. Woolridge in the following areas: (1) the appropriate growth rate for
9 the Constant Growth DCF model; (2) the long-term growth rate used in the Multi-stage
10 DCF model; (3) the Market Risk Premium ("MRP") used in the Capital Asset Pricing
11 Model ("CAPM"); (4) the level of risk associated with Granite State relative to the proxy
12 group companies; and (5) the appropriate capital structure for the Company.

13 **A. Constant Growth DCF Model**

14 **Q. Please summarize Dr. Woolridge's ROE calculation using the Constant Growth**
15 **DCF model.**

16 A. Dr. Woolridge calculates a single point estimate of 8.25% using the Constant Growth
17 DCF approach. He arrives at this estimate by calculating the average dividend yield for
18 his proxy group over a 30-day period of 2.9%, applying a growth adjustment to the
19 dividend yield of 1.02625, and adding his DCF growth rate of 5.25%.²²

²⁰ Woolridge Direct at page 6.

²¹ *Ibid.*

²² Woolridge Direct at page 40 and Attachment JRW-9 at page 2.

Q. Please summarize the growth rates considered in Dr. Woolridge’s Constant Growth DCF analysis.

A. Dr. Woolridge considers a number of different growth rates, including historical and projected dividends per share (“DPS”), book value per share (“BVPS”), and earnings per share (“EPS”) growth rates reported by Value Line, projected EPS growth rates reported by Yahoo! Finance, Zacks, and Reuters, and a measure of sustainable growth calculated from Value Line data.²³ Table 2 below summarizes Dr. Woolridge’s growth rate measures.

Table 2. Woolridge DCF Growth Rate Indicators

Growth Rate Indicator	Woolridge Proxy Group
Historic <i>Value Line</i> Growth in EPS, DPS, and BVPS	4.4%
Projected <i>Value Line</i> Growth in EPS, DPS, and BVPS	4.8%
Sustainable Growth Rate	3.5%
Projected Analyst EPS Growth (Mean/Median)	5.0%/5.3%
Woolridge Selected Growth Rate	5.25%

It is unclear how Dr. Woolridge arrives at his final estimate of 5.25%. He claims that within his “overall range for the projected growth rate indicators (ignoring historical growth),” he gives “primary weight to the projected EPS growth rate of Wall Street analysts” to arrive at his estimate.²⁴

²³ Woolridge Direct at pages 32–29 and Attachment JRW-9 at page 6.

²⁴ Woolridge Direct at page 39.

1 **Q. Do you agree with the use of historic growth rates in the Constant Growth DCF**
2 **model?**

3 A. No, I do not. The Constant Growth DCF is intended to be forward-looking, and historic
4 growth going back five and ten years is unlikely to be indicative of the long-term future
5 growth of any particular investment. Historic growth rates may reflect changes that will
6 not reasonably continue in the future and will not capture any known future changes.
7 Additionally, historic growth will have been accounted for in analyst growth projections.
8 As such, I do not find it appropriate to use historic growth rates in the Constant Growth
9 DCF model. It is also worth noting that Dr. Woolridge himself may not agree with the
10 use of historic growth rates. In his criticism of the historical approach to estimating
11 market risk premia, Dr. Woolridge asserts that “market conditions can change such that
12 *ex post* historical returns are poor estimates of *ex ante* expectation,”²⁵ an argument that
13 can easily be extended to his use of historical EPS, DPS, and BVPS growth rates in the
14 Constant Growth DCF model.

15 **Q. Do you agree with the use of Dr. Woolridge’s sustainable growth rate?**

16 A. I do not. Dr. Woolridge’s sustainable growth rate is calculated using the following
17 formula:

$$g = b * r$$

²⁵ Woolridge Direct at page 45.

1 In this equation, g is the sustainable growth rate calculated by multiplying b , the earnings
2 expected to be retained by the company, with r , an estimate of return on equity. The
3 Constant Growth DCF model implies that the chosen b and r will continue in perpetuity.
4 Importantly, Dr. Woolridge's sustainable growth calculation assumes an expected ROE.
5 Using data from Value Line, Dr. Woolridge uses a median ROE estimate of 9.8% as his
6 value for r , yet he recommends an ROE of 8.25%.²⁶ Essentially, his ROE
7 recommendation is inconsistent with the expected ROE embedded in his model.

8 **Q. Does Dr. Woolridge explain this inconsistency?**

9 A. No, he does not.

10 **Q. Do you agree with the use of DPS and BVPS growth rates in the Constant Growth**
11 **DCF model?**

12 A. No, I do not. Projections of DPS and BVPS growth rates are only reported by Value
13 Line, which increases the risk of these projections being skewed either high or low as
14 there is no consensus among various analysts. As noted by Dr. Morin:

15 “Casual inspection of the Zacks Investment Research, First Call Thompson,
16 and Multex Web sites reveals that earnings per share forecasts dominate the
17 information provided. There are few, if any, dividend growth forecasts.
18 Only Value Line provides comprehensive long-term dividend growth
19 forecasts. The wide availability of earnings forecasts is not surprising. There
20 is an abundance of evidence attesting to the importance of earnings in
21 assessing investors' expectations. The sheer volume of earnings forecasts
22 available from the investment community relative to the scarcity of
23 dividend forecasts attests to their importance. The fact that these investment
24 information providers focus on growth in earnings rather than growth in
25 dividends indicates that the investment community regards earnings growth

²⁶ Attachment JRW-9 at page 5.

1 as a superior indicator of future long-term growth. Surveys of analytical
2 techniques actually used by analysts reveal the dominance of earnings and
3 conclude that earnings are considered far more important than dividends.”²⁷

4 Additionally, earnings growth drives dividend growth. Dr. Morin further notes that:

5 “[S]ince the ability to pay dividends stems from a company’s ability to
6 generate earnings, growth in earnings per share can be expected to strongly
7 influence the market’s dividend growth expectations. After all, dividend
8 growth can only be sustained if there is growth in earnings. It is the
9 expectation of earnings growth that is the principal driver of stock prices.”²⁸

10 **Q. What do you conclude from this information?**

11 A. I conclude that projected earnings growth is the appropriate growth rate measure to use in
12 the Constant Growth DCF model.

