

STATE OF NEW HAMPSHIRE  
BEFORE THE  
PUBLIC UTILITIES COMMISSION

In the matter of

Liberty Utilities (Granite State Electric) Corp.

Docket No. DE 16-383

Petition for Permanent Rate Increase

DIRECT TESTIMONY

OF

Dr. Pradip K. Chattopadhyay  
Assistant Consumer Advocate

December 16, 2016

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1   **I. INTRODUCTION**

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

3   A.     My name is Pradip K. Chattopadhyay. My business address is 21 South Fruit  
4   Street, Suite 18, Concord, New Hampshire. I am employed as the Assistant Consumer  
5   Advocate/Rate and Market Policy Director with the New Hampshire Office of  
6   Consumer Advocate (OCA).

7   **Q.     Please describe your formal education and professional experience.**

8   A.     I have a Ph.D. in Economics from the University of Washington, Seattle, which I  
9   earned in 1997. I have also taken courses in City and Regional Planning with  
10   applications to Energy Planning from Ohio State University, Columbus OH, in 2001-02.  
11   I have taught several courses in economics at the University of Washington as an  
12   instructor and adjunct faculty at its Business School. I am also associated with the  
13   Southern New Hampshire University (SNHU) as an adjunct faculty, where I teach  
14   several courses in economics.

15         From March 1998 to October 1999, I was a consultant with the National Council  
16   of Applied Economic Research, New Delhi, India. From November 1999 to August  
17   2001, I was the Economist at the Uttar Pradesh Electricity Regulatory Commission  
18   (UPERC) in India, and advised UPERC on tariff issues. From September 2001 to June  
19   2002, I worked at the National Regulatory Research Institute, Columbus, Ohio, as a

1 graduate research associate while pursuing advanced courses in Energy Planning in the  
2 City and Regional Planning Program at Ohio State University. From June 2002 to July  
3 2002, I worked at the World Bank, Washington D.C. as a short-term consultant/intern  
4 with its Energy and Water Division.

5 I worked at the New Hampshire Public Utilities Commission (Commission) from  
6 August 2002 to January 2007 in the capacity of a Utility Analyst. My responsibilities at  
7 the Commission as an analyst were in electric utility issues including analyzing and  
8 advising the Commission on rate design, cost of capital issues, wholesale market issues,  
9 and other regional matters. I briefly worked at the Massachusetts Department of  
10 Telecommunications and Energy (later reorganized into Department of Public Utilities  
11 (MA-DPU)) starting in January 2007 as an Economist. At MA-DPU, I represented the  
12 staff and examined gas demand estimation and forecasting, decoupling issues, and  
13 environmental remediation matters.

14 I returned to the Commission in June 2007 to join its Telecom Division as its  
15 Assistant Director, and continued in that position until December 2010. I was also  
16 helping other divisions as an expert witness in economics-related issues as well as  
17 advising the Commission on regional electric matters including FERC jurisdictional  
18 issues. I joined the Commission's Regional Energy Division in January 2010 as the  
19 Regional Energy Analyst, and was advising the Commission in that capacity until I  
20 joined the Antitrust and Utilities Division, Office of the Minnesota Attorney General, in  
21 August 2013.

1 I came back to New Hampshire in March 2014 and worked as an independent  
2 consultant until the end of August, 2014, representing the Minnesota Attorney General.  
3 I joined Liberty Utilities at the end of August, 2014 as a Forecasting Analyst for its  
4 Energy Procurement Department. I worked with Liberty Utilities for about three  
5 months, before starting my own consultancy firm. In December 2014, I joined the OCA  
6 as its Rate and Market Policy Director. I was later appointed the Assistant Consumer  
7 Advocate at the OCA.

8 **Q. Have you previously provided testimony before this Commission?**

9 A. Yes.

10 **Q. In which dockets did you testify?**

11 A. I provided testimony before the Commission in the following dockets:

- 12 • DE 03-200 – Rate design testimony which was about delivery rates for retail  
13 ratepayers of Public Service of New Hampshire (PSNH);
- 14 • DE 06-028 – Cost of capital testimony which was also about PSNH’s delivery  
15 rates;
- 16 • DT 07-027 – Status of competition in retail telephony under TDS;
- 17 • DG 08-009 – Cost of equity testimony related to gas delivery rates of National  
18 Grid NH;
- 19 • DE 09-035 – Cost of equity testimony in the matter of electric distribution  
20 rates (PSNH);

- 1 • DG 14-380 – Petition of Liberty Utilities (EnergyNorth Natural Gas)  
2 requesting approval of firm transportation contract (North East Direct  
3 (NED));
- 4 • DG 15-155 – Petition of Valley Green, LLC requesting franchise in City of  
5 Lebanon and Town of Hanover, New Hampshire;
- 6 • DG 15-289 – Petition of Liberty Utilities (EnergyNorth Natural Gas)  
7 requesting franchise in City of Lebanon and Town of Hanover, New  
8 Hampshire;
- 9 • DG 15-494 – Petition of Liberty Utilities (EnergyNorth Natural Gas)  
10 requesting approval of firm transportation contract (NED);
- 11 • DE 16-384 – Petition of Unitil for Permanent Rate Increase.

12 **Q. Have you ever provided testimony and affidavits before other Commissions?**

13 A. Yes. I have testified on cost of capital before the Minnesota Public Utilities  
14 Commission in dockets G008/GR-13-316 and GR 13-617. I have also provided an  
15 affidavit before the Federal Energy Regulatory Commission in a FERC Docket ER 09-14-  
16 000 on NSTAR's petition for ROE incentive adders on behalf of the New England  
17 Conference of Public Utilities Commissioners (NECPUC).

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

19 A. The purpose of my testimony is to recommend, for Granite State Electric, the rate  
20 of return on equity in accordance with standards set forth in *Bluefield Water Works v.*

1 *Public Service Comm'n*, 262 U.S. 679, 692-93 (1923) (*Bluefield*) and *Federal Power Comm'n v.*  
2 *Hope Natural Gas Co.*, 320 U.S. 591, 605 (1944) (*Hope*). On advice of counsel, I understand  
3 that the standard set forth by the U.S. Supreme Court is that a public utility may be  
4 allowed to earn a return comparable to a return on investments in other enterprises  
5 having similar risks in order to allow the utility the opportunity to attract capital and to  
6 maintain its credit. "The return should be reasonably sufficient to assure confidence in  
7 the financial soundness of the utility and should be adequate, under efficient and  
8 economical management, to maintain and support its credit and enable it to raise the  
9 money necessary for the proper discharge of its public duties." *Bluefield*, 262 U.S. at 693.  
10 I also state my views on Granite State Electric's recommendations on cost of equity, and  
11 articulate reasons why I agree or disagree with those recommendations.

12 **Q. What Rate of Return on Equity (ROE) and Rate of Return on Capital are the**  
13 **Company requesting in this case?**

14 A. The Company is requesting a return on common equity of 10.30 percent. Based  
15 on the embedded cost of debt, and the requested capital structure, the Company is  
16 seeking approval of 8.31 percent return on capital.

17 **Q. What do you recommend as the allowed ROE for the company?**

18 A. I am recommending a return of 8.50 percent as a point estimate. Based on my  
19 analysis, I am also recommending a range of returns on equity that I consider  
20 reasonable for the company, i.e. 8.20 percent to 8.60 percent.

1    **Q.     Please discuss how your testimony is organized.**

2    A.     As for what follows, section II briefly reports my analysis of implications of  
3    observed market-to-book ratios<sup>1</sup> in the electric utility industry. In section III, which has  
4    three subsections, I use several approaches to derive estimates of the cost of equity and I  
5    conclude by stating my recommendation on the cost of equity. Finally, Section IV  
6    includes the schedules that inform the OCA's analysis.

7

8    **II.     MARKET-TO-BOOK RATIO, EXPECTED RETURN ON EQUITY AND**  
9    **REQUIRED RETURN ON EQUITY**

10   **Q.     Why is it important to analyze observed market-to-book ratios of the electric**  
11   **utility industry and Granite State Electric's proxy group?**

12   A.     It is important to investigate market-to-book ratios essentially for three reasons.  
13   First, the current level of market-to-book ratio for a regulated company is very telling  
14   with respect to the divergence between the expected return on equity and the  
15   opportunity cost of equity with respect to the regulated company's common stock.  
16   Second, whether or not the market-to-book ratio is significantly higher than one has  
17   implications for the application of the Discounted Cash Flow (DCF) approach to  
18   estimating the opportunity cost of equity. Finally, one of the DCF approaches that I  
19   have relied on uses market-to-book ratios as an input. What follows in this section is  
20   predominantly the discussion of the first two reasons mentioned above. The need for

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<sup>1</sup> This ratio relates the market price of stock to its book value.



1 tracking the market-to-book ratios of the constituent companies in the proxy group is  
2 primarily taken up in detail in section IIIA.

3 **Q. What is the relevance of the market-to-book ratio in the determination of the**  
4 **cost of equity?**

5 A. When the market-to-book ratio of a utility is significantly higher than one, it  
6 indicates that the return on equity that is *expected* by investors, which is greatly  
7 influenced by the allowed rate of return for a regulated entity, exceeds the true  
8 opportunity cost of equity. In other words, the return that investors *expect* to receive is  
9 greater than the return they would *require* in order to invest in the stock.

