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Transmission Investment: Revisiting the Federal Energy Regulatory Commission's Two-Step DCF Methodology for Calculating Allowed Returns on Equity

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1: EXECUTIVE SUMMARY

The electric power industry is vital to American jobs and our nation's economy. A recent report, Powering America: The Economic and Workforce Contributions of the U.S. Electric Power Industry,[1] finds that the industry, as a whole, supports more than 7 million American jobs and contributes $880 billion or 5 percent of total gross domestic product ("GDP"). Because virtually every sector of the economy depends on safe, reliable, affordable, and increasingly clean energy, the industry's contribution may be considered the first 5 percent of GDP.

Electric transmission infrastructure is the backbone of the energy grid and is one of the nation's most capital-intensive assets. The energy grid provides a range of benefits to customers, including reliable electricity, congestion relief, robust wholesale market competition, and access to a diverse and changing energy portfolio. New transmission investments also deploy advanced monitoring systems and other technologies designed to ensure a more flexible and resilient energy grid.

Consistent with the goals of the Administration, Congress, and the Federal Energy Regulatory Commission ("Commission" or "FERC"), members of the Edison Electric Institute ("EEI") are committed to investing in the smarter energy infrastructure needed to deliver America's energy future. EEI's member companies invested $20.8 billion in transmission infrastructure in 2016 and expect to invest an additional $90 billion through 2020 to make the transmission system more efficient, more dynamic, and more secure and to continue to provide customers with the affordable, reliable, safe, and increasingly clean energy they need.[2] However, the method by which the Commission establishes allowed shareholder returns on equity ("ROEs")—and, therefore influences private investment in transmission infrastructure—may not adequately support the level of investment needed to maintain and enhance the energy grid.

EEI member companies require shareholder support in the form of capital investment and regulatory support in the form of sound ratemaking policy in order to build, own, and operate the transmission infrastructure that ensures reliable and affordable service to customers. Consistent with long-standing Supreme Court precedent established in *Hope* and *Bluefield*, the Commission is required to set a return on shareholder investment at a level that is "commensurate with returns on investments in other enterprises having corresponding risks,"[3] and that is "sufficient to assure confidence in the financial soundness of the utility, and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise capital necessary for the proper discharge of its public duties."[4]

In 2014, the Commission issued Opinion No. 531, with the goal of providing stable, predictable, and adequate returns for transmission investment.[5] That goal, however, has not been achieved despite the Commission's valued efforts. Even with the guidance of Opinion No. 531, ROEs resulting from the current

[1] M.J. Bradley & Associates (Aug. 2017), http://mjbradley.com/sites/default/files/PoweringAmerica.pdf.
[2] Estimated transmission investments are just that—estimates—and are not guaranteed, as market conditions can and do change. Investor confidence supported by regulatory stability is necessary to ensure that infrastructure needs, including replacement and new infrastructure to meet customer needs, are met.
[3] *FPC v. Hope*, 320 U.S. 591, 603 (1944) ("Hope").
[4] *Bluefield Water Works & Improvement Co. v. Pub. Serv. Comm'n*, 262 U.S. 679, 693 (1923) ("Bluefield"); *see also FPC v.* Hope, 320 U.S. 591, 603 (1944). ("Commensurate with returns on investments in other enterprises having corresponding risks . . . [and] sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.")
[5] See the transcript of the 1006th Commission Meeting of the Federal Energy Regulatory Commission, Thursday, June 19, 2014. Available at: https://www.ferc.gov/CalendarFiles/20140703074240-transcript.pdf.

Discounted Cash Flow ("DCF") model (which, like all models, has inherent limitations) are producing estimates below other widely accepted alternative ROE estimation models and market indicators, such as state-determined ROEs for lower risk distribution investments, suggesting that these ROE estimates are below levels necessary to support the Commission's stated policy goals and to meet long-standing capital attraction standards. In 2017, the U.S. Court of Appeals for the D.C. Circuit vacated and remanded Opinion No. 531, presenting a very timely opportunity for the Commission to review its model used to calculate the range of values used to set ROEs.

Because transmission infrastructure often is a 50-plus year commitment, investors require adequate and stable returns over the long-term to provide financing for continuous infrastructure re-investment. EEI believes the time is now for the Commission to step-back and to assess whether the inherent limitations (or shortcomings) of the DCF, and the adjustments the Commission has made to the DCF methodology, are leading to outcomes necessary to meet capital attraction standards and policy goals at a time when the transmission system requires expansion and enhancement.

Regardless of the models employed, informed judgment must be applied to determine the applicability of individual model results in the context of the capital market environment. Although the DCF model is theoretically sound, its assumptions are quite limiting and rarely hold outside of the theoretical realm. These assumptions can engender unreliable results, particularly when investor expectations are not consistent with the DCF model's assumption that current market conditions will persist.

Practitioners and academics recognize that financial models simply are tools to be used in the ROE estimation process and that the strict adherence to any single approach, or to the specific results of any single approach, can lead to misleading conclusions. As such, the Commission's recent use of alternative ROE models (such as the CAPM, Risk Premium, and Expected Earning approaches) and market indicators to benchmark and check the reasonableness of the results of the DCF approach is reasonable and should be continued. This position is consistent with the *Hope* and *Bluefield* finding that the method employed is not controlling when determining just and reasonable rate levels.[6] Benchmarking against additional models would balance the fluctuations in the two-step DCF method's results and, ultimately, would increase the stability and reliability of the Commission's approach to ROE estimation.

In addition, this paper recommends the following modifications to temper, but not eliminate, existing shortcomings in the current method of employing the two-step DCF approach:

- Broaden the proxy group by modifying existing screening criteria and expanding the universe of companies eligible for inclusion.
- Consider additional sources of published analyst growth rate estimates when determining the zone of reasonableness.
- Reducing the weight currently given to the GDP growth rate in the application of the two-step DCF method, *i.e.* from 1/3 to 1/5, and incorporating an inflation adjusted long-term GDP estimate such as Morningstar's approach in the *Ibbotson SBBI Valuation Yearbook*; in the alternative, removing GDP from the application of the DCF model altogether.
- Re-examine the thresholds used to determine which DCF results do not pass tests of economic logic, and ensure the thresholds applied appropriately account for current capital market conditions.

EEI is very supportive of the Commission's efforts in Opinion No. 531 to address anomalous market conditions and to revise the DCF methodology to address shortcomings. Despite that effort, however, a rote

[6] *See Hope* at 602.

application of the DCF methodology as conceived in Opinion No. 531 does not produce authorized ROEs adequate to ensure ongoing capital attraction.

EEI offers this white paper to facilitate a holistic review and discussion of the calculation and assessment of transmission investment ROEs, while maintaining the balance between investor and customer interests. We look forward to engaging with all stakeholders to ensure that essential investments in our nation's energy infrastructure can be made today and in the future.

2: INTRODUCTION AND BACKGROUND

The electric transmission network is the backbone of the nation's energy grid. The energy grid connects and enables a diverse and rapidly evolving set of energy resources, ensures reliable service for customers, enables competitive electricity markets, and provides reasonable electricity prices for customers. Transmission accounts for only about 11 percent of an electric customer's total bill, but it is a critical component in delivering reliable, affordable electricity to customers.[7]

As the nation's mix of energy resources continues to evolve and customers demand increased choice over the sources and delivery of their energy, the electric power industry is undergoing significant transformation to enable the flexibility to meet these demands. To this end, electric companies are making significant investments to enhance the transmission system to make it more efficient, more dynamic, and more secure and to continue to provide customers with affordable, reliable, safe, and increasingly clean energy. EEI's member companies are dedicated to planning and enhancing the nation's transmission network to meet customers' changing needs and expectations, investing $20.8 billion in transmission infrastructure in 2016 and an estimated additional $90 billion in transmission infrastructure through 2020.[8]

Congress, the Administration, and the Commission have continuously recognized the numerous benefits of a robust transmission system.[9] For example, the Energy Policy Act of 2005 ("EPAct 2005") set forth several statutory requirements intended to support transmission investment. In 2012, the Commission reaffirmed its pricing policy, which provided incentive rates to ensure electric companies continue developing, constructing, operating, and maintaining the nation's vital transmission infrastructure. In addition, the Commission advanced its strategic goal of supporting transmission development by enabling regional and interregional coordination processes, as well as supporting allocation of costs for the selected transmission solutions that meet customer and system needs. In 2014, the Commission issued Opinion No. 531, discussed in more depth later, with the goal of providing stable, predictable, and adequate returns for transmission investment.[10]

The Commission has significant influence over transmission infrastructure investment through the ROEs it authorizes and the regulatory certainty it provides. This white paper reviews the limitations of the Commission's two-step DCF model and recommends that the Commission take action to ensure that ROEs support and encourage necessary investment in transmission infrastructure.

As this paper demonstrates, the Commission's current application of the two-step DCF model now produces ROEs that are inconsistent with stated Commission policy goals and that do not meet well-established capital attraction standards, strongly indicating that the Commission's current approach is not producing reliable estimates of the just and reasonable rates of return needed to attract investment in transmission infrastructure, particularly in the current capital market environment. The Commission should review the application and

[7] U.S. Energy Information Administration, Annual Energy Outlook 2017, January 2017. Reference case. Table 8: Electrical supply, disposition, prices, and emissions. Available at: https://www.eia.gov/energyexplained/index.cfm?page=electricity_factors_affecting_prices

[8] http://www.eei.org/issuesandpolicy/transmission/Pages/default.aspx.

[9] The U.S. Department of Energy's (DOE's) August 2017 Staff Report on Electricity Markets and Reliability acknowledged the need for "major transmission additions to connect the remote generation to the rest of the grid and to load centers." It also recommended that DOE and related federal agencies accelerate and reduce costs for the licensing, relicensing, and permitting of grid infrastructure, including transmission. Available on the DOE website at: https://energy.gov/sites/prod/files/2017/08/f36/Staff%20Report%20on%20Electricity%20Markets%20and%20Reliability_0.pdf

[10] *See Coakley v. Bangor-Hydro Elec. Co.*, Opinion No, 531, 147 FERC ¶ 61,234, *order on paper hearing*, Opinion No. 531-A, 149 FERC ¶ 61,032 (2014); *reh'g denied*, Opinion No. 531-B, 150 FERC ¶ 61,165 (2015).

results of the two-step DCF method and should make adjustments that would address the limits of the DCF model and that reflect assumptions that are more appropriate given current market conditions.

In particular, this paper highlights the benefits of using alternative models to help estimate and benchmark ROEs. The Commission's recent use of alternative ROE models (such as the CAPM, Risk Premium, and Expected Earning approaches) and market indicators to benchmark and check the reasonableness of the DCF approach in establishing the zone of reasonableness is appropriate and should be continued. Alternative ROE models account for factors and conditions not considered by the DCF model, including measures of capital market risk. Using multiple methods to estimate ROEs is consistent with equity investor practice and helps to ensure ROEs support the Commission's stated policy goals, meet well-established capital attraction standards, and encourage transmission investment. Regardless of the models employed, informed judgment must be applied to determine the applicability of individual model results in the context of the capital market environment.

In addition, the Commission should review assumptions and data inputs that are fundamental to its two-step DCF model. These assumptions are driving the inconsistent ROEs that result from the model. This paper assesses the impacts of certain assumptions and data inputs on the resulting ROEs and suggests that the Commission consider modifying these assumptions. This, too, will help to establish ROEs that are consistent with investor expectations and current market conditions.

In early 2017, the D.C. Circuit remanded Opinion No. 531, in which the Commission adopted the two-step DCF method for electric companies.[11] This presents an opportunity for the Commission to revisit its approach to setting ROEs. Changes to the current DCF model's assumptions, as well as a re-evaluation of the Commission's overall approach to calculating ROEs, are necessary to ensure the consistently just and reasonable returns needed to attract investment at a time when the transmission system is in the process of expansion and enhancement.

2.1 Continued Investment in Transmission Infrastructure Is Critical to the U.S. Economy

The electric power industry is vital to American jobs and our nation's economy. A recent report, Powering America: The Economic and Workforce Contributions of the U.S. Electric Power Industry,[12] finds that the industry as a whole supports more than 7 million American jobs and contributes $880 billion or 5 percent of total GDP. This is the first 5 percent of GDP because virtually every sector of the economy depends on safe, reliable, affordable, and increasingly clean energy.

The electric transmission system is one of the most capital-intensive assets in the country. It provides a range of benefits to customers: reliable electricity service, congestion relief, robust wholesale market competition, and access to diverse energy resources. Because the majority of the U.S. transmission system was built in the 1960s and 1970s, significant replacements and/or upgrades are required now and in coming years to maintain and to improve system performance. Extensive investments also are needed to integrate new renewable and distributed energy resources and to respond to a rapidly changing energy mix. To facilitate this changing energy landscape and to meet customers' changing needs, EEI's member companies continue to introduce innovative transmission technologies, such as fiber optic communications, advanced conductor technology, enhanced power device monitoring, and energy storage devices in transmission projects. At the same time, EEI's members continue to invest in the transmission system to maintain and to improve its resiliency against both cyber and physical threats.

[11] *Emera Maine v. FERC, 854 F.3d 9 (D.C. Cir. 2017).*
[12] M.J. Bradley & Associates (Aug. 2017), http://mjbradley.com/sites/default/files/PoweringAmerica.pdf

2.2 Regulatory Certainty Encourages Private Transmission Investment

Because transmission infrastructure is a long-term commitment, often serving the public for 50 years or more, investors require adequate and stable returns over the life of this infrastructure. The stability and predictability of authorized returns is of paramount importance to investors, who must commit capital to long-lived assets with multi-year development cycles.[13]

Regulatory certainty is needed to obtain and to maintain financing for both new projects and continuous infrastructure re-investments at reasonable cost. Moreover, adequate ROEs serve to maintain the transmission owner's financial integrity, ultimately helping to keep debt rates low to the benefit of customers. The authorized ROE affects not only the cash flows and credit metrics that support the financial strength of the transmission owner, it also provides an indication of the regulatory support—and risk—associated with a given electric company and the jurisdiction in which it operates.[14]

Just and reasonable returns strengthen investors' perception of the regulatory environment and support an electric company's ability to attract capital efficiently throughout various market cycles. Accordingly, it is essential that the Commission's methodology for determining the allowed ROE provide the stable, predictable, and adequate returns needed to attract the investment necessary to expand and to enhance the transmission system.

2.3 ROEs for Transmission Investment Must Be Commensurate With Risks

The U.S. Supreme Court has established the foundation on which a utility's ROE is determined to be just and reasonable, finding that the return should be commensurate with the return available to firms of comparable risk; should compensate investors fairly for capital they have invested; should enable the utility to offer a return adequate to attract new capital on reasonable terms; and should maintain the utility's financial integrity.[15] The Supreme Court recognized that investors have many investment alternatives, even within a given market sector, and, therefore, a company's financial profile must be adequate on a relative basis to ensure its ability to attract capital under a variety of economic and financial market conditions.

Investors in transmission assets assume numerous risks and challenges, including long lead times, significant development opposition from affected stakeholders, and extensive state and federal permitting and siting processes. Within the electric power sector, transmission investments differ from other electric company infrastructure investments, including distribution infrastructure, whose projects tend to be smaller in scale, lower in cost, and shorter in duration.[16] DCF estimates for transmission that are below these less risky alternative investments are not commensurate with these risks. This disconnect between DCF results and investment risk discourages investment in transmission and is inconsistent with the U.S. Supreme Court's long-established foundational standards for assessing whether rates are just and reasonable.

[13] Suppliers of equity capital for investor-owned electric companies include individual investors as well as institutional owners, such as pension funds, government retirement funds, mutual funds, insurance companies, and endowments.
[14] The terms "electric company" and "utility," as used in this document, are intended to be consistent with the term "public utility" as it is used in the Federal Power Act [16 U.S.C. § 824(e)].
[15] *See supra* note 3.
[16] Opinion No. 531 at P 149. The Commission found that investing in transmission infrastructure is inherently more risky than distribution infrastructure.

3: THE DCF MODEL: PREMISE, LIMITATIONS, AND COMMISSION APPLICATION

Before discussing the limitations of the DCF model and discussing potential solutions suggested in this paper, it is important to review the theoretical premise of the model and the general issues raised by certain key underpinning assumptions.

3.1 The Theoretical Premise of the DCF Model

The DCF model holds that the price that investors are willing to pay for an asset equals the present value of a future stream of net cash flows discounted at the cost of capital. In the case of a utility stock, the future cash flows received are in the form of dividends (and the appreciation in market price if the stock is sold at the end of a finite holding period).

As the Commission noted, "the underlying premise of the DCF model is that an investment in common stock is worth the present value of the infinite stream of dividends discounted at a market rate commensurate with the investment's risk."[17] The general form of the model is expressed as follows:

Equation [1] - General Form of the DCF Model

$$P = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \cdots + \frac{D_\infty}{(1+k)^\infty}$$

	P	=	*The current stock price*
Where:	$D_1 \ldots D_\infty$	=	*Expected future dividends*
	K	=	*The discount rate, or required ROE*

Equation [1], which solves for price from an infinite number of terms, can only be estimated in practice if one is willing to make a variety of assumptions. The simplest version of Equation [1] assumes constant growth in dividends in perpetuity. If we assume that dividends grow at a constant growth g and that g is less than k, Equation [1] reduces to:

Equation [2]

$$P = \frac{D_1}{k-g}$$

If we further assume the market price of a stock reflects its intrinsic value, Equation [2] can be rearranged and used to deduce the required cost of equity. In that case Equation [2] can be simplified and rearranged into the familiar form as shown in Equation [3].