13 **Q. Do you agree with Dr. Woolridge’s assertion that analyst earnings growth rate
14 forecasts are “overly optimistic and upwardly biased”?²⁹**

15 A. I do not. Dr. Woolridge provides several references to studies that evaluate the accuracy
16 of forecasted EPS growth rates to support his claim that analyst earnings growth forecasts
17 are upwardly biased. However, as explained by Dr. Morin, this concern is largely
18 irrelevant:

19 “Because of the dominance of institutional investors and their influence on
20 individual investors, analysts’ forecasts of long-run growth rates provide a
21 sound basis for estimating required returns. Financial analysts exert a
22 strong influence on the expectations of many investors who do not possess
23 the resources to make their own forecasts, that is, they are a cause of g. The
24 accuracy of these forecasts in the sense of whether they turn out to be
25 correct is not at issue here, as long as they reflect widely held expectations.
26 As long as the forecasts are typical and/or influential in that they are
27 consistent with current stock price levels, they are relevant. The use of

²⁷ Morin 2006 at pages 302–303.

²⁸ Morin 2006 at page 284.

²⁹ Woolridge Direct at pages 8 and 35.

1 analysts' forecasts in the DCF model is sometimes denounced on the
2 grounds that it is difficult to forecast earnings and dividends for only one
3 year, let alone for longer time periods. This objection is unfounded,
4 however, because it is present investor expectations that are being priced;
5 *it is the consensus forecast that is embedded in price and therefore in*
6 *required return, and not the future as it will turn out to be.*³⁰

7 **Q. In other words, research indicates that the forecasts do, in fact, reflect widely held**
8 **expectations of investors?**

9 A. Yes.

10 **Q. Does Dr. Woolridge use these forecasts in his own calculations?**

11 A. He does. Dr. Woolridge still gives primary weight to these very forecasts when arriving
12 at his 5.25% growth rate for the Constant Growth DCF analysis.³¹

13 **Q. Does Dr. Woolridge reconcile his objection to your use of purportedly flawed**
14 **forecasts with his own use of the same forecasts?**

15 A. No, he does not.

16 **Q. Is there support for the use of analyst earnings growth projections in regulatory**
17 **proceedings in other jurisdictions?**

18 A. Yes. The Federal Energy Regulatory Commission ("FERC") has long relied on analyst
19 earnings growth estimates as appropriate growth rates for DCF analysis in estimating
20 ROE.³² In Opinion No. 531, FERC approved the use of five-year earnings growth

³⁰ Morin 2006 at page 298 (emphasis added).

³¹ Woolridge Direct at page 39.

³² See, e.g., Opinion No. 531, 147 FERC ¶ 61,234; Opinion No. 531-B, 150 FERC ¶ 61,165; Opinion No. 569, 169 FERC ¶ 61,129.

1 estimates reported by Yahoo! Finance and noted that “the growth rate used in the DCF
2 model should be the growth rate expected by the market. That growth rate may not
3 necessarily prove to be the correct growth forecast, but the cost of common equity to a
4 regulated enterprise depends upon what the market expects, not upon what ultimately
5 happens.”³³

6 Other Commissions in the Northeast have also approved the use of analyst earnings
7 growth estimates. In Docket No. 2017-00198, the witness for the Maine Public Utilities
8 Commission estimated Emera Maine’s ROE using Yahoo! Finance analyst earnings
9 growth rates.³⁴ In Case No. 18-0974-TF, the witness testifying on behalf of the Vermont
10 Public Service Commission used analyst earnings growth forecasts from Value Line,
11 Zacks, and Yahoo! Finance, consistent with my approach.³⁵

12 **B. Multi-stage DCF Model**

13 **Q. Please summarize Dr. Woolridge’s concern with your Multi-stage DCF model.**

14 **A.** Dr. Woolridge takes issue with my use of projected analyst earnings growth rates as the
15 first stage growth rate in the Multi-stage DCF model and claims that my long-term
16 growth rate based on historical GDP growth and a measure of inflation is overstated³⁶
17 and without any theoretical or empirical support.³⁷

³³ Opinion No. 531, 147 FERC ¶ 61,234 at page 43.

³⁴ Maine Public Utilities Commission, Docket No. 2017-00198, “Bench Analysis,” December 21, 2017 at page 67.

³⁵ Vermont Public Service Commission, Case No. 18-0974-TF, Direct Testimony of Richard A. Baudino, August 10, 2018 at page 24.

³⁶ Woolridge Direct at pages 65-66.

³⁷ Woolridge Direct at page 66.

1 **Q. What does Dr. Woolridge claim about your use of historic real GDP growth as a**
2 **measure of long-term growth?**

3 A. Dr. Woolridge claims that my long-term GDP growth rate is overstated as US economic
4 growth has “slowed considerably in recent decades.”³⁸ He purports to support this claim
5 with the observation that “there has been a monotonic and significant decline in nominal
6 GDP growth over subsequent 10-year intervals, especially in the most recent 10-year
7 interval.”³⁹ However, he fails to include any discussion of the underlying reason for the
8 decline in the most recent intervals – namely, the financial crisis and Great Recession that
9 began in 2007.

10 **Q. What is your response to this claim?**

11 A. I believe my estimate of long-term GDP growth is reasonable when viewed in the context
12 of a nearly century-long history of the US economy. Economists note that unlike other
13 recessions in US history, the “the recovery from the trough of the Great Recession has
14 been very slow...there has been no period of rapid growth that has gotten the economy
15 back to the prerecession trend path. Four years after the trough, the economy remain[ed]
16 about as far below the trend path as it was at the trough.”⁴⁰ In this regard, the Great
17 Recession is similar to the Great Depression of 1929 and the oil shock of 1973.⁴¹ As
18 shown in Table 3 below, the decade immediately following both of these recessions saw

³⁸ Woolridge Direct at page 66.