10 This has another important implication. While the DCF construct is predicated  
11 on using long-term expectations, in practice, the DCF method relies on investors'  
12 expectations over the medium term. Analysts' projections about investors' sentiments  
13 on relevant variables are not available beyond three to five years into the future. The  
14 DCF method in practice therefore captures investors' medium-term expectations that  
15 the market-to-book ratio would continue to remain substantially higher than one, if to  
16 begin with the market-to-book ratio is significantly greater than one. I delve into this  
17 issue in greater detail (Pages 15-19 of my testimony) where I discuss the characteristics  
18 of the DCF approach, especially as it is practically implemented. The methods in the

current environment, therefore, will tend to produce estimates for ROE that reasonably exceed the “true” cost of equity.<sup>2</sup>

**Q. Please explain why the expected return on equity exceeds the cost of equity when the market-to-book ratio is significantly greater than one.**

A. This fundamental result stems from the seminal Discounted Cash Flow (DCF) analysis, which succinctly translates into the equation

$$\frac{P}{B} = \frac{r_e - b_e r_e}{K - b_e r_e} \dots\dots\dots \text{Equation (1)}$$

where  $r_e$  is the expected return on equity,  $B$  is the book value of stock,  $b_e$  is the expected retention ratio,  $P$  is the market stock price, and  $K$  is the cost of equity, i.e. the required return on equity.<sup>3</sup>

The DCF approach is based on the premise that the market price of a particular stock equilibrates to the sum of the stream of returns expected in the future from the stock by investors, discounted by the market cost of equity. This is an explicit way of modeling investor behavior, and is a well-accepted way of explaining observed investor behavior. Heuristically speaking, if the stock price is lower than the market-equilibrium price, the demand for the stock would be greater than the supply, and stock sellers

<sup>2</sup> I use the phrase “true cost of equity” interchangeably with “cost of equity.” I use both to refer to the opportunity cost associated with purchasing equity, i.e. the minimum return necessary to attract sufficient capital.  
<sup>3</sup> See Roger Morin’s *Regulatory Finance*, Utilities’ Cost of Capital, Public Utilities Report, Inc. (1994), Page 248. The result holds even if we model new equity financing, as long as the growth in the number of outstanding stocks is reasonably low ceteris paribus, which in practice is generally true. Retention ratio is the proportion of earnings that is kept back as retained earnings; i.e. (net income less dividends)/net income.

would raise their price to take advantage of the situation. Likewise, if the price of the stock was higher than the market-equilibrium price, the demand would be less than the supply of stocks, putting pressure on the sellers to lower their price to reduce excess supply. It follows that when the expected return on equity is greater (smaller) than the cost of equity, the market-to-book ratio would be greater (smaller) than one.

**Q. Can you explain Equation (1) in greater detail?**

A. Yes. If the expected return on equity exceeds the market cost of equity, the price of the stock would have to be higher relative to the book value to ensure that the expected dividend, i.e.  $B(r_e - b_e r_e)$ , on the stock equals the minimum required dividend, i.e.  $P(K - b_e r_e)$ . A look at comparative statics is helpful. Everything else being equal, if the expected return on equity increases (decreases), the expected dividend would momentarily be higher (lower) than  $P(K - b_e r_e)$ . Ceteris paribus, this would trigger a greater (lower) demand for the stock than the supply, which would consequently lead to a higher (lower) market price for the stock. The adjustments would continue until Equation (1) holds, i.e. until there is equilibrium.

A simple numerical example would be helpful. Suppose the expected return on equity,  $r$ , is 10 percent, and the expected retention ratio,  $b$ , is 30 percent. Based on these numbers,  $r_e - b_e r_e$  is 7 percent.<sup>4</sup> However, if the cost of equity for the same stock,  $K$ , is 8

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<sup>4</sup>  $(r_e - b_e r_e) = 10 - 0.30 \cdot 10 = 10 - 3 = 7$ .

1 percent, then  $(K - b_e r_e)$  must be 5 percent.<sup>5</sup> To ensure that 7 percent of the book value,  
2 i.e. the expected dividend, is exactly equal to 5 percent of the stock price, i.e. the  
3 minimum required dividend, the only way that equation (1) can hold is through an  
4 adjustment to the price of the stock until it is 40 percent higher than the book value of  
5 the stock, i.e. the market-to-book ratio is exactly equal to 1.4.

6 **Q. Please explain the difference between the cost of equity and the expected**  
7 **return on equity in greater detail.**

8 A. While the expected rate of return on equity for a regulated utility is an  
9 accounting return, i.e. it depends on the return allowed by the regulator as well as how  
10 the utility performs operationally, the cost of equity is the opportunity cost of equity,  
11 which is the minimum return required to attract investment by investors.<sup>6</sup>

12 Ideally, a fair and reasonable return on equity for a regulated utility would equal  
13 the opportunity cost of equity. A look at a group of regulated utilities of comparable  
14 risk is instructive in estimating the opportunity cost of equity. Intrinsic to the  
15 determination of the allowed return is the need to avoid unnecessary wealth transfer  
16 from ratepayers to shareholders. To properly balance the interests of ratepayers and the  
17 financial viability of the utility, any approach to determine the cost of equity must  
18 reasonably target the need to encourage investment in the utility's equity at the least  
19 cost to its ratepayers.

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<sup>5</sup>  $(K - b_e r_e) = 8 - 0.30 \times 10 = 8 - 3 = 5$ .

<sup>6</sup> "A rate of return may be reasonable at one time and become too high or too low by changes affecting opportunities for investment, the money market and business conditions in general." *Bluefield*, 262 U.S. at 693.

1           The expected return on equity for investment in a regulated utility at any point  
2   in time is influenced by the return currently allowed on such investment, as authorized  
3   by the regulator in the previous determination of such return. It is also influenced by  
4   investors' expectations about possible changes in the future, especially with respect to  
5   operating efficiency and income opportunities. The expected return on equity for a  
6   regulated utility can be greater, lesser or the same as the cost of equity at any point in  
7   time.

8   **Q.     Have you analyzed the electric utility industry's market-to-book ratios?**

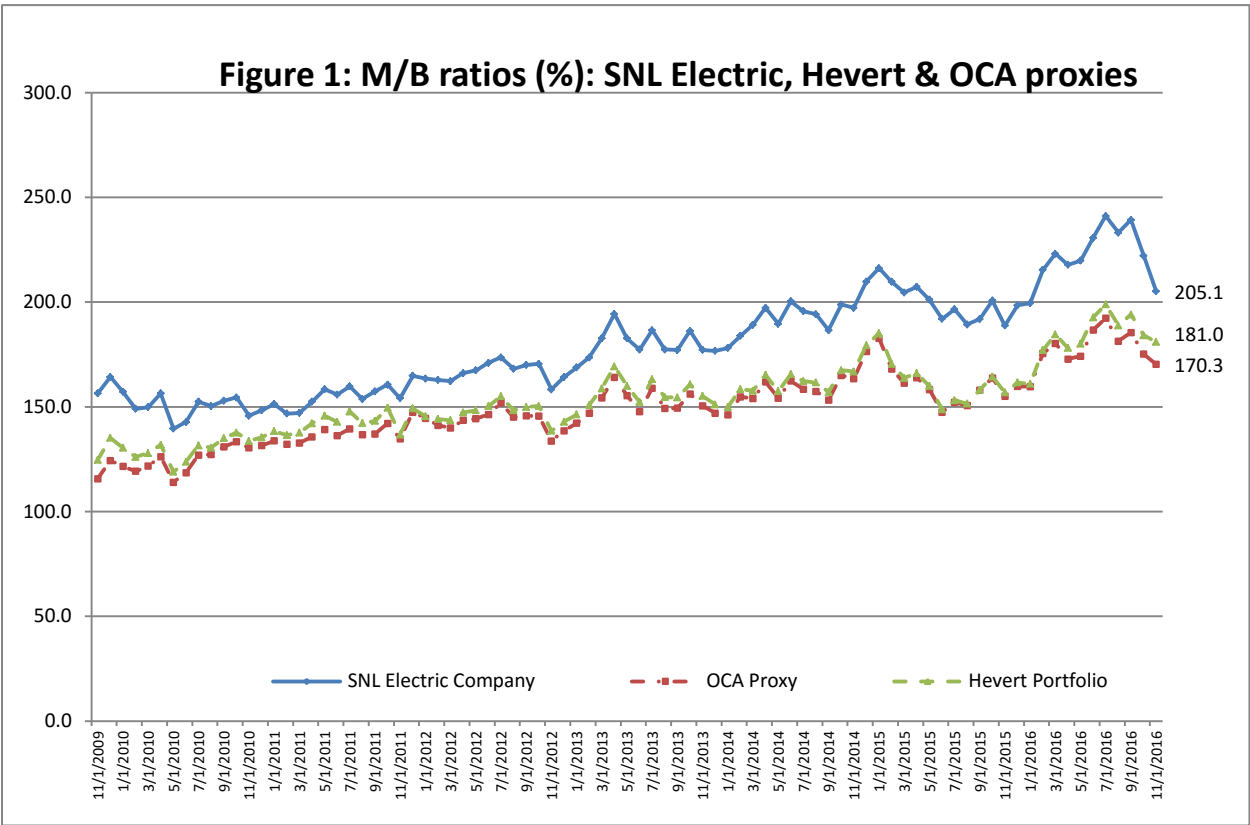
9   A.     Yes, I have. But as the objective of my analysis is to recommend the rate of  
10   return on Granite State Electric's equity, I have also analyzed the market-to-book for  
11   Mr. Hevert's recommended proxy group and OCA's recommended proxy group.  
12   These are depicted in Figure 1 below. As for the electric industry's situation, I have  
13   used SNL's Index, SNL Electric Company, which includes all publicly traded (NYSE,  
14   NYSE MKT, NASDAQ, OTC) Electric Utilities and Transmission only companies in  
15   SNL's coverage universe.