[17] Opinion No. 531 at P 14.

Equation [3]—Constant Growth Model

$$k = \frac{D_0(1+g)}{P} + g$$

Where:

P	=	*The current stock price*
D_0	=	*The current dividend*
k	=	*The discount rate, or required ROE*
g	=	*The expected growth in dividends and stock price*

Equation [3] often is referred to as the "constant growth DCF" model, in which the first term is the expected dividend yield and the second term is the expected capital gains yield (the portion of total return attributable to growth in stock price). This model is intuitively appealing because it makes explicit the two basic ways a firm distributes net income to shareholders. First, a portion of net income is distributed directly through a dividend payment. Second, remaining net income is retained for reinvestment intended to grow earnings and, as a result, increase stock price (capital gains). In this way, there is an inverse relationship between the dividend yield and capital gains yield: the more net income paid out as dividends, the less net income is available to facilitate growth.

3.2 General Limitations of the DCF Model

Although the DCF model is theoretically sound, it is important to recognize that its assumptions are quite restrictive and rarely hold outside of the theoretical realm. To use Equation [3] to estimate a constant required ROE, one must make several strict assumptions, including:

(1) The required ROE is greater than the expected growth rate;
(2) Earnings, book value, dividends, and stock price all grow at the same, constant rate in perpetuity;
(3) The dividend payout ratio remains constant in perpetuity; and
(4) The Price to Earnings ("P/E") ratio remains constant in perpetuity.

DCF model results may be unreliable when investor expectations are not consistent with the DCF model's assumption that current market conditions [*e.g.*, valuations levels (P/E ratios) and dividend payout ratios] will persist in perpetuity.

Evidence on the applicability of the constant growth DCF model is mixed. Academic research has shown that there has been a strong correlation between stock prices and present value calculations when measured over relatively long historical periods, but that the relationship can break down in the short term.[18] Because application of the DCF method to determine the cost of equity assumes that the current stock price reflects the discounted value of expected dividends in perpetuity, the results of the DCF model should be viewed with caution when there is a breakdown in the relationship between stock prices and dividends.

One study focused on back-tests of the constant-growth DCF model concludes that even under "ideal" circumstances,

[18] *See* A. Nasseh, J. Strauss, "Stock prices and the dividend discount model: did their relation break down in the 1990s?" *The Quarterly Review of Economics and Finance* Vol. 44, No. 2, (May 2004), pg. 191–207; *see also,* "The Dividend Discount Model in the Long-Run: A Clinical Study," Foerster, Stephen R; Sapp, Stephen G, *Journal of Applied Finance*; Fall 2005; 15, 2; pg. 55; *see also,* Xiaoquan Jiang and Bon-Soo Lee, "An Empirical Test of the Accounting-Based Residual Income Model and the Traditional Dividend Discount Model," *The Journal of Business*, Vol. 78, No. 4 (July 2005), pg. 1465-1504.

> "… [I]t is difficult to obtain good intrinsic value estimates in models stretching over lengthy periods of time. Shorter horizon models based on five or fewer years show more promise. Any model based on dividend streams of ten years or more, whether as a teaching tool or in practice, should be used with caution, as they are likely to produce low-quality estimates."[19]

Because Equation [3] is derived from a valuation model that assumes a perpetual dividend stream, it is best viewed as an *approximation* of the true required ROE.[20] For example, firms do not pay dividends at a constant dividend yield. Rather, continuous movements in stock prices, coupled with "sticky" dividend policies create continuous changes in dividend yield, contrary to the model's assumptions.

Moreover, the constant growth DCF model assumes that investors are using the net present value analysis in Equation [2] to determine the purchase price they are willing to pay for a stock. Consequently, the DCF model will not produce accurate estimates of the market-required ROE if the market price of a stock diverges from investors' estimates of its intrinsic value (*i.e.*, the calculated net present value of an investment based on its expected risk and return characteristics).

Deviations between market prices and intrinsic valuations can occur when investors take short-term trading positions to hedge risk (*e.g.*, a "flight to safety"), to speculate (*e.g.*, momentum trades), or to increase current income (*i.e.*, a "reach for yield").[21] DCF estimates can also deviate from investors' required return when the growth rates used in the model fail to reflect the investor growth expectations embodied in observable stock prices. Examples of this divergence include investors' speculations over the potential gain from a merger, or investors' valuations reflecting assumptions about future changes to fiscal and monetary policy actions (such as tax policy changes) that have not yet been factored into reported analyst growth rates.

3.3 The Commission's Adoption and Implementation of Its Two-Step DCF Methodology

The two-step DCF approach adopted by the Commission in Opinion No. 531 is a constant growth DCF model that uses a blended growth rate that reflects both short- and long-term growth assumptions.[22] The Commission's two-step DCF method relies on a 6-month average dividend yield[23] and a composite growth rate giving 2/3 weight to short-term analyst earnings growth projections and 1/3 weight to a long-term (GDP) growth rate projection. In Opinion No. 531, the Commission relied on Thomson Reuters' Institutional Brokers' Estimate System ("IBES") five-year analyst earnings growth estimates as the short-term growth rate estimate. To develop the long-term growth rate, the Commission relied on an average of GDP growth projections from IHS Global Insight, the Energy Information Administration ("EIA"), and the Social Security Administration ("SSA").[24] Consistent with prior precedent, the Commission established an ROE

[19] *See* P. McLemore, G. Woodward, and T. Zwirlein, "Back-tests of the Dividend Discount Model Using Time-varying Cost of Equity," *Journal of Applied Finance*, No. 2, 2015, pg. 75-94.
[20] For example, Dr. Roger Morin notes the DCF model does not always provide reliable results in his widely cited text on utility cost of capital. *See* Roger A. Morin, *New Regulatory Finance*, Public Utility Reports, Inc., 2006 at 28, and 431-436.
[21] Some investors may select relatively high dividend yield companies as a "reach for yield" in response to the shortage of investment alternatives that provide adequate yield in today's capital market, rather than investing in stocks based on their long-term return potential.
[22] The form of the constant growth DCF model applied by the Commission reflects the "half growth" approach, where the dividend yield is increased by one half the growth rate.
[23] The monthly dividend yield is based on the latest announced dividend divided by the average of the high and low price for the month.
[24] *See* Opinion No. 531-A at P 39. Also note, the Commission instituted a paper hearing to review the adopted long-term growth estimate and concluded its approach in Opinion No. 531 was reasonable. *See id.* at P 1.

zone of reasonableness using the low and high DCF estimates, excluding low-end results that did not pass tests of economic logic. The Commission relied on the midpoint as the measure of central tendency.[25]

In Opinion No. 531, the Commission relied on DCF model results from a group of comparable-risk companies selected using the following selection criteria:

(1) Is a domestic company considered an electric utility by Value Line Investment Survey ("Value Line");
(2) Has a credit rating no more than one notch above or below the subject utility or utilities, using both Standard & Poor's ("S&P") and Moody's where available;
(3) Pays dividends and has neither made nor announced a dividend cut during the six-month study period;
(4) Has not been party to major merger or acquisition activity during the six-month study period significant enough to distort DCF inputs; and
(5) Has DCF results that pass threshold tests of economic logic.[26]

The Commission's two-step DCF model produces a single growth estimate for each proxy company. Prior to Opinion No. 531, the Commission used a one-step form of the constant growth DCF model. When applying the one-step DCF model, the Commission considered high and low DCF estimates for each proxy company based on high and low dividend estimates and high and low growth estimates.[27] The use of a range of growth rate estimates for each company, rather than a single average growth estimate, generally resulted in a more robust zone of reasonableness.[28]

[25] *See* Opinion No. 531 at PP 9, 118, 122, 142, and 151. The Commission has historically used the midpoint as the measure of central tendency when estimating the cost of equity for a group of electric utilities, and used the median when estimating the cost of equity for a single electric utility; *see id.* at P 26.
[26] *Id.* at PP 92, 114 and 124.
[27] For the dividend component of the model, the Commission considered high and low dividend yield estimates based on the 6-month average of high and low stock prices. For the growth component of the model, the Commission considered analyst growth projections from IBES as well as a sustainable growth estimate. *See id*. at P 25.
[28] In August 2005, Congress enacted the Energy Policy Act of 2005. Seeking to end a two-decades-long period of underinvestment in transmission and, to some extent, in response to the 2003 blackout, Congress dedicated several sections to promote the expansion and modernization of the nation's electricity grid. Congress directed the Commission to establish a program of incentives to invest in electric transmission, recognizing that capital investments in electric transmission infrastructure produce significant benefits for electric customers and society as a whole. Congress directed the Commission to create incentives that, among other things, promote investment in the "enlargement, improvement, maintenance, and operation" of transmission facilities and encourage technologies that enhance the efficiency and operations of existing facilities. In July 2006, the Commission issued a final decision (Order No. 679) establishing its policy on transmission incentives. In 2012, the Commission issued a policy statement clarifying its transmission incentives policy. While not the central focus of this white paper, it is worth noting that when approving ROE incentives, which were encouraged by EPAct 2005, the Commission has traditionally capped the sum of the ROE incentives and the base ROE at the top end of the then-existing zone of reasonableness. In Opinion No. 531, the Commission ruled that in setting a new base ROE, it would revisit whether the combination of previously approved incentive ROEs and the new base ROE exceeded the top end of the newly created zone of reasonableness and, if so, would reduce the total ROE accordingly. *See* Opinion No. 531-B at PP 139-46. Lowering the top end of the zone often causes the total ROE to meet or exceed the cap, creating the additional effect of Opinion No. 531 potentially to limit or cap previously approved ROE incentives.

4: RATES OF RETURN ON EQUITY PRODUCED BY THE COMMISSION'S TWO-STEP DCF ANALYSIS ARE NOT CONSISTENT WITH THOSE PRODUCED BY ALTERNATIVE ROE MODELS AND OTHER MARKET INDICATORS

The Commission uses the two-step DCF analysis to determine an ROE that meets the just and reasonable standard established by the Supreme Court in *Hope and Bluefield*. As noted earlier, under that standard, the return should be commensurate with those available on investments of similar risk and should enable the subject company to attract capital. As also noted earlier, the two-step DCF model is subject to limiting assumptions that may not be valid under all market or company-specific conditions and can produce results that are inconsistent with the "comparable risk" and "financial attraction" standards.

Consequently, it is important the two-step DCF model's results continue to be viewed as indicative, unless confirmed by other analyses. In fact, the Commission did just this in Opinion No. 531 to meet the requirements of *Hope* and *Bluefield* in setting an ROE at a level sufficient to attract investment in interstate electric transmission.[29] The Commission considered the results of additional analyses to benchmark ROE estimates. The Commission ultimately found an authorized ROE higher than the two-step DCF midpoint was appropriate.

Benchmarking against additional ROE analyses is consistent with the *Hope* and *Bluefield* "end result" doctrine, which states that it is the reasonableness of the result, not the method applied, that controls in determining whether a given rate is just and reasonable. Because capital markets change over time, the Commission should not use a formulaic approach or predetermined weighting of any particular model's results, but should continue to use informed judgment in estimating ROEs and to assess model results in the context of alternative ROE measures and other relevant benchmarks. This will help to enable authorized returns that support long-term investment in the transmission system.

The following section compares the midpoint and median electric utility two-step DCF model results to relevant benchmarks, including authorized returns, alternative ROE model results, and other market indicators.[30] This exercise strongly indicates that results of the Commission's current application of the DCF model are not consistent with the results of other models and market indicators, and are not adequate to establish just and reasonable rates.

The two-step DCF results presented below and used for comparative purposes are calculated using the Commission methodology outlined above in section 3.3.[31]

[29] Opinion No. 531 at P 150.

[30] The midpoint is the average of the highest and lowest values. The median is the middle value in a data set arranged in ascending or descending order when there is an odd number of observations, or the average of the two middle-most values when there is an even number of observations.

[31] Consensus analyst growth rate projections are from Bloomberg rather than IBES due to historical data availability. The DCF and alternative ROE models (where applicable) have been applied using the Value Line universe of electric utilities as of April 30, 2017, excluding companies currently involved in major merger activity (Great Plains Energy, NextEra Energy, and Westar Energy). DCF results exclude low-end results that do not pass tests of economic logic, consistent with

4.2 Alternative ROE Models

A variety of well-recognized approaches to asset pricing have been developed in the financial literature, and investors use multiple ROE models in practice. They do so because no single model provides accurate results under all market conditions, and the results of any single model should be viewed in the context of its consistency with alternative ROE methodologies.

Charts 1a and 1b compare semi-annual results of the Commission's two-step DCF model with the results of the alternative ROE estimation methodologies—CAPM, Risk Premium, and Expected Earnings—recently considered by the Commission in electric rate cases. The results below, however, call into question the validity of relying solely on a mechanical application of the two-step DCF model.

As applied here, the Bond Yield Plus Risk Premium model adds an industry-specific premium, adjusted to reflect the current interest rate environment, to the yield on Moody's Baa-rated long-term utility bonds. Under the CAPM approach, a risk premium is specified relative to the yield expectations on Treasury (risk-free) debt. Here, a risk premium reflecting the proxy companies' risk levels relative to the overall market is added to 30-year Treasury yields.

The Expected Earnings analysis calculates the projected returns on book value for the firms in the proxy group using published analyst forecasts provided by Value Line. The model, therefore, provides a direct measure of observable investor expectations for future earned returns on book equity.

Although all three models have their own underlying assumptions and limitations, none is subject to the same limiting assumptions that underpin the two-step DCF model discussed in Section 3. The additional methods, therefore, provide a check on the reasonableness of the two-step DCF model results.[32]

The data in Charts 1a and 1b demonstrate that the recent downward trend in DCF model results is not consistent with the more consistent results from other ROE methods. The application of the ROE models presented here generally are similar to those relied on by the Commission in Opinion No. 531. The methods and assumptions used in the application of the models are discussed in more detail in Section 7.

Commission precedent (*i.e.*, results that are below the 6-month average of Moody's Baa Utility Bond Index yield plus 100 basis points).

[32] The data in charts 1a and 1b also show that any ROE model may produce anomalous results under certain market conditions, such as the relatively high CAPM results in 2007 and 2008. These elevated results were related to relatively elevated Beta coefficients for electric utilities at the time.

Chart 1a: Midpoint Two-Step DCF Model Results vs. Other ROE Estimates

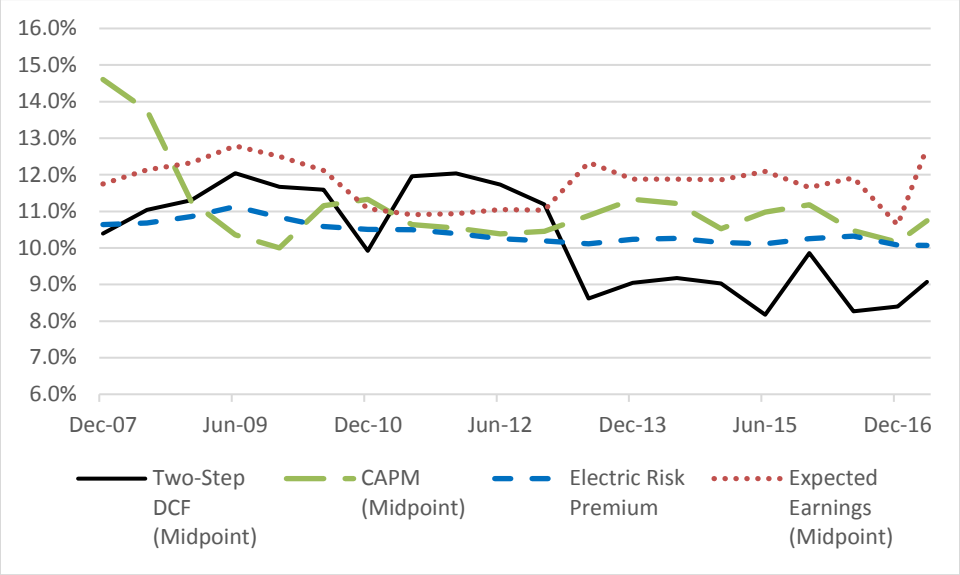
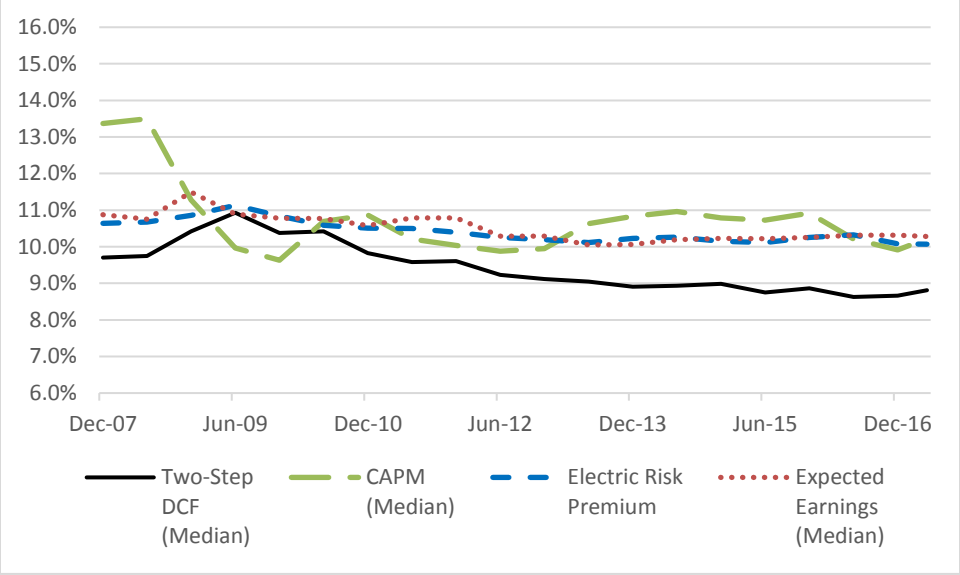


Chart 1b: Median Two-Step DCF Model Results vs. Other ROE Estimates



The CAPM and Risk Premium methods are widely recognized approaches to estimating the cost of equity. Both are based on the basic financial tenet that, because equity investors bear the residual risk associated with ownership, they require a premium over the return they would have earned as a bondholder.[33]

[33] *See, e.g.*, Eugene Brigham and Michael Ehrhardt, *Financial Management: Theory and Practice*, 12th ed. (Mason, OH: South-Western Cengage Learning, 2008), at 346.

