

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

**Southern California Edison Company**     )  
                                                          )     **Dkt. No.   ER19-\_\_\_\_\_ -000**  
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**PREPARED DIRECT TESTIMONY OF  
DR. BENTE VILLADSEN**

**ON BEHALF OF  
SOUTHERN CALIFORNIA EDISON COMPANY**

**(EXHIBIT SCE-25)**

**APRIL 2019**

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**SUMMARY OF THE  
PREPARED DIRECT TESTIMONY OF  
DR. BENTE VILLADSEN**

**(EXHIBIT SCE-25)**

Dr. Villadsen’s testimony supports SCE’s proposed conventional return of equity (“ROE”). She applies an analysis based upon a multiple-model methodology that is consistent with the Commission’s most recent guidance and policy objectives, with certain refinements, and recommends an ROE of 11.12%. This conventional ROE does not reflect the extraordinary wildfire risk faced by SCE. Dr. Villadsen also discusses SCE’s participation in the CAISO and concludes that SCE should receive a Commission-approved adder for SCE’s membership in the California Independent System Operator Corporation (“CAISO”) of 0.50 percent. Further, Dr. Villadsen explains that several SCE transmission projects have Commission-approved project-specific adders, which are added to the proposed ROE.

Dr. Villadsen’s testimony also supports an alternative proxy group consisting of capital-intensive network industries. She concludes that this proxy group of higher risk companies can be applied when considering the unique wildfire risks that SCE faces.

**PREPARED DIRECT TESTIMONY OF  
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1 **I. INTRODUCTION AND QUALIFICATIONS**

2 **Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.**

3 A. My name is Bente Villadsen. I am a Principal at The Brattle Group's ("Brattle")  
4 Boston office located at One Beacon St., Suite 2600, Boston, MA 02108, USA.

5 **Q. ON WHOSE BEHALF ARE YOU SUBMITTING TESTIMONY?**

6 A. I am submitting testimony on behalf of Southern California Edison Company  
7 ("SCE").

8 **Q. WHAT EXHIBITS ARE YOU SPONSORING?**

9 A. I am sponsoring this Prepared Direct Testimony, Exhibit No. SCE-25, as well as  
10 Exhibit No. SCE-26, which contains my résumé, Exhibit No. SCE-27, which  
11 contains the tables supporting Tables 1-5 of this testimony and Exhibit No. SCE-  
12 28, which describes the methodology used for additional analyses and supports  
13 Tables 7-10.

14 **Q. PLEASE DESCRIBE YOUR CURRENT POSITION AND**  
15 **RESPONSIBILITIES AT BRATTLE.**

16 A. I am a Principal of *The Brattle Group*, an economic, environmental, and  
17 management consulting firm with offices in Boston, Washington D.C., London,  
18 San Francisco, Madrid, Rome, New York, Toronto, Sydney, and Brussels with  
19 specialties including financial economics, regulatory economics, and the gas,  
20 water, and electric industries. My work concentrates on regulatory finance and  
21 accounting. As a Principal, I work in the areas of cost of capital, risk, regulatory  
22 accounting, regulatory precedence and related matters for regulated entities,  
23 regulators, or investors.

1 I am the co-author of the text, “Risk and Return for Regulated Industries” and I  
2 have testified or filed expert reports on cost of capital in Alaska, Arizona,  
3 California, Illinois, New Mexico, New York, Oregon, and Washington, as well as  
4 before the Bonneville Power Administration, the Surface Transportation Board, the  
5 Alberta Utilities Commission, and the Ontario Energy Board. I have provided  
6 white papers on cost of capital to the British Columbia Utilities Commission, the  
7 Canadian Transportation Agency as well as to European and Australian regulators  
8 on cost of capital. I have testified or filed testimony on regulatory accounting issues  
9 before the Federal Energy Regulatory Commission (“Commission”), the  
10 Regulatory Commission of Alaska, the Michigan Public Service Commission, the  
11 Texas Public Utility Commission as well as in international and U.S. arbitrations  
12 and regularly provide advice to utilities on regulatory matters.

13 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION?**

14 A. I have testified on regulatory accounting matters before the Commission in dockets  
15 PA10-13-000 and EL11-13-000.

16 **Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND.**

17 A. I hold a Ph.D. from Yale University’s School of Management with a concentration  
18 in accounting. I also hold a MS as well as a BS joint degree in mathematics and  
19 economics from University of Aarhus in Denmark.

1 **II. PURPOSE OF TESTIMONY**

2 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS**  
3 **PROCEEDING?**

4 A. The purpose of my testimony is to determine the return on equity for SCE. I do so  
5 by determining the reasonable range for a proxy of electric utilities using the revised  
6 FERC methodology specified in the NETO Briefing Order.<sup>1</sup> Having determined  
7 the reasonable range, I place SCE within the range taking into account the  
8 Company's higher than average risk. Importantly, my point estimate for SCE does  
9 **not** include consideration of SCE's wildfire related risks. Finally, I demonstrate  
10 that the zone of reasonableness is too constrained for a company such as SCE.  
11 Specifically, the application of the Commission's methodology to a sample of  
12 capital-intensive network industries provides a wider zone of reasonableness and  
13 thus demonstrates that there are plenty of network industries that have wider range  
14 of ROE results that what a traditional Commission sample selection method would  
15 give rise to.

16 **III. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS**

17 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS AND**  
18 **RECOMMENDATIONS.**

19 A. Based on my calculations of the ROEs for the proxy group, I recommend that SCE  
20 be placed at the upper midpoint of the reasonable range for a ROE of 11.12% before  
21 the addition of incentives or other requested adders. The recommendation is based

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<sup>1</sup> Coakley v. Bangor Hydro-Elec. Co., Opinion No. 531, 147 FERC ¶ 61,234 (2014), order on paper hearing, Opinion No. 531-A, 149 FERC ¶ 61,032 (2014), order on reh'g, Opinion No. 531-B, 150 FERC ¶ 61,165 (2015), vacated & remanded sub nom. Emera Maine, 854 F.3d 9, order on remand, Coakley v. Bangor Hydro-Elec. Co., 165 FERC ¶ 61,030 (2018) ("NETO Briefing Order").

1 on the determination of the CAPM, DCF, and expected earnings ROE for a sample  
2 of 33 electric utilities. I also report the results from the risk premium model.

3 I recommend that the ROE for SCE, before incentive or other adders be placed at  
4 the midpoint of the upper part of the Zone of Reasonableness (“ZOR”)<sup>2</sup> because  
5 SCE is of higher risk than the average electric utility. I recognize that the NETO  
6 Briefing Order stated that it would use the upper median for a single filer and the  
7 upper midpoint for a group-filer. However, from a financial economics perspective  
8 the cost of equity depends on the use of assets not the ownership of such assets.<sup>3</sup>  
9 Consequently, it is the risk of the underlying assets and not the characteristics of  
10 the owner of such assets that determine the appropriate return on equity. Therefore,  
11 there is no financial theory that justifies treating a single-filer different from a  
12 group-filer. I also did not find a discussion of the economic justification for this  
13 difference in treatment in light of the new methodology in the NETO Briefing  
14 Order.

15 Additionally, I find that an alternative sample consisting of Capital-Intensive  
16 Network Industries has a much wider range of ROE estimates using the FERC’s  
17 methodology.<sup>4</sup> The range of ROE estimates from this sample demonstrates that for  
18 higher risk companies, the FERC methodology gives rise to a wider ZOR when  
19 implementing the FERC methodology. The use of such a sample to assess the  
20 plausible ZOR for non-standard adders is merited because SCE faces unique

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<sup>2</sup> For clarity, the ZOR is determined as the range of estimates that encompasses the lowest estimate that is at least 100 basis points above the yield on BBB rated debt and no higher than the lesser of the highest ROE estimate and 1.5 times the median estimate.

<sup>3</sup> See, for example, Brealey, Myers & Allen, “Principles of Corporate Finance,” 11<sup>th</sup> Edition, 2014, p. 219.

<sup>4</sup> Using FERC’s methodology (including outlier tests), the alternative sample has a range of approximately 6.3% to 18.1%.



1 circumstances in the form of wildfire risks. Specifically, wildfires carry downside  
2 risks only and represent an asymmetric risk, which is the result of an investment  
3 having the potential to experience a large negative return without any possibility of  
4 an offsetting positive return. The asymmetric risk resulting from California  
5 legislation and wildfires is discussed in the testimony of Mr. Frank Graves.<sup>5</sup> This  
6 risk is unique and not captured in my Electric Utility Sample.<sup>6</sup> Consequently, I  
7 develop an alternative sample of Capital-Intensive Network Industries to assess  
8 what ROE would result if a broader set of companies were considered.<sup>7</sup>

9 **Q. HOW IS YOUR TESTIMONY ORGANIZED?**

10 A. Section IV formally defines the cost of capital, and touches on the principles  
11 relating to the estimation of the cost of capital for a business and the theory  
12 underlying the discounted cash flow model. Section V first describes the criteria  
13 used to create the FERC Electric Utility Sample and provides a summary of the  
14 sample. It then describes the Commission's revised cost of capital estimation  
15 method and provides the results of the revised FERC ROE methodology for the  
16 sample. Section VI summarizes my conclusions.

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<sup>5</sup> Prepared Direct Testimony of Mr. Frank Graves.

<sup>6</sup> While other electric utilities in California may face the same type of asymmetric risk, Pacific Gas & Electric is currently in Chapter 11, which leaves only Sempra Energy as a California based utility in the sample.

<sup>7</sup> For clarity, my testimony does not address what liability may be imposed on SCE nor does it address what return investors may require for accepting that specific risk. It simply recognizes that such risks are **not** captured in the standard electric sample and consequently considers group of capital-intensive network industry companies that may be more comparable albeit none of them are likely to capture the full extent of this liability. I understand that the specifics of the wildfire risk and the appropriate treatment of such risks is discussed in the testimonies of Dr. Gary Stern [Exhibit No. SCE-21] and Mr. Frank Graves [Exhibit No. SCE-22 and SCE-24].

1 Q. WAS YOUR TESTIMONY PREPARED BY YOU OR UNDER YOUR  
2 DIRECT SUPERVISION?

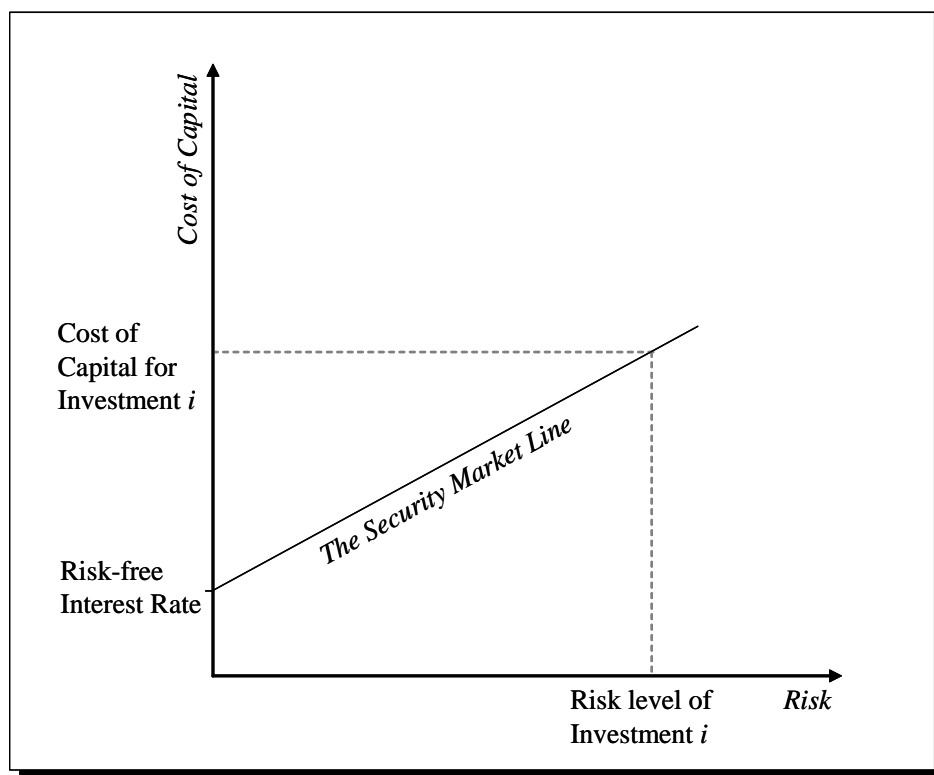
3 A. Yes.

4 IV. COST OF CAPITAL THEORY

5 A. The Cost of Capital and Risk

6 Q. PLEASE FORMALLY DEFINE THE TERM “COST OF CAPITAL.”

7 A. The cost of capital can be defined as *the expected rate of return in capital markets*  
8 *on alternative investments of equivalent risk*. In other words, it is the rate of return  
9 investors require based on the risk-return alternatives available in competitive  
10 capital markets. The cost of capital is a type of opportunity cost: it represents the  
11 rate of return that investors could expect to earn elsewhere without bearing more  
12 risk. “Expected” is used in the statistical sense: the mean of the distribution of  
13 possible outcomes. The terms “expect” and “expected” in my testimony, as in the  
14 definition of the cost of capital itself, refer to the probability-weighted average over  
15 all possible outcomes. The definition of the cost of capital recognizes a tradeoff  
16 between risk and return that is known as the “security market risk-return line,” or  
17 “security market line” for short. This line is depicted in Figure 1. The higher the  
18 risk, the higher the cost of capital. Variations of Figure 1 apply for all investments.



**Figure 1: The Security Market Line**

1 **Q. PLEASE EXPLAIN WHY THE COST OF CAPITAL IS RELEVANT IN**  
2 **RATE REGULATION?**

3 A. It has become routine in U.S. rate regulation to accept the “cost of capital” as the  
4 appropriate expected rate of return on utility investment. That practice is normally  
5 viewed as consistent with the U.S. Supreme Court’s opinions in *Bluefield Water*  
6 *Works & Improvement Co. v. Public Service Commission of West Virginia*, 262  
7 U.S. 679 (1923), and *FPC v. Hope Natural Gas Co.*, 320 U.S. 591 (1944).

8 A return that determines the ROE (absent incentive or other adders) as the expected  
9 rate of return investors require will maintain SCE’s ability to attract capital and  
10 maintain its financial integrity.

1           Importantly, an inadequate return raises serious issues not only for the regulated  
2           utility but also for its customers. Specifically, it may adversely affect the utility's  
3           ability to provide stable and favorable rates because the Company may need to  
4           potentially postpone desirable projects that are not needed for reliable service in the  
5           near term or it may require the Company to file more frequent rate cases. Long  
6           term, inadequate returns lead to inadequate investment, whether for maintenance or  
7           for new plant and equipment. The costs of an undercapitalized industry can be far  
8           greater than any short-run gains from shortfalls in the cost of capital. Moreover, in  
9           capital-intensive industries (such as the electric utility industry), systems with long  
10          expected service lives cannot be fixed overnight.

11   **V.    SCE'S RISK PROFILE**

12   **Q.    HOW IS THIS SECTION OF YOUR TESTIMONY ORGANIZED?**

13   A.    This section first outlines the unique risks that SCE is facing. Specifically, I (i)  
14          briefly discuss the unique risks that merit placing SCE at the upper midpoint of the  
15          reasonable range that results from implementing the Commission's ROE  
16          methodology and (ii) describe additional risks from wildfires that merits an  
17          alternative zone of reasonableness for SCE's all-in ROE.

18   **Q.    WHAT ARE THE UNIQUE RISK FACTORS THAT SCE FACES?**

19   A.    SCE is located in California, which has many regulatory and legislative risks that  
20          are not common to other electric utilities. California has embarked on major  
21          electricity related transformations on more than one occasion. These changes to  
22          the status quo disrupt the electric utility business and have a proven track record of

1 enhancing risk to the utilities.<sup>8</sup> The Commission should consider these unique risks  
2 in setting SCE's ROE to ensure consistency with the criteria outlined in *Hope* and  
3 *Bluefield*, including that the ROE must be comparable to returns on *investments of*  
4 *similar risk*.

5 The direct testimony of Dr. Gary Stern discusses several of the California specific  
6 risks that SCE faces. These include: (1) unique risks SCE faces due to California  
7 environmental and other policies; (2) risks relating to SCE's role in procurement;  
8 (3) risks relating to California's approach to retail electric competition and  
9 associated load uncertainty; (4) risks relating to regulatory lag in California; and  
10 (5) risks relating specifically to SCE's transmission assets.

11 **Q. WHAT IS THE MOST SEVERE RISK THAT SCE FACES?**

12 A. Wildfire liabilities are currently the most immediate and catastrophic risk for SCE  
13 and in recent years, wildfires have become a year-round phenomenon with  
14 increasing severity.<sup>9</sup> The intensity of California wildfires has increased over time,  
15 as two-thirds of the state's largest fires on record have occurred in the last 20  
16 years.<sup>10</sup> In California, the legal doctrine of inverse condemnation means that SCE  
17 faces strict liability for damages resulting from fires that the courts find were caused  
18 by SCE's utility equipment. SCE has significant cost-recovery uncertainty for those

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<sup>8</sup> Such policies are currently implemented primarily for environmental reasons.

<sup>9</sup> See, for example,

[http://calfire.ca.gov/communications/downloads/newsreleases/2018/WAWNewsRelease\\_2018\\_FINAL.pdf](http://calfire.ca.gov/communications/downloads/newsreleases/2018/WAWNewsRelease_2018_FINAL.pdf), downloaded, information accessed February 15, 2019 ("Already this year [May 7, 2018] CAL FIRE has responded to more than 950 wildfires that have burned over 5,800 acres. We need Californians to accept fire as part of our natural landscape, understand the potential fire risk. CAL FIRE's 'Ready for Wildfire' app is the perfect tool to use in year-round preparation.").

<sup>10</sup> [http://www.fire.ca.gov/communications/downloads/fact\\_sheets/Top20\\_Acres.pdf](http://www.fire.ca.gov/communications/downloads/fact_sheets/Top20_Acres.pdf), downloaded, information accessed August 23, 2018

1 damages due to a recent decision by the California Public Utilities Commission  
2 (“CPUC”).<sup>11</sup>

3 The liability and financial implications of the Courts’ application of inverse  
4 condemnation combined with the CPUC’s recent decision, is unique to California  
5 utilities. The presence of large and unique risks is the reason I consider an  
6 alternative to assess a range of reasonable returns investors may seek to carry the  
7 unique risks in California. This alternative sample consists of capital-intensive  
8 companies that operate in network industries. This means that they, like SCE, rely  
9 on a buildout system of assets. While these companies generally do not face the  
10 same magnitude of potential and imminent liabilities, as does SCE, they have a  
11 larger risk exposure than traditional electric utilities and therefore are an  
12 appropriate alternative consideration for the purpose of determining the return that  
13 investors in SCE may be seeking once all risks are considered.