³⁹ Woolridge Direct at page 67.

⁴⁰ Kathryn Dominguez and Matthew Shapiro, “Forecasting the Recovery from the Great Recession: Is This Time Different?” *American Economic Review: Papers and Proceedings*, 103(3), at page 151.

⁴¹ I have not included the oil shock of 1981 as much of the time period analyzed in Table 2 overlaps with the time period associated with the oil shock of 1973.

1 lower real GDP growth (a component of nominal GDP growth) than in the next two
2 decades.

3 **Table 3. Post-Crisis Real GDP Growth⁴²**

Economic Crisis	Compound Annual Growth Rate in Real GDP	
	Following Decade	Next Two Decades
Great Depression of 1929	1.88%	4.36%
Oil Shock of 1973	2.32%	3.07%

4
5 Barely a decade out of the trough of the Great Recession, it is not unreasonable to believe
6 that projections of real GDP are understated and that GDP may return to historic levels in
7 the decades to come. Using a historic measure of real GDP growth over as long a period
8 as I have used is likely to be more a more-than-adequate measure of future economic
9 growth.

10 **Q. Can you provide any support for the use of historic GDP growth as your chosen**
11 **long-term growth rate?**

12 **A.** Yes. Duff & Phelps writes that:

13 “A long view of capital market history...provide[s] a period long enough to
14 include most or all of the major types of events that investors have
15 experienced and may experience in the future. Such events include war and
16 peace, growth and decline, bull and bear markets, inflation and deflation,
17 and other less dramatic events that affect asset returns. By studying the past,
18 one can make inferences about the future. While the actual events that
19 occurred during 1926 – 2018 will not be repeated, the event-types of that
20 period can be expected to recur...To the degree that historical event-types

⁴² Federal Reserve Bank of St. Louis, Real Gross Domestic Product, at <https://fred.stlouisfed.org/series/GDPCA>.

1 tend to repeat themselves, the examination of past capital market returns is
2 likely informative about what may be expected in the future.”⁴³

3 Using data going back to 1929, consistent with my methodology, Dr. Morin also notes
4 that “the growth rate in US real GDP has been reasonably stable over time. Therefore, its
5 historical performance is a reasonable estimate of expected long-term future
6 performance.”⁴⁴

7 **C. CAPM**

8 **Q. Please describe Dr. Woolridge’s CAPM analysis.**

9 A. Dr. Woolridge uses a risk-free rate of 3.75%, proxy group beta of 0.55, and a market risk
10 premium of 5.75% to arrive at a CAPM estimate of ROE of 6.9%. His risk-free estimate
11 is taken from a range of yields on 30-year US Treasury bonds from 2013 – 2019 of 2.0%
12 to 4.0%;⁴⁵ his beta reflects the median beta of the proxy group companies as reported by
13 Value Line;⁴⁶ and his market risk premium is what he views to be a “conservatively
14 high” estimate based on his review of several studies and surveys of the market risk
15 premium.⁴⁷

16 **Q. What is the principal area of disagreement between you and Dr. Woolridge**
17 **regarding the CAPM?**

18 A. The key issue on which Dr. Woolridge and I diverge is the estimation of the market risk
19 premium. While Dr. Woolridge has consulted numerous studies to come up with a range

⁴³ Duff & Phelps, *2019 SBBI Yearbook* at page 2-1.

⁴⁴ Morin 2006 at page 311.

⁴⁵ Woolridge Direct at page 42.

⁴⁶ Attachment JRW-10 at page 3.

⁴⁷ Woolridge Direct at page 53.

1 of 4.0% to 6.0% and point estimate of 5.75% for his market risk premium,⁴⁸ I have
2 estimated the market risk premium based on the difference between the return on large
3 company stocks (as measured by applying the Constant Growth DCF methodology to the
4 S&P 500 companies) and the yield on the 30-year Treasury bonds. Dr. Woolridge takes
5 issue with both my methodology, specifically the use of Value Line's projected EPS
6 growth estimates, and the magnitude of my calculated market risk premium of 13.49%.

7 **Q. What are your criticisms of Dr. Woolridge's market risk premium?**

8 A. I have three main criticisms of Dr. Woolridge's market risk premium estimate and
9 methodology. First, Dr. Woolridge is inconsistent in his approach. He discusses the
10 issues inherent in using the historical "Ibbotson approach" to estimating a market risk
11 premium, yet still considers several studies employing the historical risk premium
12 approach when determining his own market risk premium estimate.

13 Second, Dr. Woolridge considers several surveys in deciding his market risk premium,
14 which are subject to various shortcomings. These shortcomings include response bias,
15 such as "subjective assessments about long-term market behavior [that] may well place
16 undue weight on recent events and immediate prospects."⁴⁹

17 Third, Dr. Woolridge's market risk premium estimate results in an outrageously low ROE
18 estimate of 6.9%.⁵⁰ His CAPM ROE estimate is 150 basis points below the lowest ROE
19 authorized since 1980, and 250 basis points below Granite State's currently authorized

⁴⁸ Woolridge Direct at page 52.

⁴⁹ Morin 2006 at page 162.

⁵⁰ Woolridge Direct at 53.