4.3 State-Level Authorized ROEs Are Higher Than Recent Two-Step DCF Model Results

Returns available to electric utilities in other jurisdictions are an important consideration for investors.[34] Although the return authorized in any individual case will reflect the particular circumstances of that proceeding, taken together the authorized returns in other jurisdictions represent a comparison point that investors will use to frame their return requirements and arrive at investment decisions. A return that is not competitive on a risk-adjusted basis with those offered for investments in other parts of the electric power industry will diminish the attractiveness of FERC-regulated transmission investments and will push investors to endeavors with more attractive risk-adjusted returns (e.*g.*, distribution facilities).

The Commission's Opinion No. 531 noted that investors providing capital for electric transmission infrastructure face unique challenges that increase their risk relative to state-regulated electric distribution investments. The incremental risks noted by the Commission included "long delays in transmission siting, greater project complexity, environmental impact proceedings, requiring regulatory approval from multiple jurisdictions overseeing permits and rights of way, liquidity risk from financing projects that are large relative to the size of a balance sheet, and shorter investment history."[35] The Commission found that these risk factors increase risk relative to investments made by state-regulated distribution companies. Consequently, in keeping with the Commission's finding in Opinion No. 531, state-authorized ROEs provide a somewhat conservative benchmark.

Two-step DCF results generally are much lower than state-allowed ROEs over the past year. In fact (and as shown in Charts 2a and 2b), the two-step DCF model has produced results below state-regulated ROEs since 2013.

[34] In Opinion No. 531, the Commission used state-commission-authorized ROEs as a lower-bound check on the reasonableness of the two-step DCF model results to prevent Commission-regulated electric transmission companies from being at a competitive disadvantage relative to state-regulated electric utilities when raising capital. *See* Opinion No. 531 at PP 148-150.

[35] *Id.* at P 149.

Chart 2a: Midpoint Two-Step DCF Model Results vs. State-Authorized Electric ROEs[36]

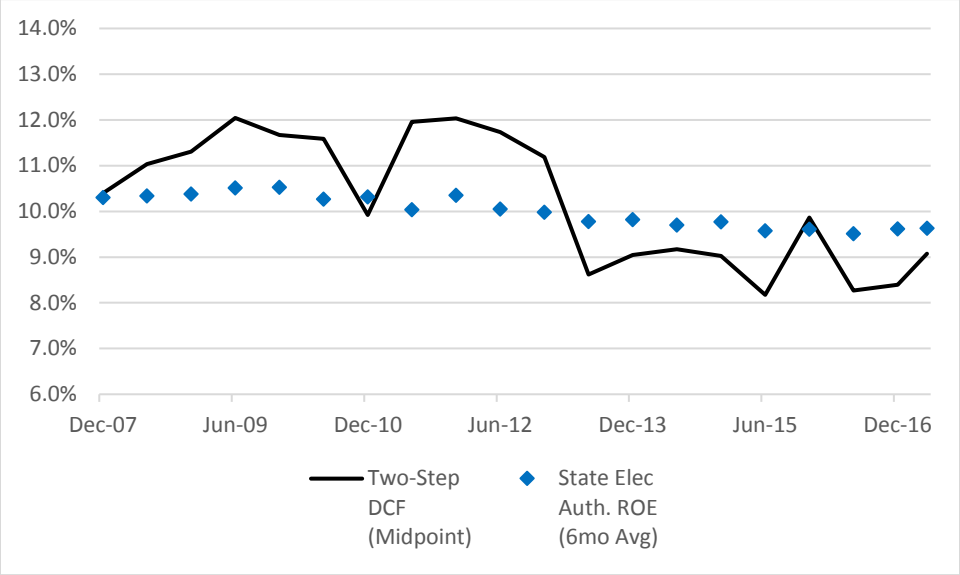
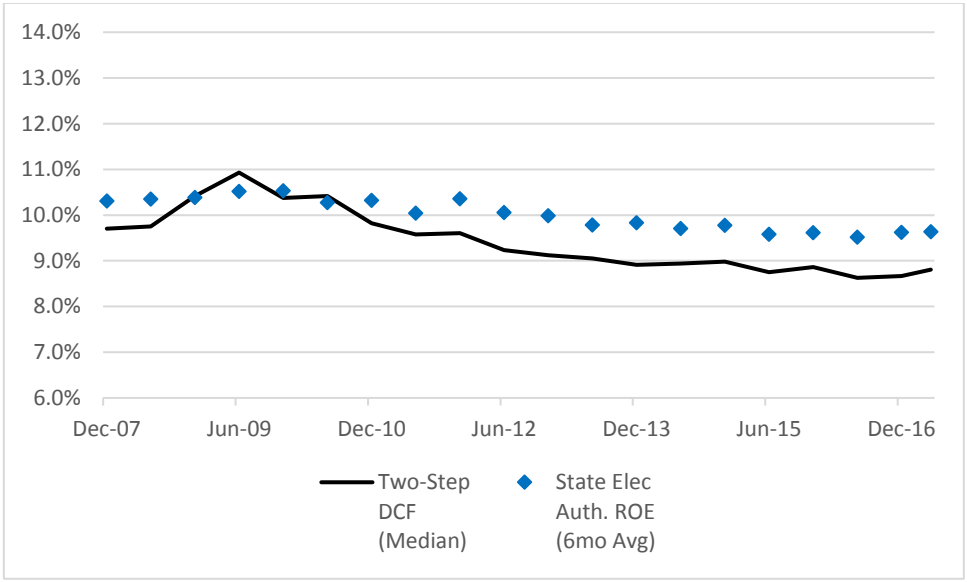


Chart 2b: Median Two-Step DCF Model Results vs. State-Authorized Electric ROEs[37]



4.4 Commission-Authorized Natural Gas Pipeline ROEs Are Another Appropriate Benchmark for Assessing Commission-Authorized ROEs

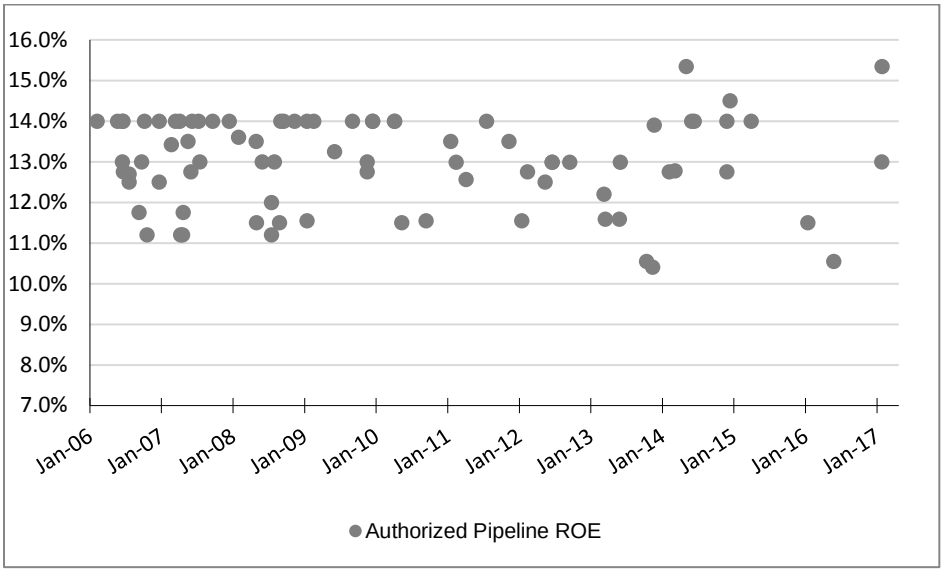
The Commission has used the two-step DCF approach to determine ROEs for natural gas and oil pipelines since the mid-1990s.[38] In *Southern California Edison*, the Commission stated it was not appropriate to

[36] Average of state-authorized ROEs authorized over the previous 6-month period reported by Regulatory Research Associates, calculated semi-annually (e.g., the value for December 2016 reflects the average of all state electric ROEs authorized from 7/1/2016 to 12/31/2016). Excludes limited issue riders and Illinois formula rates.
[37] *Id.*
[38] Opinion No. 531 at P 17.

consider returns in the natural gas industry when evaluating electric utilities because "the electric industry is just beginning a significant new phase of its restructuring."[39] More recently, the Commission found the electric industry and its restructuring have matured.[40] Given the Commission now finds that the same two-step DCF model is appropriate for both industries, the trend in natural gas pipeline ROEs is relevant in assessing the trends in electric transmission ROEs.

Chart 3 suggests that there is no discernible downward trend in the authorized returns for natural gas pipelines.

Chart 3: Commission-Authorized Natural Gas Pipeline ROEs over Time[41]



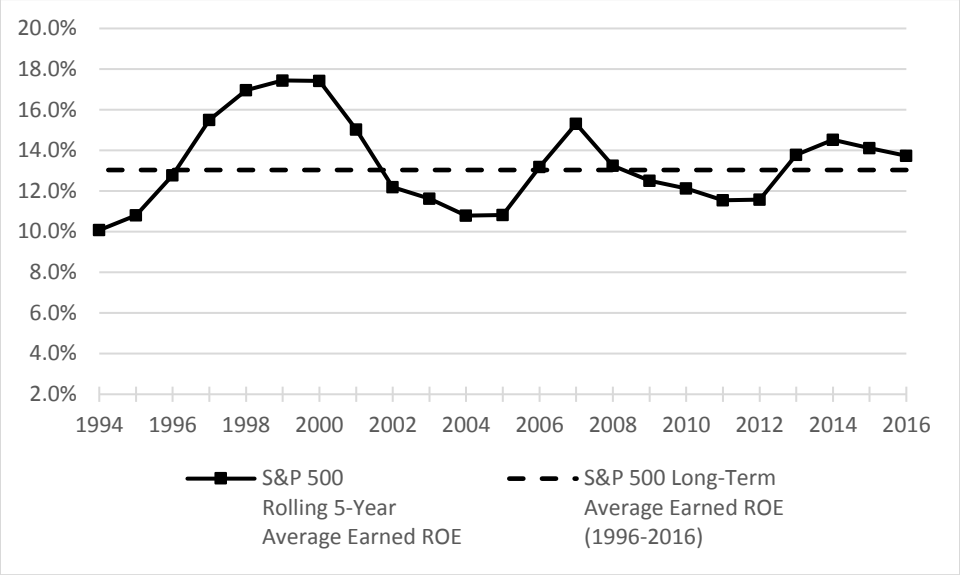
Electric and natural gas transmission operations both are federally regulated, capital-intensive infrastructure investments. To the extent the Commission's authorized ROEs for natural gas pipelines have not declined, the implied decline in required ROE for electric utilities (based on DCF results) warrants an investigation as to why the DCF model now produces lower results for electric utilities.

4.5 Earned ROEs for the Overall Market Have Not Declined; Therefore, a Declining Trend in ROEs for Electric Utilities Should Be Questioned

Another check on the reasonableness of the downward trend in required ROE for electric utilities implied by the two-step DCF model is the trend in the actual earned return on common equity for the overall equity market (as measured by the S&P 500 index; *see* Chart 4). As Chart 4 indicates, the weighted average earned return on common equity for companies in the S&P 500 index has fluctuated around its long-term average of approximately 13.00 percent, with the most recent five-year average reflecting a slightly higher return of 13.74 percent.[42]

[39] *S. Cal. Edison Co.*, Opinion No. 445, 92 FERC ¶ 61,070 at 61,261 (2000).
[40] *See* Opinion No. 531 at PP 35-36.
[41] Includes LNG. FERC-authorized ROEs based on general review of Commission orders available on: https://elibrary.ferc.gov/idmws/search/fercgensearch.asp.
[42] That is, the five-year average as of 2016. Source: Bloomberg Professional. Note, electric company risk as measured by the median Value Line Beta coefficient has been fairly stable since at least 2009, fluctuating between 0.70 and 0.75.

Chart 4: Moving 5-year Average Earned Return on Common Equity for S&P 500



To the extent the overall market's most recent five-year-average earned ROE has been above its long-term average, the downward trend in the required ROE for electric utilities implied by the two-step DCF model is a divergence from general trends in the competitive capital market.[43]

4.6 Conclusion

For more than 30 years, the Commission has relied on some form of the DCF model as its principal method of estimating the cost of equity for electric utilities.[44] However, in recent years, this approach is not producing results that achieve the stated FERC policy goals or meet long-standing capital attraction standards.[45] Other widely accepted models suggest required shareholder returns are higher.
Sole reliance on the two-step DCF method can produce volatile cost of equity estimates because inputs and, therefore, results can and do change significantly from day to day. Benchmarking against other models would help to establish more stable ROE estimates. As noted in *Hope*, the Commission is not bound to the use of any single formula or set of formulae in determining rates.[46] Section 6 of this paper discusses alternative ROE models that the Commission should consider as benchmarks, along with the two-step DCF methodology, when determining an electric company's authorized ROE.

[43] The earned return on common equity is a backward-looking accounting measure, whereas authorized ROEs are set prospectively based on market data. Nonetheless, the earned ROE provides an indication of whether there has been an overall downward trend on the return earned on equity investments for the market generally.
[44] *See, e.g.*, Opinion No. 531 at P 14, which notes the Commission has relied on the DCF model to provide an estimate of the investors' required rate of return for more than 30 years.
[45] In addition to the concerns expressed herein about the Commission's methodology for calculating ROE, the Commission has moved away from the broader goals of stability and predictability noted above by automatically setting any and all complaints for hearing and settlement, including those that "pancake" proceedings, creating an atmosphere of endless litigation and uncertainty. Despite the issuance of Opinion No. 531, transmission owners in New England and, by extension, the transmission-owning industry have endured six years of litigation without concrete ROEs. No clarity on the issue is in sight. Though not the focus of this white paper, the lack of certainty—which is a risk—caused by pancaked complaints and years of litigation has caught the eye of investor analysts and the financial community. The Commission should revisit its policy of allowing pancaked complaints as inconsistent with the FPA and the goals of certainty and efficiency.
[46] 320 U.S. at 602.

Results of alternative ROE models, as well as additional observable benchmarks (*e.g.*, the returns allowed to state-regulated utilities and the returns earned by public companies in the overall market), suggest the Commission's two-step DCF methodology may not always provide reasonable estimates of the cost of equity for electric transmission assets. As discussed in the next section, addressing specific issues with the application of the two-step DCF model may improve the likelihood the model will produce reliable estimates of market-required returns. The Commission has the flexibility to address these issues.

5: THE COMMISSION CAN ADJUST ASSUMPTIONS AND DATA INPUTS USED IN THE DCF METHODOLOGY TO HELP ENSURE THAT AUTHORIZED RETURNS ARE JUST AND REASONABLE

The following section discusses issues with the assumptions and data inputs used in the Commission's current application of the two-step DCF model and provides recommendations for potential modifications.

5.1 Proxy Group Selection for the Electric Power Industry

The cost of equity for a given enterprise depends on the risks attendant to the business in which the company is engaged. Because the cost of equity is a market-based concept, a group of publicly traded, risk-comparable companies typically is selected to serve as "proxies" in the application of ROE analyses. A significant benefit of using a proxy group is that it moderates the effects of anomalous, temporary events associated with any one company.

As noted, the Commission historically has relied on DCF analyses applied to proxy groups selected from the universe of companies considered electric utilities by Value Line. Selecting proxy companies that operate within the same general industry (*i.e.*, companies with regulated electric utility operations) is a practical and helpful approach to assembling an appropriately risk-comparable proxy group. It may, however, prove less reliable when electric companies are insufficient in number to provide a robust sample size, and there are no publicly traded, pure-play electric transmission companies to include in the proxy group.

The lack of a large, representative comparison group has become an increasing concern in recent years. Notably, the Value Line universe of electric utilities has declined in number over time, due to industry merger and acquisition activity. In early 2012, there were 52 companies in Value Line's universe of electric utilities across all credit ratings; by April 2017, the universe included 40 companies—a decline of nearly 25 percent.