14 **Q. ARE WILDFIRE RISKS INCLUDED IN YOUR ROE ESTIMATE?**

15 A. No. The risks associated with the California wildfires are (i) generally not present  
16 among the electric utilities in my proxy group<sup>12</sup> and (ii) most commonly represent  
17 an asymmetric risk, so that SCE faces a potential liability or cost from the wildfires,  
18 but there is no offsetting upward return opportunity. Such asymmetric risks are not  
19 included in the ROE that I estimate using common cost of equity models.<sup>13</sup> As a

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<sup>11</sup> CPUC Decision (D.)17-11-033, *Decision Denying Application* (issued December 6, 2017); reh’g denied, D.18-07-025 *Order Denying Rehearing of D.17-11-033* (July 12, 2018).

<sup>12</sup> Sempra is included in my proxy group but (1) is one of 33 companies and (2) does not determine either the lower or the upper end of the Zone of Reasonableness.

<sup>13</sup> A detailed discussion of asymmetric risk is provided in Bente Villadsen, Michael J. Vilbert, Dan Harris, and A. Lawrence Kolbe, *Risk and Return for Regulated Industries*, Academic Press, 2017, Chapter 10. See also Leonardo R. Giacchino and Jonathan A. Lesser, *Principles of Utility Corporate Finance*, Public Utilities Reports, Inc., 2011, pp. 25-26.

1 result the return that investors require to bear such risks has to be considered  
2 separately (e.g., outside my ROE estimate, which relies on a sample of electric  
3 utilities without such risks) and I understand that the testimony of Mr. Frank Graves  
4 does so.

5 **Q. WHAT OTHER RISKS ARE UNIQUE TO SCE, IF ANY?**

6 A. California is a leader in addressing climate change and air pollution, with the  
7 legislature and the CPUC spearheading an industry transformation towards a clean  
8 energy future. These disruptions in the status quo, while certainly providing  
9 environmental and other public benefits, enhance risk to the California utilities,  
10 including SCE. Dr. Stern discusses these risks in detail in his testimony, at Exhibit  
11 SCE-21. As Dr. Stern states, SCE is committed to this clean energy future, through  
12 use of renewable energy, energy storage, energy efficiency programs, and using a  
13 cleaner grid to improve the transportation sector and building performance through  
14 electrification. SCE and other California utilities play an important role in  
15 implementing California's environmental goals, but it comes with substantial risk  
16 to the utility. The state's aggressive environmental policy objectives, and continual  
17 changes in such policies, leaves SCE with a substantial level of planning and cost  
18 recovery risks associated with designing and operating a grid that can safely and  
19 reliably support these objectives. Such risks include changing rules for retail  
20 customer competition relating to Community Choice Aggregation ("CCA") and  
21 Direct Access and associated uncertainty as to the amount of load SCE will be  
22 responsible to procure energy to serve. This, coupled with the significant and  
23 growing amount of Distributed Energy Resources ("DER"), creates more

1 uncertainty for SCE. SCE performs significant power procurement activities,  
2 including energy, capacity and natural gas procurement, and maintains SCE's role  
3 as provider of last resort. For example, according to SCE estimates, Dr. Stern notes  
4 that portions of their existing renewable portfolio is about \$12B above market.

5 In addition, Dr. Stern notes the adoption of new and unproven technology, such as  
6 storage, and the need to build and operate a modern grid to accommodate DERs  
7 (e.g., support two-way power flows). While these initiatives are not unique to  
8 California, the magnitude is. As a result, the impact of new roles for electric service  
9 providers, DER, new technology and other mandates, combined with the pace of  
10 the changes in such mandates, technologies and prices, creates large risks for SCE  
11 and significant impacts on its system and transmission planning.

12 **Q. PLEASE SUMMARIZE THE IMPACT OF CALIFORNIA'S CARBON**  
13 **REDUCING GOALS ON SCE'S BUSINESS.**

14 A. As noted above, California has one of the most aggressive Renewables Portfolio  
15 Standards ("RPSs") in the nation.<sup>14</sup> For example, SB 100 set a goal of 100 percent  
16 clean electricity by 2045, and 60 percent renewables by 2030, while the 2015 goal  
17 through Senate Bill 350 was 50 percent from renewables by 2020. Earlier versions  
18 had lower targets (albeit at a closer date). These standards are higher than that of  
19 all other states but Hawaii and unlike many other states do not have a legislatively  
20 imposed cost cap.<sup>15</sup> Such a moving target requires SCE to address reliability issues  
21 and to handle the potential for excess generation capacity going forward.

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<sup>14</sup> Megan Cleveland, *States' Renewable Energy Ambitions* (February 4, 2019) available at:  
<http://www.ncsl.org/research/energy/states-renewable-energy-ambitions.aspx>

<sup>15</sup> <http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx> as assessed on March 20, 2019.  
I understand that the CPUC may impose a cap.



1           Additionally, the changing targets poses uncertainty for SCE’s planning process.  
2           This adds to SCE’s risk not only for generation but also for transmission, which is  
3           needed to move the renewable energy to end-users.

4   **Q.    ARE THERE OTHER UNIQUE RISKS FACING SCE?**

5    A.    Yes. There is a renewed policy shift towards deregulation and electric competition  
6           in California, as reflected by California’s now expanding Direct Access program,  
7           its CCA, and the growth of DERs. This creates business and regulatory risks for  
8           SCE that further amplify the risks relating to changes in its grid design and  
9           operation. The president of the CPUC recently acknowledged these substantial  
10          risks

11                           we are deregulating electric markets through dozens of different  
12                           decisions and legislative actions, but we do not have a plan. If we  
13                           are not careful, we can drift into another crisis.<sup>16</sup>

14   **Q.    HOW DO THESE PROGRAMS CREATE RISK FOR SCE?**

15    A.    California’s Direct Access program allows a limited selection of consumers in  
16           California to purchase their electricity from an Electric Service Provider (“ESP”),  
17           instead of their utility. This means that SCE faces declining demand that is outside  
18           its control – yet SCE has to plan for the ability to serve all customers.

19           Similarly, the California utilities are seeing a number of customers dropping off its  
20           load to be served by CCAs. CCA permits customer groups, including cities or  
21           counties, acting alone or in purchasing groups, to procure electricity directly from

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<sup>16</sup> California Customer Choice, An Evaluation of Regulatory Framework Options for an Evolving Electricity Market (August 2018), at iii, *available at* [http://www.cpuc.ca.gov/uploadedFiles/CPUC\\_Public\\_Website/Content/Utilities\\_and\\_Industries/Energy\\_-\\_Electricity\\_and\\_Natural\\_Gas/Cal%20Customer%20Choice%20Report%208-7-18%20rm.pdf](http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/Cal%20Customer%20Choice%20Report%208-7-18%20rm.pdf) (last accessed March 25, 2019).

1 wholesale non-utility suppliers. The utility continues to provide distribution  
2 services, billing, and metering. Much like the Direct Access programs, the potential  
3 for CCA affects SCE's ability to predict the size of its customer base and the load  
4 for which it must procure or generate electricity, adding to the risks of committing  
5 to longer-term resources. Dr. Stern notes that, as of December 31, 2017, SCE  
6 reported contractual obligations for power purchase agreements of almost \$40  
7 billion.<sup>17</sup> SCE has also done significant procurement of renewable energy.  
8 Because of declining prices and improvements in technology, much of its current  
9 contract holdings are above market. As noted, SCE estimates its existing renewable  
10 portfolio is \$12B above market through 2035.<sup>18</sup> In the presence of CCA and  
11 departing load, it becomes increasingly unclear what customers will remain and  
12 thus be responsible for the renewable portfolio, and other contracts, which are now  
13 above market costs. The CPUC is currently examining this in an open proceeding.<sup>19</sup>  
14 Dr. Stern discusses this issue in more detail in his testimony, Exhibit SCE-21.

15 Specifically, the CPUC in October 2018 adopted a revised version of its Power  
16 Charge Indifference Adjustment ("PCIA"), which is "the mechanism to ensure that  
17 the customers who remain with the utility do not end up taking on the long-term  
18 financial obligations the utility incurred on behalf of now-departed customers,"  
19 such as utility expenditures to build power plants and long-term power purchase  
20 agreements.<sup>20</sup> The CPUC recently adopted a revised PCIA methodology, including  
21 an annual true-up mechanism and cap.<sup>21</sup> This decision opens up a second phase of

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<sup>17</sup> Exhibit No. SCE-21, Dr. Stern's Prefiled Direct Testimony, provides the details.

<sup>18</sup> See Exhibit No. SCE-21.

<sup>19</sup> Exhibit No. SCE-21, Dr. Stern's testimony.

<sup>20</sup> See <http://www.cpuc.ca.gov/PCIA/> (last visited March 6, 2019).

<sup>21</sup> CPUC Decision 18-10-019, issued October 19, 2018.

1 the CPUC's PCIA rulemaking to consider utility portfolio optimization, to establish  
2 a process for ESPs (i.e., Direct Access) or CCAs choosing to prepay their PCIA  
3 obligation, to develop the true-up process for the market price benchmarks used to  
4 calculate the PCIA, and to consider other potential issues related to the PCIA.<sup>22</sup> As  
5 Dr. Stern discusses in his testimony, while D.18-10-019 provides some certainty in  
6 terms of a revised PCIA methodology that provides a greater likelihood that SCE's  
7 bundled service customer will remain indifferent to departing customers,  
8 uncertainty remains around how accurate the true-up process will be, what impact  
9 the cap will have, and what potential portfolio optimization measures the CPUC  
10 will require SCE to implement.

11 Another factor to consider is the growth in DER, where an increasing number of  
12 customers install their own generation capacity. Through policies such as Net  
13 Energy Metering ("NEM"), customers who install self-generation technologies  
14 avoid transmission and distribution investment costs incurred by SCE on behalf of  
15 its customers. Dr. Stern notes SCE has over 2300MW of roof-top based solar  
16 within its service territory.<sup>23</sup> Yet, SCE continues to incur transmission (and  
17 distribution) costs, so when groups of customers avoid paying for these costs, the  
18 fixed portion of the costs are re-allocated to remaining customers. This in turn leads  
19 more customers to become self-generating and SCE's ability to recover its costs  
20 becomes more and more challenging.

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<sup>22</sup> CPUC Decision 18-10-019 at pp. 111-119, Ordering Paragraph No. 14.

<sup>23</sup> Exhibit No. SCE-21, Testimony of Dr. Stern.

1 **Q. HOW DOES THE CHANGING POLICY AND THE PACE OF THE**  
2 **CHANGES AFFECT THE RISKS OF SCE’S INVESTORS?**

3 A. As energy policy changes, the scope and design of the transmission assets change  
4 and consequently, some assets that were designed and built to meet prior goals may  
5 now need to be modified, retired, or otherwise re-purposed. Dr. Stern’s testimony  
6 cites several examples of the cancellation of transmission projects occurring as a  
7 result of changes in demand forecast due to the growth of distributed solar  
8 generation. The pace of change regarding both policy and technological  
9 development increases the Company’s risk exposure. As the goals and the need for  
10 specific assets change, SCE’s ability to earn its allowed return on equity changes.  
11 Specifically, it gets more and more difficult to collect costs associated with  
12 abandoned projects or stranded assets.

13 **Q. WHAT ARE THE IMPLICATIONS OF THESE UNIQUE RISKS?**

14 A. These risks mean that SCE is riskier than the electric utility industry and the proxy  
15 group I use. Consequently, it is necessary that the Commission grant SCE a return  
16 on equity that will ensure comparability to the return on similar risk entities and  
17 one that allows SCE to attract capital on reasonable terms and maintain its financial  
18 integrity.

19 **Q. HAS SCE IN THE PAST BEEN GRANTED ANY INCENTIVE ADDERS?**

20 A. Yes. As approved by the Commission’s Order Granting Petition for Declaratory  
21 Order in Docket EL07-62-000<sup>24</sup>, SCE is requesting a 0.50 percent adder to the base  
22 ROE to compensate SCE for its membership in the CAISO (“CAISO Adder”).

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<sup>24</sup> *Southern California Edison Co.*, 121 FERC ¶ 61,168 (2007) at p. 158.

1 Similarly, in Docket ER 18-169-000 (December 2017), the Commission issued an  
2 order accepting SCE's Second Formula Rate subject to refund and granted SCE's  
3 request for the CAISO Adder.<sup>25</sup> This CAISO adder was challenged by the CPUC  
4 and the Transmission Agency of Northern California and a rehearing request  
5 remains pending.<sup>26</sup>

6 **Q. DOES SCE'S REQUEST FOR AN INCENTIVE ADDER FOR CAISO**  
7 **MEMEBERSHIP HAVE MERIT?**

8 A. Yes. SCE's participation in CAISO has resulted in tangible benefits. For example,  
9 CAISO, though it's FERC-jurisdictional tariffs, has implemented numerous  
10 policies and practices that benefit the CAISO grid and its customers.<sup>27</sup>  
11 Significantly, the CAISO has actively been implementing Order 1000, which  
12 allows for competitive transmission in the CAISO footprint.<sup>28</sup> Further, the CAISO  
13 plans the transmission system to meet reliability standards and resiliency goals and  
14 manages market issues. Notably, the July 31, 2018 western Energy Imbalance  
15 Markets ("EIM") quarterly report indicates significant benefits flowing to CAISO  
16 members regarding cost savings.<sup>29</sup>

17 Lastly, providing incentive adders for CAISO is consistent with past precedents

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<sup>25</sup> *Southern California Edison Co.*, 161 FERC 61,309 at P 25. A remand order regarding Pacific Gas & Electric ("PG&E") rate cases and the CAISO adder also is pending.

<sup>26</sup> *Order Granting Rehearing for Further Consideration*, Dkt. Nos. ER18-169-001, EL18-44-001 (Feb. 28, 2018).

<sup>27</sup> See Exhibit No. SCE-21, the testimony of Dr. Gary Stern, for details.

<sup>28</sup> See Sections 24.5 and 24.18 of the CAISO's tariffs. Available at <http://www.caiso.com/Documents/ConformedTariff-asof-Mar1-2019.pdf>

<sup>29</sup> *Western EIM Benefits Report*, Second Quarter 2018, dated July 31, 2018, at p. 4 (indicating \$27.93 million of estimated EIM gross benefits attributable to the CAISO in the second quarter of 2018), available at [https://www.westerneim.com/Documents/ISOEIMBenefitsReportQ2\\_2018.pdf](https://www.westerneim.com/Documents/ISOEIMBenefitsReportQ2_2018.pdf).

1 **Q. WHAT IS YOUR RECOMMENDATION CONCERNING AN ISO**  
2 **INCENTIVE ADDER FOR SCE?**

3 A. SCE has been and continues to be a member of the CAISO. Consistent with  
4 Commission policy, while SCE remains within the CAISO it should receive the  
5 ISO incentive adder.

6 **Q. HAS THE COMMISSION PREVIOUSLY GRANTED SCE ADDITIONAL**  
7 **ROE INCENTIVES FOR SPECIFIC TRANSMISSION PROJECTS?**

8 A. Yes. The Commission has previously granted ROE incentive adder on three  
9 specific transmission projects. These projects and their associated ROE incentive  
10 adders are: Rancho Vista, 0.75 percent; Tehachapi, 1.25 percent; and Devers-  
11 Colorado River, 1.00 percent.<sup>30</sup> Given my recommended conventional ROE of  
12 11.62% inclusive of the CAISO adder, the total ROEs for these three projects are  
13 12.37 percent, 12.87 percent, and 12.62 percent, respectively. In accordance with  
14 past precedents, SCE should continue to receive incentives for these projects.  
15 While the Tehachapi project and to a lesser degree the Devers-Colorado River are  
16 above the upper end of the Commission's conventional reasonable range, I note  
17 that there certainly are companies in the full range with an estimated ROE above  
18 12.87 percent. For example, CMS Energy shows 14.4% based on the Expected  
19 Earnings method.

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<sup>30</sup> See, *Southern California Edison Co.*, 121 FERC ¶ 61,168 (2007) at P 129 and *Southern California Edison Co.*, 132 FERC ¶ 61,213 (2010).

1 **VI. THE COMMISSION'S REVISED COST OF CAPITAL METHODOLOGY**

2 **Q. HOW IS THIS SECTION OF YOUR TESTIMONY ORGANIZED?**

3 A. This section first outlines the steps involved in selecting the sample companies used  
4 in the FERC Electric Utility Sample. Second, it describes the Commission's  
5 revised ROE method in general and provides the specifics of the implementation of  
6 the models. Third, the section discusses the results of my ROE calculations. Finally,  
7 this section concludes with a discussion of current economic conditions in the U.S.,  
8 including how these conditions have affected the capital markets and impacted cost  
9 of capital.

10 **A. Sample Selection**

11 **1. Sample Selection Criteria**

12 **Q. PLEASE EXPLAIN WHAT CRITERIA YOU APPLIED IN SELECTING A**  
13 **SAMPLE THAT IS CONSISTENT WITH THE COMMISSION'S**  
14 **PRECEDENT FOR TRANSMISSION ENTITIES.**

15 A. I have reviewed key Commission decisions and selected a sample consisting of  
16 electric transmission-owning utilities typically used by the Commission (FERC  
17 Electric Utility Sample). For the reasons discussed above, I believe that SCE is of  
18 higher risk than the FERC Electric Utility Sample before the consideration of any  
19 wildfire risks. The magnitude of the potential liabilities associated with wildfire  
20 risks combined with California legislation means that these risks are extraordinary  
21 and not captured in the FERC Electric Utility Sample. Consequently, I develop an  
22 alternative sample of capital-intensive network industries to assess what the  
23 potential ROE range for such companies might be.