16   **Q.     What do the electric utilities' market-to-book ratios indicate about the**  
17   **relationship between the investors' expected return on equity and the cost of equity**  
18   **in the current milieu?**

19   A.     Figure 1 shows that the average market-to-book-ratio of electric utilities as well  
20   Mr. Hevert's proxy have remained persistently well above one over the past six years;

the average market-to-book ratios for SNL electric utilities and Mr. Hevert’s proxy over the last six years have been 1.85 and 1.58, respectively.<sup>7</sup> As for the OCA’s proxy, the average market-to-book ratio for the corresponding period has been 1.54.

More importantly, as for the more current market-to-book ratios (beginning of November, 2016), they are 2.05, 1.81 and 1.70 for SNL electric, Hevert’s proxy and the OCA’s proxy, respectively. This indicates that the true cost of equity currently is comfortably less than the return on equity expected by investors in electric utilities. In view of that, if the cost of equity is plainly estimated based on existing expected return on common equity, the resulting return would unreasonably benefit shareholders at the expense of ratepayers.



<sup>7</sup> Data downloaded from SNL on November 28<sup>th</sup>, 2016.

1    **Q.     In view of the observed market-to-book ratio being considerably higher than**  
2    **one, do you have any recommendation on your preferred approach on estimating the**  
3    **cost of equity?**

4    A.     Yes, I do. Out of the three primary methods that Mr. Hevert used to estimate his  
5    recommended cost of equity, the Capital Asset Pricing Model (CAPM) predominantly  
6    uses historical stock-price appreciation as the basis for measuring the expected return  
7    on common equity. Even when attempting to look at forward-looking estimates, the  
8    method relies considerably on the historical trends in stock prices. Not trivially, the  
9    betas, under the CAPM approach are generally based on historical prices. In a climate  
10   of market-to-book ratios being significantly greater than one, if historically prices have  
11   tended to appreciate significantly because allowed returns (that are to begin with higher  
12   than the true cost of equity) have moved further away from the true cost of equity, the  
13   method will tend to produce estimates that will be further away from the true cost of  
14   equity.

15           As for the Risk Premium Method (RPM), Mr. Hevert uses historically allowed  
16   returns on equity to calculate the risk premiums. Using historical data on allowed  
17   returns and treasury yields to inform cost of equity (which is inherently a forward-  
18   looking concept) is inappropriate. Even setting that issue aside, to the extent allowed  
19   returns have captured the impact of price appreciation resulting from greater  
20   divergence between allowed returns and the true cost of equity, the method is

1 susceptible to producing estimates that will have the same problem that the CAPM  
2 approach has.

3 In contrast, the forward looking DCF approach tends to correct somewhat for the  
4 deviation between stock prices and book values. While the growth component is  
5 influenced positively by price appreciation, the dividend yield component is negatively  
6 influenced by price appreciation, thus producing a cost of equity estimate that relative  
7 to the other methods is more in line with the true market cost of equity. It is true that  
8 investors' medium-term expectation about ongoing sales in shares and the persistence  
9 in a greater-than-one market-to-book ratio, and our reliance in practice on expectations  
10 of growth over the medium-term, tend to produce a higher DCF estimate of cost of  
11 equity than the true cost of equity. However, investors understand that a continuing  
12 divergence in the stock price and the book value is unsustainable in the long-run. That  
13 understanding gets somewhat reflected in the forward-looking DCF method, even as it  
14 is usually implemented. In view of that, I recommend reliance on methods that are  
15 based on the DCF approach.

16 **Q. Do you have any additional observations on the application of DCF in**  
17 **estimating the cost of equity?**

18 A. Yes. Myron J. Gordon, who popularized the use of the DCF method for  
19 estimating ROE, states that "the perfect capital markets cost of capital can be measured  
20 without bias only in the special and uninteresting case where the allowed rate of return  
21 already is equal to the cost of capital. When the allowed rate of return is above (below)



1 the “true” cost of capital, the measured cost of capital is biased up (down).”<sup>8</sup> In the  
2 traditional model (wherein debt is valued at embedded cost), while the conclusion that  
3 the allowed rate of return is above (below) the cost of capital when the market-to-book  
4 value ratio is above (below) one remains true,<sup>9</sup> the estimate of the cost of capital is not  
5 problematic as long as the inputs to that estimation are reflected reasonably accurately.  
6 With respect to the practical implementation of DCF approach to the estimation of cost  
7 of equity though, there are compelling reasons to conclude that the approach as  
8 proposed by the company leads to an upward-biased estimate of the cost of equity,  
9 precisely due to the reliance on inaccurate inputs.

10 First, the standard DCF model is based on the premise that all key variables like  
11 the stock price, book value, earnings, and dividends grow at the same rate in the long-  
12 run, and in the absence of external financing, market price converges to the book value.  
13 Theoretically, a market-to-book ratio that is significantly greater than one at any point  
14 in time implies that investors in general expect the price over earnings ratio to decrease  
15 in the long-run. This translates into a growth projection for stock price that lags the  
16 growth projection for earnings growth. Under the standard DCF construct, since in the  
17 long-run, both the stock price and earnings are premised to grow at the same rate, the  
18 long-term equilibrium growth lies somewhere between the expected earnings growth  
19 and the expected growth in price. In the current environment, the exclusive use of  
20 earnings growth projections, theoretically, leads to an upward-biased estimate of the

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<sup>8</sup> See “The Cost of Capital to a Public Utility”, Myron J. Gordon, 1974, Pages 9-10.

<sup>9</sup> *Id.* at 8.

1 DCF growth component, and consequently produces an upward-biased estimate of the  
2 opportunity cost of equity.<sup>10</sup>

3 Second, very importantly, analysts' growth estimates have been shown to be  
4 overly optimistic and overstate the actual reported earnings. It is instructive to look at  
5 "The Cost of Capital - A Practitioner's Guide," by David C. Parcell, prepared for the  
6 Society of Utility and Regulatory Financial Analysts (2010 edition), Pages 142-43,  
7 specifically for the insight that follows:

8 A study by Dreman and Berry concluded that consensus estimates  
9 of EPS differ significantly from actual reported earnings. They also  
10 concluded that the average error appears to be increasing over time  
11 and that analysts are optimistic on average. They conclude "These  
12 findings question the use of finely calibrated earnings forecasts that  
13 are integral to the most common valuation/models and indirectly  
14 question the valuation methods themselves" (Dreman and Berry,  
15 1995, 30). A similar study by Clayman and Schwartz compared  
16 Zacks Investment Research EPS projections with actual EPS for 399  
17 companies for the period 1982-1992. They concluded that analysts'  
18 forecasts of EPS overstated actual EPS by as much as fifty percent.  
19 They conclude "...market participants should take analysts' innate  
20 overestimation biases into account when making stock valuation

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<sup>10</sup> It is instructive to see Roger Morin's *Regulatory Finance*, Utilities' Cost of Capital, Public Utilities Report, Inc. (1994), Page 123. Dr. Morin states that the "[a]pplication of the standard DCF model would result in a downward-biased estimate of the cost of equity to a public utility whose current market-to-book ratio is less than 1 and that is expected to converge toward 1 by investors." This is because investors recognize that a continuous divergence away from a market-to-book ratio equal to one is unsustainable. Investors' expectation about increase or decrease in the market-to-book ratio affects the growth component of the DCF model, biasing its result positively or negatively. When the market-to-book ratio is less than one, it is reasonable to assume that the investors expect the ratio to increase. The expected growth increase in market-to-book ratio results in price appreciation that exceeds the growth in earnings and application of the standard DCF approach will lead to a downward-biased estimate of the cost of equity. In contrast, when the market-to-book ratio is significantly greater than one, it is reasonable to assume that the investors expect the ratio to decrease. In that case, the expected decrease in the market-to-book ratio results in price appreciation that lags the growth in earnings and the application of the standard DCF approach will produce an upward-biased estimate of the cost of equity (k).