Table 1: Mergers & Acquisitions in the Value Line Electric Utility Universe

	2012	2013	2014	2015	2016	2017
Electric Utility Count (beginning of year)	52	48	47	46	46	40
Removed Companies (Tickers; removed due to mergers and acquisitions)	• CV • CEG • PGN	▪ CHG ▪ NVE	▪ UNS	▪ TEG ▪ UIL	▪ CNL ▪ ITC ▪ POM ▪ TE	▪ EDE

Looking back further, the change has been even more extreme. The current universe is less than half the size it was in the early 1990s when EEI reported tracking 100 investor-owned electric companies.[47]

Not only has the number of publicly-traded electric companies declined as target companies are merged into acquirers, the acquiring companies themselves often are electric utilities. Because one of the Commission's screening criteria excludes companies that are party to a merger or acquisition during the six-month study period significant enough to distort DCF inputs, the increase in utility merger activity further reduces the universe of potential proxy companies. The ultimate effect is a smaller and possibly less robust proxy group to which the DCF model can be applied.

Acquisitions also may have a significant effect on the zone of reasonableness established by the two-step DCF approach. For example, the DCF result for UIL Holdings Corporation set the top of the zone of reasonableness established in Opinion No. 531, but the company was acquired by Iberdrola S.A. in February 2015. Likewise, TECO Energy, Inc.'s DCF result set the high end of the zone of reasonableness in Opinion No. 551; that company was acquired by Emera Inc. in September 2015.[48,49] Once those companies were acquired and no longer eligible proxies, the top of the range of reasonableness was reduced.

5.1.1 Potential Proxy Group Modification 1— Loosen Credit Rating Screen

Among the Commission's screening criteria is the requirement that proxy companies be rated within one credit rating "notch" (above or below) of the subject company (or companies) by both S&P's and Moody's ratings services. That requirement is overly restrictive, however, because the critical distinction from the perspective of equity holders is not based on credit ratings notches. Instead, it is based on whether a given company is rated above or below investment grade. Relaxing the credit rating threshold would increase the number of potential proxy companies while maintaining a sufficient degree of comparability, particularly for rate cases that involve a single electric company.

The proxy companies used to estimate the cost of equity for a company, or a group of companies, should have comparable equity risk. Credit ratings, however, are provided for the benefit of debt (bond) investors—they are not precise measures of equity (stock) risk. A credit rating is an evaluation of a borrower's ability to meet its financial obligations (debt payments) in a timely manner. Because debt and equity are fundamentally different securities with different risk and return profiles, different lives, and different investors, there is not a direct relationship between credit ratings and the cost of equity.[50]

Because credit ratings can provide general information regarding risk and access to debt capital, they can provide a relevant data point. Credit ratings, however, are not direct measures of equity risk and the salient issue for selecting proxy companies is whether or not a company is below investment grade. Being below investment grade can meaningfully impair access to capital at reasonable terms and cost, and may preclude some institutional investors from purchasing the company's stock. Loosening the credit rating screening criteria to include all investment grade utilities would expand the pool of utilities available for inclusion in

[47] *See* Edison Electric Institute, *1992 Financial Review—Annual Report of the Investor-Owned Electric Utility Industry* (1993), at 43. The latest EEI index of investor-owned electric utilities included 44 companies; *see*, Edison Electric Institute, *2016 Financial Review—Annual Report of the U.S. Investor-Owned Electric Utility Industry* (2017), at 101.
[48] Opinion No. 531 at P 125 and Appendix.
[49] *Ass'n of Businesses Advocating Tariff Equity, et al. v. MISO*, Opinion No. 551, 156 FERC ¶ 61,234 at PP 20 and 65 (2016).
[50] For example, debt investors have a contractual, priority claim on cash flows not available to equity investors, and, as such, equity investors bear the residual risk of ownership. Further, because the life of debt is finite, debt investors' exposure to business and financial risk likewise is finite. Equity, on the other hand is perpetual and as such, equity investors are exposed to residual risk in perpetuity.

the proxy group. At a minimum, the Commission should include within the proxy group utilities within one notch of the subject utility based on either S&P or Moody's ratings, rather than both.

Charts 5a and 5b show that as of April 30, 2017, the majority of electric utilities fall into Standard & Poor's BBB- to A ratings range and Moody's equivalent Baa3 to A3 ratings range.[51]

Chart 5a: Value Line Electric Utilities—S&P's Credit Ratings

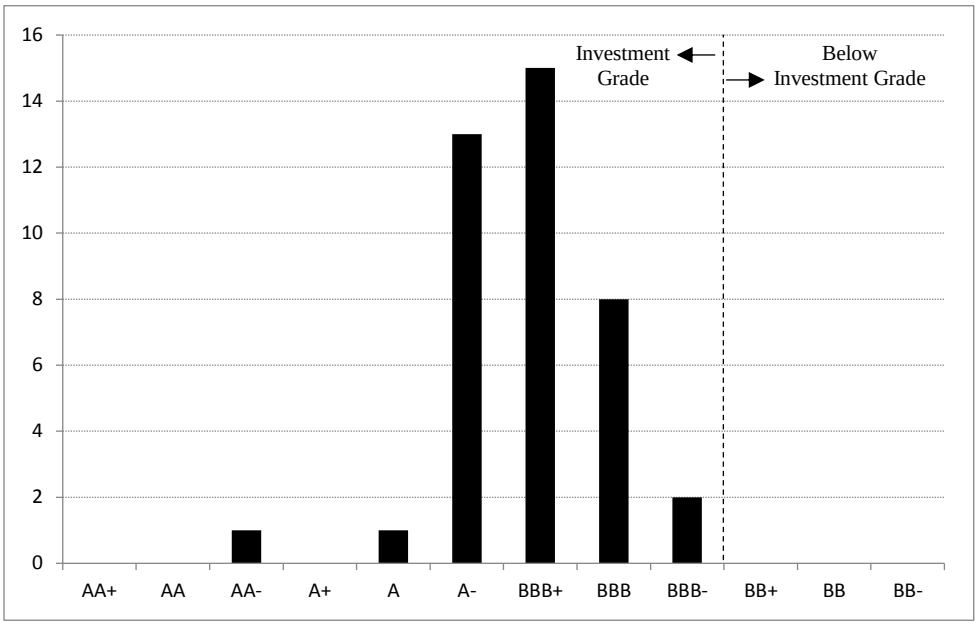
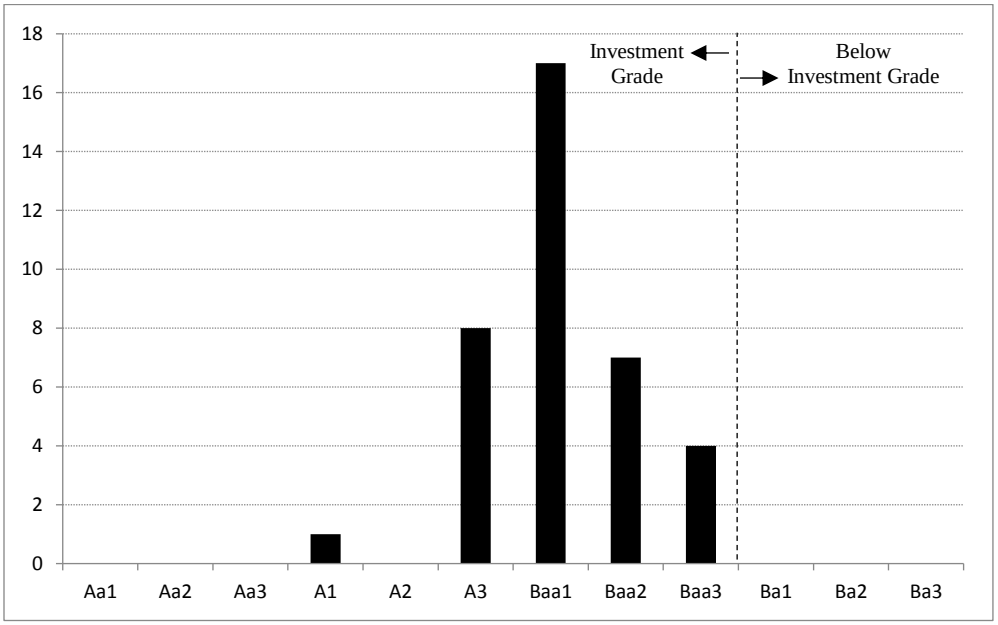


Chart 5b: Value Line Electric Utilities—Moody's Credit Ratings



[51] Source: SNL Financial.

Table 2 provides two-step DCF results as of April 30, 2017, for a set of potential proxy groups selected using S&P credit rating ranges. If there was a direct relationship between credit ratings and the cost of equity, we would expect to see the lowest credit ratings associated with the highest cost of equity, reflecting the assumption that changes in ratings notches directly reflect changes in equity risk. However, the relationship is not demonstrated in the two-step DCF model results. Rather, the lowest DCF result (8.07 percent) is associated with the lowest credit rating (BBB-); there is no meaningful difference in DCF results among the remaining ratings notches. This demonstrates that the present credit rating criteria do not serve as an appropriate basis to fine-tune ROE estimates based on relative risk.

Table 2: Median Two-Step DCF Results Using S&P Credit Rating Screen Scenarios[52]

Company Rating:	No Screen	A-	BBB+	BBB	BBB-
Proxy Rating Range (-/+ one notch)	All Investment Grade	BBB+/A	BBB/A-	BBB-/BBB+	BB+/BBB
Median DCF	8.81%	8.88%	8.86%	8.79%	8.07%
Proxy Group Count	36	27	33	23	10

5.1.2 Potential Proxy Group Modification 2—Consider a Separate DCF Analysis Using Companies from Other Industries as a Secondary Benchmark

Because there are no publicly traded, pure-play transmission companies, the proxy group already implicitly reflects business segments beyond electric transmission operations. The *Hope* and *Bluefield* comparability standard does not limit the selection of proxy companies to those operating in the same industry. Cost of equity estimates from other rate-regulated industries, or non-utility companies with similar overall equity investment risk levels, may provide a useful corroborating method to determine returns that will enable electric transmission assets to attract capital efficiently and effectively in an open and competitive market.

Cost of equity estimates for oil and natural gas pipelines, for example, would provide information regarding the return expected from the wider breadth of investor choices truly available when investing in the utility industry. As noted above, the Commission's decision to begin using the two-step DCF model for electric utilities was premised, in part, on the conclusion that electric utilities have reached a more mature stage of development and now can be valued in a similar manner as oil and natural gas pipelines. Pipeline companies to consider for inclusion in future benchmark analyses when estimating ROE for electric transmission companies may include Kinder Morgan, Boardwalk Pipeline Partners, EnLink Midstream Partners, Energy Transfer Partners, Spectra Energy Partners, TC Pipelines, and Williams Partners LP.[53]

In addition, because utilities must compete for capital with the universe of investment opportunities available in the market place, non-regulated firms with comparable total risk may provide a useful proxy for determining the cost of equity for electric transmission investments. A risk-comparable non-utility proxy group could be identified using selection criteria that screen based on risk characteristics including, but not necessarily limited

[52] Note: there were no Value Line electric utilities with an S&P credit rating of BB+. Although there is no utility rated below investment grade at present, such companies may have a different risk profile and, therefore, should be excluded.

[53] Pipeline companies listed are covered by Value Line and report greater than 50 percent of operating income from oil and natural gas transmission operations. We recognize the Commission opened a notice of inquiry in Docket No. PL17-1-000 to look at the use of master limited partnerships ("MLPs") in proxy groups for MLP rate proceedings, with regard to the issue of income tax recovery.

to, (1) credit rating (*i.e.*, requiring investment grade ratings); (2) Beta coefficient; (3) Value Line Safety Rating; (4) Value Line Financial Strength Rating; (5) dividend yield; (6) market capitalization; and (7) country of domicile.

5.2 Selection of Analyst Growth Rate Estimates

As noted above, the DCF model requires an estimate of investors' expectations regarding earnings growth. As also discussed earlier, the Commission's two-step DCF approach assigns analysts' growth estimates two-thirds weight in the final composite growth estimate. Although the Commission has noted it does not require the use of analyst growth rate estimates from IBES,[54] in practice the Commission has relied on IBES data. The sole reliance on near-term earnings growth projections reported by a single source (*i.e.*, the Thomson Reuters' IBES database) unnecessarily limits the breadth of market data used in the model.

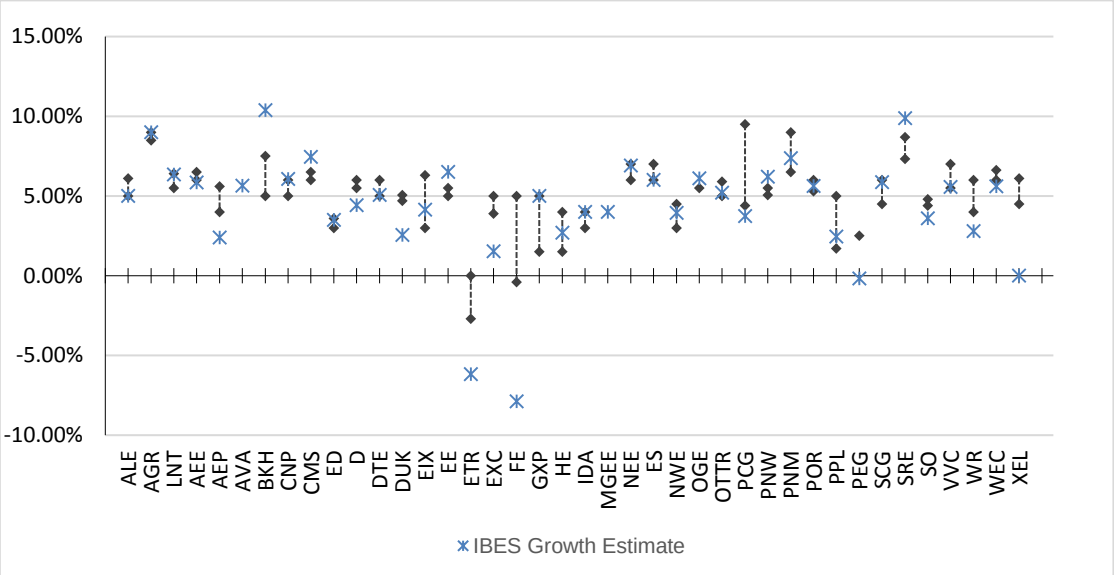
Investors have access to many credible sources of growth rate estimates, and different investors will have different growth assumptions. Institutional and other large investors often employ analysts (sometimes referred to as "buy side" analysts) who may develop their own growth estimates rather than relying entirely on reported consensus estimates.

Consequently, a single data provider may not adequately capture the growth rate expectations associated with the marginal investor driving stock valuations at any given time. In the current market environment, for example, relatively high industry valuations may reflect above-average earnings growth rate assumptions by some investors.[55] Reported growth rate projections from a single source, whether IBES or any other provider, may not capture those expectations. While they presumably represent averages from multiple sources, consensus growth estimates from different data providers may vary widely for a given company, depending on the identity, number, and reporting frequency of the underlying contributors. To illustrate, Chart 6 compares IBES' reported EPS growth rate projections to the range of growth rates reported by other widely used data sources including Bloomberg, Zacks, and Value Line.

[54] *See* Opinion No. 531 at P 90. The Commission did not mandate the use of IBES growth rates, but did say they should be from a consistent source. "[W]hile we reaffirm that there may be more than one valid source of growth rate estimates, in order to ensure that growth rate estimates are internally consistent in an ROE analysis we find it inappropriate to use estimates from different sources for different proxy group companies."

[55] Current electric utility P/E ratios are above their long-term historical average levels and are elevated relative to the overall market.

Chart 6: EPS Growth Projections—IBES vs. Zacks, Value Line, and Bloomberg (as of April 30, 2017)[56]



As Chart 6 points out, published growth rate projections vary for the same company, sometimes significantly so. Because restricting growth rate estimates to a single source, such as IBES, fails to account for the range of growth rate assumptions likely used by investors, that practice also may produce ranges of results that do not capture investors' return requirements fully.

5.2.1 Potential Analyst Growth Rate Modification—Use Growth Rate Projections from Multiple Providers

Because the DCF model is used to estimate investors' required ROE, it is important that the inputs to the model reflect the assumptions made by investors. Investors use data from a variety of data sources to develop their return expectations, and a wide range of growth estimates may be reflected in stock prices. Relying on growth rate data from multiple credible sources and calculating high and low two-step DCF estimates using the highest and lowest growth rate estimates to set the zone of reasonableness, regardless of whether those estimates came from the same investor service company, would provide a range of ROE estimates that reflects the range of assumptions relied on by individual market participants.[57] Including additional sources of published growth rate projection data would be consistent with the Efficient Market Hypothesis, which suggests market prices reflect all publicly available information. Considering a range of high and low results would be similar to the approach previously used by the Commission when it relied on the one-step DCF model. Doing so also would help to address concerns that parties themselves have raised regarding IBES estimates.

[56] IBES growth rate estimates reported by Yahoo!Finance. Note, Value Line growth rates are reported quarterly.
[57] To be clear, we do not recommend the Commission average the results, as this would not reflect the full range of investor expectations. Rather, the DCF should be performed for each company using investor service data separately. The lowest DCF result would set the bottom of the range (subject to a low-end threshold screen), and the highest DCF result would set the high end of the range.