1 To develop the FERC Electric Utility Sample, I started with the universe of 41  
2 electric transmission-owning companies in the U.S. as reported by *Value Line*. I  
3 then determined, whether each company met the Commission's standard criteria,  
4 which means that I checked whether the company (i) is a domestic company with  
5 an investment grade credit rating,<sup>31</sup> (b) has issued dividends with no dividend cuts  
6 in the last six months, and (iii) has had no substantial completed mergers or  
7 acquisitions in the last six months or pending mergers announced in the previous  
8 three years (not yet completed). The companies remaining constitute the FERC  
9 Electric Utility Sample. Exhibit No. SCE-27, Table BV-2 provides details  
10 regarding the selection of the sample, the companies considered for inclusion in the  
11 sample, and why some companies were excluded from the final FERC Electric  
12 Utility Sample. I note that I did not eliminate a company because it was more than  
13 one notch above or below SCE's credit rating for two reasons. First, a restriction  
14 based on +/- one credit rating notch would lead to a sample that is too small to  
15 capture the electric utility industry. Second, SCE's credit rating has been evolving  
16 over the past one to two years and may continue to do so. To illustrate this,  
17 Standard & Poor's and Moody's have downgraded SCE (and its parent) three times  
18 since January 2018, with Moody's having downgraded both entities 3 notches since  
19 the start of 2018. Consequently, the reliance of being within plus or minus one  
20 notch for SCE's rating would give differing results depending on the exact timing  
21 of the filing. This is exaggerated by the fact that the credit rating agencies have

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<sup>31</sup> Only companies with U.S. traded stock were included in the sample. Therefore, companies with the same parent company appear only once in the sample.



1 different ratings for SCE and that ratings differ between SCE and its parent EIX.<sup>32</sup>

2 For these reasons, I include all investment grade companies.<sup>33</sup>

3 **Q. WHY DO BOND RATINGS NOT CAPTURE THE RISK THAT EQUITY**  
4 **HOLDERS HAVE IN THE CASE OF SCE?**

5 A. Bond ratings capture the risk to creditors and in the case of very large asymmetric  
6 risks such as wildfires, bondholders will, in the case of bankruptcy, get paid before  
7 equity holders. Consequently, the potential liabilities associated with wildfire risk  
8 are unique and will affect equity holders before bondholders, who have priority in  
9 case of bankruptcy. Additionally, there is no sample of U.S. electric utilities that  
10 face similar wildfire risks as utilities in California.

11 **2. Characteristics of the FERC Electric Utility Sample**

12 **Q. PLEASE DESCRIBE THE FINANCIAL CHARACTERISTICS OF THE**  
13 **FERC ELECTRIC UTILITY SAMPLE.**

14 A. The FERC Electric Utility Sample consists of 33 electric utility companies.  
15 provides financial information on the companies in the sample, including each  
16 company's last 12 months of revenues as of December 2018,<sup>34</sup> market capitalization  
17 as of December 31, 2018, S&P's and Moody's credit ratings, and the Institutional

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<sup>32</sup> See, for example, Moody's Investor Service, "Moody's downgrades Southern California Edison to A3 from A2 and Edison International to Baa1 from A3; outlooks stable," September 6, 2018; Moody's Investor Service, "Moody's downgrades Edison International to Baa3 and Southern California Edison to Baa2; outlooks negative," March 5, 2019, and Standard & Poor's, "Edison International And Subsidiary Southern California Edison Downgraded to 'BBB': Ratings Placed on Watch Negative," January 21, 2019. For completeness, S&P in a March 18, 2019 update SCE and its parent's ratings and kept the companies on a negative outlook.

<sup>33</sup> See Opinion No. 531 at P 52 and P 108, n. 209 ("We note that the credit rating bands are based on only those NETOs that have credit ratings from S&P or Moody's."); see also *Atlantic Grid Operations A LLC, et al.*, Order on Petition for Declaratory Order, 135 FERC ¶ 61,144 at P 88, n. 55 (2011).

<sup>34</sup> December 2018 data reflects the most recent quarterly revenues data available for all companies at the time of the analysis.

1 Brokers Estimation System (IBES) earnings per share (EPS) forecast for the DCF  
2 model. I note that not all models may be implementable for all companies due to  
3 data limitations. Further, companies may be excluded from the results if they fail  
4 the Commission's outlier tests.

**Table 1: Characteristics of the FERC Electric Utility Sample**

Company	Last 12 Months of Revenues as of 12/31/18 (\$MM)*	Market Cap. As of Most Recent Quarter 12/31/18 (\$MM)*	S&P Bond Rating	Moody's Bond Rating	IBES Long Term Growth Rate Forecast	Value Line Projected EPS Growth Rate
	[1]	[2]	[3]	[4]	[5]	[6]
ALLETE	1,499	3,920	BBB+	WR	N/A	4.53%
Alliant Energy	3,535	10,327	A-	WR	7.25%	4.87%
Amer. Elec. Power	16,196	36,855	A-	Baa1	5.74%	5.09%
Ameren Corp.	6,291	15,919	BBB+	WR	7.70%	4.53%
AVANGRID Inc.	6,478	15,478	BBB+	NA	9.20%	10.25%
CMS Energy Corp.	6,873	14,067	BBB+	Baa1	7.00%	4.66%
Consol. Edison	12,337	24,858	A-	Baa1	2.90%	3.12%
DTE Energy	14,212	20,066	BBB+	Baa1	5.49%	5.95%
Duke Energy	24,521	61,532	A-	Baa1	4.41%	5.74%
Edison Int'l	12,657	18,496	BBB	Baa3	3.75%	6.35%
El Paso Electric	904	2,040	BBB	Baa1	5.10%	4.57%
Entergy Corp.	11,009	15,591	BBB+	Baa2	-3.77%	5.74%
Evergy Inc.	4,276	14,956	A-	Baa2	9.20%	8.78%
Eversource Energy	8,448	20,610	A+	Baa1	5.83%	5.33%
Exelon Corp.	35,986	43,562	BBB+	Baa2	8.77%	10.67%
FirstEnergy Corp.	11,454	19,205	BBB	Baa3	-6.61%	24.35%
Hawaiian Elec.	2,861	3,987	BBB-	WR	7.80%	4.32%
IDACORP Inc.	1,371	4,690	BBB	Baa1	2.60%	3.93%
MGE Energy	560	2,079	AA-	NA	N/A	8.14%
NextEra Energy	16,740	83,076	A-	NA	7.45%	5.58%
NorthWestern Corp.	1,192	2,991	BBB	Baa2	2.59%	2.48%
OGE Energy	2,270	7,828	BBB+	WR	-2.25%	4.46%
Otter Tail Corp.	916	1,969	BBB	WR	N/A	6.83%
Pinnacle West Capital	3,691	9,549	A-	WR	4.16%	6.92%
PNM Resources	1,437	3,273	BBB+	Baa3	4.10%	6.41%
Portland General	1,988	4,092	BBB+	WR	5.05%	3.46%
PPL Corp.	7,785	20,389	A-	NA	3.59%	2.41%
Public Serv. Enterprise	9,696	26,309	BBB+	Baa1	7.21%	5.74%
Sempra Energy	11,687	29,607	BBB+	Baa1	8.69%	9.82%
Southern Co.	23,495	44,541	A-	Baa2	1.68%	4.81%
Unitil Corp.	444	753	BBB+	NA	3.70%	n/a
WEC Energy Group	7,680	21,853	A-	Baa1	4.70%	6.13%
Xcel Energy Inc.	11,537	25,787	A-	A3	6.60%	3.64%

Sources and Notes:  
[1] - [4]: Bloomberg as of January 31, 2019. Note that WR means Withdrawn Rating.  
Credit ratings checked as of March 25, 2019.  
[5]: Long-term (i.e. 5 year) IBES estimates from Thomson Reuters as of January 31, 2019.  
[6]: Proj EPS Growth Rate. Value Line Plus Edition as of January 31, 2019  
\*Revenues and market capitalization data reflect the most recent quarter ending December 31, 2018.

1           **B.       FERC REVISED ROE ESTIMATION METHODOLOGY**

2   **Q.       PLEASE DESCRIBE THE FERC’S REVISED ROE ESTIMATION**  
3   **METHODOLOGY.**

4   A.       On October 16, 2018, the Commission issued an Order Directing Briefs (“NETO  
5       Briefing Order”) on the return on equity ROE to be used by New England electric  
6       utilities for setting transmission rates. The Commission proposes to expand the  
7       methodological basis for determining the Zone of Reasonableness to encompass  
8       three analyses, each applied to the same proxy group of electric utilities:

- 9           1. Capital Asset Pricing Model (CAPM)  
10          2. Two-step DCF – same as employed in Opinion No. 531, and  
11          3. Expected Earnings Method.

12       After excluding low- and high-end outliers from each model’s results, the  
13       methodology establishes a “composite ZOR.” The NETO Briefing Order indicates  
14       that outliers are identified based on a minimum spread of 100 basis points (“bps”)  
15       between the ROE estimate and the yield on BBB-rated utility debt (“low-end”) and  
16       based on a maximum of a 1.5 multiple of the median estimate (“high-end”).

17       A “Presumptively Just and Reasonable” range of ROEs for the Average Risk  
18       Utility is established consisting of one quarter of the composite ZOR, centered  
19       around the sample midpoint ROE estimate.<sup>35</sup>

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<sup>35</sup> The NETO Briefing Order distinguishes between single filers and group filers unlike Order 531 with single filers ROE focused on the median and group filers focused on the midpoint of the upper half. For reasons discussed below, I focus on the upper midpoint.

1 For setting the new ROE (i.e., if an existing ROE is determined to be no longer just  
2 and reasonable), the methodology uses the average of the midpoints or the medians  
3 of the three models along with a *single point estimate* from a proposed fourth  
4 methodology, the Risk Premium.<sup>36</sup>

5 Additionally, the NETO Briefing Order returns the focus to the midpoint/median  
6 (for average risk utilities), from the “upper midpoint” established by Opinion 531  
7 albeit the order explicitly notes that the Commission:

8 would use the midpoint/medians of the resulting lower and upper  
9 halves of the zone of reasonableness to determine ROEs for below  
10 or above average risk utilities, respectively.<sup>37</sup>

11 Consequently, an above-average risk entity such as SCE should be placed in the  
12 upper half of the zone of reasonableness.

### 13 1. The Capital Asset Pricing Model

14 **Q. CAN YOU EXPLAIN THE CAPM?**

15 A. Yes. Modern models of capital market equilibrium express the cost of equity as  
16 the sum of a risk-free rate and a market risk premium. The CAPM is a long-standing  
17 and widely used version of these models. The model requires the specification of:  
18 (1) the values of the benchmarks that determine the Security Market Line (see  
19 Figure 1 above); (2) the relative risk of a security or investment (i.e., beta); and (3)  
20 how the benchmarks combine to produce the Security Market Line. Given these  
21 specifications, the company's cost of capital is a function of the company's relative

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<sup>36</sup> The NETO Briefing Order states that “[t]he Commission will continue to use the midpoint of the zone of reasonableness as the appropriate measure of central tendency for a diverse group of average risk utilities and the median as the measure of central tendency for a single utility.” NETO Briefing Order at fn. 46. It is difficult to see a reason for such different treatment as standard finance theory makes clear it is the use and not the sources of funds that determines the cost of capital.

<sup>37</sup> NETO Briefing Order ¶17.

1 risk. More precisely, the CAPM calculates the cost of capital for an investment, S  
2 (e.g., a particular common stock) as follows:

$$3 \quad r_s = r_f + \beta_s \times MRP \quad (1)$$

4 where  $r_s$  is the cost of capital for investment S;

5  $r_f$  is the risk-free interest rate;

6  $\beta_s$  is the beta risk measure for the investment S; and

7  $MRP$  is the market risk premium.

8 The CAPM relies on the empirical fact that investors price risky securities to offer  
9 a higher expected rate of return than safe securities. The higher the systematic risk,  
10 the greater is the expected return.<sup>38</sup> Thus, the CAPM states that the Security Market  
11 Line starts at the risk-free interest rate (that is the return on a zero-risk security, the  
12 y-axis intercept in Figure 1, equals the risk-free interest rate). Further, the risk  
13 premium of a security over the risk-free rate equals the product of the beta of that  
14 security and the risk premium on a value-weighted portfolio of all investments,  
15 which by definition has average risk.

16 *a. The Risk-free Interest Rate*

17 **Q. WHAT INTEREST RATES DO YOUR CALCULATIONS REQUIRE?**

18 A. The Commission's methodology relies upon the version of the model that is based  
19 upon the long-term risk-free rate.

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<sup>38</sup> Systematic risk is the risk that affects the expected return of an investment as opposed to non-systematic (sometimes called diversifiable) risk that does not.

1 **Q. WHAT INTEREST RATE DO YOU USE IN YOUR IMPLEMENTATION**  
2 **OF THE CAPM?**

3 A. The interest rate used in the CAPM must be consistent with the MRP selected. If  
4 the MRP is measured relative to 20-year U.S. Treasury bonds, then the risk-free  
5 rate should be for a 20-year U.S. Treasury bonds.

6 **Q. DO YOU RECOMMEND THE CURRENT YIELD OR THE FORECAST**  
7 **YIELD AS A MEASURE OF THE RISK-FREE RATE?**

8 A. I do not believe the current yield on the long-term Treasury bond is a good estimate  
9 for the risk-free rate that will prevail over the time period the rates in this  
10 proceeding are expected to be in effect. For this reason, I use a risk-free rate based  
11 on the forecasted value from Blue Chip Economic Indicators. Specifically, I use the  
12 3.2 percent yield on the 10-year U.S. Treasury bond forecasted to be in effect in  
13 2020<sup>39</sup> and adjust upward by 50 bps, which is my estimate of the representative  
14 maturity premium for the 20-year over the 10-year Treasury Bond. The resulting  
15 value for the unadjusted risk-free rate is 3.7 percent.

16 **b. *The Market Risk Premium***

17 **Q. HOW WAS THE MRP ESTIMATED IN THE NETO BRIEFING ORDER?**

18 A. The NETO Briefing Order relied upon a methodology proposed by Dr. Avera, the  
19 NETO witness in the proceeding. Dr. Avera estimated the MRP by implementing  
20 a single stage DCF model for the dividend paying companies in the S&P 500 index  
21 using *IBES* earnings growth rate estimates. He then calculated the expected market  
22 return by calculating market-value weighted-average of the individual company

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<sup>39</sup> Blue Chip Economic Indicators, January 2019.

1 DCF estimates. To derive the MRP, Dr. Avera subtracted the 6-month average  
2 risk-free interest rate on 30-year Treasury bonds.

3 **Q. HOW DO YOU ESTIMATE THE RISK MARKET RISK PREMIUM?**

4 A. I implement the method used by Dr. Avera, but use the forecasted risk-free rate for  
5 a 20-year Treasury bond. When calculating the expected return on the S&P 500, I  
6 eliminate outliers. Specifically, I eliminate companies with IBES growth rates  
7 estimates above 20 percent as high-end outliers, and eliminate companies with  
8 IBES growth rates estimates below zero percent as low-end outliers. I also eliminate  
9 any ROE estimate that is less than the yield on BBB rated utility debt plus 100 basis  
10 points as low-end outliers.

11 **Q. WHAT MRP DID YOU ESTIMATE?**

12 A. Using the methodology above, which is a slightly modified version of Dr. Avera's  
13 method, I estimate the MRP to be 9.67 percent.

14 *c. Beta*

15 **Q. WHAT BETA ESTIMATES WERE USED IN THE NETO BRIEFING  
16 ORDER?**

17 A. The NETO Briefing Order uses beta estimates for the sample companies from  
18 *Value Line*. I similarly use *Value Line* as the source of my beta estimates.

19 **Q. CAN YOU MORE FULLY EXPLAIN BETA?**

20 A. The basic idea behind beta is that risks that cannot be diversified away in large  
21 portfolios matter more than those that can be eliminated by diversification. Beta is  
22 a measure of the risks that cannot be eliminated by diversification. That is, it

1 measures the “systematic” risk of a stock—the extent to which a stock's value  
2 fluctuates more or less than average when the market fluctuates.

3 Diversification is a vital concept in the study of risk and return. (Harry Markowitz  
4 won a Nobel Prize for work showing just how important it was.) Over the long run,  
5 the rate of return on the stock market has a very high standard deviation, on the  
6 order of 20 percent per year. Many individual stocks have much higher standard  
7 deviations than this. The stock market's standard deviation is “only” about 15-20  
8 percent because when stocks are combined into portfolios, some of the risk of  
9 individual stocks is eliminated by diversification. Some stocks go up when others  
10 go down, and the average portfolio return—whether positive or negative—is  
11 usually less extreme than that of many individual stocks within it. The fact that the  
12 market's actual annual standard deviation is so large means that, in practice, the  
13 returns on stocks are positively correlated with one another, and to a material  
14 degree. The reason is that many factors that make a particular stock go up or down  
15 also affect other stocks. Examples include the state of the economy, the balance of  
16 trade, and inflation. Thus, some risk is “non-diversifiable” in that even a well-  
17 diversified portfolio of stocks will experience changes in value caused by these  
18 shared risk factors. Single-factor equity risk premium models (such as the CAPM)  
19 are based upon the assumption that all of the systematic factors that affect stock  
20 returns can be considered simultaneously, through their impact on one factor: the  
21 market portfolio. Other models derive somewhat less restrictive conditions under  
22 which several factors might be individually relevant.

23



1 **Q. WHAT DOES A PARTICULAR VALUE OF BETA SIGNIFY?**

2 A. By definition, a stock with a beta equal to 1.0 has average non-diversifiable risk: it  
3 goes up or down by 10 percent on average when the market goes up or down by 10  
4 percent. Stocks with betas above 1.0 exaggerate the swings in the market: stocks  
5 with betas of 2.0 tend to fall 20 percent when the market falls 10 percent, for  
6 example. Stocks with betas below 1.0 are less volatile than the market. A stock with  
7 a beta of 0.5 will tend to rise 5 percent when the market rises 10 percent.

8 *d. Size Adjustment*

9 **Q. WHAT IS THE SIZE ADJUSTMENT?**

10 A. The size adjustment is a modification to the CAPM estimates based upon empirical  
11 evidence from academic studies documenting a difference between a company's  
12 theoretical return as estimated by the CAPM and its realized return. The difference  
13 is a function of the size of the entity, where size is measured by its market value  
14 capitalization. The appropriate size adjustment is reported by Duff & Phelps<sup>40</sup> and  
15 varies with decile. The smallest decile of companies requires the largest addition  
16 to the expected return, while the largest decile actually needs a reduction.

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<sup>40</sup> Duff & Phelps, *2017 Valuation Handbook*, U.S. Guide to Cost of Capital, 7-10 and 7-11.