1 judgments" (Clayman and Schwartz, 1994, 68). Still another study  
2 by Chopra (1998) concluded 'Analysts' forecasts of EPS and growth  
3 in EPS tend to be overly optimistic. He concluded that analysts'  
4 forecasts of EPS over the past 13 years have been more than twice  
5 actual growth rate.<sup>11</sup>  
6

7 It is important that at the least the DCF growth variable input should not be  
8 solely based on earnings growth projections or any other solitary variable's growth  
9 projections; I discuss this issue in greater detail in section IIIA to further support this  
10 conclusion.  
11

### 12 **III. ESTIMATING COST OF EQUITY USING SEVERAL APPROACHES**

13 **Q. Which approaches have you used to estimate the cost of equity?**

14 A. While I have relied primarily on the DCF construct to estimate the cost of equity  
15 for the utility, I have also estimated the cost of equity using the CAPM construct. As for  
16 the DCF construct, I have used the standard DCF approach (Section III.A), where the  
17 cost of equity is estimated as the sum of the dividend yield and a measure of the growth  
18 component. As for the CAPM approach (subsection III.B), while I have derived an  
19 estimate of the cost of equity, for reasons I discuss later, I do not base my point-estimate  
20 recommendation on that method. The CAPM estimation is nevertheless useful as it

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<sup>11</sup> Not surprisingly, one research thread on investors' projection of earnings growth has been to explain the "optimistic bias in earnings forecasts by security analysts". The explanations include strategic reporting bias, selection bias, cognitive bias, and bias due to skewed distribution of earnings and analysts' efforts to produce more accurate forecast. See "Earnings skewness and analyst forecast bias", Zhaoyang Gu & Joanna Shuang Wu, Journal of Accounting & Economics 35(2003) 5-29, Page 6.

1 provides a check on the reasonableness of the DCF estimates.<sup>12</sup> In each of these  
2 subsections I comment on Mr. Hevert's analysis to the extent it is relevant to my  
3 recommendation. I should also add that unlike Mr. Hevert, I did not use the RPM to  
4 derive an estimate of the cost of equity. While I have discussed briefly why previously,  
5 I discuss the reasons a little bit more in what follows. Finally, I conclude this section  
6 with my recommendation on the cost of equity for Granite State Electric.

7 **Q. Apart from your preference for the DCF approach due to market-to-book ratio**  
8 **consideration, are there other reasons why you rely primarily on the DCF construct to**  
9 **estimate the cost of equity?**

10 A. Of the methods that Mr. Hevert used to estimate his recommended cost of  
11 equity, CAPM and RPM predominantly use historical data as the basis for measuring  
12 the expected return on common equity. Compared to attempts at forward-looking  
13 estimations, these methods rely to a great extent on the historical trends in stock prices  
14 or other relevant variables. This may provide insight into what returns investors expect  
15 based on past experience, but it has limited value in assessing what returns are  
16 necessary to attract needed capital going forward. While the CAPM model relies on  
17 betas that are based on historical stock prices, Mr. Hevert's RPM approach relies on  
18 regressing risk premiums on 30-year Treasury yields using historic data for the period  
19 January, 1980 to February, 2016. Of course, Mr. Hevert also relies on historically

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<sup>12</sup> When the market-to-book ratio remains consistently significantly higher than 1, the CAPM estimate tends to be upward biased and provides some direction towards what would be a reasonable allowed return on equity, even when one bases that allowed return on the DCF construct.

1 allowed returns on equity to calculate historical risk premiums.<sup>13</sup> By contrast, the DCF  
2 approach is essentially forward looking. Also, the fundamental underlying construct  
3 behind the DCF analysis, i.e. the value of a common stock equates to the sum of the  
4 discounted stream of future income from that stock, is widely accepted. Further,  
5 regarding the techniques that are used to estimate the cost of equity for regulated  
6 utilities, the DCF model is the most commonly used model for estimating the cost of  
7 common equity for public utilities.<sup>14</sup> Of course, as Mr. Hevert has acknowledged in his  
8 testimony, the Commission in New Hampshire has exclusively relied on the DCF  
9 construct previously.

### 11 **III.A Discounted Cash Flow Approach**

#### 12 **Q. Which DCF model do you use to estimate the cost of equity?**

13 A. I use a single-stage DCF model to derive estimates for the cost of equity for a  
14 group of companies that forms a reasonable proxy for Granite State Electric. The two  
15 essential elements of this method are the dividend yield and the growth component.  
16 While I discuss the estimation of both elements later in detail, it is important to point  
17 out that the growth component of the DCF equation tends to be the most critical  
18 element in the use of the DCF methodology. A couple of things render the estimation of  
19 the growth component somewhat challenging. First, while the growth component of

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<sup>13</sup> While the reliance on historical data is problematic, as was discussed before, allowed return on equity in itself is not necessarily a good measure of the true cost of equity at any point in time.

<sup>14</sup> See "*The Cost of Capital - A Practitioner's Guide*," by David C. Parcell, prepared for the Society of Utility and Regulatory Financial Analysts (2010 edition), Page 124.

1 the single-stage DCF model is in principle meant to be based on long-term projections,  
2 in practice, it is based at most on three-to-five-years' projections, since long-term  
3 projections are seldom available. Second, "it is reasonable to believe that investors, as a  
4 group, do not utilize a single growth estimate when they price a utility's stock."<sup>15</sup> While  
5 growth projections by equity analysts are available on variables like earnings,  
6 dividends, book value per share, among other things, what weight one should give to  
7 different projections is often a matter of contention. Unlike Mr. Hevert's approach,  
8 which relies only on earnings growth to estimate the growth component, I have relied  
9 on three estimates for the growth component: (1) the average of the growth rates in  
10 earnings per share (EPS), book value per share (BVPS), and dividends per share (DPS);  
11 (2) earnings growth only; and (3) sum of internal growth rate, i.e.  $br$ , and the external  
12 growth component, i.e.  $sv$ .<sup>16</sup> Of course, I strongly disagree with Mr. Hevert's sole  
13 reliance on earnings growth projections for reasons already discussed above, but also I  
14 do not believe that investors rely only on earnings growth rates when they price a  
15 utility's stock. I discuss this in greater detail later.

16 **Q. Briefly Describe The Single-Stage DCF Method.**

17 A. The single-stage DCF model is typically represented by the equation,  $K = \frac{D_1}{P} + g$

18 where  $K$  is the estimate of the cost of equity,  $\frac{D_1}{P}$  is next period's dividend yield, i.e. next

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<sup>15</sup> *The Cost of Capital - A Practitioner's Guide*, by David C. Parcell, prepared for the Society of Utility and Regulatory Financial Analysts (2010 edition), Page 146.

<sup>16</sup> The alternative is based on the formula,  $br + sv$ , where  $b$  is the retention ratio,  $r$  is the expected return on equity,  $s$  is the expected funds raised from the sale of stock as a fraction of existing equity, and  $v$  is  $(1-(B/P))$ , where  $B$  is the book value of the share and  $P$  is the price of the share.

1 period's dividend divided by the stock price, and  $g$  is the expected (constant) growth  
2 rate in dividends. The model is based on the premise that since cash dividends are the  
3 only income from a share of stock held in perpetuity, the value of that stock is the  
4 present value of its stream of cash dividends, where the discount rate is the market's  
5 required return, i.e.,  $K$ . Expected future dividends are represented by applying a  
6 constant growth rate to the current observable dividend, to obtain the functionally  
7 elegant expression for  $K$  as shown above.

8 **Q. What criteria did you use to select the DCF proxy group?**

9 A. When choosing my recommended sample, I effectively began with Mr. Hevert's  
10 universe of electric companies (Value Line Electric Universe) that he subjected to his  
11 proxy screening analysis. I find that all but the fourth and the fifth criteria that were  
12 used by him are reasonable.<sup>17</sup> To ensure that the companies selected for Granite State  
13 Electric's proxy are predominantly regulated electric utilities, I only included them in  
14 the proxy if at least 70 percent of the revenues over 2015 are attributable to regulated  
15 electric business and at least 80 percent of the assets are attributable to regulated  
16 business over 2015.

17 **Q. Why do your criteria differ from that of Mr. Hevert's criteria?**

18 A. In creating a reasonably "pure play" proxy that is comparable to Granite State  
19 Electric it is important that these companies exhibit a fairly high percentage of *regulated*  
20 *assets* and have the majority of their revenue coming from electric regulated operations.  
21 A sufficiently high cut-off for share of regulated net operating income as a percentage of

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<sup>17</sup> See Mr. Hevert's Testimony, Bates Page 0385, lines 12 through 17.

1 total net operating income may seem like an appropriate screen at first glance, but such  
2 a metric is prone to exaggerate the role of regulated operations when the non-regulated  
3 segment of a company is reporting significant losses on net operating income. For such  
4 a company, measuring the regulated share in total net operating income would tend to  
5 overstate its importance and may incorrectly allow the company's inclusion in the  
6 proxy, even as that company may be fundamentally different from a regulated  
7 company since it is exposed to significant market risks given a substantial presence in  
8 the non-regulated arena or a non-gas activity. In contrast, if the non-regulated segment  
9 of the company is reporting significant income, such an analysis may eliminate the  
10 company from the proxy, even though that company may otherwise consist  
11 predominantly of its regulated business. Such a company's foray into a non-regulated  
12 arena may be so insignificant that the company's risk profile actually matches that of a  
13 regulated company better than the one included erroneously by relying on net-income  
14 variable like net operating income. Accordingly, to better assess whether a company  
15 should be included in a proxy for Granite State Electric, I believe we should strive to  
16 have it sufficiently reflective of a "pure play" regulated electric utility. I find that cut-  
17 offs of at least 80 percent for regulated assets and at least 70 percent for regulated  
18 electric revenues are reasonable, given the dearth of standalone companies that are  
19 publicly traded and consist solely of regulated electric business. Also, as I rely not only  
20 on earnings projections but also on dividends and book value projections in my DCF  
21 analysis, since to the best of my knowledge dividends and book value projections are



1 covered only by Value Line Survey, I only consider companies that are covered by  
2 Value Line Survey.