1 ROE. As a result, I find his market risk premium and resulting CAPM analysis to be
2 entirely unreasonable.

3 **Q. Can you provide any support for your chosen methodology of calculating the**
4 **market risk premium?**

5 A. Yes. In *New Regulatory Finance*, Dr. Morin outlines an approach to estimating the
6 market risk premium by applying the DCF model to a representative market index.⁵¹
7 Several other empirical studies completed over the last two decades, such as those
8 undertaken by Harris (1986), Harris and Marston (1992), Harris, Marston, Mishra, and
9 O'Brien (2003), estimate a market return by applying the Constant Growth DCF model to
10 the S&P 500 companies using analyst earnings growth forecasts.⁵² They then convert the
11 market return into a market risk premium by subtracting the yield on long-term
12 government bonds. This methodology, including the use of analyst growth rates, is also
13 consistent with methodology approved by the FERC in Opinion Nos. 531, 531-B, and
14 569.⁵³ The Commission notes:

15 “A CAPM analysis is forward-looking if its market risk premium
16 component is based on a DCF study of a large segment of the market. In a
17 forward-looking CAPM analysis, the market risk premium is calculated by
18 subtracting the risk-free rate from the result produced by the DCF study.”⁵⁴

⁵¹ Morin 2006 at page 159.

⁵² Robert Harris, “Using Analysts’ Growth Forecasts to Estimate Shareholder Required Rates of Return,” *Financial Management*, Spring 1986, 15(1), pages 58-67; Robert Harris and Felicia Marston, “Estimating Shareholder Risk Premia Using Analysts’ Growth Forecasts,” *Financial Management*, Summer 1992, 21(2), pages 63-70; Robert Harris, Felicia Marston, Dev Mishra, and Thomas O’Brien, “Ex Ante Cost of Equity Estimates of S&P 500 Firms: The Choice between Global and Domestic CAPM,” *Financial Management*, Autumn 2003, 32(3), pages 51-66.

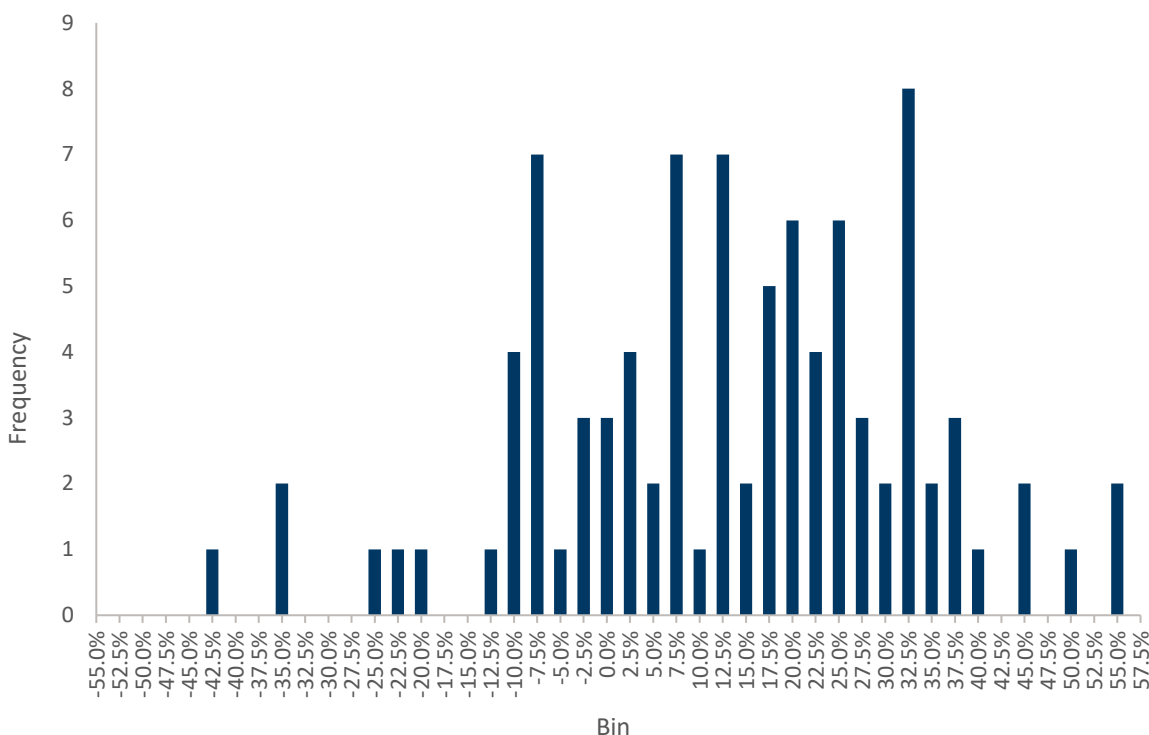
⁵³ Opinion No. 531, 147 FERC ¶ 61,234; Opinion No. 531-B, 150 FERC ¶ 61,165; Opinion No. 569, 169 FERC ¶ 61,129.

⁵⁴ Opinion No. 531-B, 150 FERC ¶ 61,165 at page 60.

Q. What is your response to Dr. Woolridge’s claim that your expected market return and market risk premium are “totally unrealistic and defy economic logic”?⁵⁵

A. I disagree with his claim. Using data provided by Duff & Phelps, I have compared my expected return to observed market returns as measured by the total return to large-capitalization stocks over the period 1926 – 2018, as shown in the figure below.

Figure 4. Distribution of Observed Market Returns, 1926 – 2018



Source: Duff & Phelps, 2019 *SBBI Yearbook*, at Appendix A-1.