**Table 2: CAPM ROE Estimates**

Company	RFR	Risk Premium	Beta	Unadjusted Ke	Market Cap (\$Million)	Size Adjustment	Implied Cost of Equity
	[4]	[5] = [3]-[4]	[6]	[7] = [4]+[5]*[6]	[8]	[9]	[10] = [7] + [9]
ALLETE	3.70%	9.67%	0.65	9.98%	\$3,955	0.98%	10.96%
Alliant Energy	3.70%	9.67%	0.60	9.50%	\$10,492	0.89%	10.39%
Amer. Elec. Power	3.70%	9.67%	0.55	9.02%	\$39,014	-0.35%	8.67%
Ameren Corp.	3.70%	9.67%	0.55	9.02%	\$16,933	0.61%	9.63%
AVANGRID Inc.	3.70%	9.67%	0.30	6.60%	\$15,410	0.61%	7.21%
CMS Energy Corp.	3.70%	9.67%	0.55	9.02%	\$14,771	0.61%	9.63%
Consol. Edison	3.70%	9.67%	0.40	7.57%	\$24,182	0.61%	8.18%
DTE Energy	3.70%	9.67%	0.55	9.02%	\$21,422	0.61%	9.63%
Duke Energy	3.70%	9.67%	0.50	8.53%	\$62,587	-0.35%	8.18%
Edison Int'l	3.70%	9.67%	0.55	9.02%	\$18,562	0.61%	9.63%
El Paso Electric	3.70%	9.67%	0.65	9.98%	\$2,129	1.66%	11.64%
Entergy Corp.	3.70%	9.67%	0.60	9.50%	\$16,155	0.61%	10.11%
Evergy Inc.	3.70%	9.67%	N/A	N/A	\$14,956	0.61%	N/A
Eversource Energy	3.70%	9.67%	0.60	9.50%	\$21,995	0.61%	10.11%
Exelon Corp.	3.70%	9.67%	0.65	9.98%	\$46,184	-0.35%	9.63%
FirstEnergy Corp.	3.70%	9.67%	0.60	9.50%	\$20,049	0.61%	10.11%
Hawaiian Elec.	3.70%	9.67%	0.60	9.50%	\$4,049	0.98%	10.48%
IDACORP Inc.	3.70%	9.67%	0.55	9.02%	\$4,913	0.98%	10.00%
MGE Energy	3.70%	9.67%	0.60	9.50%	\$2,230	1.66%	11.16%
NextEra Energy	3.70%	9.67%	0.55	9.02%	\$85,543	-0.35%	8.67%
NorthWestern Corp.	3.70%	9.67%	0.55	9.02%	\$3,444	1.51%	10.53%
OGE Energy	3.70%	9.67%	0.85	11.92%	\$8,179	0.89%	12.81%
Otter Tail Corp.	3.70%	9.67%	0.75	10.95%	\$1,922	1.66%	12.61%
Pinnacle West Capital	3.70%	9.67%	0.55	9.02%	\$9,869	0.89%	9.91%
PNM Resources	3.70%	9.67%	0.65	9.98%	\$3,393	1.51%	11.49%
Portland General	3.70%	9.67%	0.60	9.50%	\$4,312	0.98%	10.48%
PPL Corp.	3.70%	9.67%	0.70	10.47%	\$22,541	0.61%	11.08%
Public Serv. Enterprise	3.70%	9.67%	0.60	9.50%	\$27,493	-0.35%	9.15%
Sempra Energy	3.70%	9.67%	0.75	10.95%	\$32,053	-0.35%	10.60%
Southern Co.	3.70%	9.67%	0.50	8.53%	\$48,551	-0.35%	8.18%
Unitil Corp.	3.70%	9.67%	0.55	9.02%	\$780	2.08%	11.10%
WEC Energy Group	3.70%	9.67%	0.50	8.53%	\$23,043	0.61%	9.14%
Xcel Energy Inc.	3.70%	9.67%	0.50	8.53%	\$26,876	-0.35%	8.18%
Minimum							7.21%
Maximum							12.81%
Median							10.05%
Midpoint							10.01%
Upper end of ZOR							12.81%
Upper Midpoint							11.41%

## Sources and Notes:

[1]: Value Line Investment Analyzer as of 01/31/2019, weighted average dividend yield for dividend paying firms in S&amp;P 500 Index.

[2]: Weighted average of earnings growth rates from IBES for dividend-paying stocks in the S&amp;P 500, accessed 1/31/2019.

[4]: Forecast for 2020 10 Year Treasury Bond Yield + 50bps Spread, January 2019 Blue Chip Economic Indicators.

[6]&amp;[8]: Value Line Investment Analyzer as of 01/31/2019. Evergy Inc. market cap is from Bloomberg, as of 12/31/2018.

[9]: Duff&amp;Phelps 2017 Valuation Handbook U.S. Guide to Cost of Capital, 7-10 and 7-11.

1                   **2. The Commission’s Two-Step Discounted Cash Flow Model**2                   **a. The Discounted Cash Flow Model**

3 **Q. PLEASE DESCRIBE THE THEORETICAL DISCOUNTED CASH FLOW**  
4 **MODEL.**

5 A. The DCF method assumes that the market price of a stock is equal to the present  
6 value of the dividends (or cash flows) that its owners expect to receive. The model  
7 also assumes that this present value can be calculated by the standard formula for  
8 the present value of a cash flow stream:

$$P = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \dots + \frac{D_T}{(1+k)^T} \quad (2)$$

9 where “P” is the market price of the stock; “D<sub>t</sub>” is the dividend cash flow expected  
10 at the end of period t (i.e., subscript period 1, 2, 3 or T in the equation); “k” is the  
11 cost of capital; and “T” is the last period in which a dividend cash flow is to be  
12 received. The formula says that the stock price is equal to the sum of the expected  
13 future dividends, each discounted for the time and risk between now and the time  
14 the dividend is expected to be received.

15 One version of the DCF assumes that the growth rate is constant over time, which  
16 implies that the formula can be rearranged to estimate the cost of capital as

$$P = \frac{D_1}{(k-g)} \quad (3)$$

17 where “D<sub>1</sub>” is the dividend expected at the end of the first period, “g” is the  
18 perpetual growth rate, and “P” and “k” are the market price and the cost of capital,  
19 as before. Equation (3) is a simplified version of Equation (2) that can be solved to  
20 yield the well-known “DCF formula” for the cost of capital:

$$\begin{aligned} k &= \frac{D_1}{P} + g \\ &= \frac{D_0 \times (1 + g)}{P} + g \end{aligned} \tag{4}$$

1 where “D<sub>0</sub>” is the current dividend, which investors expect to increase at rate g by  
2 the end of the next period, and the other symbols are defined as before. Equation  
3 (4) provides that if Equation (3) is satisfied, the cost of equity equals the expected  
4 dividend yield plus the (perpetual) expected future (forever constant) growth rate  
5 of dividends.

6 ***b. The Commission’s Two-Step DCF Model***

7 **Q. PLEASE DESCRIBE THE COMMISSION’S TWO-STEP DCF MODEL.**

8 A. The Commission’s two-step DCF model is a modification of the theoretical DCF  
9 model that uses a constant growth of dividends. Instead of estimating the cost of  
10 capital in one step, it estimates it in two steps (hence it is called the “two-step” DCF  
11 model). The model is articulated in Opinion No. 531:

12 The Commission developed the two-step DCF methodology used  
13 for determining the cost of capital for individual gas and oil  
14 pipelines in a series of orders during the mid-1990s. Under that  
15 methodology, the Commission determines a single cost of equity  
16 estimate for each member of a proxy group. For the dividend yield  
17 component of the DCF model, the Commission derives a single,  
18 average dividend yield based on the indicated dividend and the  
19 average of the monthly high and low stock prices over a six-month  
20 period. The Commission uses a two-step procedure for determining  
21 the constant dividend growth component of the model, averaging  
22 short-term and long-term growth estimates. Security analysts’ five-  
23 year forecasts for each company in the proxy group, as published by

1 the Institutional Brokers Estimate System (IBES), are used for  
2 determining growth for the short term; earnings forecasts made by  
3 investment analysts are considered to be the best available estimates  
4 of short-term dividend growth because they are likely relied on by  
5 investors when making their investment decisions.<sup>29</sup> Long-term  
6 growth is based on forecasts of long-term growth of the economy as  
7 a whole, as reflected in GDP. The short-term forecast receives a  
8 two-thirds weighting and the long-term forecast receives a one-third  
9 weighting in calculating the growth rate in the DCF model.<sup>41</sup>

10 **Q. HOW IS THE DIVIDEND YIELD DETERMINED?**

11 A. The dividend yield is calculated as the six-month average of the highest monthly  
12 price and lowest monthly stock price divided into the annualized current quarterly  
13 dividend, i.e., the current dividend times four, for each month. The historical six-  
14 month average dividend yield is multiplied by 150 percent of the IBES growth rate  
15 to give the adjusted dividend yield.

16 **Q. HOW IS THE GROWTH RATE DETERMINED?**

17 A. In Opinion No. 531,<sup>42</sup> the Commission changed the method for determining the  
18 growth rate,  $g$ , in the formula above. Specifically, the Commission now determines  
19 the growth rate as

$$g = (2/3) \times \text{ST growth} + (1/3) \times \text{LT growth} \quad (4)$$

20 where the ST growth is the firm-specific 5-year growth rate obtained from IBES  
21 (Institutional Brokers Estimate System) or comparable sources. Currently, the  
22 Commission uses GDP growth rate forecasts from EIA (Energy Information  
23

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<sup>41</sup> Opinion No. 531 at P 17 (footnotes omitted).

<sup>42</sup> *Id.* at PP 17, 32-41.

1 Administration), Social Security Administration, and IHS Global Insight (formed  
2 by the merger of DRI/McGraw Hill and Wharton Econometrics). Instead of IHS  
3 Global Insight, I used Blue Chip Economic Indicators because I do not have access  
4 to IHS Global Insight. I use the following steps to calculate the growth rate for each  
5 company:

6 1. Calculate forecast GDP growth from the most recent GDP growth  
7 rate forecasts from EIA, Social Security Administration, and Blue Chip Economic  
8 Indicators weighted equally.

9 2. Use the most recent IBES 5-year projected EPS growth rate for each  
10 company in the sample.

11 3. For each company, “g” is calculated as the IBES 5-year growth rate  
12 weighted by 2/3 and the weighted-average GDP forecast growth rate weighted by  
13 1/3.

14 I have also calculated the DCF results using Value Line growth rates in Table 4.

**Table 3: DCF ROE Estimates for the FERC Electric Utility Sample**

Company	Adjusted Dividend Yield	GDP Growth Forecast	IBES Long Term Growth Rate Forecast	Combined Growth Rate	Implied Cost of Equity
	[4]	[5]	[6]	[7]	[8]
ALLETE	N/A	4.24%	N/A	N/A	-
Alliant Energy	3.25%	4.24%	7.25%	6.25%	9.49%
Amer. Elec. Power	3.59%	4.24%	5.74%	5.24%	8.83%
Ameren Corp.	2.95%	4.24%	7.70%	6.55%	9.49%
AVANGRID Inc.	3.73%	4.24%	9.20%	7.55%	11.28%
CMS Energy Corp.	3.01%	4.24%	7.00%	6.08%	9.09%
Consol. Edison	3.74%	4.24%	2.90%	3.34%	<del>7.08%</del>
DTE Energy	3.30%	4.24%	5.49%	5.07%	8.37%
Duke Energy	4.54%	4.24%	4.41%	4.35%	8.89%
Edison Int'l	3.99%	4.24%	3.75%	3.91%	<del>7.90%</del>
El Paso Electric	2.61%	4.24%	5.10%	4.81%	7.43%
Energy Corp.	4.19%	4.24%	-3.77%	-1.10%	<del>3.09%</del>
Evergy Inc.	3.43%	4.24%	9.20%	7.55%	10.98%
Eversource Energy	3.25%	4.24%	5.83%	5.30%	8.55%
Exelon Corp.	3.25%	4.24%	8.77%	7.26%	10.51%
FirstEnergy Corp.	3.72%	4.24%	-6.61%	-2.99%	<del>0.72%</del>
Hawaiian Elec.	3.55%	4.24%	7.80%	6.61%	10.16%
IDACORP Inc.	2.56%	4.24%	2.60%	3.15%	<del>5.71%</del>
MGE Energy	N/A	4.24%	N/A	N/A	-
NextEra Energy	2.67%	4.24%	7.45%	6.38%	9.05%
NorthWestern Corp.	3.69%	4.24%	2.59%	3.14%	6.83%
OGE Energy	3.70%	4.24%	-2.25%	-0.09%	<del>3.61%</del>
Otter Tail Corp.	N/A	4.24%	N/A	N/A	-
Pinnacle West Capital	3.54%	4.24%	4.16%	4.19%	7.73%
PNM Resources	2.72%	4.24%	4.10%	4.15%	6.86%
Portland General	3.21%	4.24%	5.05%	4.78%	7.99%
PPL Corp.	5.59%	4.24%	3.59%	3.81%	9.39%
Public Serv. Enterprise	3.52%	4.24%	7.21%	6.22%	9.74%
Sempra Energy	3.27%	4.24%	8.69%	7.21%	10.48%
Southern Co.	5.33%	4.24%	1.68%	2.53%	7.86%
Unitil Corp.	2.98%	4.24%	3.70%	3.88%	6.86%
WEC Energy Group	3.28%	4.24%	4.70%	4.55%	7.83%
Xcel Energy Inc.	3.20%	4.24%	6.60%	5.81%	9.01%
Minimum					6.83%
Maximum					11.28%
Midpoint					9.06%
Upper Midpoint					10.17%

## Sources and Notes:

[1]: Bloomberg as of January 31, 2019.

[2]: Bloomberg as of January 31, 2019.

[3]: Bloomberg from 08/01/2018 through 01/31/2019.

[4]: Dividend Yield x ( 1 + 0.5 x [6]).

[5]: Long Term GDP Growth Rate Forecasts from Social Security Administration, EIA's Annual Energy Outlook 2018 (Table A20), and Blue Chip Economic Indicators, March 2018.

[6]: Long term growth rate estimates from Thomson Reuters as of 01/31/2019.

[7]: ( (1/3) x [5]) + ( (2/3) x [6]).

[8]: [4] + [7], excluding companies that did not meet all sample selection criteria.

\* Companies are excluded for (i) the low spread between cost of equity and cost of debt; and/or (ii) negative long-term IB

1

Table 4: DCF ROE Results Using Value Line Growth Rates

Company	Adjusted Dividend Yield	GDP Growth Forecast	Value Line Long Term Growth Rate Forecast	Combined Growth Rate	Implied Cost of Equity Before Additional Screens
ALLETE	3.00%	4.24%	4.53%	4.44%	7.44%
Alliant Energy	3.21%	4.24%	4.87%	4.66%	7.87%
Amer. Elec. Power	3.58%	4.24%	5.09%	4.80%	8.39%
Ameren Corp.	2.90%	4.24%	4.53%	4.44%	7.34%
CMS Energy Corp.	2.97%	4.24%	4.66%	4.52%	7.49%
DTE Energy	3.30%	4.24%	5.95%	5.38%	8.68%
Entergy Corp.	4.39%	4.24%	5.74%	5.24%	<del>9.63%</del>
Evergy Inc.	3.42%	4.24%	8.78%	7.26%	10.69%
MGE Energy	2.21%	4.24%	8.14%	6.84%	9.05%
OGE Energy	3.82%	4.24%	4.46%	4.38%	<del>8.21%</del>
Otter Tail Corp.	2.90%	4.24%	6.83%	5.96%	8.86%
WEC Energy Group	3.30%	4.24%	6.13%	5.50%	8.80%
AVANGRID Inc.	3.75%	4.24%	10.25%	8.24%	12.00%
Consol. Edison	3.74%	4.24%	3.12%	3.50%	7.24%
Duke Energy	4.57%	4.24%	5.74%	5.24%	9.81%
Eversource Energy	3.24%	4.24%	5.33%	4.97%	8.21%
Exelon Corp.	3.28%	4.24%	10.67%	8.53%	11.80%
FirstEnergy Corp.	4.31%	4.24%	24.35%	17.65%	<del>21.96%</del>
NextEra Energy	2.64%	4.24%	5.58%	5.13%	7.77%
PPL Corp.	5.55%	4.24%	2.41%	3.02%	8.57%
Public Serv. Enterprise	3.50%	4.24%	5.74%	5.24%	8.73%
Southern Co.	5.41%	4.24%	4.81%	4.62%	10.04%
Unitil Corp.	N/A	4.24%	n/a	N/A	-
Edison Int'l	4.04%	4.24%	6.35%	5.64%	9.68%
El Paso Electric	2.61%	4.24%	4.57%	4.46%	7.07%
Hawaiian Elec.	3.49%	4.24%	4.32%	4.29%	7.78%
IDACORP Inc.	2.58%	4.24%	3.93%	4.03%	6.61%
NorthWestern Corp.	3.69%	4.24%	2.48%	3.07%	6.76%
Pinnacle West Capital	3.59%	4.24%	6.92%	6.03%	9.61%
PNM Resources	2.75%	4.24%	6.41%	5.69%	8.43%
Portland General	3.19%	4.24%	3.46%	3.72%	6.91%
Sempra Energy	3.29%	4.24%	9.82%	7.96%	11.25%
Xcel Energy Inc.	3.15%	4.24%	3.64%	3.84%	6.99%
Minimum					6.61%
Maximum					12.00%
Median					8.43%
Midpoint					9.30%
Upper End of FERC ZOR					12.00%
Upper Midpoint					10.65%

2  
3



1 A comparison of Tables 3 and 4 above makes clear that the use of IBES growth  
2 rates and the exclusion of Value Line growth rates results in a lower midpoint and  
3 a non-trivially lower maximum.

4  
5

### 3. Expected Earnings Method

6 **Q. HOW DID THE NETO BRIEFING ORDER IMPLEMENT THE**  
7 **EXPECTED EARNINGS METHOD?**

8 A. The expected earnings method uses the expected or forecast return on book equity  
9 as provided by *Value Line*. The forecast used is the expected ROE 3 to 5 years in  
10 the future. Because the forecast is assumed to be an ROE based upon the  
11 company's book equity in the last year of the period, an adjustment is needed to  
12 convert the forecast ROE to ROE over an average book value of equity over the  
13 period. The adjustment used is to multiply the forecast ROE by an adjustment  
14 factor equal to  $2 \cdot (1 + 5\text{-yr. change in equity}) / (2 + 5\text{-yr. change in equity})$ .

15 **Q. ARE THE EXPECTED EARNINGS MARKET BASED ESTIMATES?**

16 A. No. They are based on accounting data. They have the advantage of being a book  
17 rate of return, which is comparable to the allowed ROE on a book value rate base.