3 **Q. What is your recommended DCF proxy?**

4 A. Using information provided by the Company in response to data requests about  
5 the percentages discussed above, and applying the mentioned cut-offs, I determined  
6 that the appropriate proxy group consists of Alliant Energy Corporation (LNT),  
7 Ameren Corporation (AEE), American Electric Power Inc. (AEP), Avista Corporation  
8 (AVA), Consolidated Edison (ED), Eversource Energy (ES), IDACORP, Inc. (IDA),  
9 NorthWestern Corporation (NWE), OGE Energy Corporation (OGE), Pinnacle West  
10 Capital Corporation (PNW), PNM Resources Inc. (PNM), Portland General Electric  
11 Company (POR) and XCEL Energy Inc. (XEL). It should be pointed out that OCA's  
12 proxy group, unlike that of Mr. Hevert, does not include Great Plains Energy Inc. (GXP)  
13 and Westar Energy, Inc. (WR) as Great Plains Energy Inc. is in the process of acquiring  
14 Westar.<sup>18</sup>

15 **Q. Do you believe that the group listed above is a reasonable proxy for Granite**  
16 **State Electric?**

17 A. Yes, I do. The screening criteria go a long way in ensuring that my proxy group  
18 reasonably reflects the risk profile of Granite State Electric's electric utility business. For  
19 example, the proxy group's average percentage of assets subject to electric utility

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<sup>18</sup> The Company's response to DR OCA 3-4 does not provide data on Allele's share of electric regulated revenue in total revenue. Allele, Inc. 2015 Form 10-K at Page 8 however reports that the regulated revenue as a percentage of consolidated operating revenue is 67 percent. Part of this revenue also includes revenue from gas and water utility service. As for 2015, it is evident that the share of regulated electric revenue is less than 70 percent of Allele's consolidated revenue. Also, in 2015, the company's share of regulated assets in total assets is less than 80 percent. OCA's proxy therefore does not include Allele Inc.

1 regulation is 95 percent and the average percentage of revenue subject to regulated  
2 electric business is 88 percent in 2015, which are reasonably close to complete regulation  
3 as is the case for the distribution business of Granite State Electric in New Hampshire.  
4 Also, a check (see Schedule PKC-1) reveals that the S&P credit-ratings for the group  
5 range between BBB to A-. The rating associated with Algonquin Power & Utilities  
6 Corporation (Granite State Electric's parent) is BBB. As for the capital structure, the  
7 company has proposed a common equity ratio of 55 percent based on the capital  
8 structure approved in Commission Order No. 25,638 (Mr. Hevert's Testimony, Bates  
9 Page 0430, line 19-20). A look at the proxy group indicates that while over 2011 to 2015  
10 the average equity ratio has been 51.02 percent, over the next five years or so the  
11 expected equity ratio is 50.75 percent (see Schedule PKC-2 for Value Line data). While  
12 Granite State Electric's parent has a rating that is somewhat lower than the average  
13 credit rating of the proxy group, the company's proposed capital structure is less  
14 leveraged than that of the proxy group's capital structure. It is reasonable to conclude  
15 that the proxy group's cost of equity estimate would reasonably inform what the  
16 allowed returns on equity and capital should be for the company.<sup>19</sup>

17 **Q. Did you consider any additional check on the reasonableness of your DCF**  
18 **proxy?**

19 **A.** Yes. As a rough check to examine the reasonableness of the OCA proxy group, I  
20 also briefly looked at the economic conditions characterizing New Hampshire (NH)

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<sup>19</sup> The actual capital structure of Granite State Electric is actually significantly skewed toward equity, but the requested hypothetical equity ratio (that has been previously approved by the Commission) is just few percentage points higher than the average equity ratio of the proxy group.

1 relative to the nation as well as states collectively served by the proxy group. As for  
2 quarter-to-quarter growth (annualized) in Real GDP between 4<sup>th</sup> quarter of 2015 and 1<sup>st</sup>  
3 quarter of 2016, while NH grew by 2.9 percent, the US economy grew by only 0.8  
4 percent. Also, as for the states served by the companies included in the proxy, the  
5 corresponding growth rates varied between -11.4 percent and 3.9 percent. Only 3 of the  
6 relevant 32 states registered higher growth compared to NH.<sup>20</sup>

7 **Q. What bearing do the economic conditions, as described above, have on the**  
8 **reasonableness of the DCF proxy group?**

9 A. Investors are assumed to be aware of current regional and national economic  
10 conditions. Investors in Granite State Electric's distribution business in NH are expected  
11 to know that the local economy has been outperforming the national economy as well  
12 as states wherein the proxy group's businesses operate. An investor's opportunity cost  
13 of equity, i.e. investor's required return, is expected to be lower for investing in an  
14 economic activity in New Hampshire when compared to investing in a comparable  
15 activity operating in an environment that is relatively less robust, all else equal. In view  
16 of the above, it is my conclusion that the proxy group produces an estimate for the cost  
17 of equity that reflects a somewhat higher risk than that is perceived from investing in  
18 Granite State Electric. In short, the DCF proxy group as chosen is rather conservative  
19 and reasonable.

20 **Q. Please explain why you used data from November 15, 2016 to December 14,**  
21 **2016 to measure the dividend yields for the proxy's constituent companies.**

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<sup>20</sup> See [http://www.bea.gov/newsreleases/regional/gdp\\_state/ggsp\\_newsrelease.htm](http://www.bea.gov/newsreleases/regional/gdp_state/ggsp_newsrelease.htm)

1 A. Investors' expectations about how companies will fare in the future are captured  
2 in the most recently observed market price and dividend data. Data from fairly long  
3 historical periods are unlikely to reflect investors' current expectations. That said, it is  
4 also true that some smoothing of the price trend is useful as it filters possible transitory  
5 and temporary changes that characterize daily movements in prices. I have, therefore,  
6 as of preparing this testimony, used daily pricing data from the most recent month to  
7 calculate the average price, which in conjunction with the annualized dividend helps  
8 measure the dividend yield (Schedule PKC-4) component of the DCF based cost of  
9 equity.

10 **Q. Mr. Hevert exclusively uses expected earnings growth rates for the growth**  
11 **component in his DCF analysis. Do you agree with his approach?**

12 A. No. It is unreasonable to assume that investors use a single growth estimate  
13 when pricing a utility's stock. Mr. Hevert states in his testimony that "investors form  
14 their investment decisions based on expectations of growth in earnings, not dividends."  
15 When the OCA asked Mr. Hevert to provide specific support for this assertion, he  
16 provided references to several articles that do not even remotely provide such support.  
17 As for the overt reference in the testimony to the article by Carleton and Vander Weide,  
18 the fact is that the paper only looks at historical growth rate in dividends (See Page 79).  
19 As for analysts' growth forecasts, earnings growth is the only variable that the article  
20 investigates. The paper does provide evidence that it is better to use growth  
21 expectations rather than historical data to measure the growth component. It does not,  
22 however, at all investigate whether analysts' earnings growth forecasts are better than

1 their dividends growth forecasts in capturing investors' expectations. It also does not,  
2 more importantly, even remotely, demonstrate that investors use only earnings and not  
3 dividends in forming their investment decisions.

4 As for other references, the article by Christofi, Lori and Moliver (1999), the word  
5 "dividend" appears few times in that article, but none of those references are about  
6 expectations of growth in dividends. Again, more importantly, the paper has nothing  
7 to say about whether investors form their investment decisions only based on earnings  
8 and not dividends. The article by Harris and did not even investigate how dividends  
9 growth expectations perform. The article relies solely on EPS growth expectations to  
10 measure the growth component of DCF (Page 65) by noting in footnote 6 that "[while]  
11 the model calls for expected growth in dividends, no source of data on such projections  
12 is readily available." Most importantly again, this article has nothing to offer on  
13 whether investors form their investment decisions based *only* on earnings and *not*  
14 dividends. As for Charles Phillips, *The Economics of Regulation*, 1969, Chapter 9, while it  
15 points out how the market is also valuing utilities based on earnings per share, it  
16 nowhere discredits the importance of dividends and more importantly has nothing to  
17 offer on whether *only* earnings growth forecasts should be used to estimate the DCF  
18 growth component. The reference is clearly not useful if it is meant to show that  
19 investors demonstrably form their investment decisions based solely on expectations of  
20 growth in earnings, not dividends. In conclusion, Mr. Hevert has not provided any  
21 persuasive evidence backing his assertion.