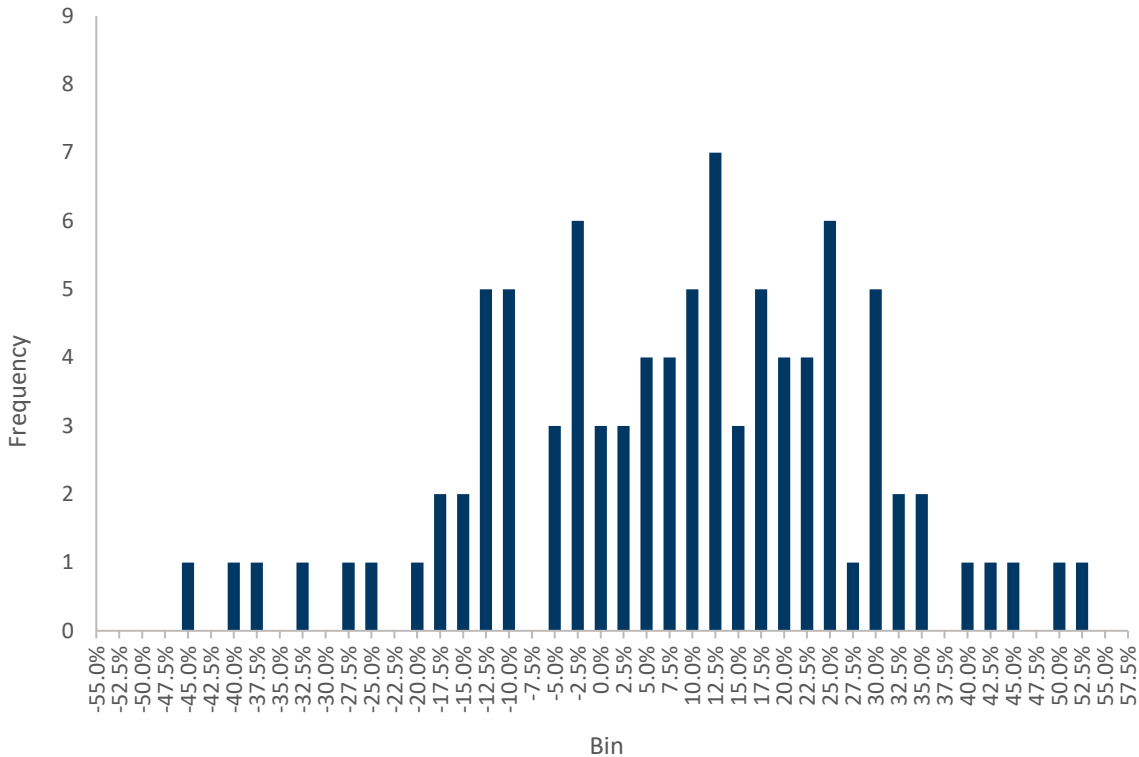
⁵⁵ Woolridge Direct at page 73.

1 According to these data, observed market returns have exceeded 16.54%, my estimated
2 market return, in 41 years of the 93-year period, or approximately 44% of the time.

3 When viewed alongside these data, my estimated market return is not unreasonable.

4 Figure 5 below shows a similar analysis for the observed market risk premia, calculated
5 by subtracting the reported yield on long-term government bonds from the observed
6 market returns for the same period. Market risk premia above my estimated market risk
7 premium of 13.49% were observed in 36 years over the 93-year period, approximately
8 39% of the time. It is hardly the case that a market risk premium of 13.49% is “totally
9 unrealistic,” as evidenced by data reported by Duff & Phelps – a source Dr. Woolridge
10 himself uses in evaluating market risk premia.

Figure 5. Distribution of Observed Market Risk Premia, 1926 – 2018



Source: Duff & Phelps, *2019 SBBI Yearbook*, at Appendix A-1 and Appendix A-9.

D. Capital Structure

Q. What is the capital structure recommended by Dr. Woolridge?

A. Dr. Woolridge recommends a capital structure consisting of 50% debt and 50% common equity, which he claims is more reflective of the capital structures of electric utilities than the capital structure proposed by Messrs. Greene and Simek, which consists of 55% equity and 45% debt.

1 **Q. What is your response to Dr. Woolridge's recommended capital structure?**

2 A. As stated in my Direct Testimony, a capital structure consisting of 55% common equity
3 is squarely within the range of common equity ratios for the proxy group companies,
4 which ranged from approximately 32% to 77% on average over the period 2014 – 2018.⁵⁶
5 As a result, I continue to find that the capital structure consisting of 55% equity and 45%
6 debt proposed by Messrs. Greene and Simek is reasonable.

7 **V. RESPONSE TO OCA ROE TESTIMONY**

8 **Q. Please summarize Dr. Chattopadhyay's testimony and ROE recommendation.**

9 A. Dr. Chattopadhyay recommends a range for Granite State's ROE of 8.15% to 8.35%,
10 with a specific point estimate of 8.23%.⁵⁷ His results are primarily based on his Constant
11 Growth DCF model, as he purports to use his CAPM analysis as a check on the asserted
12 reasonableness of his DCF estimates.

13 **Q. What are the main areas of disagreement between you and Dr. Chattopadhyay?**

14 A. In addition to the aforementioned areas of disagreement common to both witnesses, I
15 disagree with Dr. Chattopadhyay in the following areas: (1) the composition of the proxy
16 group; (2) the appropriate growth rate for the Constant Growth DCF model; (3) the
17 market return used in the CAPM; and (4) the risk-free rate used in the CAPM.

⁵⁶ Cochrane Direct at Attachment JC-11.

⁵⁷ Chattopadhyay Direct at page 7.

A. Proxy Group Composition

Q. What are the criteria used by Dr. Chattopadhyay in selecting his proxy group?

A. Dr. Chattopadhyay began with the same universe of companies identified as electric utilities by Value Line as I did and applied similar screening criteria. However, while I found that a threshold of 50% was appropriate for the percentage of operating revenue derived from regulated electric operations, Dr. Chattopadhyay used a higher threshold of 70% regulated electric revenue and additionally required proxy group companies to hold 80% of their assets as regulated assets.⁵⁸ His screening criteria resulted in the following proxy group.⁵⁹

Table 4. OCA Proxy Group

Company	Ticker
Alliant Energy Corporation	LNT
Ameren Corporation	AEE
American Electric Power, Inc.	AEP
Avista Corporation	AVA
Consolidated Edison	ED
Duke Energy Corporation	DUK
Edison International	EIX
Evergy, Inc.	EVRG
Eversource Energy	ES
Entergy Corporation	ETR
First Energy Corporation	FE
IDACORP, Inc.	IDA
Northwestern Corporation	NEW
OGE Energy Corporation	OGE
Pinnacle West Capital Corporation	PNW
PNM Resources, Inc.	PNM
Portland General Electric Company	POR
PPL Corporation	PPL
Southern Company	SO
Xcel Energy, Inc.	XEL

⁵⁸ Chattopadhyay Direct at page 21.