**Table 5: Expected Earnings Method Applied to the FERC Electric Sample**

<b>Company</b>	<b>2021-23 Expected Return on Equity</b> [1]	<b>Adjustment Factor</b> [2]	<b>Adjusted Return on Equity</b> [3]=[1]*[2]
ALLETE	9.00%	1.015	9.14%
Alliant Energy	10.50%	1.005	10.55%
Amer. Elec. Power	11.00%	1.022	11.25%
Ameren Corp.	10.50%	1.021	10.72%
AVANGRID Inc.	6.50%	1.007	6.55%
CMS Energy Corp.	14.00%	1.032	14.45%
Consol. Edison	8.50%	1.013	8.61%
DTE Energy	11.00%	1.030	11.33%
Duke Energy	8.50%	1.011	8.59%
Edison Int'l	12.50%	1.020	12.75%
El Paso Electric	8.50%	1.013	8.61%
Entergy Corp.	11.00%	1.029	11.32%
Evergy Inc.	9.50%	0.991	9.41%
Eversource Energy	9.50%	1.014	9.64%
Exelon Corp.	9.50%	1.022	9.71%
FirstEnergy Corp.	16.50%	1.039	17.15%
Hawaiian Elec.	9.50%	1.021	9.70%
IDACORP Inc.	9.50%	1.017	9.66%
MGE Energy	9.00%	1.045	9.40%
NextEra Energy	13.00%	1.023	13.29%
NorthWestern Corp.	9.00%	1.012	9.11%
OGE Energy	11.50%	1.013	11.64%
Otter Tail Corp.	11.00%	1.042	11.47%
Pinnacle West Capital	10.50%	1.017	10.67%
PNM Resources	9.50%	1.025	9.74%
Portland General	9.00%	1.014	9.12%
PPL Corp.	13.50%	1.029	13.89%
Public Serv. Enterprise	11.00%	1.018	11.20%
Sempra Energy	12.00%	1.028	12.34%
Southern Co.	12.50%	1.019	12.74%
Unitil Corp.	N/A	N/A	N/A
WEC Energy Group	12.00%	1.013	12.16%
Xcel Energy Inc.	10.50%	1.021	10.72%
Minimum			6.5%
Maximum			17.1%
Midpoint			11.8%
Maximum (outlier tested)			14.4%
Upper Midpoint (outlier tested)			12.5%

## Sources and Notes:

[1]: Value Line Investment Analyzer as of 01/31/2019.

FirstEnergy Corp. is included from the ROE estimation because it fails the outlier test.

Unitil Corp. is excluded from the sample due to data inavailability.

1                   **4. The Risk Premium Method**

2 **Q. PLEASE DESCRIBE THE RISK PREMIUM METHOD AS**  
3 **IMPLEMENTED IN THE NETO BRIEFING ORDER.**

4 A. The risk premium method compares the Commission allowed ROE for  
5 Commission regulated companies with a measure of the concurrent cost of debt  
6 using regression analysis. The concept is that the market cost of equity is greater  
7 than the cost of debt because equity is riskier. The cost of equity will change as the  
8 cost of debt changes, but the change is not likely to be one for one. This means that  
9 a one percentage point increase in the cost debt will not result in a one percentage  
10 point change in the cost of equity.

11 **Q. WHAT ARE THE INPUT DATA FOR THE RISK PREMIUM ANALYSIS?**

12 A. The data are the allowed ROEs for Commission regulated electric transmission  
13 companies and the six-month average yield on BBB-rated utility debt as reported  
14 by Moody's. The relationship between the change in interest rates (independent  
15 variable) and the allowed ROE (dependent variable) is estimated using linear  
16 regression. The method allows for two estimates: one using a historical yield on  
17 BBB-rated debt; and one using a forecast yield on BBB-rated debt.

18 **Q. WHAT IS THE ESTIMATE USING THE RISK PREMIUM METHOD?**

19 A. The results are 10.14 percent using a historical measure of the BBB-rated utility  
20 debt and 10.73 using a forecast of the BBB-rated utility debt for an average of  
21 10.44.<sup>43</sup> These are the estimates reported by Mr. Adrien M. McKenzie in his

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<sup>43</sup> Please refer to Attachment PGE-0017-5, Risk Premium Approach in Mr. McKenzie's testimony for the underlying calculations.

1 testimony for Pacific Gas & Electric in Exhibit No. PGE-0017 in Docket No. ER19-  
2 13-000. There are to my knowledge no new results that need to be considered and  
3 hence no new analysis needs to be conducted.

4 **C. The Range of Reasonableness**

5 **Q. WHAT ARE THE RESULTS OF THE APPLICATION OF THE**  
6 **COMMISSION'S REVISED ROE METHODOLOGY TO THE FERC**  
7 **ELECTRIC UTILITY SAMPLE?**

8 A. **Error! Reference source not found.** below presents the summary information for  
9 each of the ROE estimation methods for the companies in the FERC Electric Utility  
10 Sample using data through January 31, 2019.<sup>44</sup> **Error! Reference source not**  
11 **found.** also reports the minimum, maximum, midpoint, and median ROE estimates  
12 as well as the ZOR for each method and the Composite ZOR. The Composite ZOR  
13 ranges from a low of 6.7 percent to a high of 12.5 percent with a midpoint of 9.6  
14 percent. The midpoint of the upper half of the range is 11.12 percent.

15 **Table 6: Zone of Reasonableness<sup>45</sup>**  
16

	DCF (IBES Growth Rates)	CAPM	Expected Earnings	Composite Zone of Reasonableness	Risk Premium*
Minimum	6.8%	7.2%	6.5%	6.9%	10.1%
Maximum	11.3%	12.8%	14.4%	12.8%	10.7%
Midpoint	9.1%	10.0%	10.5%	9.9%	10.4%
<b>Zone of Reasonableness</b>	6.8% - 11.3%	6.8% - 11.7%	6.5% - 14.4%	6.7% - 12.5%	
<b>Midpoint of Upper-Half Zone of Reasonableness**</b>	<b>10.2%</b>	<b>11.4%</b>	<b>12.5%</b>	<b>11.12%</b>	

Notes:

DCF, Expected Earnings, and CAPM models are updated as of 01/31/2019.

CAPM estimates reflect a size premium based on Duff & Phelps 2017 Valuation Handbook.

\* Risk Premium model does not produce a Zone of Reasonableness; midpoint is average of two point estimates derived using Avera methodology applied to updated 2018 data.

\*\* Midpoint of Upper-Half Zone of Reasonableness for the Composite Zone of Reasonableness is calculated as the average

<sup>44</sup> I restrict the estimates to be greater than the yield on BBB-rated utility debt by at least 100 bps and less than 1.5 times the median estimate.

<sup>45</sup> Briefing Order at pp. 17-32.

1 **Q. WHERE IN THE RANGE SHOULD SCE'S ROE BEFORE INCENTIVES**  
2 **OR OTHER ADDERS FALL?**

3 A. Because SCE, as discussed above, is higher risk than the FERC Electric Utility  
4 Sample, I recommend that it be placed in the upper half of the ZOR. The  
5 Commission has previously allowed entities of higher risk to be placed in the upper  
6 half of the ZOR<sup>46</sup> and, in the NETO Briefing Order, acknowledged such placement  
7 can be appropriate.<sup>47</sup> Specifically, I recommend the midpoint of the upper half of  
8 the ZOR be used.

9 The NETO Briefing Order proposes to use different methods to determine ROEs  
10 for below or above average risk utilities based on filing status as either a single- or  
11 group-filing utility. Specifically, for group-filers, the Commission proposes to use  
12 midpoints of the upper half of the ZOR for above average risk group-filers, while  
13 for single-filers, the Commission proposes to use the median.<sup>48</sup> As noted earlier,  
14 according to finance theory, the cost of capital for an entity depends on the use of  
15 funds not the source of funds.<sup>49</sup> Consequently, there is no finance or economic

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<sup>46</sup> See *e.g.*, Opinion No. 445, 92 FERC 61,070 at 61,266-61,267 267 (“[We] find that SoCal Edison is more risky than the comparison group. Therefore, the appropriate ROE for SoCal Edison should be above the midpoint of returns indicated for the comparison group. Therefore, we will establish SoCal Edison's ROE at the midpoint of the upper half of the zone of reasonableness. That zone is 11.02-12.44 percent with a midpoint of 11.73. However, because this return exceeds SoCal Edison's own request, we will adjust the indicated return downward to 11.60 percent.”) (citations omitted).

<sup>47</sup> NETO Briefing Order at P 32 (“We propose to use the midpoint/medians of the resulting lower and upper halves of the zone of reasonableness to determine ROEs for below or above average risk utilities, respectively.”).

<sup>48</sup> NETO Briefing Order at pp. 17-32.

<sup>49</sup> Brealey, Myers and Allen, “Principles of Corporate Finance,” 11<sup>th</sup> Edition, 2014, p. 219.

1 reason to treat single-filers and group-filers differently and the NETO Briefing  
2 Order presents no analysis that demonstrates a reason for such difference.  
3 Importantly, using the proposal to treat group and single-filers differently would  
4 result in two assets of equal risk being awarded a different level return on equity,  
5 which is contrary to the notion that the allowed ROE should be commensurate with  
6 that of entities of similar risk.

7 Additionally, the most recent Commission Order that I am aware of, which pertains  
8 to an above average risk applicant, relied on the Upper Midpoint.<sup>50</sup>

9 For these reasons, I consider the upper midpoint to be a reasonable point estimate  
10 for SCE's ROE.

11 **Q. BASED UPON THESE RESULTS AND OTHER FACTORS, WHAT IS**  
12 **YOUR RECOMMENDED ROE?**

13 A. I recommend that SCE's request to set the allowed ROE be set at 11.12 percent  
14 before consideration of incentives or other adders. This is higher than SCE's most  
15 recently approved ROE and higher than what is currently under consideration in  
16 Docket ER 18-169-000. However, the Commission's approach to ROE  
17 determination has changed as have market conditions and SCE's risk profile.  
18 Consequently, this is not an inconsistency.

19 **Q. DO YOU HAVE OTHER OBSERVATIONS REGARDING SCE'S ROE?**

20 A. Yes. As noted previously, SCE participates in the CAISO and has in the past  
21 received incentives for specific projects. I recommend this policy be continued.<sup>51</sup>

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<sup>50</sup> Order 521.

<sup>51</sup> See the Testimony of Dr. Stern for a discussion of the benefits of participating in CAISO and the projects that were awarded incentive adders by the Commission.

1 Further, as discussed above, SCE faces substantial risks from wildfire liabilities  
2 that may render the traditional Commission ZOR inadequate to meet investor  
3 expectations regarding the all-in return for taking on such risks. Consequently, I  
4 developed ROE estimates for an alternative sample, which looks to a broader set of  
5 companies to consider what ZOR applies to such companies. I note that even this  
6 alternative ZOR may be inadequate because the potential risks associated with  
7 wildfires are extraordinarily large, ongoing and because California law operates  
8 with an uncommon approach to such liabilities.<sup>52</sup>

9 **VII. EXPANDED ZONE OF REASONABLENESS**

10 **A. Sample selection**

11 **Q. HOW DO YOU SELECT AN ALTERNATIVE SAMPLE?**

12 A. I selected a group of Capital-Intensive Network Industry (“CINI”) companies after  
13 considering the characteristics of the electric utility industry.  
14 Regulated electric utilities are capital intensive and operate networks of assets.  
15 Thus, the sample captures two key characteristics of the electric utility industry’s  
16 assets – namely that each dollar invested generate relatively low revenue and that  
17 the assets are not readily re-deployed to a different use (contrary to, for example,  
18 the liquid assets owned by a bank). I measure capital intensity as the amount of  
19 capital (in dollars) that is needed to generate a dollar of revenue. The higher that  
20 figure is the more capital intensive a company is.<sup>53</sup> Financial analysts commonly

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<sup>52</sup> As noted earlier, I make no recommendation regarding the magnitude of potential liability associated with wildfire risks, the recovery of such liabilities or the magnitude of the return investors may seek to take on such risks.

<sup>53</sup> Financial analysts commonly calculate the so-called asset turnover ratio, which is revenue per dollar investment thus capital intensity equals 1 divided by the asset turnover ratio. See, for example, Ross, Westerfield & Jaffe, “Corporate Finance,” 10<sup>th</sup> edition, 2013, pp. 52-53.

1 calculate the so-called asset turnover ratio, which is revenue per dollar of  
2 investment. The lower the revenue per dollar invested, the more capital is needed  
3 to generate revenue and the higher the capital intensity. Across industries, the  
4 capital intensity differs widely, with regulated industries commonly being among  
5 the most capital intensive in the economy, and the regulated electric utility industry  
6 is capital intensive.<sup>54</sup>

7 In addition to electric utilities, the following industries are also network industries:  
8 water, natural gas distribution, oil and natural gas pipelines, pipeline master limited  
9 partnerships (“MLPs”), telecom services, telecom utility, cable TV, trucking,  
10 railroads, and air transport. Consequently, the CINI sample includes companies  
11 from these industries that meet the selection criteria and have sufficient data for  
12 estimation.

13 **Q. HOW DID YOU DETERMINE WHAT COMPANIES TO INCLUDE IN**  
14 **THE CAPITAL-INTENSIVE NETWORK SAMPLE?**

15 A. The CINI sample is derived from the universe of publicly traded U.S. domiciled  
16 companies on *Value Line* with industry classifications that are network based and  
17 that empirically can be shown to be capital intensive. The initial group of  
18 companies for which I examined capital intensity and other characteristics  
19 consisted of 296 companies, including 41 electric utilities, which I eliminated.

20 After the elimination of electric utilities, 255 companies remain, but a very large  
21 number are also eliminated because they do not pay dividends, have recently

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<sup>54</sup> To be included in the CINI Sample, individual companies must have an asset turnover ratio of less than 1.60.



1 engaged in merger and acquisition activity, have a non-investment grade credit  
2 rating (or no credit rating), or simply lack data. Consequently, I end up with a  
3 sample of 27 companies, whose characteristics are displayed below.

4 **Table 7: Companies in the Capital Intensive Network Industries Sample**

<b>Company</b>	<b>Annual Revenue (Q3 2018) (\$MM)</b>	<b>Market Cap. (Q3 2018) (\$MM)</b>	<b>S&amp;P Credit Rating</b>
Delta Air Lines	\$43,925	\$39,686	BBB-
Southwest Airlines	\$21,519	\$35,168	BBB+
FedEx Corp.	\$67,205	\$65,007	BBB
United Parcel Serv.	\$70,988	\$102,379	A+
Atmos Energy	\$3,116	\$10,426	A
Chesapeake Utilities	\$697	\$1,423	A-
NiSource Inc.	\$5,021	\$9,407	BBB+
Northwest Natural	\$721	\$1,960	A
ONE Gas Inc.	\$1,632	\$4,277	A
Southwest Gas	\$2,834	\$3,967	BBB+
Spire Inc.	\$1,965	\$3,779	A-
Enable Midstream Part.	\$3,287	\$7,004	BBB-
Enterprise Products	\$35,779	\$63,318	BBB+
Magellan Midstream	\$2,634	\$15,604	BBB+
CSX Corp.	\$11,970	\$62,290	BBB+
GATX Corp.	\$1,357	\$3,191	BBB
Kansas City South'n	\$2,680	\$11,890	BBB-
Union Pacific	\$22,525	\$118,559	A-
Heartland Express	\$630	\$1,666	n/a
Ryder System	\$8,082	\$4,009	BBB+
Amer. States Water	\$430	\$2,205	A+
Amer. Water Works	\$3,411	\$15,928	A
Middlesex Water	\$136	\$780	A
York Water Co. (The)	\$49	\$390	A-
MDU Resources	\$4,487	\$5,194	BBB+
EOG Resources	\$16,216	\$69,860	A-
National Fuel Gas	\$1,593	\$4,815	BBB

5  
6 As can be seen from the sample above, the resulting sample has regulated entities  
7 from the natural gas distribution, the pipeline industry, and the water utility

1 industry. The remaining industries in the resulting sample are mostly not regulated:  
2 airlines, railroads, transportation, and diversified gas companies.<sup>55</sup>

3 **1. Capital Intensity Screen**

4 **Q. PLEASE EXPLAIN HOW YOU MEASURE CAPITAL INTENSITY.**

5 A. To ensure a company truly is capital intensive, I calculated the five-year average  
6 Asset-Turnover for each company and included only those with a measure below  
7 1.6. Specifically, I calculated

8 
$$\text{Asset Turnover} = \frac{\text{Revenue}}{\text{Average Total Assets}}$$

9 where revenue is net sales revenue and average total assets is the average of balance  
10 sheet total assets from the prior year and the current year.

11 The five-year average asset turnover ratio is calculated as the average of asset  
12 turnover from each of the last five years leading up to 2017, which is the most  
13 recent year for which I have sufficient data for all companies.

14 **B. Calculating the Commission ROE for the Alternative Sample**

15 **Q. HOW DO YOU CALCULATE THE RANGE OF ROE ESTIMATES FOR**  
16 **THE ALTERNATIVE SAMPLE?**

17 A. I rely on the same estimation methods as for the Electric Utility Sample. First, I  
18 calculate the Commission two-stage DCF, the CAPM, and the Expected Earnings  
19 for each of the samples companies. I do not calculate a risk premium ROE as most

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<sup>55</sup> I started considered the following industries: electric utilities, water utilities, natural gas distribution utilities, oil and natural gas pipelines, pipeline master limited partnerships, telecom services, telecom utilities, cable TV, trucking, railroads and air transportation from Value Line. From the original group of 296 companies, I eliminated 89 companies for lack of an investment grade credit rating, 99 for dividend cuts or no dividend payment, 40 for mergers and acquisitions, 5 due to a small size, and 7 for a low capital intensity. Additionally, I eliminated the overlap with the Electric Utility Sample.

1 of the companies do not have an allowed ROE and even fewer have a Commission-  
2 allowed ROE. In implementing the two-stage DCF, I rely on the same GDP growth  
3 rate as for the Electric Utility Sample. Similarly, the risk-free rate and the MRP is  
4 the same as for the Electric Utility Sample when implemented for the CINI sample.  
5 Second, I determine the minimum, maximum, midpoint and upper midpoint for  
6 each estimation method and implement outlier tests in the same manner as for the  
7 Electric Utility Sample. I rely on the same methods as described above for the  
8 Electric Utility Sample. Finally, I summarize the results.