5.3 Long-Term Growth Rate Estimate and Its Weighting

The blended growth rate used in the Commission's two-step DCF methodology assigns one-third weight to long-term projections of GDP growth, which gives the GDP growth estimate a significant influence on the end result. There is, however, a lack of evidence to indicate that investors' growth expectations for electric utilities have begun to converge with the economy.

As the Commission has noted, long-term projections are "inherently more difficult to make, and thus less reliable."[58] Even if investors have started to assume electric utilities' growth will begin to converge to GDP growth in the foreseeable future, it is not clear that the economic forecasts relied on by the Commission (from SSA, EIA and Global Insights) accurately reflect what investors expect in perpetuity.

The long-term GDP projections from sources such as those used by the Commission generally represent growth assumptions over a fixed period of time and reflect assumptions regarding a range of uncertain future conditions such as tax and trade policies, central bank monetary policies, worker productivity growth, workforce participation, and many other factors.[59] Rather than assume current policies and economic conditions will remain in place forever, a reasonable approach is to rely on historical average nominal growth observed over an approximately 90-year period—including a number of economic cycles, monetary policy conditions, and fiscal policy conditions—as a benchmark for expected long-term future growth. As a point of reference, the 4.39 percent GDP growth projection used by the Commission in Opinion No. 531 is 174 basis points below the long-term historical nominal GDP growth of 6.13 percent reported by the U.S. Bureau of Economic Analysis.[60]

Table 3 provides another perspective, comparing GDP projections consistent with the Commission's prescribed approach (averaging together SSA, EIA, and Global Insights estimates) to the long-term growth rate implied by state-level authorized ROEs and contemporaneous electric utility dividend yields.[61]

[58] Opinion No. 531 at P 21, citing Opinion 414-A.
[59] For example, EIA's "reference case" forecasts assume factors, such as current laws and regulations, are unchanged throughout the forecast period (*see* Annual Energy Outlook 2017 with projections to 2050, at 6.)
[60] *See* Bureau of Economic Analysis, "Current-Dollar and 'Real' Gross Domestic Product," May 26, 2017 release. Nominal GDP grew from $104.60 billion in 1929 to $18.57 trillion in 2016, reflecting a geometric average growth rate of 6.13 percent annually.
[61] Note, this analysis is representative only. The specific dividend yields of the companies used as proxies in the individual rate cases will vary.

Table 3: Growth Rates Implied by Recent State-Authorized ROEs[62]

Year	Average of Recent State-Allowed ROEs	Average Electric Utility Dividend Yield	Implied Growth Rate
2017 YTD	9.64%	3.07%	6.47%
2016	9.60%	3.17%	6.33%
2015	9.60%	3.55%	5.94%
2014	9.75%	3.51%	6.13%
2013	9.81%	3.83%	5.87%
2012	10.01%	3.91%	5.98%
2011	10.19%	4.17%	5.89%
2010	10.29%	4.46%	5.71%
2009	10.52%	4.69%	5.70%
2008	10.37%	3.64%	6.61%
2007	10.31%	2.90%	7.30%
Average:	10.01%	3.72%	6.18%

The implied growth rates shown in Table 3 are generally consistent with the assumption that over time, GDP growth reverts to its long-term mean (*i.e.*, the 6.13 percent long-term growth rate noted above). Over the same 2007 to 2017 period, long-term growth rates calculated using the approach adopted by the Commission would have ranged from approximately 4.30 percent to 4.70 percent, averaging 4.40 percent.[63]

Finally, electric utility P/E ratios currently are elevated relative to both their historical average level and relative to the broad market as measured by the S&P 500. If valuations are driven by investors' expectations that electric utility growth rates are beginning to moderate and converge toward a relatively lower long-term rate of U.S. economic growth, it is not clear why their P/E ratios would be higher now than historically observed. To the extent current stock price valuations are driven by factors other than long-term GDP assumptions, the rationale for using long-term GDP projections in the two-step DCF model is undermined.

5.3.1 Potential Long-Term Growth Modification 1—Lower Weight Given to GDP Growth, or Discontinue Use

The Commission's use of GDP growth in the two-step DCF model does not adequately reflect the continuing growth opportunities for electric companies.[64] The industry is undergoing significant transformation, and public utilities are making significant investments to make the energy grid smarter, cleaner, stronger, more dynamic, and more secure and to integrate a rapidly changing mix of energy resources.[65] Investors may see

[62] Source: SNL Financial. Dividend yield based on the market capitalization weighted SNL electric utility index. Consistent with the half-growth form of the constant growth DCF model used by the Commission, the implied growth rate is calculated as (ROE - Yield / (.5 x Yield +1).
[63] Based on a review of long-term growth rates referenced in the Commission's electric, oil, and natural gas transmission rate case orders.
[64] This paper does not explore the relationship between other Commission jurisdictional entities and GDP growth.
[65] *See, e.g., From growth to modernization: The changing capital focus of the U.S. utility sector*, Deloitte, June 2016.

potential growth paths for utilities that differ from GDP indicators, and as such, they may give little or no weight to the long-term GDP growth rate. Therefore, it would be reasonable to reduce the weight given to GDP growth in the Commission's blended growth rate calculation (*e.g.* from one-third to one-fifth) or to remove GDP growth from the application of the DCF analysis altogether (while still considering other adjustments discussed in this paper).

Moreover, if investors believe that the public utility industry is in the mature phase of its lifecycle, it should already be reflected in the reported growth rate expectations for public utilities. Accordingly, there is no need to adjust investors' earnings growth rate expectations toward macroeconomic estimates of long-term GDP growth.

To the degree there is inherent uncertainty associated with the long-term GDP growth estimate, caution should be used when assigning the weight given to GDP forecasts.

5.3.2 Potential Long-Term Growth Modification 2—Adopt a Revised GDP Growth Calculation

The economic forecasts of nominal GDP growth relied on by the Commission may not be congruent with the long-term growth expectations reflected in utility stock market prices. Because the DCF methodology places investors' expectations of future growth at the center of its assumptions, utilizing an unrepresentative growth assumption would lead to distorted ROE estimates. An alternate approach is to assume that, over time, real GDP growth is mean-reverting. Morningstar's Ibbotson SBBI Valuation Yearbook, for example, describes a long-term GDP estimate for use as a long-term DCF growth rate that adds a market-based measure of inflation to the historical average real GDP growth rate. Morningstar's approach assumes real GDP will converge toward its historical average growth rate, while forward-looking inflation is estimated using the spread between nominal and inflation-protected U.S. Treasury securities.[66] As of April 2017, Morningstar's method produces a long-term nominal GDP estimate of 5.27 percent, based on a historical real GDP growth of 3.22 percent and a projected long-term inflation rate of 2.05 percent.[67]

5.4 Low-end Threshold Test

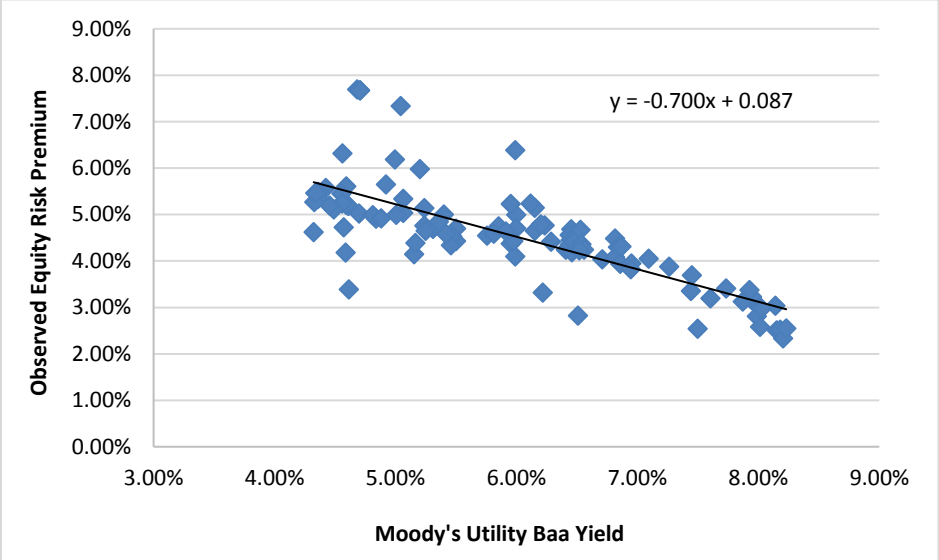
As noted in Opinion No. 531, the Commission precedent has been to exclude low-end results "whose cost of equity estimates fail tests of reasonableness and economic logic."[68] To exclude ROE estimates that "are sufficiently low that an investor would consider the stock to yield essentially the same return as debt," the Commission historically has applied a low-end threshold of approximately 100 basis points above utility bond yields.[69] The Commission has noted the low-end test is a "flexible test."[70]

The Commission's general approach of using the cost of debt to establish a minimum threshold for estimates of the required ROE is logical, as equity investors require a risk premium above the cost of debt to compensate them for the residual risks associated with owning common stock. Debt holders are entitled to contractually obligated payments, have protections provided by debt covenants and other restrictions, and have priority claim on assets in the event of insolvency. Equity holders are not entitled to the same protections and, therefore, are exposed to incremental (sometimes referred to as "residual") business and financial risks.

[66] *See Ibbotson SBBI 2013 Valuation Yearbook*, Morningstar, Inc., at 50-52.
[67] Geometric average U.S. GDP growth from 1929-2016 as reported by the U.S. Bureau of Economic Analysis; projected inflation calculated as the 30-day average difference between nominal and inflation-protected 30-year Treasury yields as of April 28, 2017.
[68] Opinion No. 531 at P 119.
[69] *Id*. at P 122.
[70] *Id*.

The required equity risk premium, however, changes over time. Prior research has shown, for example, the equity risk premium to be inversely related to the change in the level of interest rates.[71] That is, as interest rates decline, the required risk premium increases (and, as interest rates increase, the required risk premium declines). As shown in Chart 7a, there is an inverse relationship between interest rates and the equity risk premium implied by Commission-authorized ROEs; since 2007, the equity risk premium increased approximately 70 basis points for every 100-basis point decline in Baa utility bond yields.[72]

Chart 7a: Inverse Relationship Between Equity Risk Premium and Baa Utility Bonds Yields—Commission-Authorized ROEs



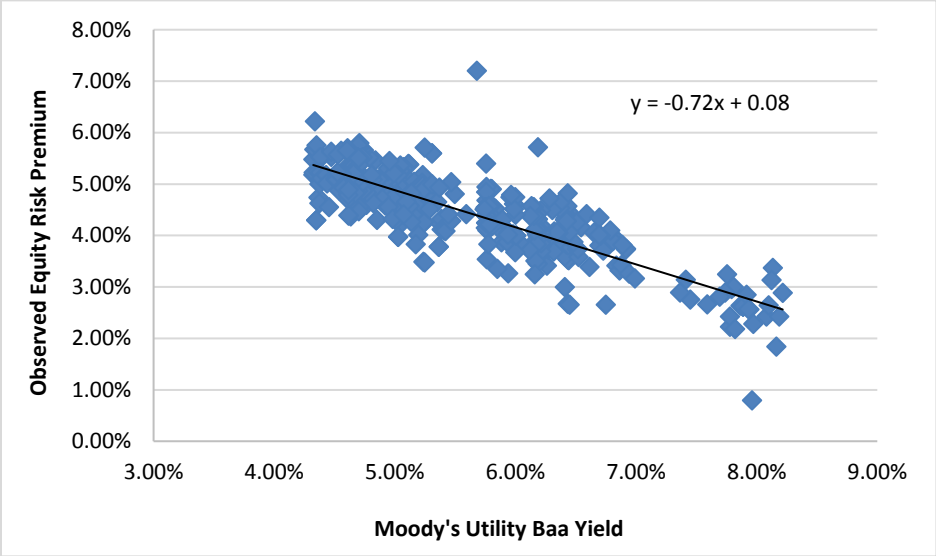
Similarly, the equity risk premium implied by state-level authorized ROEs increased by approximately 72 basis points for every 100 basis point decline in Baa utility bond yields.[73]

[71] *See, e.g.*, Robert S. Harris and Felicia C. Marston, "Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts," *Financial Management*, Summer 1992, at 63-70; Eugene F. Brigham, Dilip K. Shome, and Steve R. Vinson, "The Risk Premium Approach to Measuring a Utility's Cost of Equity," *Financial Management*, Spring 1985, at 33-45; and Farris M. Maddox, Donna T. Pippert, and Rodney N. Sullivan, "An Empirical Study of Ex Ante Risk Premiums for the Electric Utility Industry," *Financial Management*, Autumn 1995, at 89-95.

[72] 6-month average Baa-rated utility bond yields. Commission-authorized base ROEs; data from general review of Commission orders available at: https://elibrary.ferc.gov/idmws/search/fercgensearch.asp.

[73] 6-month average Baa-rated utility bond yields. Authorized ROE data from Regulatory Research Associates.

Chart 7b: Inverse Relationship Between Equity Risk Premium and Baa Utility Bonds Yields—State-Authorized ROEs



The Commission has used a risk premium generally close to 100 basis points since at least 2006, when it found results 97 to 126 basis points above the average yield for public utility debt were too low to be credible.[74] Given the relatively large changes in the capital market environment over that period, including unprecedented changes in monetary policy, a premium near 100 basis points no longer provides a reasonable low-end threshold check and should be increased. The cost of equity is a forward-looking concept, and the Commission's low-end tests should also be forward-looking.

5.4.1 Potential Low-End Test Modification 1—Use a Dynamic Threshold That Reflects Changes in Interest Rates

There is a well-established inverse relationship between interest rates and the equity risk premium. Recognizing and accounting for that relationship would improve the low-end test. Assuming the equity risk premium increases approximately 70 basis points for every 100-basis point decline in utility bond yields (*see* Chart 7a), the nearly 200 basis point decline in the six-month average Moody's Baa utility bond yield since 2006 suggests the risk premium should currently be approximately 240 basis points.

5.4.2 Potential Low-End Test Modification 2—Consider Using Published Bond Yield Forecasts

In response to extraordinary financial market dislocation in 2008, the Federal Reserve: (1) lowered the Federal Funds rate from 5.25 percent in September 2007 to near zero by December 2008; and (2) purchased approximately $4 trillion of U.S. agency debt and mortgage-backed securities with the specific intent of putting "downward pressure" on long-term interest rates.[75] As of the end of 2016, the Federal Reserve held approximately 36 percent of the supply of U.S. government Treasury securities with maturities over 10 years.[76] In December 2015, the Federal Reserve raised the Federal Funds rate for the first time in nine years

[74] *See Kern River Gas Transmission Company*, Opinion No. 486, 117 FERC ¶ 61,077 at P 135 (2006), *order on reh'g*, Opinion No. 486-A, 123 FERC ¶ 61,056 (2008), *order on reh'g*, Opinion No. 486-B, 126 FERC ¶ 61,034 (2009).
[75] *See* http://www.federalreserve.gov/monetarypolicy/openmarket.htm. *See also*: Federal Reserve Board Schedule H.4.1.
[76] Federal Reserve Bank of New York, *Domestic Open Market Operations During 2016*, April 2017 at 25.

and began the process of rate "normalization." More recently the Federal Reserve has begun addressing the "unwinding" of the balance sheet, although the ultimate path and timing of that process remain uncertain. [77]

As the Federal Reserve continues to move forward with interest rate normalization, investors expect rates to continue to increase from their historically low levels. As of June 2017, consensus projections provided by *Blue Chip Financial Forecasts* show corporate Baa debt yields are expected to increase from 4.7 percent in Q2 2017 to 5.6 percent in Q3 2018.[78] Corporate Baa debt yields are expected to further increase to 6.3 percent by 2020.[79] Applying the Commission's approximately 100 basis point premium to published consensus bond yield forecasts would address investors' expectations for changing capital market conditions. Using *Blue Chip Financial Forecasts*' projected Baa debt yields, the low-end threshold would currently be in the range of 6.6 percent to 7.3 percent.

[77] Minutes of the Federal Open Market Committee, March 14-15, 2017. The FOMC minutes indicate committee participants anticipate a change in reinvestment policy later this year, which would be a significant first step in unwinding the additions made to the Federal Reserve's balance sheet as part of QE.
[78] *See* Blue Chip Financial Forecast, Vol. 36 No. 6, June 1, 2017, at 2.
[79] *See id* at 14.

6: THE COMMISSION SHOULD ALSO CONSIDER BENCHMARKING AGAINST ALTERNATIVE MODELS TO HELP ENSURE THAT AUTHORIZED RETURNS ARE JUST AND REASONABLE

The following section provides a high-level overview of several common ROE models, which can be used as credible benchmarks for determining the cost of equity for Commission-regulated electric utilities. Regardless of the models employed, informed judgment—not just mechanical application of a methodology—should be applied to determine the applicability of individual model results.

All ROE estimation methods, including the DCF approach, are subject to limiting assumptions that may become more or less consistent with market conditions as those conditions change. Any ROE model may be affected by data inputs that fail to reflect investors' true expectations. For that reason, academics and practitioners tend to rely on multiple methods when valuing investments.[80] The results of each model provide useful information that should be used to inform the determination of the market required ROE.