⁵⁹ Chattopadhyay Direct at pages 21–22.

1 Dr. Chattopadhyay's proxy group differs from mine with the inclusion of Entergy, First
2 Energy, and OGE Energy, and the exclusion of ALLETE, Avangrid, CMS Energy,
3 Hawaiian Electric, MGE Energy, NextEra Energy, Otter Tail, Unitil, and WEC Energy
4 Group.⁶⁰ It is worth noting that Dr. Woolridge found all of my proxy group screening
5 criteria to be reasonable and adopted my proxy group for his analyses.

6 **Q. Are there any flaws in Dr. Chattopadhyay's screening criteria?**

7 A. There are. In particular, the combination of screens of requiring both 70% regulated
8 electric revenue and 80% regulated assets threshold is excessively high and limiting. Dr.
9 Chattopadhyay argues that it is important that proxy group companies "exhibit a fairly
10 high percentage of regulated assets in total assets and have the majority of their revenue
11 coming from electric regulated operations."⁶¹ The term "fairly high" is undefined and no
12 support is provided for the thresholds he uses for either revenue or assets.

13 **Q. Do you find his screening criteria overly restrictive?**

14 A. Yes, I do.

15 **Q. Why?**

16 A. Edison Electric Institute ("EEI") categorizes US investor-owned electric utility holding
17 companies into "regulated companies," which are companies with more than 80%
18 regulated assets, and "mostly regulated companies," which are companies with less than
19 80% regulated assets. According to EEI, CMS Energy, MGE Energy, Otter Tail, Unitil,

⁶⁰ My proxy group also included El Paso Electric Company, which Dr. Chattopadhyay has excluded as it is currently in the process of being acquired by Infrastructure Investments Fund (see Chattopadhyay Direct at page 22).

⁶¹ Chattopadhyay Direct at page 21.

1 and WEC Energy were all companies over the 80% regulated asset threshold at the end of
2 2018.⁶² These companies also generated the majority (over half) of their operating
3 revenues from regulated electric operations over the 2016–2018 period. Similarly,
4 ALLETE, Avangrid, NextEra, and Hawaiian Electric are classified as “mostly regulated”
5 by EEI⁶³ and derived between 60% and 88% of their operating revenues from regulated
6 electric operations over the 2016–2018 period. I see no reason to exclude any of these
7 companies based on arbitrarily high cutoffs imposed by Dr. Chattopadhyay.

8 **Q. Do you have any other concerns regarding Dr. Chattopadhyay’s proposed proxy**
9 **group?**

10 A. Yes. Yahoo! Finance currently reports negative long-term earnings growth projections
11 for First Energy (-6.6%) and Entergy (-1.5%). While Dr. Chattopadhyay does not use
12 Yahoo! Finance earnings growth rates, I (and other commissions as well as investors, as
13 discussed earlier in my testimony) find Yahoo! Finance estimates to be a valuable and
14 commonly-used source of analyst growth projections. Companies with negative earnings
15 growth estimates from sources widely used by investors are typically screened out of
16 proxy groups.

17 **Q. Why is it problematic to include companies with negative earnings growth**
18 **projections in the proxy group?**

19 A. Using negative earnings growth projections in the Constant Growth DCF model would
20 assume that those firms will experience negative earnings into perpetuity. While

⁶² Edison Electric Institute, 2018 Financial Review at page 38.

⁶³ *Ibid.*

1 negative earnings may occur in the short-term for some firms, it is not reasonable to
2 assume that any firm can grow at a negative rate of earnings forever in a competitive
3 market environment.

4 **B. Constant Growth DCF Model**

5 **Q. Please provide a brief summary of Dr. Chattopadhyay's Constant Growth DCF**
6 **methodology and results.**

7 A. Dr. Chattopadhyay applies the same Constant Growth DCF methodology as I do, with the
8 exception of his choice of growth rate and the fact that he only uses pricing data from
9 October 31, 2019, to November 29, 2019. Dr. Chattopadhyay disagrees with my
10 approach of using analyst earnings growth projections and instead relies on an average of
11 Value Line's expected growth rates for DPS and BVPS and the average of Value Line,
12 Zacks, and SNL median long-term EPS projections.⁶⁴ Dr. Chattopadhyay also considers
13 a second growth measure similar to Dr. Woolridge's sustainable growth rate, which is
14 comprised of estimates of both internal and external growth components.⁶⁵

15 **Q. What are your areas of disagreement with Dr. Chattopadhyay's Constant Growth**
16 **DCF methodology?**

17 A. My disagreement with Dr. Chattopadhyay's Constant Growth DCF largely lies with his
18 choice of growth rate. As I discussed in my response to the testimony of Dr. Woolridge,
19 I do not believe that projections of DPS and BVPS nor Dr. Chattopadhyay's measure of

⁶⁴ Chattopadhyay Direct at page 26.

⁶⁵ *Ibid.*

1 sustainable growth⁶⁶ are the appropriate growth rate measures for use in the Constant
2 Growth DCF model. Instead, for reasons discussed earlier in this Rebuttal Testimony, I
3 reiterate that projected earnings growth is the appropriate growth rate measure for the
4 Constant Growth DCF model.