9 **Q. WHAT ARE YOUR RESULTS FOR THE CAPM?**

10 A. The results from the CAPM are displayed in Table 8 below. The range is 9.4  
11 percent to 17.8 percent.

1

**Table 8: FERC CAPM ROE for CINI Sample**

Company	RFR	Risk Premium	Beta	Unadjusted Ke	Market Cap (\$Million)	Size Adjustment	Implied Cost of Equity
	[1]	[2]	[3]	[4] = [1] + [2]x [3]	[5]	[6]	[7] = [4] + [6]
Delta Air Lines	3.70%	9.67%	1.20	15.3%	\$34,624	-0.35%	15.0%
Southwest Airlines	3.70%	9.67%	1.15	14.8%	\$26,316	-0.35%	14.5%
Atmos Energy	3.70%	9.67%	0.60	9.5%	\$10,141	0.89%	10.4%
Chesapeake Utilities	3.70%	9.67%	0.65	10.0%	\$1,306	1.72%	11.7%
NiSource Inc.	3.70%	9.67%	0.50	8.5%	\$9,199	0.89%	9.4%
Northwest Natural	3.70%	9.67%	0.60	9.5%	\$1,738	1.66%	11.2%
ONE Gas Inc.	3.70%	9.67%	0.65	10.0%	\$4,111	0.98%	11.0%
Southwest Gas	3.70%	9.67%	0.70	10.5%	\$3,729	0.98%	11.4%
Spire Inc.	3.70%	9.67%	0.65	10.0%	\$3,711	0.98%	11.0%
Enable Midstream Part.	3.70%	9.67%	1.25	15.8%	\$5,706	0.89%	16.7%
Enterprise Products	3.70%	9.67%	1.30	16.3%	\$52,908	-0.35%	15.9%
Magellan Midstream	3.70%	9.67%	1.20	15.3%	\$12,850	0.61%	15.9%
CSX Corp.	3.70%	9.67%	1.20	15.3%	\$52,405	-0.35%	15.0%
GATX Corp.	3.70%	9.67%	1.30	16.3%	\$2,718	1.51%	17.8%
Kansas City South'n	3.70%	9.67%	1.10	14.3%	\$9,753	0.89%	15.2%
Union Pacific	3.70%	9.67%	1.10	14.3%	\$101,143	-0.35%	14.0%
Heartland Express	3.70%	9.67%	0.90	12.4%	\$1,484	1.72%	14.1%
Ryder System	3.70%	9.67%	1.30	16.3%	\$2,551	1.51%	17.8%
Amer. States Water	3.70%	9.67%	0.70	10.5%	\$2,444	1.51%	12.0%
Amer. Water Works	3.70%	9.67%	0.55	9.0%	\$16,147	0.61%	9.6%
Middlesex Water	3.70%	9.67%	0.75	11.0%	\$851	2.08%	13.0%
York Water Co. (The)	3.70%	9.67%	0.75	11.0%	\$407	2.68%	13.6%
EOG Resources	3.70%	9.67%	1.45	17.7%	\$51,483	-0.35%	17.4%
MDU Resources	3.70%	9.67%	1.00	13.4%	\$4,567	0.98%	14.3%
National Fuel Gas	3.70%	9.67%	1.00	13.4%	\$4,460	0.98%	14.3%
FedEx Corp.	3.70%	9.67%	1.15	14.8%	\$42,033	-0.35%	14.5%
United Parcel Serv.	3.70%	9.67%	0.90	12.4%	\$83,993	-0.35%	12.1%
						<b>Min</b>	9.4%
						<b>Max (outlier tested)</b>	17.8%
						<b>Median</b>	14.1%
						<b>Midpoint</b>	13.6%

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**Q. WHAT ARE THE RESULTS FROM THE COMMISSION TWO-STAGE DCF?**

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**A.** While the Commission CAPM ZOR includes all sample companies, the Commission outlier test removes two companies from the Commission two-stage DCF, of which one is slightly above the upper end of the Commission's ZOR. The results are displayed in Table 9 below, which shows a range of 6.3 to 18.2 percent.

9

1

**Table 9: FERC Two\_Stage DCF ROE for CINI Sample**

Company	S&P Credit Rating [1]	Dividend Yield [3]	Adjusted Dividend Yield [4]	GDP Growth Forecast [5]	IBES Growth Estimate [6]	Combined Growth Rate [7]	Implied Cost of Equity [8]
Delta Air Lines	BBB-	2.53%	2.69%	4.21%	16.82%	12.62%	15.3%
Southwest Airlines	BBB+	1.16%	1.23%	4.21%	15.90%	12.00%	13.2%
FedEx Corp.	BBB	1.14%	1.19%	4.21%	9.71%	7.87%	9.1%
United Parcel Serv.	A+	3.22%	3.37%	4.21%	11.59%	9.13%	12.5%
Atmos Energy	A	2.13%	2.19%	4.21%	6.45%	5.70%	7.9%
Chesapeake Utilities	A-	1.75%	-	4.21%	n/a	-	-
NiSource Inc.	BBB+	3.00%	3.08%	4.21%	5.92%	5.35%	8.4%
Northwest Natural	A	2.89%	2.95%	4.21%	4.00%	4.07%	7.0%
ONE Gas Inc.	A	2.30%	2.36%	4.21%	5.50%	5.07%	7.4%
Southwest Gas	BBB+	2.63%	2.70%	4.21%	6.20%	5.54%	8.2%
Spire Inc.	A-	3.06%	3.10%	4.21%	2.70%	3.20%	6.3%
Enable Midstream Part.	BBB-	8.05%	8.33%	4.21%	8.10%	6.80%	15.1%
Enterprise Products	BBB+	6.24%	6.48%	4.21%	9.39%	7.66%	14.1%
Mazellan Midstream	BBB+	5.90%	6.10%	4.21%	8.02%	6.75%	12.9%
CSX Corp.	BBB+	1.25%	1.36%	4.21%	23.21%	16.88%	18.2%
GATX Corp.	BBB	2.17%	2.27%	4.21%	12.00%	9.40%	11.7%
Kansas City South'n	BBB	1.34%	1.41%	4.21%	14.70%	11.20%	12.6%
Union Pacific	A-	2.12%	2.26%	4.21%	18.27%	13.58%	15.8%
Heartland Express	=N/AN/A	0.41%	0.45%	4.21%	27.11%	19.48%	19.9%
Ryder System	BBB+	3.32%	3.50%	4.21%	14.61%	11.14%	14.6%
Amer. States Water	A+	1.76%	1.81%	4.21%	6.00%	5.40%	7.2%
Amer. Water Works	A	2.04%	2.11%	4.21%	8.20%	6.87%	9.0%
Middlesex Water	A	1.93%	-	4.21%	n/a	-	-
York Water Co. (The)	A-	2.13%	-	4.21%	n/a	-	-
MDU Resources	BBB+	2.99%	-	4.21%	n/a	-	-
EOG Resources	A-	0.72%	0.97%	4.21%	102.56%	69.78%	70.7%
National Fuel Gas	BBB	3.12%	-	4.21%	n/a	-	-
						Maximum	70.7%
						Minimum	6.3%
						Median	12.6%
						Maximum (Outlier Tested)	18.2%

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**Q. WHAT ARE THE RESULTS FROM THE EXPECTED EARNINGS MODEL?**

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**A.** In the case of the application of the Expected Earnings model, several companies fall outside the Commission's conventionally determined ZOR. However, the range of estimates is very wide and range from 9.9% to 18.0%.

7

8

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**Table 10: FERC Expected Earnings ROE for CINI Sample**

<b>Company</b>	<b>2021-23 Expected Return on Common Equity</b>	<b>Adjustment Factor</b>	<b>Adjusted Return on Common Equity (full sample)</b>
[1]	[4]	[5]	[6]
Delta Air Lines	25.5%	1.04	26.4%
Southwest Airlines	23.0%	1.02	23.4%
FedEx Corp.	18.0%	1.03	18.6%
United Parcel Serv.	NA	1.10	NA
Atmos Energy	11.0%	1.02	11.3%
Chesapeake Utilities	10.0%	1.05	10.5%
NiSource Inc.	11.5%	1.01	11.6%
Northwest Natural	12.0%	1.02	12.2%
ONE Gas Inc.	11.0%	1.02	11.2%
Southwest Gas	9.5%	1.04	9.9%
Spire Inc.	10.0%	1.02	10.2%
Enable Midstream Part.	11.5%	1.02	11.7%
Enterprise Products	24.0%	1.00	24.1%
Magellan Midstream	46.0%	1.01	46.5%
CSX Corp.	30.5%	1.00	30.6%
GATX Corp.	11.0%	1.01	11.1%
Kansas City South'n	16.5%	1.01	16.7%
Union Pacific	43.0%	0.99	42.4%
Heartland Express	14.0%	1.04	14.5%
Ryder System	11.5%	1.03	11.8%
Amer. States Water	14.0%	1.01	14.1%
Amer. Water Works	10.5%	1.03	10.8%
Middlesex Water	13.0%	1.02	13.2%
York Water Co. (The)	13.5%	1.02	13.7%
MDU Resources	14.0%	1.03	14.5%
EOG Resources	17.0%	1.07	18.2%
National Fuel Gas	16.5%	1.06	17.5%
			<b>Full Sample</b>
			Minimum 9.9%
			Maximum 46.5%
			Median (Outlier Tested) 12.0%
			Maximum (Outlier Tested) 18.0%

2  
3

1 **VIII. CONCLUSIONS**

2 **Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE ROE FOR SCE**  
3 **GIVEN THE RESULTS GENERATED BY THE FERC ELECTRIC**  
4 **UTILITY SAMPLE?**

5 A. As discussed in Section V above, the majority of the companies in the  
6 Commission's traditional electric utility sample face less risk than SCE, even  
7 before any consideration of the potentially enormous wildfire liabilities that SCE  
8 may be exposed to. Consequently, SCE needs an ROE above what is awarded to  
9 average risk utilities and, given the substantial additional risk; I recommend it be  
10 awarded an ROE of 11.12% before any consideration of incentive or other adders.  
11 Additionally, I recommend that SCE be granted incentive adders for CAISO  
12 participation consistent with the Commission's historical approach.  
13 Lastly, I find that an alternative and broader sample of companies that represent  
14 Capital-Intensive Network Industries are illustrative of the kind of return such  
15 companies' investors may require. Looking to the Commission's approach to  
16 determining the ROE, I find a range of 6.3% to 18.2% with multiple observations  
17 above or below that range. These companies are similar to SCE in that they (1)  
18 operate a network and (2) are capital-intensive. Their risks are, on average, higher  
19 than that of the Electric Utility Sample, but the specific risk exposure differs across  
20 industries and companies.  
21 In my opinion, the Capital-Intensive Network Industries sample provides an  
22 alternative sample to consider when determining SCE's ROE, taking into account  
23 that SCE has higher risks than the average utility.

1 **Q. HOW SHOULD SCE'S WILDFIRE RISKS BE TREATED?**

2 A. As noted in the introduction, wildfire risks are ultimately an asymmetric risk and  
3 the treatment hereof is not part of my testimony.

4 For a discussion regarding how SCE's wildfires affects SCE's financial condition  
5 and the re-numeration necessary to insure investors receive a return commensurate  
6 with the risks associated with the wildfire risk, I refer to the Direct Testimony of  
7 Mr. Frank Graves.<sup>56</sup> The Direct Testimony of Mr. Dan Wood<sup>57</sup> summarizes the  
8 return that SCE is requesting in this proceeding given SCE's risk profile, including  
9 the wildfire risks.

10 **Q. DO YOU HAVE ANY OTHER COMMENTS?**

11 A. Yes, I recognize that the Commission is evaluating its approach to ROE  
12 determination (in the Commission's NOI in Docket PL19-4-000) and therefore I  
13 may revisit my calculations should the Commission change its methodology.

14 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

15 A. Yes.

---

<sup>56</sup> Exhibit No. SCE-22 and SCE-24.

<sup>57</sup> Exhibit No. SCE-19.



**DECLARATION**

I, Bente Villadsen, identified in the foregoing prepared direct testimony, do hereby declare under penalty of perjury, that I prepared or caused such testimony to be prepared; that the answers appearing therein are true to the best of my knowledge and belief; and that if asked the questions appearing therein, my answers would, under oath, be the same.

Executed on April 9, 2019 in Boston, Massachusetts.

  
\_\_\_\_\_  
Bente Villadsen

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

**Southern California Edison Company**     )  
                                                          )  
                                                          )  
**Dkt. No. ER19-\_\_\_\_\_ -000**

**EXHIBIT SCE-26**

**EXHIBIT TO THE TESTIMONY OF  
DR. BENTE VILLADSEN**

**ON BEHALF OF  
SOUTHERN CALIFORNIA EDISON COMPANY**

**APRIL 2019**

**BENTE VILLADSEN**  
Principal

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Bente.Villadsen@brattle.com

**Dr. Bente Villadsen's** work concentrates in the areas of regulatory finance and accounting. Her recent work has focused on accounting issues, damages, cost of capital and regulatory finance. Dr. Villadsen has testified on cost of capital and accounting, analyzed credit issues in the utility industry, risk management practices as well the impact of regulatory initiatives such as energy efficiency and de-coupling on cost of capital and earnings. Among her recent advisory work is the review of regulatory practices regarding the return on equity, capital structure, recovery of costs and capital expenditures as well as the precedence for regulatory approval in mergers or acquisitions. Dr. Villadsen's accounting work has pertained to disclosure issues and principles including impairment testing, fair value accounting, leases, accounting for hybrid securities, accounting for equity investments, cash flow estimation as well as overhead allocation. Dr. Villadsen has estimated damages in the U.S. as well as internationally for companies in the construction, telecommunications, energy, cement, and rail road industry. She has filed testimony and testified in federal and state court, in international and U.S. arbitrations and before state and federal regulatory commissions on accounting issues, damages, discount rates and cost of capital for regulated entities.

Dr. Villadsen holds a Ph.D. from Yale University's School of Management with a concentration in accounting. She has a joint degree in mathematics and economics (BS and MS) from University of Aarhus in Denmark. Prior to joining The Brattle Group, Dr. Villadsen was a faculty member at Washington University in St. Louis, University of Michigan, and University of Iowa.

She has taught financial and managerial accounting as well as econometrics, quantitative methods, and economics of information to undergraduate or graduate students. Dr. Villadsen serves as the president of the Society of Utility Regulatory Financial Analysts for 2016-2018.

**AREAS OF EXPERTISE**

- Regulatory Finance
  - Cost of Capital
  - Cost of Service (including prudence)
  - Energy Efficiency, De-coupling and the Impact on Utilities Financials
  - Relationship between regulation and credit worthiness
  - Risk Management
  - Regulatory Advisory in Mergers & Acquisitions
- Accounting and Corporate Finance
  - Application of Accounting Standards
  - Disclosure Issues
  - Credit Issues in the Utility Industry
- Damages and Valuation (incl. international arbitration)

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- Utility valuation
- Lost Profit for construction, oil&gas, utilities
- Valuation of construction contract
- Damages from the choice of inaccurate accounting methodology

**EXPERIENCE****Regulatory Finance**

- Dr. Villadsen has testified on cost of capital and capital structure for many regulated entities including electric and gas utilities, pipelines, railroads, and water utilities in many jurisdictions including at the FERC, the Surface Transportation Board, the states of Alaska, Arizona, California, Illinois, New Mexico, New York, Oregon, and Washington as well as in the provinces of Alberta and Ontario.
- On behalf of the Association of American Railroads, Dr. Villadsen appeared as an expert before the Surface Transportation Board (STB) and submitted expert reports on the determination of the cost of equity for U.S. freight railroads. The STB agreed to continue to use two estimation methods with the parameters suggested.
- For several electric, gas and transmission utilities as well as pipelines in Alberta, Canada, Dr. Villadsen filed evidence and appeared as an expert on the cost of equity and appropriate capital structure for 2015-17. Her evidence was heard by the Alberta Utilities Commission.
- Dr. Villadsen has estimated the cost of capital and recommended an appropriate capital structure for natural gas and liquids pipelines in Canada, Mexico, and the US. using the jurisdictions' preferred estimation technique as well as other standard techniques. This work has been used in negotiations with shippers as well as before regulators.
- For the Ontario Energy Board Staff, Dr. Villadsen submitted evidence on the appropriate capital structure for a power generator that is engaged in a nuclear refurbishment program.
- She has estimated the cost of equity on behalf of Anchorage Municipal Light and Power, Arizona Public Service, Portland General Electric, Anchorage Water and Wastewater, American Water, California Water, and EPCOR in state regulatory proceedings. She has also submitted testimony before the Bonneville Power Authority. Much of her testimony involves not only cost of capital estimation but also capital structure, the impact on credit metrics and various regulatory mechanisms such as revenue stabilization, riders and trackers.
- In Australia, she has submitted led and co-authored a report on cost of equity and debt estimation methods for the Australian Pipeline Industry Association. The equity report was

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filed with the Australian Energy Regulator as part of the APIA's response to the Australian Energy Regulator's development of rate of return guidelines and both reports were filed with the Economic Regulation Authority by the Dampier Bunbury Pipeline. She has also submitted a report on aspects of the WACC calculation for Aurizon Network to the Queensland Competition Authority.

- In Canada, Dr. Villadsen has co-authored reports for the British Columbia Utilities Commission and the Canadian Transportation Agency regarding cost of capital methodologies. Her work consisted partly of summarizing and evaluating the pros and cons of methods and partly of surveying Canadian and world-wide practices regarding cost of capital estimation.
- Dr. Villadsen worked with utilities to estimate the magnitude of the financial risk inherent in long-term gas contracts. In doing so, she relied on the rating agency of Standard & Poor's published methodology for determining the risk when measuring credit ratios.
- She has worked on behalf of infrastructure funds, pension funds, utilities and others on understanding and evaluating the regulatory environment in which electric, natural gas, or water utilities operate for the purpose of enhancing investors ability to understand potential investments. She has also provided advise and testimony in the approval phase of acquisitions.
- On behalf of utilities that are providers of last resort, she has provided estimates of the proper compensation for providing the state-mandated services to wholesale generators.
- In connection with the AWC Companies application to construct a backbone electric transmission project off the Mid-Atlantic Coast, Dr. Villadsen submitted testimony before the Federal Energy Regulatory Commission on the treatment the accounting and regulatory treatment of regulatory assets, pre-construction costs, construction work in progress, and capitalization issues.
- On behalf of ITC Holdings, she filed testimony with the Federal Energy Regulatory Commission regarding capital structure issues.
- Testimony on the impact of transaction specific changes to pension plans and other rate base issues on behalf of Balfour Beatty Infrastructure Partners before the Michigan Public Service Commission.
- On behalf of financial institutions, Dr. Villadsen has led several teams that provided regulatory guidance regarding state, provincial or federal regulatory issues for integrated

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electric utilities, transmission assets and generation facilities. The work was requested in connection with the institutions evaluation of potential investments.