The models discussed below include the CAPM, Risk Premium and Expected Earnings analyses that the Commission has recently considered when determining where within the zone of reasonableness established by the two-step DCF model to set the allowed ROE. In addition, a more general form of the multi-stage DCF model is discussed. The multi-stage DCF model offers an alternative to the two-step DCF method, which would allow for additional flexibility regarding input assumptions.

6.1 The Bond Yield Plus Risk Premium Model

The Bond Yield Plus Risk Premium model, or "Risk Premium" model, is based on the basic financial principle of risk and return, *i.e.*, that investors require greater returns for bearing greater risk. The Risk Premium approach recognizes that common equity capital has greater investment risk than debt capital, as common equity shareholders are behind debt holders in any claim on an entity's assets and earnings. The Risk Premium approach specifically recognizes that equity investors require a premium to take on the additional risks associated with equity ownership.

Recall that the cost of equity cannot be directly determined or observed. However, a forward-looking estimate of the cost of equity can be derived based on directly observed bond yields and an estimated Equity Risk Premium over those bond yields. According to Risk Premium theory, the cost of equity equals the expected cost rate for long-term debt capital, plus a risk premium as compensation for residual equity risk.

The traditional Risk Premium formula can be expressed as:

Equation [4]—Traditional Risk Premium Model

$$Cost\ of\ Equity = Bond\ Yield + Equity\ Risk\ Premium$$

[80] *See, e.g.,* Eugene Brigham and Michael Ehrhardt, *Financial Management: Theory and Practice*, 12th Ed. (Mason, OH: South-Western Cengage Learning, 2008), at 346.

A reasonable approach to calculating the risk premium for electric utilities is to use authorized ROEs as the historical measure of the cost of equity.[81] The Commission's past authorized equity returns are an appropriate estimate of the historical ex-ante cost of equity because they reflect the input and analysis of expert witnesses, as well as the Commission's reasoned judgment regarding the forward-looking cost of equity. The Risk Premium model results shown in Charts 1a and 1b (Section 4) use this approach and are consistent with actual authorized ROEs.[82,83]

Academic research has demonstrated that the Equity Risk Premium is inversely related to the level of interest rates; i.e., as interest rates fall, the Equity Risk Premium increases (as discussed in Section 5). Therefore, given the dynamic nature of interest rates, it is not reasonable to rely on a long-term historical average Equity Risk Premium. This is particularly relevant given the low level of current U.S. Treasury yields.

One approach to estimating the forward-looking Equity Risk Premium, therefore, is to perform a regression analysis using the observed Equity Risk Premium over time as the dependent variable and rates on long-term bonds as the independent variable. By applying the regression coefficients to current and expected bond yields, a forward-looking ROE is developed. Using sufficient historical data allows the estimated Equity Risk Premium to reflect market conditions over various economic cycles, with the understanding that, looking forward, investors also will face varying economic and capital market cycles.

Some of the benefits of the Risk Premium model include:

- The model is not dependent on the assumptions required for the DCF model enumerated earlier, including that current market conditions and company policies will persist in perpetuity.
- The bond yield component of the model directly reflects changes in the interest rate environment.
- Trends in the model results tend to be smooth over time, avoiding sharp swings in results that can be associated with the DCF model. As discussed, reducing the uncertainty and volatility of expected future returns is of paramount importance for attracting capital to an essentially irreversible investment in assets with multi-year development cycles and long recovery lives.
- When applied using the Commission's past authorized ROEs as the measure of the cost of equity, the Risk Premium model also provides a measure of consistency in the rate-setting paradigm.

The primary challenge with the implementation of the model is determining a forward-looking Equity Risk Premium, which changes over time.

6.2 Capital Asset Pricing Model

The CAPM analysis is a risk premium approach that estimates the cost of equity for a given security as a function of a risk-free return plus a risk premium (to compensate investors for the non-diversifiable or "systematic" risk of that security). As shown in Equation [5], the CAPM is defined by four components, each of which theoretically must be a forward-looking estimate:

[81] The model reflects valuation techniques relied on in practice, and is referenced in both academic and industry practitioner literature. *See, e.g.*, CFA Level I Program Curriculum, Volume 4, at 52. *See also* Morin, Roger A., *New Regulatory Finance*, Public Utilities Report, Inc., 2006, at 123-124.

[82] The bond yield component of the model based on then-prevailing level of Moody's Baa-rated public utility long-term debt yields.

[83] See Appendix C for detailed data on the historical Risk Premium analysis results.

Equation [5]—Capital Asset Pricing Model

$$k_e = r_f + \beta\,(r_m - r_f)$$

Where:

k_e	=	*The required market ROE for a security*
β	=	*The Beta coefficient of the security*
r_f	=	*The risk-free rate of return*
r_m	=	*The required return on the market as a whole*

In Equation [5], the term ($r_m - r_f$) represents the Market Risk Premium ("MRP").[84] According to the theory underlying the CAPM, since unsystematic risk can be diversified away by adding securities to their investment portfolio, investors should be concerned only with systematic or non-diversifiable risk. Non-diversifiable risk is measured by the Beta coefficient, which is defined as:

Equation [6]—Beta Coefficient

$$\beta_j = \frac{\sigma_j}{\sigma_m}\,\rho_{j,m}$$

Where:

σ_j	=	*The standard deviation of returns for a company*
σ_m	=	*The standard deviation of returns for the broad market*
$\rho_{j,m}$	=	*The correlation of returns between company "j" and the broad market*

Where σ_j is the standard deviation of returns for company "*j*"; σ_m is the standard deviation of returns for the broad market (as measured, for example, by the S&P 500 Index), and $\rho_{j,m}$ is the correlation of returns between company *j* and the broad market. The Beta coefficient, therefore, represents both relative volatility (*i.e.*, the standard deviation) of returns and the correlation in returns between the subject company and the overall market. Intuitively, higher Beta coefficients indicate that the subject company's returns have been relatively volatile, exaggerating returns on the overall market. If a company has a Beta coefficient of 1.00, it is as risky as the market. The CAPM results in Charts 1a and 1b (section 4) use this approach. [85]

A central theme of the CAPM is that rational investors make investment decisions reflecting an inherent aversion to taking on additional risk without being compensated by additional returns. In the context of the CAPM, risk is defined as the uncertainty, or variability, of returns. The systematic portion of risk is that which can be attributed to the market as a whole, while non-systematic risk is attributable to the idiosyncratic nature of the subject company itself. As noted, systematic risk is measured by the Beta coefficient within the CAPM structure. Because the CAPM assumes that all other risk, *i.e.*, all unsystematic or diversifiable risk, can be eliminated through diversification, only systematic risk is reflected in the cost of equity.

Some of the benefits of the CAPM approach include:

[84] The Market Risk Premium is defined as the incremental return of the market over the risk-free rate.

[85] These results are derived using the 30-day average of the 30-year U.S. Treasury bond yield as the risk-free rate, Beta coefficients reported by Value Line, and a market required rate of return based on a market capitalization-weighted constant growth DCF analysis of the companies in the S&P 500 using consensus growth rates reported by Bloomberg. CAPM results using this methodology have generally been in line with average authorized electric ROEs over the past 10-years. See Appendix B for historical CAPM results.

- The model is a widely taught and commonly used approach to estimate the cost of capital.[86] Research shows that investors' investment decisions are consistent with use of the CAPM to compute the cost of equity.[87]
- The model is not dependent on the assumptions required for the DCF model enumerated earlier, including that current market conditions and company policies will persist in perpetuity.
- The model is premised on the risk/reward relationship that is fundamental to finance and investment theory and, therefore, addresses the *Hope* principle that the allowed return should be commensurate with the relative risk of the investment.
- The model directly incorporates market return data not included in the DCF model, including interest rate levels (through the risk-free rate) and overall market return expectations (through the MRP).

A challenge with implementing the CAPM, however, is that all three inputs (the risk-free rate, the Beta coefficient, and the MRP) vary over time and are sensitive to variations in input assumptions. Model inputs often are the subject of differences in reasoned judgment between analysts in regulatory proceedings. For example, calculation of the Beta coefficient is derived from observable stock price data, but it requires individual judgment regarding the return intervals (*e.g.*, daily, weekly, or monthly returns), measurement period (*e.g.*, one, two or five years), and the benchmark market index to use (*e.g.*, the S&P 500 or the NYSE Index). To the extent there are differences in the assumptions used to estimate the models' inputs, the results can vary significantly. In the context of estimating the appropriate return on the original cost of assets for ratemaking purposes, it is therefore reasonable to gauge whether the assumptions used produce results in line with observed returns on common equity over time.

It is also worth noting that the implied required returns based on the CAPM approach for the overall market have been consistent with the actual earned returns on book equity for the market (*see* Chart 4 above), which averaged 13.24 percent and ranged between approximately 11.5 percent and 15.3 percent over the past 10 years.[88]

6.3 The Expected Earnings Method

The Expected Earnings method calculates the projected returns on book value for comparable electric utilities based on analysts' published projections of electric utility companies' earnings and book equity. One benefit of the Expected Earnings method is that the expected values are directly observable rather than inferred using a mix of market-based pricing data and secondary assumptions about investor expectations (*e.g.*, growth rates).

Another benefit is that the model provides a perspective on the expected return on book value available to comparable companies. For example, the dividend yield, a principal component of the DCF analysis, is a market-derived parameter. Because the DCF model calculates the discount rate that equates the future stream of cash flows to the current market price, it calculates the required return on the market value of the utility's stock (rather than the book value of equity). Similarly, the CAPM calculates a required return on market price (*e.g.*, risk is based on movements in stock prices, and required risk compensation is based on expected returns on a market index). In practice, those returns are applied to the book value of the utility's equity to determine the revenue requirement. The market value, except under very rare circumstances, is not equal to

[86] *See, e.g.*, Ibbotson, *SBBI 2013 Valuation Yearbook*, at 43; Shannon P. Pratt, Roger J. Grabowski, *Cost of Capital: Applications and Examples*, 4th ed. (John Wiley & Sons, Inc., 2010), at 79; Eugene Brigham and Michael Ehrhardt, *Financial Management: Theory and Practice*, 12th ed. (Mason, OH: South-Western Cengage Learning, 2008), at 346.
[87] *See* J. B. Berk and J. H. Binsbergen, "How Do Investors Compute the Discount Rate? They Use the CAPM," *Financial Analysts Journal* 73, No. 2, 2017, pg. 25-32.
[88] Based on rolling five-year average earned ROE.

the book value. Given this mismatch, it is useful to consider a direct measure of the expected return on the book value, versus market value, of electric utility stocks. The approach, therefore, is consistent with the *Hope* and *Bluefield* standards, in that it provides a useful benchmark in assessing whether a proposed return to be applied to a utility's book equity is commensurate with the expected returns available to other investments with comparable risks.

The model also provides a useful perspective because its results are independent from swings in market data. Models such as the DCF and CAPM, in contrast, can be limited by their reliance on a number of assumptions related to investor behavior (*e.g.*, prices reflect DCF-based intrinsic valuations) and efficiency (price volatility is an accurate measure of investors' perceptions of systematic risk).

Although the Expected Earnings approach is a useful method and benchmark, it is important to recognize that the model has limitations. For example, fewer data sources provide forward-looking book value estimates than earnings growth estimates (used in the DCF model) or Beta coefficients (used in the CAPM). In addition, over-reliance on the model could introduce an element of circularity between analysts' expectations and Commission-authorized returns that would become disconnected from market pricing signals.

The Expected Earnings analysis results shown in Charts 1a and 1b are based on Value Line's three-to-five year projections of return on common equity and shares outstanding. Because Value Line calculates the expected earned ROE based on common shares outstanding at the end of the period, the returns are adjusted to reflect growth in common shares. The semi-annual mean results of the Expected Earnings analysis have generally been consistent with average authorized Commission ROEs over the past 10 years.[89]

6.4 The Multi-Stage DCF Model

The two-step DCF method relied on by the Commission uses the constant growth DCF model, but assumes a blended growth rate based on near-term and long-term growth estimates. As previously stated, the general form of the DCF model presented in Equation [1] can be estimated only if one makes simplifying assumptions. A less-restrictive version of the growth assumptions leading to Equation [2] allows for growth to change over time. For example, one might assume a two-stage growth model as follows:

Equation [7]—Two-Stage Growth DCF Model

$$P = \frac{D_0(1+g_a)}{(1+k)} + \frac{D_0(1+g_a)^2}{(1+k)^2} + \cdots + \frac{D_0(1+g_a)^T}{(1+k)^T} + \frac{\left[\frac{D_0(1+g_a)^T(1+g_b)}{(k-g_b)}\right]}{(1+k)^T}$$

Where:

P	=	*The current stock price*
D_0	=	*The current dividend*
k	=	*The discount rate, or required ROE*
g_a	=	*Expected first-stage growth in dividends*
g_b	=	*Expected terminal growth in dividends*
T	=	*The number of years the dividends are expected to grow at g_a*

The bracketed term in Equation [7] represents the expected price of the shares at time T based on a constant growth of dividends at rate g_b after time T in perpetuity. Note that, whereas dividends in Equation [7] are

[89] See Appendix D for historical results.

expected to grow at variable rates, the required ROE *k* does not change through time. A value for k can be solved from Equation [7] through an iterative calculation process. Also, note that the two-stage growth model in Equation [7] is illustrative only; additional growth stages can be added.

In a sense, the Commission's two-step approach is designed to approximate the two-stage growth model presented in Equation [7]. A drawback of using Equation [7] as a substitute for the Commission two-step approach is that the math becomes a little more complicated, although this problem is easily surmounted by use of a simple spreadsheet. An advantage of using Equation [7] is that one can explicitly specify the two stages of growth by the growth rates and by the length of time the initial growth rate prevails. Such explicit consideration of inputs may be more appropriate under certain market conditions, and may mitigate the concern with specific GDP estimates and the weight given to them.

In addition, using Equation [7] as a starting point, one can consider different approaches to estimation of the expected price of the shares at time T. For example, if one estimates the future price using P/E ratios, Equation [7] becomes:

Equation [8]

$$P = \frac{D_0(1+g_a)}{(1+k)} + \frac{D_0(1+g_a)^2}{(1+k)^2} + \cdots + \frac{D_0(1+g_a)^T}{(1+k)^T} + \frac{\left[\frac{P}{E}E_0\,(1+g_a)^T\right]}{(1+k)^T}$$

Where:

P	=	*The current stock price*
D_0	=	*The current dividend*
E_0	=	*The current earnings per share (EPS)*
k	=	*The discount rate, or required ROE*
g_a	=	*Expected first-stage growth in dividends*
T	=	*The number of years the dividends are expected to grow at g_a*

The use of different terminal value assumptions, for example, by reference to trading multiples like the P/E ratio, may produce ROE estimates more consistent with observable market conditions.

An important benefit of the multi-stage DCF model is that it specifically addresses certain limiting assumptions of the constant growth DCF model. For example, it has the ability to recognize that dividend payout ratios may decrease during periods of increasing capital expenditures. Another advantage of the multi-stage DCF model is that internal assumptions of the model, such as the implied price-to-earnings growth ratio, can be checked for reasonableness against observable market data.[90]

6.5 Summary of Benefits of Alternative ROE Models and Recommendation

There is no question that equity analysts and investors use multiple methods to develop their return requirements. The CAPM, Risk Premium, Expected Earnings approaches, and the multi-stage form of the DCF model provide useful measures of required return that reflect the types of analysis used in practice. Data for the models can be obtained from widely accessible data sources and can be implemented without undue complexity.

[90] The price-to-earnings growth ratio (sometimes referred to as the "PEG ratio") is calculated by dividing the P/E ratio by the expected growth rate. The PEG ratio is a commonly referenced financial valuation metric that recognizes price is a function of both current earnings and growth.

In Opinion No. 531, the Commission found it necessary to consider alternative ROE benchmarks in establishing the just and reasonable ROE. Regardless of the models employed, informed judgment—not just mechanical application of a methodology—should be applied to determine the reasonableness and applicability of individual model results in the context of the capital market environment using observable benchmarks, such as the returns allowed by state commissions.

In addition to the alternative ROE methods discussed earlier, there are a number of extensions to the models that could be explored and potentially used (such as the multi-factor form of the CAPM, the empirical form of the CAPM, the build-up method of Risk Premium analysis, or the adjusted present value form of the DCF approach). Extensions to the standard forms of the ROE models may allow some of the underlying assumptions to be relaxed, and the inputs to be adapted to varying market conditions. Research into additional alternative methods may be warranted.

7: CONCLUSION AND SUMMARY OF RECOMMENDATIONS

Transmission is integral to our nation's energy infrastructure, providing value to customers by delivering reliable, affordable, and increasingly clean energy needed to power their homes, their businesses, and their communities. Maintaining, expanding, and enhancing the transmission system requires ongoing investment, and it is imperative that the Commission foster this investment by providing stable, predictable, and adequate returns to the investors and owners of the transmission infrastructure.

Despite the Commission's valued efforts in Opinion No. 531 to provide stable, predictable, and adequate returns for transmission investment, shortcomings in the Commission's prevailing two-step DCF method for determining the allowed ROE for electric transmission companies is leading to estimates below other widely accepted alternative estimation models and market indicators. This, in turn, undermines investment in transmission infrastructure and investor confidence, and it constrains access to external sources of capital.