5 **C. CAPM**

6 **Q. Please summarize how Dr. Chattopadhyay calculates his expected market return**
7 **estimates.**

8 A. Dr. Chattopadhyay calculates three estimates of expected market return by applying the
9 Constant Growth DCF model to the S&P 500 companies. For his first two estimates, he
10 uses only the subset of the S&P 500 companies that pay dividends and applies two
11 different measures of growth: earnings growth projections and the average of earnings,
12 dividend, and book value growth projections.⁶⁷ For his third estimate, he uses all S&P
13 500 companies and applies only the earnings growth projections.⁶⁸

14 **Q. Do you agree with Dr. Chattopadhyay's approach to calculating the expected**
15 **market return?**

16 A. I disagree with Dr. Chattopadhyay's first two methods of estimating the expected market
17 return – specifically, I do not agree with his choice of growth rate and with his decision to
18 remove companies that do not pay dividends from the market return calculation. First,
19 for reasons described earlier in my testimony, I do not think that the average of earnings,

⁶⁶ *Ibid.*

⁶⁷ Chattopadhyay Direct at page 32.

⁶⁸ *Ibid.*

1 dividend, and book value growth is the appropriate growth rate to use. Second, excluding
2 non-dividend paying companies from the calculation will result in an expected market
3 return that does not accurately reflect the market. Based on the data contained in
4 Schedules PKC-11a and PKC-11b, the companies in the S&P 500 that do not pay
5 dividends represented nearly 17% of the total market capitalization of the S&P 500 and
6 included major companies such as Amazon and Facebook.

7 To exclude these companies would not only result in a distorted market risk premium, but
8 would also divorce the calculation from the market as viewed by investors. The expected
9 market return is intended to estimate the total return investors would require for an
10 investment in the broader market represented by the S&P 500 Index. An investment that
11 tracks this index includes the returns of both dividend paying and non-dividend paying
12 companies. Thus, I believe it is inappropriate and not representative of the market to
13 exclude non-dividend paying companies from the expected market return calculation.

14 **Q. What is the risk-free rate used by Dr. Chattopadhyay in his CAPM model?**

15 A. Dr. Chattopadhyay uses the yield on 10-year Treasury bonds as his risk-free rate.⁶⁹ He
16 claims that this measure “strikes a reasonable balance between choosing a truly interest
17 rate risk-free instrument (like the shortest of short term Treasury bills) and a
18 consideration that investors have relatively long investment horizons and that regulated
19 utility rates are usually set for longer terms than just a few months.”⁷⁰

⁶⁹ Chattopadhyay Direct at page 30.

⁷⁰ Chattopadhyay Direct at page 31.

1 **Q. Do you agree with Dr. Chattopadhyay's chosen risk-free rate?**

2 A. No. Dr. Chattopadhyay's chosen risk-free rate does not reflect the time horizon of the
3 underlying investments, i.e., electric utility companies. According to Dr. Aswath
4 Damodaran, the risk-free rate to be used in a CAPM analysis is "the rate on a zero
5 coupon default-free bond matching the time horizon of the cash flow being analyzed...If
6 the government is default-free, using a long term government rate (even on a coupon
7 bond) as the risk free rate on all of the cash flows in a long term analysis will yield a
8 close approximation of the true value."⁷¹

9 **Q. What is the appropriate time horizon for the risk-free rate?**

10 A. The appropriate time horizon can be calculated using the concept of equity duration,
11 which represents the average time it takes to receive all of the cash flows of a security,
12 weighted by the present value of each of the cash flows.⁷² Effectively, equity duration
13 reflects the payment-weighted time at which an investor can expect to recoup his or her
14 original investment in the stock. In the context of the dividend discount model, equity
15 duration can be measured by the following formula:

16
$$D = \frac{1 + ROE}{ROE - g}$$

⁷¹ Aswath Damodaran, "From Risk & Return Models to Hurdle Rates: Estimation Challenges," at <http://people.stern.nyu.edu/adamodar/podcasts/cfUGspr16/Session6.pdf> at pages 91-92.

⁷² See, e.g., Zvi Bodie, Alex Kane, and Alan Marcus, *Investments*, 10th Edition, 2014 at page 519.

1 where D represents the equity duration in years, ROE is the calculated cost of capital
2 resulting from the Dividend Discount Model, and g is the expected growth rate used in
3 the Dividend Discount Model.⁷³

4 I have calculated the equity duration for Dr. Chattopadhyay's proxy group, using his
5 measures of growth and ROE reported in Schedules PKC-5 and PKC-8. As shown in
6 Attachment JC-R-1, the equity duration for his proxy group ranges between 33.05 years
7 and 33.19 years, depending on the measure of growth used. Thus, the yield on the 30-
8 year Treasury bond is the more appropriate risk-free rate as it more closely matches the
9 duration of the underlying investments than the 10-year Treasury bond yield, as proposed
10 by Dr. Chattopadhyay.

11 **Q. Can you provide additional support for the use of 30-year Treasury yields as the**
12 **appropriate risk-free rate in a CAPM analysis?**

13 A. Yes. In Opinion No. 531-B, FERC holds that "the risk-free rate and betas used in a
14 CAPM study are generally not controversial. The risk-free rate is represented by a proxy,
15 typically the yield on 30-year Treasury bonds."⁷⁴

16 **VI. CONCLUSIONS AND RECOMMENDATIONS**

17 **Q. Please summarize your conclusions.**

18 A. I have four primary conclusions, each of which are described below. *First*, I conclude
19 that the recommendations of Drs. Woolridge and Chattopadhyay are completely

⁷³ Lewis D. Johnson, *Equity Duration: Another Look*, Financial Analysts Journal, Volume 45 Issue 2, 1989, at page 74.

⁷⁴ Opinion No. 531-B, 150 FERC ¶ 61,165 at page 60.

1 inconsistent with industry standards. *Second*, I conclude that that inconsistency derives,
2 in part, from methodological flaws in their calculation of Granite State's ROE. *Third*, I
3 conclude that the authorized ROE and reasonable range I recommend in my Direct
4 Testimony continues to be appropriate. *Fourth*, I conclude that the Company's proposed
5 capital structure also continues to be appropriate.