- For a natural gas utility facing concerns over mark to market losses on long term gas hedges, Dr. Villadsen helped develop a program for basing a portion of hedge targets on trends in market volatility rather than on just price movements and volume goals. The approach was refined and approved in a series of workshops involving the utility, the state regulatory staff, and active intervener groups. These workshops evolved into a forum for quarterly updates on market trends and hedging positions.
- She has advised the private equity arm of three large financial institutions as well as two infrastructure companies, a sovereign fund and pension fund in connection with their acquisition of regulated transmission, distribution or integrated electric assets in the U.S. and Canada. For these clients, Dr. Villadsen evaluated the regulatory climate and the treatment of acquisition specific changes affecting the regulated entity, capital expenditures, specific cost items and the impact of regulatory initiatives such as the FERC's incentive return or specific states' approaches to the recovery of capital expenditures riders and trackers. She has also reviewed the assumptions or worked directly with the acquirer's financial model.
- On behalf of a provider of electric power to a larger industrial company, Dr. Villadsen assisted in the evaluation of the credit terms and regulatory provisions for the long-term power contract.
- For several large electric utility, Dr. Villadsen reviewed the hedging strategies for electricity and gas and modeled the risk mitigation of hedges entered into. She also studies the prevalence and merits of using swaps to hedge gas costs. This work was used in connection with prudence reviews of hedging costs in Colorado, Oregon, Utah, West Virginia, and Wyoming.
- She estimated the cost of capital for major U.S. and Canadian utilities, pipelines, and railroads. The work has been used in connection with the companies' rate hearings before the Federal Energy Regulatory Commission, the Canadian National Energy Board, the Surface Transportation Board, and state and provincial regulatory bodies. The work has been performed for pipelines, integrated electric utilities, non-integrated electric utilities, gas distribution companies, water utilities, railroads and other parties. For the owner of Heathrow and Gatwick Airport facilities, she has assisted in estimating the cost of capital of U.K. based airports. The resulting report was filed with the U.K. Competition Commission.
- For a Canadian pipeline, Dr. Villadsen co-authored an expert report regarding the cost of equity capital and the magnitude of asset retirement obligations. This work was used in arbitration between the pipeline owner and its shippers.

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- In a matter pertaining to regulatory cost allocation, Dr. Villadsen assisted counsel in collecting necessary internal documents, reviewing internal accounting records and using this information to assess the reasonableness of the cost allocation.
- She has been engaged to estimate the cost of capital or appropriate discount rate to apply to segments of operations such as the power production segment for utilities.
- In connection with rate hearings for electric utilities, Dr. Villadsen has estimated the impact of power purchase agreements on the company's credit ratings and calculated appropriate compensation for utilities that sign such agreements to fulfill, for example, renewable energy requirements.
- Dr. Villadsen has been part of a team assessing the impact of conservation initiatives, energy efficiency, and decoupling of volumes and revenues on electric utilities financial performance. Specifically, she has estimated the impact of specific regulatory proposals on the affected utilities earnings and cash flow.
- On behalf of Progress Energy, she evaluated the impact of a depreciation proposal on an electric utility's financial metric and also investigated the accounting and regulatory precedent for the proposal.
- For a large integrated utility in the U.S., Dr. Villadsen has for several years participated in a large range of issues regarding the company's rate filing, including the company's cost of capital, incentive based rates, fuel adjustment clauses, and regulatory accounting issues pertaining to depreciation, pensions, and compensation.
- Dr. Villadsen has been involved in several projects evaluating the impact of credit ratings on electric utilities. She was part of a team evaluating the impact of accounting fraud on an energy company's credit rating and assessing the company's credit rating but-for the accounting fraud.
- For a large electric utility, Dr. Villadsen modeled cash flows and analyzed its financing decisions to determine the degree to which the company was in financial distress as a consequence of long-term energy contracts.
- For a large electric utility without generation assets, Dr. Villadsen assisted in the assessment of the risk added from offering its customers a price protection plan and being the provider of last resort (POLR).

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- For several infrastructure companies, Dr. Villadsen has provided advice regarding the regulatory issues such as the allowed return on equity, capital structure, the determination of rate base and revenue requirement, the recovery of pension, capital expenditure, fuel, and other costs as well as the ability to earn the allowed return on equity. Her work has spanned 12 U.S. states as well as Canada, Europe, and South America. She has been involved in the electric, natural gas, water, and toll road industry.

**Accounting and Corporate Finance**

- On behalf of a construction company in arbitration with a sovereign, Dr. Villadsen filed an expert report report quantifying damages in the form of lost profit and consequential damages.
- In arbitration before the International Chamber of Commerce Dr. Villadsen testified regarding the true-up clauses in a sales and purchase agreement, she testified on the distinction between accruals and cash flow measures as well as on the measurement of specific expenses and cash flows.
- On behalf of a taxpayer, Dr. Villadsen recently testified in federal court on the impact of discount rates on the economic value of alternative scenarios in a lease transaction.
- In an arbitration matter before the International Centre for Settlement of Investment Disputes, she provided expert reports and oral testimony on the allocation of corporate overhead costs and damages in the form of lost profit. Dr. Villadsen also reviewed internal book keeping records to assess how various inter-company transactions were handled.
- Dr. Villadsen provided expert reports and testimony in an international arbitration under the International Chamber of Commerce on the proper application of US GAAP in determining shareholders' equity. Among other accounting issues, she testified on impairment of long-lived assets, lease accounting, the equity method of accounting, and the measurement of investing activities.
- In a proceeding before the International Chamber of Commerce, she provided expert testimony on the interpretation of certain accounting terms related to the distinction of accruals and cash flow.
- In an arbitration before the American Arbitration Association, she provided expert reports on the equity method of accounting, the classification of debt versus equity and the distinction between categories of liabilities in a contract dispute between two major oil companies. For



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the purpose of determining whether the classification was appropriate, Dr. Villadsen had to review the company's internal book keeping records.

- In U.S. District Court, Dr. Villadsen filed testimony regarding the information required to determine accounting income losses associated with a breach of contract and cash flow modeling.
- Dr. Villadsen recently assisted counsel in a litigation matter regarding the determination of fair values of financial assets, where there was a limited market for comparable assets. She researched how the designation of these assets to levels under the FASB guidelines affect the value investors assign to these assets.
- She has worked extensively on litigation matters involving the proper application of mark-to-market and derivative accounting in the energy industry. The work relates to the proper valuation of energy contracts, the application of accounting principles, and disclosure requirements regarding derivatives.
- Dr. Villadsen evaluated the accounting practices of a mortgage lender and the mortgage industry to assess the information available to the market and ESOP plan administrators prior to the company's filing for bankruptcy. A large part of the work consisted of comparing the company's and the industry's implementation of gain-of-sale accounting.
- In a confidential retention matter, Dr. Villadsen assisted attorneys for the FDIC evaluate the books for a financial investment institution that had acquired substantial Mortgage Backed Securities. The dispute evolved around the degree to which the financial institution had impaired the assets due to possible put backs and the magnitude and estimation of the financial institution's contingencies at the time of it acquired the securities.
- In connection with a securities litigation matter she provided expert consulting support and litigation consulting on forensic accounting. Specifically, she reviewed internal documents, financial disclosure and audit workpapers to determine (1) how the balance's sheets trading assets had been valued, (2) whether the valuation was following GAAP, (3) was properly documented, (4) was recorded consistently internally and externally, and (5) whether the auditor had looked at and documented the valuation was in accordance with GAAP.
- In a securities fraud matter, Dr. Villadsen evaluated a company's revenue recognition methods and other accounting issues related to allegations of improper treatment of non-cash trades and round trip trades.

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- For a multi-national corporation with divisions in several countries and industries, Dr. Villadsen estimated the appropriate discount rate to value the divisions. She also assisted the company in determining the proper manner in which to allocate capital to the various divisions, when the company faced capital constraints.
- Dr. Villadsen evaluated the performance of segments of regulated entities. She also reviewed and evaluated the methods used for overhead allocation.
- She has worked on accounting issues in connection with several tax matters. The focus of her work has been the application of accounting principles to evaluate intra-company transactions, the accounting treatment of security sales, and the classification of debt and equity instruments.
- For a large integrated oil company, Dr. Villadsen estimated the company's cost of capital and assisted in the analysis of the company's accounting and market performance.
- In connection with a bankruptcy proceeding, Dr. Villadsen provided litigation support for attorneys and an expert regarding corporate governance.

**Damages and Valuation**

- For the Alaska Industrial Development and Export Authority, Dr. Villadsen co-authored a report that estimated the range of recent acquisition and trading multiples for natural gas utilities.
- On behalf of a taxpayer, Dr. Villadsen testified on the economic value of alternative scenarios in a lease transaction regarding infrastructure assets.
- For a foreign construction company involved in an international arbitration, she estimated the damages in the form of lost profit on the breach of a contract between a sovereign state and a construction company. As part of her analysis, Dr. Villadsen relied on statistical analyses of cost structures and assessed the impact of delays.
- In an international arbitration, Dr. Villadsen estimated the damages to a telecommunication equipment company from misrepresentation regarding the product quality and accounting performance of an acquired company. She also evaluated the IPO market during the period to assess the possibility of the merged company to undertake a successful IPO.

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- On behalf of pension plan participants, Dr. Villadsen used an event study estimated the stock price drop of a company that had engaged in accounting fraud. Her testimony conducted an event study to assess the impact of news regarding the accounting misstatements.
- In connection with a FINRA arbitration matter, Dr. Villadsen estimated the value of a portfolio of warrants and options in the energy sector and provided support to counsel on finance and accounting issues.
- She assisted in the estimation of net worth of individual segments for firms in the consumer product industry. Further, she built a model to analyze the segment's vulnerability to additional fixed costs and its risk of bankruptcy.
- Dr. Villadsen was part of a team estimating the damages that may have been caused by a flawed assumption in the determination of the fair value of mortgage related instruments. She provided litigation support to the testifying expert and attorneys.
- For an electric utility, Dr. Villadsen estimated the loss in firm value from the breach of a power purchase contract during the height of the Western electric power crisis. As part of the assignment, Dr. Villadsen evaluated the creditworthiness of the utility before and after the breach of contract.
- Dr. Villadsen modeled the cash flows of several companies with and without specific power contract to estimate the impact on cash flow and ultimately the creditworthiness and value of the utilities in question.

**BOOKS**

*“Risk and Return for Regulated Industries,”* (with Michael J. Vilbert, Dan Harris, and A. Lawrence Kolbe) Elsevier, May 2017.

**BENTE VILLADSEN****PUBLICATIONS AND REPORTS**

“Impact of New Tax Law on Utilities’ Deferred Taxes,” (with Mike Tolleth and Elliott Metzler), *CRRRI 37<sup>th</sup> Annual Eastern Conference*, June, 2018.

“Implications of the New Tax Law for Regulated Utilities,” The Brattle Group, January 2018.

“Using Electric and Gas Forwards to Manage Market Risks: When a power purchase agreement with a utility is not possible, standard forward contracts can act as viable hedging instruments,” *North American Windpower*, May 2017, pp. 34-37.

“*Managing Price Risk for Merchant Renewable Investments: Role of Market Interactions and Dynamics on Effective Hedging Strategies*,” (with Onur Aydin and Frank Graves), Brattle Whitepaper, January 2017.

“Aurizon Network 2016 Access Undertaking: Aspects of the WACC,” (with Mike Tolleth), filed with the *Queensland Competition Authority*, Australia, November 2016.

“Report on Gas LDC multiples,” with Michael J. Vilbert, *Alaska Industrial Development and Export Authority*, May 2015.

“Aurizon Network 2014 Draft Access Undertaking: Comments on Aspects of the WACC,” prepared for Aurizon Network and submitted to the *Queensland Competition Authority*, December 2014

“*Brattle Review of AE Planning Methods and Austin Task Force Report*.” (with Frank C. Graves) September 24, 2014.

Report on “Cost of Capital for Telecom Italia’s Regulated Business” with Stewart C. Myers and Francesco Lo Passo before the *Communications Regulatory Authority of Italy* (“AGCOM”), March 2014. *Submitted in Italian*.

“Alternative Regulation and Ratemaking Approaches for Water Companies: Supporting the Capital Investment Needs of the 21st Century,” (with J. Wharton and H. Bishop), prepared for the *National Association of Water Companies*, October 2013.

“Estimating the Cost of Debt,” (with T. Brown), prepared for the Dampier Bunbury Pipeline and filed with the *Economic Regulation Authority*, Western Australia, March 2013.

“Estimating the Cost of Equity for Regulated Companies,” (with P.R. Carpenter, M.J. Vilbert, T. Brown, and P. Kumar), prepared for the Australian Pipeline Industry Association and filed with the *Australian Energy Regulator* and the *Economic Regulation Authority*, Western Australia, February 2013.

“Calculating the Equity Risk Premium and the Risk Free Rate,” (with Dan Harris and Francesco LoPasso), prepared for *NMa and Opta, the Netherlands*, November 2012.

**BENTE VILLADSEN**

“Shale Gas and Pipeline Risk: Earnings Erosion in a More Competitive World,” (with Paul R. Carpenter, A. Lawrence Kolbe, and Steven H. Levine), *Public Utilities Fortnightly*, April 2012.

“Survey of Cost of Capital Practices in Canada,” (with Michael J. Vilbert and Toby Brown), prepared for *British Columbia Utilities Commission*, May 2012.

“Public Sector Discount Rates” (with rank Graves, Bin Zhou), *Brattle* white paper, September 2011

“FASB Accounting Rules and Implications for Natural Gas Purchase Agreements,” (with Fiona Wang), *American Clean Skies Foundation*, February 2011.

“IFRS and You: How the New Standards Affect Utility Balance Sheets,” (with Amit Koshal and Wyatt Toolson), *Public Utilities Fortnightly*, December 2010.

“Corporate Pension Plans: New Developments and Litigation,” (with George Oldfield and Urvashi Malhotra), Finance Newsletter, Issue 01, *The Brattle Group*, November 2010.

“Review of Regulatory Cost of Capital Methodologies,” (with Michael J. Vilbert and Matthew Aharonian), *Canadian Transportation Agency*, September 2010.

“Building Sustainable Efficiency Businesses: Evaluating Business Models,” (with Joe Wharton and Peter Fox-Penner), *Edison Electric Institute*, August 2008.

“Understanding Debt Imputation Issues,” (with Michael J. Vilbert and Joe Wharton and *The Brattle Group* listed as an author), *Edison Electric Institute*, June 2008.

“Measuring Return on Equity Correctly: Why current estimation models set allowed ROE too low,” *Public Utilities Fortnightly*, August 2005 (with A. Lawrence Kolbe and Michael J. Vilbert).

“The Effect of Debt on the Cost of Equity in a Regulatory Setting,” (with A. Lawrence Kolbe and Michael J. Vilbert, and with “*The Brattle Group*” listed as author), *Edison Electric Institute*, April 2005.

“Communication and Delegation in Collusive Agencies,” *Journal of Accounting and Economics*, Vol. 19, 1995.

“Beta Distributed Market Shares in a Spatial Model with an Application to the Market for Audit Services” (with M. Hviid), *Review of Industrial Organization*, Vol. 10, 1995.

**SELECTED PRESENTATIONS**

“Decoupling and its Impact on Cost of Capital” presented to *SURFA Members and Friends*, February 27, 2019.

“Current Issues in Cost of Capital” presented to *EEI Members*, July 23, 2018.

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“Introduction to Capital Structure & Liability Management”, presented at *the American Gas Association (AGA)/Edison Electric Institute (EEI) “Introduction and Advanced Public Utility Accounting Courses”*, August 21, 2018.

“Lessons from the U.S. and Australia” presented at *Seminar on the Cost of Capital in Regulated Industries: Time for a Fresh Perspective?* Brussels, October 2017.

“Should Regulated Utilities Hedge Fuel Cost and if so, How?” presented at *SURFA’s 49 Financial Forum*, April 20-21, 2017.

“Transmission: The Interplay Between FERC Rate Setting at the Wholesale Level and Allocation to Retail Customers,” (with Mariko Geronimo Aydin) presented at *Law Seminars International: Electric Utility Rate Cases*, March 16-17, 2017.

“Capital Structure and Liability Management,” *American Gas Association and Edison Electric Institute Public Utility Accounting Course*, August 2015-2017.

“Current Issues in Cost of Capital,” *Edison Electric Institute Advanced Rate School*, July 2013-2017.

“Alternative Regulation and Rate Making Approaches for Water Companies,” *Society of Depreciation Professionals Annual Conference*, September 2014.

“Capital Investments and Alternative Regulation,” *National Association of Water Companies Annual Policy Forum*, December 2013.

“Accounting for Power Plant,” *SNL’s Inside Utility Accounting Seminar*, Charlotte, NC, October 2012.

“GAAP / IFRS Convergence,” *SNL’s Inside Utility Accounting Seminar*, Charlotte, NC, October 2012.

“International Innovations in Rate of Return Determination,” *Society of Utility Financial and Regulatory Analysts’ Financial Forum*, April 2012.

“Utility Accounting and Financial Analysis: The Impact of Regulatory Initiatives on Accounting and Credit Metrics,” 1.5 day seminar, EUCI, Atlanta, May 2012.

“Cost of Capital Working Group Eforum,” *Edison Electric Institute webinar*, April 2012.

“Issues Facing the Global Water Utility Industry” Presented to Sensus’ Executive Retreat, Raleigh, NC, July 2010.

“Regulatory Issues from GAAP to IFRS,” *NASUCA 2009 Annual Meeting*, Chicago, November 2009.

“Subprime Mortgage-Related Litigation: What to Look for and Where to Look,” *Law Seminars International: Damages in Securities Litigation*, Boston, May 2008.

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“Evaluating Alternative Business / Inventive Models,” (with Joe Wharton). *EEI Workshop, Making a Business of Energy Efficiency: Sustainable Business Models for Utilities*, Washington DC, December 2007.

“Deferred Income Taxes and IRS’s NOPR: Who should benefit?” *NASUCA Annual Meeting*, Anaheim, CA, November 2007.

“Discussion of ‘Are Performance Measures Other Than Price Important to CEO Incentives?’” *Annual Meeting of the American Accounting Association*, 2000.

“Contracting and Income Smoothing in an Infinite Agency Model: A Computational Approach,” (with R.T. Boylan) *Business and Management Assurance Services Conference*, Austin 2000.

**TESTIMONY**

Direct Testimony on cost of equity for Consolidated Edison of New York submitted to the *New York Public Service Commission*, Docket No. 19-00317, January 2019.