This paper recommends the following modifications to temper, but not eliminate, existing shortcomings in the current method of employing the two-step DCF approach. The Commission should:

- Broaden the proxy group by modifying existing screening criteria and expanding the universe of companies eligible for inclusion.
- Consider additional sources of published analyst growth rate estimates when determining the zone of reasonableness.
- Reduce the weight currently given to the GDP growth rate in the application of the two-step DCF method, *i.e.* from 1/3 to 1/5, and incorporate an inflation-adjusted long-term GDP estimate such as Morningstar's approach in the *Ibbotson SBBI Valuation Yearbook*; in the alternative, remove GDP from the application of the DCF model altogether.
- Re-examine the thresholds used to determine which DCF results do not pass tests of economic logic, and ensure the thresholds applied appropriately account for current capital market conditions.

Changes such as broadening the group of comparison companies used as proxies, using additional estimates of both short-term and long-term growth, and updating the Commission's test for eliminating illogical low-end and high-end results would temper existing shortcomings in the current method of employing the two-step DCF approach.

Although the DCF model is theoretically sound, its assumptions are quite restrictive and rarely hold outside of the theoretical realm. These assumptions can engender unreliable results, particularly when investor expectations are not consistent with the DCF model's assumption that current market conditions will persist. Practitioners and academics recognize that financial models simply are tools to be used in the ROE estimation process and that the strict adherence to any single approach, or to the specific results of any single approach, can lead to misleading conclusions.

As such, the Commission's recent use of alternative ROE models (such as the CAPM, Risk Premium, and Expected Earning approaches) and market indicators to benchmark and check the reasonableness of the results of the DCF approach is reasonable and should be continued. This position is consistent with the *Hope and Bluefield* finding that the method employed is not controlling when determining just and reasonable rate levels. Benchmarking against additional models would help to ensure rates are set at levels supportive of the Commission's stated policy goals and meet well-established capital attraction standards. Importantly,

regardless of the models employed, informed judgment must be applied to determine the applicability of individual model results in the context of the capital market environment.

APPENDIX A—TWO-STEP DCF MODEL RESULTS (BLOOMBERG GROWTH RATES)

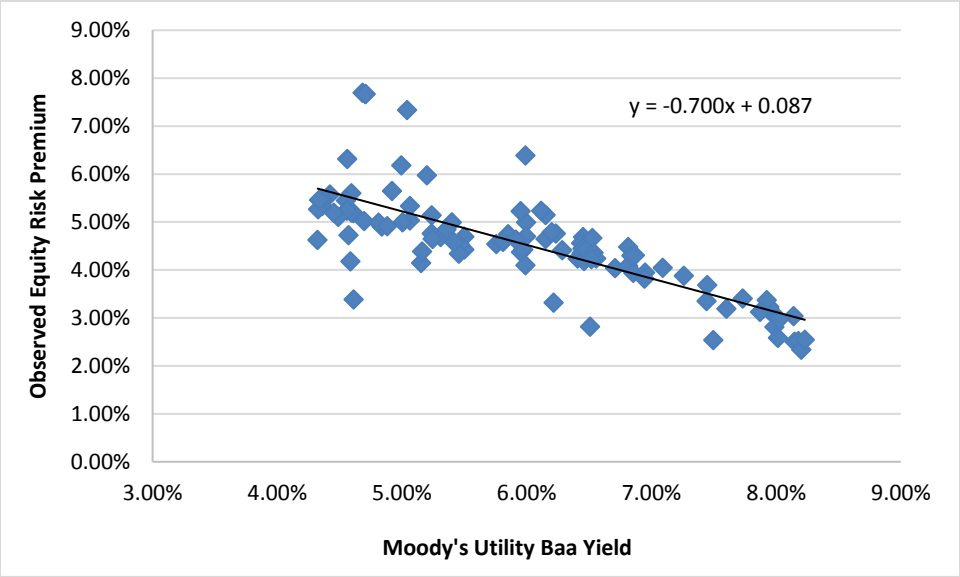
TICKER	Dec-07	Jun-08	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	Jun-11	Dec-11	Jun-12	Dec-12	Jun-13	Dec-13	Jun-14	Dec-14	Jun-15	Dec-15	Jun-16	Dec-16	Apr-17
AEE	12.19%	11.08%	13.04%	11.22%	10.23%	6.26%	5.14%	4.94%	3.99%	3.73%	3.71%	8.96%	8.76%	10.53%	10.22%	10.14%	10.31%	9.13%	8.99%	8.88%
AEP	9.73%	9.23%	9.80%	10.79%	9.44%	8.79%	8.95%	9.71%	8.95%	9.29%	8.93%	8.57%	9.06%	8.84%	9.19%	8.62%	8.97%	8.62%	8.66%	8.09%
ALE	10.46%	10.99%	11.19%	12.99%	11.97%	10.94%	9.86%	9.56%	9.74%	9.74%	9.85%	9.56%	N/A	N/A	N/A	9.42%	9.30%	9.33%	9.14%	8.86%
AGR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11.17%	11.92%
AVA	8.71%	10.39%	10.75%	11.95%	12.90%	10.84%	9.47%	9.77%	9.41%	9.39%	9.21%	9.13%	8.68%	9.05%	N/A	N/A	8.86%	8.34%	8.82%	9.05%
BKH	9.23%	9.39%	10.86%	12.49%	11.27%	10.65%	10.30%	9.59%	10.35%	10.03%	9.89%	9.05%	N/A	8.96%	9.15%	6.11%	8.13%	8.86%	7.63%	9.66%
CMS	6.74%	7.98%	9.36%	10.24%	9.24%	10.49%	11.16%	9.81%	9.84%	9.71%	9.60%	9.35%	9.34%	9.32%	9.18%	8.80%	8.90%	8.61%	8.46%	8.79%
CNP	10.33%	10.11%	13.79%	13.25%	12.35%	9.83%	11.77%	10.02%	9.59%	9.25%	9.16%	9.29%	8.36%	9.20%	9.53%	10.50%	10.69%	10.48%	9.52%	9.65%
D	11.84%	10.86%	11.28%	10.94%	8.84%	8.41%	9.29%	8.45%	8.90%	9.67%	9.63%	9.67%	9.10%	8.97%	9.40%	9.22%	9.27%	9.70%	9.38%	9.15%
DTE	9.33%	10.20%	11.05%	11.73%	10.27%	9.36%	9.47%	9.41%	9.63%	9.18%	9.00%	8.41%	8.43%	8.75%	8.77%	8.44%	8.87%	8.79%	8.12%	8.88%
DUK	9.97%	9.95%	10.14%	10.93%	10.31%	8.13%	9.79%	10.01%	9.86%	9.23%	9.26%	8.95%	8.74%	8.97%	9.02%	8.93%	8.64%	8.94%	8.51%	9.25%
ED	9.35%	9.12%	9.90%	10.20%	10.42%	9.75%	9.43%	8.59%	8.22%	7.84%	7.73%	7.45%	6.22%	8.49%	7.86%	7.66%	7.38%	7.44%	7.30%	7.34%
EE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9.61%	8.43%	9.92%	N/A	9.24%	9.19%	9.16%	N/A	N/A	N/A	N/A	8.45%
EIX	9.43%	10.31%	10.38%	9.58%	8.51%	6.01%	5.97%	6.80%	5.58%	4.26%	8.42%	7.54%	7.25%	7.53%	7.03%	8.44%	7.37%	8.19%	8.20%	7.53%
ES	10.18%	9.37%	9.55%	10.38%	10.87%	10.60%	9.54%	10.08%	9.74%	8.45%	9.79%	10.12%	9.73%	9.36%	9.35%	9.15%	9.38%	9.38%	9.11%	8.81%
ETR	12.45%	12.54%	11.38%	11.61%	8.22%	8.19%	7.52%	7.07%	5.99%	7.79%	7.69%	7.26%	5.31%	5.76%	6.95%	9.72%	5.58%	6.06%	2.86%	4.40%
EXC	9.91%	9.44%	9.29%	8.51%	7.38%	5.29%	5.55%	6.79%	6.70%	5.62%	6.14%	5.51%	4.21%	8.28%	8.71%	9.85%	8.96%	8.45%	7.39%	8.13%
FE	10.49%	9.48%	11.00%	11.87%	8.58%	9.71%	9.60%	9.26%	8.30%	6.57%	9.12%	10.07%	9.16%	9.31%	4.16%	5.84%	4.83%	4.74%	5.00%	6.26%
HE	8.00%	8.61%	8.29%	10.67%	15.97%	13.82%	17.97%	12.65%	12.52%	10.53%	10.04%	10.02%	11.78%	9.21%	8.70%	8.04%	8.50%	8.17%	8.25%	7.99%
IDA	8.52%	9.41%	9.11%	9.74%	9.08%	8.19%	8.07%	7.83%	7.30%	7.77%	7.58%	7.42%	7.49%	7.36%	7.32%	7.22%	7.30%	7.00%	6.24%	6.23%
LNT	8.17%	9.43%	10.42%	10.74%	10.42%	12.21%	9.41%	9.99%	9.88%	9.70%	9.93%	9.78%	9.23%	8.58%	8.80%	9.08%	9.11%	9.67%	9.49%	9.03%
MGEE	N/A	N/A	N/A	N/A	9.00%	9.17%	8.77%	7.90%	7.18%	7.58%	7.29%	7.11%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NWE	N/A	N/A	N/A	13.77%	12.67%	11.81%	10.94%	10.84%	10.22%	10.43%	9.47%	9.08%	9.76%	10.99%	9.47%	8.37%	8.48%	8.28%	8.08%	7.06%
OGE	7.54%	7.84%	8.52%	10.68%	10.23%	8.83%	9.38%	9.26%	9.50%	8.69%	7.76%	7.91%	7.21%	8.05%	8.50%	8.62%	9.09%	8.15%	8.99%	8.77%
OTTR	8.07%	9.54%	11.62%	15.14%	14.38%	15.05%	10.84%	16.84%	17.37%	16.89%	16.41%	9.75%	N/A	N/A	11.11%	N/A	N/A	N/A	8.36%	8.75%
PCG	10.26%	10.45%	10.68%	10.63%	10.58%	10.77%	10.03%	9.76%	8.35%	8.46%	8.45%	9.05%	7.75%	10.43%	10.45%	8.93%	7.69%	7.88%	7.81%	8.98%
PEG	13.25%	12.03%	8.82%	8.95%	8.64%	6.64%	6.66%	7.87%	8.14%	5.71%	5.97%	5.18%	6.30%	8.94%	7.87%	8.81%	8.00%	8.14%	6.92%	6.92%
PNM	11.59%	19.15%	9.48%	12.20%	22.78%	13.28%	12.31%	11.50%	11.03%	7.95%	8.31%	8.90%	8.46%	8.93%	7.60%	7.70%	7.83%	7.57%	8.98%	8.94%
PNW	9.60%	8.13%	11.31%	12.14%	12.68%	11.57%	11.03%	9.32%	10.58%	10.17%	8.19%	8.42%	8.50%	8.61%	8.55%	8.76%	8.64%	8.15%	8.36%	8.20%
POR	11.76%	9.94%	10.20%	11.09%	10.59%	10.10%	10.37%	8.99%	9.33%	9.13%	8.19%	9.52%	8.91%	8.35%	9.22%	8.39%	8.03%	9.02%	8.67%	8.00%
PPL	12.30%	14.23%	13.64%	13.54%	12.41%	9.33%	9.82%	9.23%	15.20%	0.87%	10.27%	7.97%	10.11%	10.79%	9.26%	8.01%	8.13%	9.07%	5.62%	7.01%
SCG	9.23%	9.63%	10.07%	10.79%	10.58%	9.40%	9.55%	9.63%	9.43%	8.93%	9.03%	8.30%	9.81%	9.08%	9.69%	9.44%	9.15%	8.94%	8.94%	8.96%
SO	9.68%	9.93%	9.91%	10.65%	10.08%	10.46%	9.83%	10.00%	10.16%	9.59%	9.39%	9.16%	9.39%	8.76%	8.88%	8.96%	9.15%	8.89%	8.74%	9.04%
SRE	8.27%	9.44%	9.13%	9.22%	8.73%	9.12%	10.34%	9.39%	10.59%	10.49%	9.75%	9.07%	9.12%	8.91%	9.04%	9.48%	12.43%	9.29%	10.08%	9.41%
VVC	8.29%	9.55%	10.59%	13.51%	10.54%	10.62%	9.92%	10.46%	10.35%	9.70%	10.41%	9.12%	9.04%	8.29%	8.38%	8.66%	8.59%	8.28%	8.33%	8.30%
WEC	8.67%	9.87%	10.86%	10.56%	10.52%	10.42%	10.48%	9.54%	9.20%	8.00%	7.89%	8.05%	8.58%	8.43%	8.95%	7.81%	9.27%	8.64%	9.07%	9.46%
XEL	9.85%	10.45%	9.60%	10.65%	10.33%	10.44%	9.83%	9.39%	8.87%	8.94%	8.76%	8.50%	8.84%	8.85%	8.59%	8.74%	8.32%	8.92%	8.82%	8.94%
Zone of Reasonableness Summary																				
High Result	13.25%	14.23%	13.79%	15.14%	15.97%	15.05%	12.31%	16.84%	17.37%	16.89%	16.41%	10.12%	11.78%	10.99%	11.11%	10.50%	12.43%	10.48%	11.17%	11.92%
High Company	PEG	PPL	CNP	OTTR	HE	OTTR	PNM	OTTR	OTTR	OTTR	OTTR	ES	HE	NWE	OTTR	CNP	SRE	CNP	AGR	AGR
Low Result	7.54%	7.84%	8.82%	8.95%	7.38%	8.13%	7.52%	7.07%	6.70%	6.57%	5.97%	7.11%	6.30%	7.36%	6.95%	5.84%	7.30%	6.06%	5.62%	6.23%
Low Company	OGE	OGE	PEG	PEG	EXC	DUK	ETR	ETR	EXC	FE	PEG	MGEE	PEG	IDA	ETR	FE	IDA	ETR	PPL	IDA
Midpoint	10.40%	11.04%	11.30%	12.04%	11.67%	11.59%	9.92%	11.96%	12.04%	11.73%	11.19%	8.62%	9.04%	9.17%	9.03%	8.17%	9.86%	8.27%	8.40%	9.07%
Median	9.70%	9.75%	10.42%	10.93%	10.37%	10.42%	9.82%	9.58%	9.61%	9.23%	9.12%	9.05%	8.91%	8.94%	8.98%	8.75%	8.86%	8.63%	8.66%	8.81%
Low-End Screen	7.43%	7.69%	8.77%	8.78%	7.33%	7.16%	6.76%	6.92%	6.21%	6.03%	5.68%	5.72%	6.24%	5.89%	5.70%	5.65%	6.41%	5.94%	5.40%	5.63%