6 **Q. Please explain your first conclusion regarding the inconsistency of the ROEs**
7 **recommended by Drs. Woolridge and Chattopadhyay to industry standards.**

8 A. The analyses contained in Section II of this testimony reveal that the ROEs recommended
9 by Dr. Woolridge and Dr. Chattopadhyay are grossly understated relative to recent and
10 historic industry standards. Not only do they recommend ROEs lower than the lowest
11 ROE authorized for any electric utility in the last forty years, but they also do not provide
12 evidence of such a dramatic change in circumstances for Granite State that would warrant
13 a downward adjustment of over 100 basis points below its currently authorized ROE. I
14 also find their argument that market-to-book ratios in excess of unity indicate that electric
15 utilities have been over-earning on their true cost of capital to be erroneous and not
16 supportive of such a low range of recommended ROEs.

17 **Q. Please explain your second conclusion regarding the methodological flaws in the**
18 **ROE calculations undertaken by Dr. Woolridge and Chattopadhyay.**

19 A. As discussed in my testimony, I find several methodological flaws in their ROE
20 calculations, such as their use of DPS and BVPS growth rates and the circular and
21 inconsistent sustainable growth rates for their implementation of the Constant Growth

1 DCF model, their chosen market risk premiums in the CAPM model, and in the case of
2 Dr. Chattopadhyay, his proxy group screening criteria.

3 **Q. Please explain your third conclusion regarding the reasonableness of your**
4 **recommended ROE and reasonable range.**

5 A. Based on the first two conclusions and my analyses contained herein, I find no
6 compelling reason to adjust my original recommended ROE and reasonable range. I
7 conclude that my recommended ROE of 10.0% and range of 9.32% to 10.03% represents
8 a reasonable set of ROEs for Granite State.

9 **Q. Please explain your fourth conclusion regarding the reasonableness of the**
10 **Company's proposed capital structure.**

11 A. I continue to find the Company's proposed capital structure consisting of 55% common
12 equity to be reasonable. Based on an analysis of the capital structures of proxy group
13 companies, that proposed structure is reflective of and within the range of common equity
14 ratios in place at those companies.

15 **Q. Please summarize your recommendations.**

16 A. My recommendations are unchanged from those found in my Direct Testimony.
17 Specifically, I recommend that the Commission authorize an ROE for Granite State of
18 10.00%, that it accept the Company's proposed capital structure of 55% common equity
19 and 45% debt as well as debt costs, and that it authorize a total ROR of 8.19%.

20 **Q. Does this conclude your testimony?**

21 A. Yes.

OCA Proxy Group Equity Duration

		Average of EPS, DPS, and BVPS Growth Rates			Internal plus External Growth Rates			EPS Growth Rates		
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Company	Ticker	Growth Rate	ROE	Equity Duration (Years)	Growth Rate	ROE	Equity Duration (Years)	Growth Rate	ROE	Equity Duration (Years)
Alliant Energy Corporation	LNT	6.33%	9.19%	38.28	5.51%	8.37%	37.99	6.00%	8.85%	38.16
Ameren Corporation	AEE	5.61%	8.35%	39.59	4.94%	7.67%	39.34	5.84%	8.58%	39.68
AEP Company	AEP	4.90%	8.07%	34.05	5.29%	8.47%	34.17	5.19%	8.36%	34.14
Avista	AVA	3.66%	7.10%	31.13	3.07%	6.51%	30.96	3.47%	6.91%	31.08
Consolidated Edison	ED	3.22%	6.72%	30.50	2.82%	6.32%	30.39	2.67%	6.17%	30.34
Duke Energy Corporation	DUK	3.42%	7.71%	25.12	2.72%	7.01%	24.96	5.27%	9.55%	25.55
Edison International	EIX	4.52%	8.18%	29.57	6.58%	10.24%	30.13	5.56%	9.21%	29.85
Evergy, Inc.	EVRG	6.38%	9.67%	33.38	2.57%	5.85%	32.22	6.38%	9.67%	33.38
Eversource	ES	5.23%	8.00%	38.97	4.92%	7.69%	38.86	5.70%	8.47%	39.14
Entergy Corporation	ETR	3.74%	6.95%	33.30	5.42%	8.63%	33.82	3.22%	6.43%	33.14
First Energy Corporation	FE	5.56%	8.95%	32.07	7.06%	10.46%	32.51	6.17%	9.56%	32.25
IDACORP, Inc.	IDA	4.53%	7.14%	41.09	3.50%	6.10%	40.70	3.60%	6.21%	40.74
NorthWestern Corporation	NWE	3.55%	6.96%	31.38	3.18%	6.59%	31.27	3.15%	6.56%	31.26
OGE Energy Corporation	OGE	5.47%	9.26%	28.82	3.40%	7.19%	28.27	5.42%	9.21%	28.81
Pinnacle West Capital Corporation	PNW	5.04%	8.70%	29.74	3.91%	7.57%	29.43	5.13%	8.79%	29.77
PNM Resources, Inc.	PNM	5.73%	8.27%	42.68	6.06%	8.59%	42.81	6.20%	8.74%	42.87
Portland General Electric Company	POR	4.68%	7.59%	36.92	3.29%	6.21%	36.45	4.53%	7.45%	36.87
PPL Corporation	PPL	3.42%	8.34%	22.00	4.91%	9.84%	22.30	2.75%	7.67%	21.86
Southern Company	SO	3.50%	7.62%	26.12	4.32%	8.44%	26.32	4.00%	8.12%	26.24
Xcel Energy Inc.	XEL	5.38%	8.19%	38.53	4.40%	7.20%	38.18	5.63%	8.44%	38.62
Average				33.16			33.05			33.19

[1] Source: Schedule PKC-5.

[2] Source: Schedule PKC-8.

[3] $(1 + [2]) / ([2] - [1])$

[4] Source: Schedule PKC-5.

[5] Source: Schedule PKC-8.

[6] $(1 + [5]) / ([5] - [4])$

[7] Source: Schedule PKC-5.

[8] Source: Schedule PKC-8.

[9] $(1 + [8]) / ([8] - [7])$

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OCA Proxy Group Equity Duration

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