22 **Q. Please discuss the evidence from research and market realities?**

1 A. Both market realities and research indicate that not all investors are alike and  
2 they do not only care about earnings growth. While providing a review of dividend  
3 policy theories and evidence, Malkawi, Rafferty and Pillai (2010) survey academic  
4 research that argues why dividends matter to investors.<sup>21</sup> Different researchers have  
5 provided empirical support for different theories. To just note a couple of them, some  
6 have argued that dividends are sought as investors prefer “bird in the hand” dividends  
7 rather than “two in the bush” future capital gains. Others have argued that investors  
8 care about after-tax return and the differential tax treatment of capital gains and  
9 dividends influences their demand for shares. In informing why dividends matter,  
10 some of the theories and empirical analysis directly stress how different investors may  
11 view dividends differently. For example, investors whose dividends are taxed higher  
12 than their capital gains may prefer earnings driven stocks rather than dividends paying  
13 stocks, or how institutional investors as opposed to individual investors are more  
14 attracted towards dividend-paying stocks, etc. It also remains true that companies pay  
15 out dividends in billions of dollars in the marketplace suggesting that companies  
16 recognize that investors value them. I believe it is inappropriate to assume that only  
17 earnings growth expectations matter to investors.<sup>22</sup>

18 **Q. What measures of the growth component do you consider?**

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<sup>21</sup> See “*Dividend Policy: A Review of Theories and Empirical Evidence*”, Malkawi, Rafferty, and Pillai, International Bulletin of Business Administration, ISSN: 1451-243X Issue 9 (2010). Even managers need to carefully consider dividends policy because investors not only view dividends as being a return to shareholders but also watch movements in dividends to infer about the health of the firm. See “*Topics in Finance Part VII – Dividend Policy*” Judy Laux, American Journal of Business Education – November 2011, Volume 4, Number 11.

<sup>22</sup> Also see *The Cost of Capital - A Practitioner's Guide*, by David C. Parcell, prepared for the Society of Utility and Regulatory Financial Analysts (2010 edition), Page 146

1 A. Since the DCF estimate is derived from the concept that cash dividends are the  
2 only income from a share of stock held to infinity, in principle, it is the growth in  
3 dividends that should be used for the growth component. Investors, however, have  
4 different expectations about growth and no single indicator captures the expectations of  
5 all investors. Also, whether growth in dividends per share (DPS) is sustainable or not is  
6 pertinent and its sustainability is affected by how both earnings per share (EPS) and  
7 book value per share (BVPS) perform in the future. Sustainability of growth in  
8 dividends under the DCF construct assumes that EPS, DPS and BVPS are all expected to  
9 grow at the same rate in the future. Value Line five-year projections for the growth rates  
10 in earnings, dividends and book value, however, reveal that these financial variables  
11 are expected to grow at significantly different rates over the next three to five years.

12 In view of that, sole reliance on either dividends growth rate, book value growth  
13 rate or earnings growth rate is unlikely to produce a reliable measure of the DCF  
14 growth component. I instead use the average of the three expected growth rates as one  
15 of the measures for the growth component to represent the growth component in the  
16 DCF analysis. One may reasonably assume that the sustainable long-run growth rate to  
17 which earnings, dividends and book value growth rates may converge in the future is  
18 represented by their average, rather than just one of those variables, as Mr. Hevert's  
19 analysis suggests. I have used the average of the Value Line five-year projections for  
20 growth in DPS and BVPS *and* the average of the Value Line, Yahoo Finance, Zacks and  
21 SNL median long-term projections for EPS growth rates to calculate the growth  
22 component. While in principle the single-stage DCF model is meant to be based on

1 long-term projections, its application however is based on at most five-year projections,  
2 as truly long-term projections are seldom available.

3 I have also considered a second measure of the growth component, which is  
4 based on estimates for the internal and external components for growth, retention ratio,  
5 expected return on common equity, market-to-book ratio, and growth in the number of  
6 outstanding shares (called retention growth). Finally, even though I have reservations  
7 about Mr. Hevert's sole reliance on earnings growth as a measure of the growth  
8 component, I considered and applied that approach to my proxy to derive another DCF  
9 estimate for the cost of equity (see Schedule PKC-5 for the calculation of the growth  
10 components; also see Schedules PKC-6 and PKC-7 for the inputs for external and  
11 internal growth components).

12 **Q. Please explain how you estimate the growth component based on the retention**  
13 **ratio, expected return on common equity, market-to-book ratio, and growth in the**  
14 **number of outstanding stocks.**

15 A. I have used Value Line's expectation regarding retention ratios and returns on  
16 equity for five years into the future to derive estimates for  $b$  and  $r$  and have used them  
17 to calculate the expected internal growth component, i.e.  $br$ . To account for growth  
18 expectations from external financing and derive estimates of the external growth  
19 component, I have also used the latest market-to-book ratios from Yahoo Finance and  
20 the average of Value Line's five-year projections for the number of outstanding shares.  
21 That is helpful in calculating the external growth component, i.e.  $s_e v$ , where  $s_e =$



1 expected funds raised from sale of stock as a fraction of existing equity, and  $v = \left(1 - \frac{B}{P}\right)$

2 .<sup>23</sup> The revised formulation for the growth component can be alternatively expressed as

3  $b_e r_e + g_e \left(\frac{P}{B} - 1\right)$ , where  $g_e$  is the expected growth rate in the number of outstanding

4 shares. In short, the growth component can be viewed as the sum of the “internal”

5 growth rate, i.e.  $b_e r_e$ , and the “external” growth rate, i.e.  $g_e \left(\frac{P}{B} - 1\right)$ .

6 **Q. Do you employ any outlier-determination approach?**

7 A. Yes.

8 **Q. Please describe your outlier-determination approach.**

9 A. I have employed the statistical outlier-determination approach that cost of equity  
10 estimates lying outside the bandwidth of the mean plus or minus two times the  
11 variance are not statistically representative of the proxy. In terms of probabilistic  
12 distribution terminology, this selection criterion effectively mimics the widely-used  
13 statistical confidence interval of 95 percent.

14 **Q. What are the DCF estimates for your proxy?**

15 A. The single-stage DCF estimate, based on the average expected growth rates in  
16 earnings, dividends and book value, is 8.46 percent. Schedule PKC-8 provides the  
17 calculations. When only the EPS growth rate is used for the growth component, the  
18 single-stage DCF method produces an estimate of 8.69 percent. When the “internal-  
19 plus-external” growth approach is used, the DCF method produces an estimate of 7.38

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<sup>23</sup> See “*The Cost of Capital to a Public Utility*,” Myron Gordon, MSU Public Utilities Studies (1974), Page 30.

1 percent. I have applied my recommended outlier-determination criteria in deriving  
2 these estimates. As it turns out, the outlier boundaries do not require eliminating any  
3 of the sample observations for any of the estimations.

4 **Q. While Mr. Hevert provides DCF estimates using the multi-stage**  
5 **DCF approach, you have not done so. Why?**

6 A. The Multi-Stage approach relies on one's judgment over how growth rates will  
7 pan out in the future. It is no different from the kind of judgment I have applied with  
8 respect to weighting different growth estimates even though they are all derived from  
9 applying the single-stage DCF approach. Also, one of the primary uses of the Multi-  
10 Stage DCF approach is for a company that is not in a sufficiently stable environment.  
11 Certainly, with respect to Granite State Electric, there is no reason to believe that is the  
12 case. I, therefore, do not conduct a Multi-Stage DCF estimation for the return on equity.

13 **Q. Mr. Hevert recommends adjustment for flotation costs in his estimates of the**  
14 **cost of equity. Do you agree with those adjustments?**

15 A. No. As I have noted already, the DCF approach, informed by equity analysts'  
16 projections, in practice relies on investors' expectations about earnings and dividends  
17 and other relevant variables over three to five years. Even with reasonable treatment of  
18 the DCF growth component, the approach tends to internalize the medium term  
19 expectation that the market-to-book ratio will persist at levels relatively close to what is  
20 currently being observed. Given the reliance at best on medium term expectations, we  
21 tend to derive estimates of the ROE that are sufficiently above the true cost of equity in

1 a setting where the stock prices are significantly above the book value.<sup>24</sup> Flotation cost  
2 is effectively small enough that my recommended return on equity, that relies on  
3 investors' expectations of persistence in the market-to-book ratio being significantly  
4 greater than one, already accounts for such costs adequately. Any further adjustment  
5 would simply unnecessarily transfer wealth from ratepayers to shareholders.

6 **Q. Are you suggesting that flotation cost adder should be allowed only if the**  
7 **market-to-book ratio was close to one?**

8 A. Let's assume that the market-to-book ratio is actually close to one. If a new  
9 issuance is in the horizon out of necessity and there is a real risk of dilution hinting that  
10 the allowed return on equity in place at that time is not fair and trails the opportunity  
11 cost of equity, it may become necessary that a flotation cost recovery mechanism be  
12 allowed. Actually, anything that will help to instill investors' confidence in the utility  
13 would be worthwhile during such times. It may well be the case though, that something  
14 more fundamental than mere allowance of flotation cost would be needed. It would be  
15 in the interest of both the investors and the ratepayers to allow an upward adjustment  
16 to the allowed return on equity more generally for such a utility, if it is evident that the  
17 company is otherwise prudent in its operations.