APPENDIX B—CAPITAL ASSET PRICING MODEL RESULTS

	Beta, as of:																			
TICKER	Dec-07	Jun-08	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	Jun-11	Dec-11	Jun-12	Dec-12	Jun-13	Dec-13	Jun-14	Dec-14	Jun-15	Dec-15	Jun-16	Dec-16	Apr-17
AEE	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.75	0.75	0.75	0.75	0.75	0.65	0.70
AEP	0.95	0.85	0.75	0.75	0.70	0.70	0.70	0.70	0.70	0.70	0.65	0.65	0.70	0.65	0.70	0.70	0.70	0.70	0.65	0.65
ALE	0.95	0.90	0.75	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.80	0.80	0.80	0.75	0.75	0.80
AGR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AVA	1.00	0.95	0.85	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.80	0.80	0.80	0.75	0.70	0.70
BKH	1.10	0.90	0.85	0.80	0.80	0.80	0.80	0.80	0.85	0.85	0.80	0.80	0.85	0.90	0.90	0.95	0.95	0.90	0.90	0.85
CMS	1.35	1.05	0.95	0.80	0.80	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.70	0.75	0.70	0.75	0.75	0.70	0.65	0.65
CNP	0.95	0.95	0.90	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.75	0.80	0.80	0.75	0.75	0.80	0.85	0.85	0.85	0.85
D	0.75	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.65	0.70	0.70	0.70	0.70	0.70	0.70	0.65	0.70
DTE	0.80	0.80	0.70	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.80	0.75	0.75	0.75	0.75	0.70	0.65	0.65
DUK	NMF	NMF	0.60	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.60	0.60	0.65	0.60	0.60	0.60	0.65	0.60	0.60	0.60
ED	0.75	0.75	0.65	0.65	0.65	0.65	0.65	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.55	0.55	0.55
EE	0.80	0.90	0.95	0.80	0.75	0.75	0.75	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.70	0.75
EIX	1.05	0.85	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.75	0.75	0.75	0.80	0.75	0.75	0.70	0.70	0.65	0.60
ES	0.80	0.75	0.75	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.75	0.75	0.70	0.70
ETR	0.85	0.85	0.75	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.65	0.65
EXC	0.90	0.85	0.90	0.85	0.85	0.85	0.85	0.85	0.85	0.80	0.80	0.80	0.75	0.70	0.70	0.70	0.70	0.65	0.65	0.70
FE	0.85	0.80	0.85	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.75	0.75	0.75	0.70	0.70	0.70	0.70	0.70	0.65	0.65
HE	0.70	0.70	0.75	0.60	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.85	0.80	0.80	0.80	0.75	0.70	0.70
IDA	1.00	0.90	0.85	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.80	0.80	0.80	0.80	0.75	0.75
LNT	0.80	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.70	0.70	0.75	0.75	0.80	0.80	0.80	0.75	0.70	0.70
MGEE	0.95	0.95	0.70	0.65	0.65	0.65	0.65	0.60	0.60	0.60	0.60	0.60	0.65	0.70	0.70	0.75	0.75	0.70	0.70	0.70
NWE	N/A	NMF	NMF	NMF	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.65
OGE	0.85	0.90	0.75	0.75	0.75	0.75	0.75	0.75	0.80	0.80	0.75	0.75	0.85	0.85	0.90	0.90	0.95	0.95	0.90	0.95
OTTR	0.95	0.95	0.90	0.95	0.95	0.95	0.95	0.95	0.90	0.90	0.90	0.90	0.95	0.90	0.90	0.90	0.85	0.80	0.85	0.85
PCG	0.95	0.80	0.85	0.60	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.50	0.55	0.60	0.65	0.65	0.65	0.70	0.65	0.65
PEG	0.95	0.90	0.85	0.80	0.80	0.80	0.80	0.75	0.80	0.80	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.70	0.70
PNM	0.95	0.85	0.90	0.85	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.95	0.85	0.85	0.85	0.80	0.75	0.70
PNW	1.00	0.80	0.75	0.70	0.75	0.75	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.70	0.70	0.75	0.75	0.70	0.70
POR	NMF	0.85	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.80	0.80	0.80	0.80	0.80	0.70	0.70
PPL	0.90	0.90	0.80	0.70	0.70	0.70	0.70	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.60	0.65	0.70	0.70	0.70	0.70
SCG	0.85	0.85	0.70	0.70	0.65	0.65	0.70	0.65	0.70	0.70	0.65	0.65	0.70	0.70	0.75	0.75	0.75	0.70	0.70	0.65
SO	0.70	0.70	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.60	0.55	0.60	0.60	0.55	0.55	0.55
SRE	1.00	0.90	0.90	0.90	0.85	0.85	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.75	0.80	0.80	0.85	0.80	0.80
VVC	0.90	0.90	0.85	0.75	0.75	0.70	0.70	0.70	0.70	0.75	0.70	0.70	0.70	0.75	0.80	0.80	0.75	0.75	0.75	0.75
WEC	0.85	0.80	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.60	0.60	0.65	0.65	0.65	0.70	0.70	0.65	0.60	0.60
XEL	1.05	0.75	0.75	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.60	0.65	0.65	0.70	0.65	0.65	0.65	0.60	0.60
Proxy Group:																				
Mean Beta	0.91	0.85	0.78	0.73	0.73	0.73	0.73	0.72	0.73	0.73	0.71	0.71	0.73	0.74	0.74	0.75	0.75	0.73	0.70	0.70
Median Beta	0.90	0.85	0.75	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.73	0.70	0.70
High Beta	1.35	1.05	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.90	0.95	0.95	0.95	0.90	0.95
Low Beta	0.70	0.70	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.50	0.55	0.60	0.55	0.60	0.60	0.55	0.55	0.55
Market:																				
Risk-Free Rate	4.49%	4.66%	3.02%	4.48%	4.44%	4.12%	4.37%	4.24%	2.97%	2.73%	2.86%	3.34%	3.87%	3.40%	2.87%	3.07%	2.97%	2.50%	3.08%	2.96%
Market Return	14.36%	15.06%	14.03%	12.32%	11.85%	13.50%	13.65%	12.77%	13.07%	12.94%	12.98%	13.75%	13.81%	13.49%	13.42%	13.28%	13.56%	13.13%	12.84%	13.33%
MRP	9.87%	10.39%	11.01%	7.84%	7.41%	9.38%	9.28%	8.53%	10.10%	10.21%	10.12%	10.41%	9.94%	10.08%	10.56%	10.22%	10.59%	10.63%	9.75%	10.37%
CAPM ROE Result:																				
Mean	13.46%	13.51%	11.66%	10.23%	9.87%	10.96%	11.15%	10.40%	10.32%	10.16%	10.05%	10.70%	11.08%	10.84%	10.64%	10.68%	10.92%	10.27%	9.88%	10.21%
Median	13.37%	13.50%	11.28%	9.97%	9.63%	10.69%	10.86%	10.21%	10.04%	9.88%	9.95%	10.63%	10.83%	10.97%	10.78%	10.73%	10.92%	10.21%	9.91%	10.22%
Midpoint	14.61%	13.76%	11.28%	10.36%	10.00%	11.16%	11.33%	10.64%	10.54%	10.39%	10.45%	10.89%	11.33%	11.22%	10.52%	10.98%	11.18%	10.48%	10.15%	10.74%

Note: Market return based on market capitalization weighted DCF of S&P 500 using analyst growth rate projections from Bloomberg

APPENDIX C—BOND YIELD PLUS RISK PREMIUM RESULTS



Bond Yield Plus Risk Premium Using FERC Electric Authorized ROEs and Baa Bond Yields

	Dec-07	Jun-08	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	Jun-11	Dec-11	Jun-12	Dec-12	Jun-13	Dec-13	Jun-14	Dec-14	Jun-15	Dec-15	Jun-16	Dec-16	Apr-17
Regression Slope	-0.700																			
Regressoin Constant	0.087																			
Baa yield (6-month)	6.38%	6.50%	7.11%	8.01%	7.04%	6.20%	5.93%	5.90%	5.57%	5.08%	4.88%	4.63%	5.01%	5.11%	4.75%	4.61%	5.07%	5.31%	4.49%	4.47%
Equity Risk Premium	4.26%	4.17%	3.75%	3.12%	3.80%	4.39%	4.58%	4.60%	4.83%	5.17%	5.31%	5.49%	5.22%	5.15%	5.41%	5.50%	5.18%	5.01%	5.59%	5.60%
ROE Estimate	10.64%	10.68%	10.86%	11.13%	10.84%	10.59%	10.51%	10.50%	10.40%	10.25%	10.19%	10.12%	10.23%	10.26%	10.15%	10.11%	10.25%	10.32%	10.07%	10.07%

APPENDIX D—EXPECTED EARNINGS ANALYSIS RESULTS

TICKER	Dec-07	Jun-08	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	Jun-11	Dec-11	Jun-12	Dec-12	Jun-13	Dec-13	Jun-14	Dec-14	Jun-15	Dec-15	Jun-16	Dec-16	Apr-17
AEE	9.17%	9.71%	10.72%	8.20%	8.18%	6.62%	7.14%	7.12%	7.12%	7.10%	7.11%	8.67%	8.67%	9.72%	9.72%	10.26%	10.72%	9.66%	9.66%	10.20%
AEP	12.94%	12.41%	10.86%	10.79%	10.80%	10.28%	10.79%	10.80%	10.79%	10.25%	9.72%	10.24%	10.75%	10.21%	10.21%	10.73%	10.22%	9.69%	10.72%	11.22%
ALE	10.84%	9.93%	8.83%	9.33%	9.33%	8.13%	9.17%	9.70%	9.77%	10.25%	10.30%	9.77%	9.36%	9.20%	9.27%	9.18%	9.19%	8.67%	9.18%	9.20%
AGR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.52%	5.04%
AVA	8.71%	8.70%	8.70%	8.16%	8.70%	9.18%	9.20%	9.17%	9.16%	9.18%	8.65%	8.64%	8.64%	9.16%	8.65%	9.16%	9.14%	9.16%	8.65%	8.12%
BKH	9.72%	9.74%	7.63%	8.63%	9.69%	8.13%	7.70%	8.13%	7.60%	8.63%	8.11%	9.18%	9.19%	9.70%	9.19%	8.67%	9.71%	11.01%	11.02%	10.97%
CMS	12.81%	12.42%	12.42%	11.35%	10.81%	11.88%	12.87%	12.89%	12.90%	12.88%	12.87%	13.41%	13.43%	13.91%	13.97%	13.93%	13.93%	13.96%	13.98%	13.97%
CNP	21.46%	17.71%	18.31%	18.28%	17.22%	16.14%	14.62%	11.77%	11.76%	11.73%	12.84%	13.31%	14.89%	13.17%	15.25%	12.21%	13.43%	15.75%	15.73%	17.37%
D	15.82%	15.86%	15.83%	15.70%	16.24%	15.03%	15.01%	14.47%	14.46%	14.99%	14.95%	16.59%	15.66%	15.65%	15.23%	18.18%	18.16%	18.82%	19.44%	18.81%
DTE	9.05%	9.15%	9.14%	9.70%	10.25%	9.23%	9.20%	9.16%	9.19%	9.70%	9.77%	9.27%	9.79%	10.29%	9.80%	10.31%	10.31%	10.25%	10.79%	10.78%
DUK	8.11%	8.12%	8.11%	8.08%	8.07%	8.09%	8.09%	8.61%	8.62%	9.14%	8.10%	8.09%	8.11%	8.11%	8.11%	8.11%	8.09%	8.09%	8.60%	8.59%
ED	8.70%	9.16%	8.64%	9.17%	9.69%	9.63%	9.70%	9.68%	9.68%	9.68%	9.17%	9.16%	9.16%	8.63%	9.15%	9.15%	9.15%	8.64%	8.65%	8.65%
EE	10.38%	9.37%	9.90%	9.80%	9.87%	9.31%	9.88%	11.23%	11.75%	11.69%	10.71%	10.67%	10.74%	10.19%	10.18%	9.19%	9.71%	8.65%	9.19%	9.69%
EIX	10.87%	11.97%	11.97%	11.33%	11.90%	9.22%	8.70%	8.18%	8.17%	9.21%	9.19%	11.35%	11.33%	11.33%	11.34%	11.82%	11.84%	11.79%	11.79%	11.25%
ES	10.90%	10.05%	9.59%	8.92%	9.80%	9.28%	10.33%	10.34%	10.86%	9.71%	9.70%	9.69%	9.69%	9.69%	9.70%	10.22%	9.70%	9.68%	9.69%	10.21%
ETR	14.56%	15.84%	14.53%	14.60%	14.98%	13.82%	11.78%	11.79%	10.72%	9.60%	9.59%	9.61%	9.66%	10.20%	10.71%	9.13%	9.11%	11.23%	9.64%	10.14%
EXC	25.16%	26.13%	25.51%	24.33%	19.70%	15.93%	14.24%	14.69%	15.19%	12.13%	12.64%	9.72%	8.14%	9.19%	9.79%	9.27%	9.80%	10.33%	9.81%	9.77%
FE	13.99%	16.16%	15.61%	14.44%	14.93%	12.84%	11.19%	10.18%	10.19%	10.69%	10.16%	8.60%	9.19%	8.18%	8.69%	8.69%	9.22%	9.24%	8.81%	8.77%
HE	11.12%	10.64%	11.19%	10.66%	10.67%	11.28%	10.74%	10.89%	10.82%	9.70%	10.53%	9.50%	8.40%	9.76%	10.28%	9.75%	9.72%	9.20%	9.21%	9.17%
IDA	7.20%	7.67%	7.66%	7.76%	7.77%	8.75%	8.75%	8.72%	8.72%	8.22%	8.68%	8.69%	8.69%	8.16%	8.66%	8.65%	8.65%	9.18%	9.18%	9.17%
LNT	10.81%	10.36%	10.82%	10.77%	10.23%	11.76%	12.28%	12.25%	11.72%	10.67%	11.22%	11.29%	11.78%	11.76%	12.24%	11.68%	11.64%	12.66%	12.66%	13.18%
MGEE	14.17%	12.22%	12.22%	12.07%	12.08%	12.23%	12.23%	12.16%	12.09%	10.78%	11.28%	11.52%	12.27%	13.41%	13.93%	13.41%	13.09%	13.32%	13.34%	12.87%
NWE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10.22%	9.56%	9.71%	9.67%	9.67%	10.21%	10.20%	10.21%	10.21%	9.67%
OGE	12.28%	11.97%	12.02%	12.04%	11.97%	12.00%	12.98%	12.46%	12.45%	11.93%	11.56%	11.37%	12.31%	12.40%	12.38%	11.25%	11.22%	12.22%	11.71%	12.22%
OTTR	10.84%	10.31%	9.22%	8.77%	9.26%	9.73%	7.75%	9.28%	7.25%	10.31%	10.88%	11.21%	11.87%	12.85%	12.86%	12.84%	12.84%	10.85%	10.36%	9.90%
PCG	11.36%	11.81%	11.87%	13.08%	12.51%	12.47%	12.47%	11.92%	11.92%	10.76%	10.28%	9.19%	8.68%	8.68%	8.68%	9.74%	10.88%	10.32%	11.30%	10.29%
PEG	15.26%	15.23%	17.74%	16.65%	16.11%	12.97%	12.99%	12.90%	12.89%	11.28%	11.25%	10.20%	10.75%	10.75%	10.75%	10.74%	11.28%	11.26%	11.19%	11.76%
PNM	7.68%	5.52%	4.53%	5.09%	5.61%	6.11%	6.11%	6.68%	6.68%	9.19%	9.19%	8.67%	9.19%	9.66%	9.66%	9.67%	9.67%	9.64%	9.64%	9.59%
PNW	8.60%	8.11%	8.14%	9.22%	9.30%	9.28%	9.27%	9.27%	9.28%	9.23%	9.24%	10.21%	10.23%	9.74%	9.74%	9.74%	10.26%	10.19%	10.20%	10.21%
POR	8.75%	9.34%	9.43%	9.26%	8.71%	8.81%	8.82%	8.66%	9.19%	9.18%	9.16%	8.14%	8.27%	9.19%	9.35%	9.20%	9.71%	9.19%	9.17%	9.67%
PPL	24.44%	22.99%	21.80%	23.10%	20.39%	15.87%	12.10%	12.68%	12.69%	11.59%	12.09%	11.41%	10.80%	10.71%	10.71%	10.24%	11.83%	15.53%	13.83%	14.53%
SCG	11.23%	10.87%	10.96%	10.89%	10.93%	10.28%	10.43%	9.91%	9.43%	9.95%	9.97%	9.90%	9.89%	10.37%	10.39%	9.76%	10.30%	10.28%	10.27%	10.28%
SO	13.37%	14.48%	14.47%	14.42%	14.38%	13.94%	13.44%	13.44%	13.45%	12.95%	12.90%	12.85%	12.34%	12.82%	12.83%	13.73%	13.75%	12.68%	11.20%	11.20%
SRE	12.55%	13.97%	13.98%	12.53%	12.56%	11.46%	10.27%	11.37%	10.85%	11.30%	11.80%	10.76%	11.27%	11.79%	11.80%	12.85%	12.86%	13.92%	14.17%	13.02%
VVC	10.71%	10.65%	11.80%	10.34%	11.29%	10.77%	10.82%	10.77%	11.27%	12.27%	11.26%	11.64%	11.88%	14.24%	14.25%	14.70%	15.21%	12.84%	13.36%	12.83%
WEC	11.82%	12.38%	12.86%	12.34%	11.83%	12.86%	13.35%	14.18%	14.16%	14.16%	13.73%	14.22%	15.65%	15.59%	15.63%	16.06%	11.20%	11.20%	11.20%	11.19%
XEL	10.73%	11.27%	10.74%	10.76%	10.76%	10.30%	10.32%	10.27%	10.26%	10.29%	10.30%	10.27%	10.25%	10.11%	10.24%	10.22%	10.21%	10.71%	11.22%	10.70%
Proxy Group:																				
Mean	12.18%	12.06%	11.94%	11.73%	11.61%	10.96%	10.71%	10.74%	10.66%	10.58%	10.53%	10.46%	10.57%	10.78%	10.92%	10.91%	11.00%	11.11%	10.93%	10.92%
Median	10.90%	10.87%	10.96%	10.77%	10.80%	10.30%	10.43%	10.77%	10.79%	10.29%	10.29%	10.05%	10.06%	10.19%	10.23%	10.22%	10.28%	10.32%	10.36%	10.28%
Low	7.20%	5.52%	4.53%	5.09%	5.61%	6.11%	6.11%	6.68%	6.68%	7.10%	7.11%	8.09%	8.11%	8.11%	8.11%	8.11%	8.09%	8.09%	5.52%	5.04%
High	25.16%	26.13%	25.51%	24.33%	20.39%	16.14%	15.01%	14.69%	15.19%	14.99%	14.95%	16.59%	15.66%	15.65%	15.63%	18.18%	18.16%	18.82%	19.44%	18.81%
Midpoint	16.18%	15.83%	15.02%	14.71%	13.00%	11.13%	10.56%	10.69%	10.94%	11.05%	11.03%	12.34%	11.88%	11.88%	11.87%	13.14%	13.13%	13.45%	12.48%	11.92%
Zone of Reasonableness Summary																				
Mean	11.22%	11.41%	11.71%	11.61%	11.28%	11.24%	10.84%	10.86%	10.66%	10.58%	10.53%	10.46%	10.57%	10.78%	10.92%	10.70%	10.79%	10.89%	10.69%	10.87%
Median	10.87%	10.76%	11.49%	10.89%	10.78%	10.77%	10.58%	10.79%	10.79%	10.29%	10.29%	10.05%	10.06%	10.19%	10.23%	10.22%	10.26%	10.32%	10.32%	10.28%