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<sup>24</sup> Despite several rates cases and Commissions setting new ROEs since 2010, we have not witnessed a consistently significant movement towards a market-to-book ratio being one; while the SNL Electric M/B ratio has increased from 1.57 to 2.05, Mr. Hevert's proxy's M/B ratio has increased from 1.26 to 1.81 over 2010 to 2016. Interestingly, there have been 302 electric rate-case decisions on ROEs since year 2010 in the US, and the median allowed-return on equity has fallen from 10.50 percent to 9.65 percent between 2009 and 2015 (source: RRA Rate-Case Statistics). As I have explained before, even as Commissions try to set the allowed return to be close to the true cost of equity, the application of different methodologies including the DCF approach, given current realities, tend to capture the persistence in the market-to-book ratio being greater than one enough that they produce estimates of cost of equity that comfortably exceed the true cost of equity.

1 **Q. Since flotation costs are real regardless of whether the market-to-book ratio is**  
2 **greater than one or not, are you ignoring those costs in recommending disallowing**  
3 **flotation cost adder when market-to-book ratio is significantly higher than one?**

4 A. Not at all. If a utility issues stocks and successfully sells them to raise the book  
5 value it needs, it must be true that investors expect a return on investment that is at  
6 least the cost of equity otherwise they would not have purchased the stock. Since an  
7 investor is completely aware that the utility's receipt per new share is definitely lower  
8 than the price paid for that stock (due to issuance cost), by buying the stock he or she  
9 reveals that the return on the book value is at least equal to the required return on the  
10 price of the stock. The mere fact that the stocks were bought by investors reveals that  
11 the allowed return on the book value adequately compensates for issuance costs. In an  
12 environment of market-to-book ratios being significantly greater than one, given the  
13 size of flotation costs relative to the market-to-book leverage, even with a reasonable  
14 application of the DCF approach to determine the cost of equity, the market-to-book  
15 ratio continues to remain sufficiently higher than one. Even without a flotation cost  
16 adder, one can conclude that going forward the utility will have little issue with  
17 attracting equity when it needs additional funds to ensure reliable service for the rate  
18 payers without compromising its financial viability.

19 **Q. Do you agree with Mr. Hevert that there is a need to adjust the return on**  
20 **equity upward due to the consideration of small-size premium?**

A. No. Even though he does not recommend an explicit adjustment for small-firm effect, Mr. Hevert devotes part of his testimony on why he thinks the allowed return on equity should build in some slack for such an adjustment, and he considers “the effect of small size in determining where the Company’s ROE falls within the range of results”. It is the OCA’s position that the Commission should not allow any accommodation of the small size premium. First, there is counter-evidence indicating that the small-firm effect is too dependent on the time-period chosen for analysis, and is dependent on the month of January for high stock price returns. Second, there is also counter-evidence that the size effect may not apply to regulated utility operations.<sup>25</sup>

### III.B Capital Asset Pricing Model (CAPM)

**Q. Briefly describe the CAPM method.**

A. The CAPM method recognizes that common equity capital is more risky than debt from an investor's standpoint, and that investors require higher returns on stocks than on bonds to be compensated for the additional risk. The cost of common equity under CAPM is represented by the following equation:  $K = R_f + \beta_s * (R_M - R_f)$  where  $K$  is the cost of equity,  $R_f$  is the yield on risk free securities,  $R_M$  is the expected return on the overall market and  $(R_M - R_f)$  is the equity risk premium demanded by shareholders to accept equity relative to debt.  $\beta_s$  is the average beta of a group of comparable-risk

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<sup>25</sup> See for example, Block, S.B., “A Study of Financial Analysts: Practice and Theory,” Association for Investment Management Research (July/August 1999); and Wong, A., “Utility Stocks and the Size Effect: An Empirical Analysis,” Journal of the Midwest Finance Association (1993).

1 companies that is used to adjust the risk premium to measure risks specific to the  
2 regulated utility in question.

3 **Q. What is Mr. Hevert's estimate of the cost of equity based on the CAPM**  
4 **method?**

5 A. Mr. Hevert derives two sets of CAPM estimates of the cost of equity (See Mr.  
6 Hevert's Testimony, Bates Page 0412, Table 8). The pure "Bloomberg" estimates are  
7 9.02 percent and 9.69 percent, and the pure "Value Line estimates are 10.22 percent and  
8 10.89 percent. He also estimates two other sets of CAPM estimates that mix Bloomberg  
9 data with Value Line betas and Value Line data with Bloomberg betas. While the  
10 Bloomberg data/ Value Line betas based estimates are 10.95 percent and 11.62 percent,  
11 the Value Line data/ Bloomberg betas based estimates are 8.46 percent and 9.13  
12 percent.

13 **Q. Do you agree with Mr. Hevert's CAPM approach? Please explain.**

14 A. No. First, as I have already noted, Mr. Hevert's estimates are actually not ex-  
15 ante. The betas are estimated using historical stock prices. Since the CAPM approach  
16 relies on betas that are based on historical data, it cannot provide a truly forward-  
17 looking estimate of the cost of equity. Second, I do not agree even with his approach to  
18 measure ex-ante risk premiums. The disagreement is both with respect to how he  
19 measures risk-free return and how he calculates market returns. I discuss these  
20 considerations below, but as an initial observation, I disagree with his mixing market  
21 return estimates from one source with betas from the other. While Value Line betas are  
22 based on a market return assumed to be that of the NYSE Composite Index, the

1 Bloomberg betas are based on the S&P 500 Index. Only the pure estimates are the ones  
2 that are relevant; i.e. coupling Value Line betas with Value Line estimates of market  
3 return, and Bloomberg betas with Bloomberg estimates of market return.

4 **Q. Why do you disagree with Mr. Hevert's specification of the risk-free rate?**

5 A. I do not agree that the yield on 30-year Treasury bond is a reasonable proxy for  
6 the risk-free rate. Strictly speaking, the risk-free return is best captured by short-term  
7 Treasury bills, but in recognition that utility rates are usually set for longer periods and  
8 interested investors typically have relative long investment time horizons, longer-term  
9 bonds are used to capture the risk-free rate when applying CAPM to estimate the cost  
10 of equity.

11 It should be understood that long-term bonds are not risk-free for two main reasons:  
12 default (credit) risk and interest rate risk. As for the interest rate risk, the longer termed  
13 a default-free bond is, the greater is its interest rate risk. The 10-year Treasury long-term  
14 bond is my preferred metric for the risk-free rate when conducting CAPM analysis for  
15 regulated companies. It strikes a reasonable balance between choosing a truly interest  
16 rate risk-free instrument (like the shortest of short term Treasury bills) and a  
17 consideration that investors have relatively long investment horizons and that  
18 regulated utility rates are usually set for longer terms than just a few months.<sup>26</sup>

19 As for relying on the 10-year Treasury bond yield to measure the risk-free rate,  
20 since the observed market based yield at any point in time is inherently based on future

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<sup>26</sup> For a good discussion on the determination of risk-free rate, see "What is the Risk Free Rate? A Search for the Basic Building Block," Aswath Damodaran, Stern School of Business, New York University, December 2008.

1 expectations of market participants about the economy, I do not find it appropriate to  
2 use any information about what analysts think the yields are going to be in the future  
3 either near-term or long-term.<sup>27</sup> Also, it is appropriate to rely on the most recently-  
4 observed yields. I discuss my approach in detail later.

5 **Q. You stated that you do not agree with Mr. Hevert's approach to calculate**  
6 **market returns. Please explain why.**

7 A. My reservation about Mr. Hevert's approach again stems from the overreliance  
8 on earnings growth projections that tend to be upward biased as discussed before in the  
9 section on DCF estimation of the proxy's cost of equity. As already noted, I also do not  
10 agree that the market-return estimates associated with the projected-yield are  
11 warranted (See Table 8 of Mr. Hevert's testimony). Additionally, even if those were  
12 warranted, I disagree with Mr. Hevert that the market premiums associated with the  
13 *projected-yield* based cost of equity estimations should be the difference between the  
14 DCF estimate of market return and the *observed yield* on bond. In estimating the  
15 *projected-yield* based cost of equity for the proxy, the market premium for the proxy  
16 should more appropriately be the proxy's beta times the difference between DCF  
17 estimate of market return and the *projected-yield*. Even if one were to agree with Mr.

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<sup>27</sup> Yields observable at any point in time in the market place is akin to price being observable in the market place at any point in time. In a competitive environment, they contain all the information about what economic agents expect will happen in the future, and are the best indicators to use when one is trying to estimate forward looking measures like the "risk-free" return or the cost of equity.



Hevert's approach to rely on the projected bond yield, his approach results in an overstated cost of equity, given the mechanics he employs.<sup>28</sup>

**Q. What do you consider to be a reasonable approach to estimating the market returns?**

A. First, as already noted, it is not appropriate to use projections on bond-yields to measure the "risk-free return" component of the CAPM approach. The OCA as mentioned before finds it reasonable to use the currently observed yields on the 10-year Treasury bond. Second, as for Bloomberg market return estimates, it is important that *only* market return information from Bloomberg is relied upon. Likewise, *only* market return information from Value Line should be used to derive the Value Line estimates. It should be recognized that the market portfolio as used by Bloomberg and Value Line are very different and the betas associated with one source should not be used to derive CAPM cost of equity estimates that relies on market data from the other. Therefore, the OCA has only estimated two CAPM based cost-of -equity estimates; one that relies entirely only on Bloomberg data and another that relies entirely only on Value Line data.

As for the need to correct for the sole reliance on earnings growth estimates, the OCA finds it reasonable to use Mr. Hevert's *Bloomberg* estimate (that relies solely on

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<sup>28</sup> Limiting the analysis to only the "pure" Bloomberg and Value Line estimations as reported in Table 8 of Mr. Hevert's testimony, given that the Bloomberg and Value Line betas for the proxy are 0.585 and 0.764, the projected bond yield is 3.35%, and the DCF ex-ante market risk premiums for Bloomberg and Value Line are respectively (13.51-3.35) and (12.55-3.35), i.e. 10.16% and 9.20%, the CAPM projected-yield based cost of equity estimates are 3.35 *plus* 0.585\*10.16 and 3.35 *plus* 0.764\*9.20, respectively. Therefore, the projected yield based pure Bloomberg CAPM estimate of ROE is 9.30%, and the pure Value Line estimate of ROE is 10.38%. Mr. Hevert's corresponding estimates, i.e. 9.69% and 10.89% (See Table 8, Mr. Hevert's Testimony) are overstated by 0.39% and 0.51% respectively.

1 earnings growth projections), but for the Value Line estimate it uses information on  
2 earnings growth, dividends growth as well as book value growth projections. The OCA  
3 ultimately relies on the average of its Bloomberg and Value Line estimates to obtain its  
4 CAPM estimate of the proxy's cost of equity (see Schedule PKC-10). Doing so is  
5 reasonable, as that ensures that the OCA estimate is not entirely predicated on earnings  
6 growth projections. Finally, I reject the small size premium adjustment (explicitly or  
7 otherwise) for reasons discussed in section III.A. The OCA's CAPM estimation is  
8 discussed below in detail by going through the inputs one-by-one.

9 **Q. What beta measures do you use for your sample?**

10 A. I use Value Line and Bloomberg beta estimates for the companies in my DCF  
11 sample (see Schedule PKC-9). The proxy beta for the Bloomberg application is 0.62,  
12 while that for the Value Line estimation, it is 0.72.

13 **Q. How do you calculate the equity risk premium?**

14 A. Two key elements in the determination of the equity risk premium are the risk-  
15 free rate and the expected return on the market portfolio. As a proxy for the risk-free  
16 rate, as already discussed earlier, the OCA relies on the average of the current yields on  
17 the 10-Year Treasury bond observed over the last month. The average yield over  
18 November 16, 2016 to December 14, 2016 has been 2.38 percent.

19 As for the expected market returns, it is helpful to discuss the Bloomberg  
20 approach and the Value Line approach separately. As for Bloomberg, I completely rely  
21 on the long-term growth expectations furnished by Mr. Hevert and his application of

1 the DCF approach, which produces an estimate of the expected market return of 13.02  
2 percent (Company's response to OCA 3-6, Attachment OCA 3-6).

3 In the case of Value Line, I use not only earnings growth projections, but also  
4 latest Value Line dividends and book value growth projections to derive three capital-  
5 weighted estimates of the expected market return. While the starting group of  
6 companies is same as the S&P 500 companies analyzed by Mr. Hevert (Company  
7 response to OCA 3-6, Attachment OCA 3-6), to ensure that we are consistently looking  
8 at the same companies as a group in deriving the EPS, DPS, and BVPS projections, I  
9 only use companies for which the data is fully available for not only the aforementioned  
10 projections, but also for market capitalization, betas, and dividend yields. Schedule  
11 PKC-11 reports the OCA analysis. The number of companies that are subjected to that  
12 analysis is 409. The resulting expected market returns for this Value Line sample are  
13 12.86 percent, 10.87 percent and 9.58 percent respectively for EPS and DPS and BVPS 3-  
14 5 years' growth projections. The average of these returns represents the estimate of the  
15 expected market return for the Value Line sample, i.e. 11.11 percent.

16 As for the Bloomberg and Value Line market risk premiums, their derivations  
17 differ in a crucial way. To derive the Bloomberg market risk premium, the average  
18 bond yield is simply subtracted from the Bloomberg estimate of market return. To  
19 derive the Value Line market risk premium, however, the difference between Value  
20 Line market return and the bond yield is *divided* by the market-capitalization weighted  
21 mean of Value Line betas of the 409 companies that constitute the OCA's Value Line  
22 sample. Doing so is appropriate, as the market proxy in the derivation of the Value

Line betas (that would be associated with a beta of one) is different from that is associated with the group of companies that is used to estimate the Value Line market return.

**Q. What are your estimates for market-risk premium?**

A. As explained above, the Bloomberg estimate of the equity risk premium is 13.02 percent *less* 2.38 percent, i.e. 10.64 percent. The Value Line estimate of equity risk premium, however, is (11.11 percent *less* 2.38 percent) divided by 0.98, which is the market-capitalization weighted mean beta of the Value Line sample.<sup>29</sup> The Value Line estimate of equity risk premium is therefore 8.73 percent divided by 0.98, i.e. 8.89 percent.<sup>30</sup>

**Q. What are the Bloomberg and Value Line estimates of the cost of equity for the Granite State Electric proxy?**

A. As for Bloomberg, using the recent average yield on 10-year Treasury bond, and the Bloomberg beta of 0.62, the proxy's cost of equity is estimated to be 2.38 *plus*  $0.62 \times 10.64$  percent, i.e. 8.95 percent. The corresponding Value Line calculation yields 2.38 *plus*  $0.72 \times 8.89$  percent, i.e. 8.77 percent.

**Q. What is your CAPM cost of equity estimate for Granite State Electric?**

A. The OCA finds it reasonable to use the average of the two estimates noted above to derive its CAPM estimate of Granite State Electric's cost of equity, i.e. 8.86 percent. While the OCA's recommended point-estimate is strictly based on DCF approaches, the

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<sup>29</sup> As it turns out, the OCA's Value Line sample has a beta that indicates that the portfolio is less volatile than the underlying market portfolio that the Value Line relied on in its estimation of betas for different companies/stocks. The analysis is based on data obtained from Value Line on December 5, 2016.

<sup>30</sup> All numbers reported here are rounded.

1 CAPM estimate provides a useful check as to the reasonability of the DCF based  
2 estimate, and ultimately the OCA's recommended allowed return on equity.

3  
4 **III.C Conclusion**

5 **Q. Before summarizing your analysis, do you have any additional observation to**  
6 **share with respect to Mr. Hevert's analysis?**

7 A. Yes, I do. Mr. Hevert delves into the issue of whether the Company's requested  
8 Capital Investment Recovery Mechanism should lead to a further adjustment in the  
9 allowed return on equity to account for lower risks. He concludes that, such cost  
10 recovery mechanisms being common among the proxy companies, Granite State's  
11 proposed mechanism does not reduce its risk relative to the proxy group. The OCA  
12 cannot agree that Mr. Hevert's analysis is comprehensive enough to conclude  
13 definitively that the Company's proposed mechanism does not reduce risk relative to  
14 either Mr. Hevert's or OCA's proxy groups. Nevertheless, the OCA has in this instance  
15 not conducted any analysis to conclude otherwise. What follows, therefore, is strictly  
16 based on estimations that were reported above. Additional information on the  
17 implementation of the capital recovery mechanism with respect to the proxy group may  
18 inform adjustments in this proceeding later. I believe though that the reliance on the  
19 OCA's estimates, as discussed next, to set the allowed return on equity for Granite State  
20 Electric, is very reasonable.

21 **Q. Please summarize your cost of equity estimates.**

1 A. The table below reports the cost of equity estimates based on the different  
2 methodologies that the OCA relied on.

| Summary of Cost of Equity Estimates        |      |
|--|------|
| DCF (traditional: EPS, BVPS & DPS average) | 8.46 |
| DCF (traditional: EPS)                     | 8.69 |
| DCF ( $g=br+sv$ Method)                    | 7.38 |
| CAPM                                       | 8.86 |

3  
4 **Q. What is your recommendation on the allowed rate of return on equity?**

5 A. The table above summarizes estimates of cost of equity that the OCA's analysis  
6 produced. The average of those estimates is 8.35 percent. The range of estimates is 7.38  
7 percent to 8.86 percent. The OCA recommends using solely the DCF approach in  
8 estimating the cost of equity, for reasons that were discussed in sections II and IIIA. As  
9 stated earlier, the CAPM based cost of equity was estimated mainly as a check. The  
10 average of all of the DCF estimates is 8.18 percent. In considering the DCF estimates, as  
11 the  $br+sv$  method yields a considerably lower estimate compared to the rest of the DCF  
12 estimates, the OCA bases its recommended allowed return on equity predominantly on  
13 the other two DCF estimates. The OCA recommends an allowed return of 8.50 percent.  
14 As was discussed in this testimony before, it is important that the allowed return be set  
15 fairly conservatively to account for changing market conditions (more specifically,  
16 economic downturns). In setting the recommended return on equity, it is therefore  
17 reasonable to opt for an estimate that is at the higher end of the range of the OCA's  
18 estimates. With respect to what constitutes a reasonable range of allowed return on  
19 equity, the OCA recommends 8.20 to 8.60 percent.

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

2    **A.**    Yes, it does.