Direct Testimony on cost of capital and capital structure for Northwest Natural Gas Company submitted to the *Washington Utilities and Transportation Commission*, Docket No. 181053, December 2018.

Pre-filed Direct Testimony on cost of capital and capital structure for Anchorage Water Utility and Anchorage Wastewater Utility submitted to the *Regulatory Commission of Alaska*, TA163-122 and TA164-126, December 2018.

Direct Testimony on cost of capital for Portland General Electric Company submitted to the *Oregon Public Utility Commission* on behalf of Portland General Electric Company (with Hager and Liddle), EU 335, February 2018.

Direct Testimony and Rebuttal Testimony on cost of capital for NW Natural submitted to the *Oregon Public Utility Commission* on behalf of NW Natural, UG 344, December 2017, May 2018.

Direct Pre-filed Testimony and Reply Pre-filed Testimony on cost of equity and capital structure for Anchorage Water and Wastewater Utilities before the *Regulatory Commission of Alaska*, TA161-122 and TA162-126, November 2017, September 2018.

Direct Testimony, Rebuttal Testimony, deposition, and hearing appearance on wholesale water rates for Petitioner Cities, *Texas Public Utility Commission*, PUC Docket 46662, SOAH Docket 473-17-4964.WS, November 2017, January, June, July, October 2018.

Affidavit on Lifting the Dividend Restriction for Anchorage Water Utility for AWWU, *Regulatory Commission of Alaska*, U-17-095, November 2017.

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Written Evidence, Rebuttal Evidence and Hearing appearance on the Cost of Capital and Capital Structure for the ATCO Utilities and AUI, 2018-2020 Generic Cost of Capital Proceeding, *Alberta Utilities Commission*, October 2017, February – March 2018.

Written Evidence, Rebuttal Evidence, and Hearing Appearance on Regulatory Tax Treatment for the ATCO Utilities and AUI, 2018-2020 Generic Cost of Capital Proceeding, *Alberta Utilities Commission*, October 2017, February – March 2018.

Affidavit on the Creation of a Regulatory Assets for PRV Rebates for Anchorage Water Utility, submitted to the *Regulatory Commission of Alaska*, U-17-083, August 2017.

Direct and Rebuttal Testimony, Hearing Appearance on Cost of Capital for California-American Water Company for California-American Water submitted to the *California Public Utilities Commission*, Application 17-04-003, April, August, September 2017.

Direct, Rebuttal, Surrebuttal, Supplemental, Supplemental Rebuttal Testimony and Hearing Appearance on the Cost of Capital for Northern Illinois Gas Company submitted to the *Illinois Commerce Commission*, GRM #17-055, March, July, August, September, and November 2017.

Direct and Rebuttal Testimony on Cost of Capital for Portland General Electric Company submitted to the *Oregon Public Utility Commission* on behalf of Portland General Electric Company, Docket No. UE 319, February, July 2017.

Pre-filed Direct and Reply Testimony and Hearing Appearance on Cost of Equity and Capital Structure for Anchorage Municipal Light and Power, *Regulatory Commission of Alaska*, Docket No. TA357-121, December 2016, August and December 2017.

Expert report and Hearing Appearance regarding the Common Equity Ratio for OPG's Regulated Generation for OEB Staff, *Ontario Energy Board*, EB-2016-0152, November 2016, April 2017.

Pre-filed Direct Testimony on Cost of Equity and Capital Structure for Anchorage Municipal Wastewater Utility, *Regulatory Commission of Alaska*, Docket No. 158-126, November 2016.

Expert Report and Reply Expert Report on damages (quantum) in exit arbitration (with Dan Harris), *International Center for the Settlement of Investment Disputes*, October 2016, October 2018.

Direct Testimony on capital structure, embedded cost of debt, and income taxes for Detroit Thermal, Michigan Public Service Commission, Docket No. UE-18131, July 2016.

Direct Testimony on return on equity for Arizona Public Service Company, Arizona Corporation Commission, Docket E-01345A-16-0036, June 2016.



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Written evidence, rebuttal evidence and hearing appearance regarding the cost of equity and capital structure for Alberta-based utilities, the Alberta Utilities Commission, Proceeding No. 20622 on behalf of AltaGas Utilities Inc., ENMAX Power Corporation, FortisAlberta Inc., and The ATCO Utilities, February, May and June 2016.

Verified Statement, Verified Reply Statement, and Hearing Appearance regarding the cost of capital methodology to be applied to freight railroads, the *Surface Transportation Board* on behalf of the Association of American Railroads, Docket No. EP 664 (Sub-No. 2), July 2015, September and November 2015.

Direct Testimony on cost of capital submitted to the Oregon Public Utility Commission on behalf of Portland General Electric, Docket No. UE 294, February 2015.

Supplemental Direct Testimony and Reply Testimony on cost of capital submitted to the *Regulatory Commission of Alaska* on behalf of Anchorage Water and Wastewater utilities, Docket U-13-202, September 2014, March 2015.

Expert Report and hearing appearance on specific accrual and cash flow items in a Sales and Purchase Agreement in international arbitration before the *International Chamber of Commerce*. Case No. 19651/TO, July and November 2014. (*Confidential*)

Rebuttal Testimony regarding Cost of Capital before the *Oregon Public Utility Commission* on behalf of Portland General Electric, Docket No. UE 283, July 2014.

Direct Testimony on the rate impact of the pension re-allocation and other items for Upper Peninsula Power Company in connection with the acquisition by BBIP before the *Michigan Public Service Commission* in Docket No. U-17564, March 2014.

Expert Report on cost of equity, non-recovery of operating cost and asset retirement obligations on behalf of oil pipeline in arbitration, April 2013. (*Confidential*)

Direct Testimony on the treatment of goodwill before the *Federal Energy Regulatory Commission* on behalf of ITC Holdings Corp and ITC Midwest, LLC in Docket No. PA10-13-000, February 2012.

Direct and Rebuttal Testimony on cost of capital before the *Public Utilities Commission of the State of California* on behalf of California-American Water in Application No. 11-05, May 2011.

Direct Testimony, Rebuttal Testimony, and Hearing Appearance on cost of capital before the *New Mexico Public Regulation Commission* on behalf of New Mexico-American Water in Case No. 11-00196-UT, May 2011, November 2011, and December 2011.

Direct Testimony on regulatory assets and FERC accounting before the *Federal Energy Regulatory Commission* on behalf of AWC Companies, EL11-13-000, December 2010.

Expert Report and deposition in Civil Action No. 02-618 (GK/JMF) in the *United States District Court for the District of Columbia*, November 2010, January 2011. (*Confidential*)

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Direct Testimony, Rebuttal Testimony, and Rejoinder Testimony on the cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-10-0448, November 2010, July 2011, and August 2011.

Direct Testimony on the cost of capital before *the New Mexico Public Regulation Commission* on behalf of New Mexico-American Water in Docket No. 09-00156-UT, August 2009.

Direct and Rebuttal Testimony and Hearing Appearance on the cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-09-0343, July 2009, March 2010 and April 2010.

Rebuttal Expert Report, Deposition and Oral Testimony re. the impact of alternative discount rate assumptions in tax litigation. *United States Court of Federal Claims*, Case No. 06-628 T, January, February, April 2009. (*Confidential*)

Direct Testimony, Rebuttal Testimony and Hearing Appearance on cost of capital before the *New Mexico Public Regulation Commission* on behalf of New Mexico-American Water in Docket No. 08-00134-UT, June 2008 and January 2009.

Direct Testimony on cost of capital and carrying charge on damages, U.S. Department of Energy, *Bonneville Power Administration*, BPA Docket No. WP-07, March 2008.

Direct Testimony, Rebuttal Testimony, Rejoinder Testimony and Hearing Appearance on cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-08-0227, April 2008, February 2009, March 2009.

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Expert Report on accounting information needed to assess income. *United States District Court* for the District of Maryland (Baltimore Division), Civil No. 1:06cv02046-JFM, June 2007 (*Confidential*)

Expert Report, Rebuttal Expert Report, and Hearing Appearance regarding investing activities, impairment of assets, leases, shareholder' equity under U.S. GAAP and valuation. *International Chamber of Commerce* (ICC), Case No. 14144/CCO, May 2007, August 2007, September 2007. (Joint with Carlos Lapuerta, *Confidential*)

Direct Testimony, Rebuttal Testimony, and Hearing Appearance on cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-06-0491, July 2006, July 2007.

Direct Testimony, Rebuttal Testimony, Rejoinder Testimony, Supplemental Rejoinder Testimony and Hearing Appearance on cost of capital before the *Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-06-0403, June 2006, April 2007, May 2007.

Direct Testimony, Rebuttal Testimony, Rejoinder Testimony, and Hearing Appearance on cost of capital before *the Arizona Corporation Commission* on behalf of Arizona-American Water in Docket No. W-01303A-06-0014, January 2006, October 2006, November 2006.

## BENTE VILLADSEN

Expert report, rebuttal expert report, and deposition on behalf of a major oil company regarding the equity method of accounting and classification of debt and equity, *American Arbitration Association*, August 2004 and November 2004. (*Confidential*).

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

**Southern California Edison Company**     )  
                                                          )  
                                                          )  
**Dkt. No. ER19-\_\_\_\_\_ -000**

**EXHIBIT SCE-27**

**EXHIBIT TO THE TESTIMONY OF  
DR. BENTE VILLADSEN**

**ON BEHALF OF  
SOUTHERN CALIFORNIA EDISON COMPANY**

**APRIL 2019**

**Table No. BV-1**

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Table BV-2: Sample Selection

Company	Include Based on American Company	Include Based on Bond Rating	Include Based on Dividend Cuts	Include Based on Revenues	Include Based on M&A	Final Sample
ALLETE	Yes	Yes	Yes	Yes	Yes	Yes
Alliant Energy	Yes	Yes	Yes	Yes	Yes	Yes
Amer. Elec. Power	Yes	Yes	Yes	Yes	Yes	Yes
Ameren Corp.	Yes	Yes	Yes	Yes	Yes	Yes
CMS Energy Corp.	Yes	Yes	Yes	Yes	Yes	Yes
DTE Energy	Yes	Yes	Yes	Yes	Yes	Yes
Entergy Corp.	Yes	Yes	Yes	Yes	Yes	Yes
Evergy Inc.	Yes	Yes	Yes	Yes	Yes	Yes
MGE Energy	Yes	Yes	Yes	Yes	Yes	Yes
OGE Energy	Yes	Yes	Yes	Yes	Yes	Yes
Otter Tail Corp.	Yes	Yes	Yes	Yes	Yes	Yes
WEC Energy Group	Yes	Yes	Yes	Yes	Yes	Yes
AVANGRID Inc.	Yes	Yes	Yes	Yes	Yes	Yes
Consol. Edison	Yes	Yes	Yes	Yes	Yes	Yes
Duke Energy	Yes	Yes	Yes	Yes	Yes	Yes
Eversource Energy	Yes	Yes	Yes	Yes	Yes	Yes
Exelon Corp.	Yes	Yes	Yes	Yes	Yes	Yes
FirstEnergy Corp.	Yes	Yes	Yes	Yes	Yes	Yes
NextEra Energy	Yes	Yes	Yes	Yes	Yes	Yes
PPL Corp.	Yes	Yes	Yes	Yes	Yes	Yes
Public Serv. Enterprise	Yes	Yes	Yes	Yes	Yes	Yes
Southern Co.	Yes	Yes	Yes	Yes	Yes	Yes
Unitil Corp.	Yes	Yes	Yes	Yes	Yes	Yes
Edison Int'l	Yes	Yes	Yes	Yes	Yes	Yes
El Paso Electric	Yes	Yes	Yes	Yes	Yes	Yes
Hawaiian Elec.	Yes	Yes	Yes	Yes	Yes	Yes
IDACORP Inc.	Yes	Yes	Yes	Yes	Yes	Yes
NorthWestern Corp.	Yes	Yes	Yes	Yes	Yes	Yes
Pinnacle West Capital	Yes	Yes	Yes	Yes	Yes	Yes
PNM Resources	Yes	Yes	Yes	Yes	Yes	Yes
Portland General	Yes	Yes	Yes	Yes	Yes	Yes
Sempra Energy	Yes	Yes	Yes	Yes	Yes	Yes
Xcel Energy Inc.	Yes	Yes	Yes	Yes	Yes	Yes
CenterPoint Energy	Yes	Yes	Yes	No	Yes	No
Fortis Inc.	Yes	#N/A	Yes	Yes	No	#N/A
Vectren Corp.	Yes	Yes	No	No	Yes	No
Dominion Energy	Yes	Yes	Yes	No	Yes	No
Summer Energy Holdings Inc	Yes	No	Yes	Yes	No	No
Avista Corp.	Yes	Yes	Yes	No	Yes	No
Black Hills	Yes	Yes	Yes	No	Yes	No
PG&E Corp.	Yes	No	Yes	Yes	Yes	No

## Sample Selection Criteria:

Company is publicly traded and has operations in the U.S.

Company has Bloomberg data.

Company has over \$300MM in revenue in past year.

Company has maintained at least a BBB- rating over the last 6 months.

Company has no dividend cuts in last 6 months.

Company has no mergers or acquisitions which cumulatively exceed 30% of beginning of year market capitalization in the past 6 months AND

no pending mergers or acquisitions which cumulatively exceed 30% of beginning of year market capitalization in the past 3 years.

Company is not being double counted.

**Table No. BV-3**  
**Electric Utility**  
**Summary of Cost of Equity Estimates using IBES Growth Forecast**

Company	S&P Bond Rating	Moody's Bond Rating	Dividend Yield	Adjusted Dividend Yield	GDP Growth Forecast	IBES Long Term Growth Rate Forecast	Combined Growth Rate	Implied Cost of Equity
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
ALLETE	BBB+	WR	2.94%	N/A	4.24%	N/A	N/A	-
Alliant Energy	A-	WR	3.13%	3.25%	4.24%	7.25%	6.25%	9.49%
Amer. Elec. Power	A-	Baa1	3.49%	3.59%	4.24%	5.74%	5.24%	8.83%
Ameren Corp.	BBB+	WR	2.84%	2.95%	4.24%	7.70%	6.55%	9.49%
CMS Energy Corp.	BBB+	Baa1	2.90%	3.01%	4.24%	7.00%	6.08%	9.09%
DTE Energy	BBB+	Baa1	3.21%	3.30%	4.24%	5.49%	5.07%	8.37%
Entergy Corp.	BBB+	Baa2	4.27%	4.19%	4.24%	-3.77%	-1.10%	<del>3.00%</del>
Eergy Inc.	A-	Baa2	3.28%	3.43%	4.24%	9.20%	7.55%	10.98%
MGE Energy	AA-	NA	2.12%	N/A	4.24%	N/A	N/A	-
OGE Energy	BBB+	WR	3.74%	3.70%	4.24%	-2.25%	-0.09%	<del>3.61%</del>
Otter Tail Corp.	BBB	WR	2.80%	N/A	4.24%	N/A	N/A	-
WEC Energy Group	A-	Baa1	3.20%	3.28%	4.24%	4.70%	4.55%	7.83%
AVANGRID Inc.	BBB+	NA	3.57%	3.73%	4.24%	9.20%	7.55%	11.28%
Consol. Edison	A-	Baa1	3.68%	3.74%	4.24%	2.90%	3.34%	7.08%
Duke Energy	A-	Baa1	4.44%	4.54%	4.24%	4.41%	4.35%	8.89%
Eversource Energy	A+	Baa1	3.16%	3.25%	4.24%	5.83%	5.30%	8.55%
Exelon Corp.	BBB+	Baa2	3.11%	3.25%	4.24%	8.77%	7.26%	10.51%
FirstEnergy Corp.	BBB	Baa3	3.84%	3.72%	4.24%	-6.61%	-2.99%	<del>0.72%</del>
NextEra Energy	A-	NA	2.57%	2.67%	4.24%	7.45%	6.38%	9.05%
PPL Corp.	A-	NA	5.49%	5.59%	4.24%	3.59%	3.81%	9.39%
Public Serv. Enterprise	BBB+	Baa1	3.40%	3.52%	4.24%	7.21%	6.22%	9.74%
Southern Co.	A-	Baa2	5.29%	5.33%	4.24%	1.68%	2.53%	7.86%
Unitil Corp.	BBB+	NA	2.92%	2.98%	4.24%	3.70%	3.88%	6.86%
Edison Int'l	BBB	Baa3	3.92%	3.99%	4.24%	3.75%	3.91%	7.90%
El Paso Electric	BBB	Baa1	2.55%	2.61%	4.24%	5.10%	4.81%	7.43%
Hawaiian Elec.	BBB-	WR	3.42%	3.55%	4.24%	7.80%	6.61%	10.16%
IDACORP Inc.	BBB	Baa1	2.53%	2.56%	4.24%	2.60%	3.15%	<del>5.71%</del>
NorthWestern Corp.	BBB	Baa2	3.65%	3.69%	4.24%	2.59%	3.14%	6.83%
Pinnacle West Capital	A-	WR	3.47%	3.54%	4.24%	4.16%	4.19%	7.73%
PNM Resources	BBB+	Baa3	2.66%	2.72%	4.24%	4.10%	4.15%	6.86%
Portland General	BBB+	WR	3.13%	3.21%	4.24%	5.05%	4.78%	7.99%
Sempra Energy	BBB+	Baa1	3.13%	3.27%	4.24%	8.69%	7.21%	10.48%
Xcel Energy Inc.	A-	A3	3.10%	3.20%	4.24%	6.60%	5.81%	9.01%
<b>Minimum</b>								<b>6.83%</b>
Maximum								11.28%
Median								8.86%
Midpoint								9.06%
<b>Upper End of FERC ZOR</b>								<b>11.28%</b>
Upper Midpoint								10.17%

Sources and Notes:

[1], [2]: Bloomberg as of January 31, 2019.

[3]: See Table No. BV-4.

[4] = [3] x ( 1 + 0.5 x [6] )

[5]: See Table No. BV-7.

[6]: See Table No. BV-5.

[7] = ( (1/3) x [5] ) + ( (2/3) x [6] )

[8]: [4] + [7], excluding companies that did not meet all sample selection criteria.

\* Companies are excluded for (i) the low spread between cost of equity and cost of debt; and/or (ii) negative long-term IBES growth rate.

**Table No. BV-4**  
**Electric Utility Sample**  
**Calculation of Dividend Yields**

Company	Average Monthly Stock Price as of Aug 31, 2018 [1]	Average Monthly Stock Price as of Sep 30, 2018 [2]	Average Monthly Stock Price as of Oct 31, 2018 [3]	Average Monthly Stock Price as of Nov 30, 2018 [4]	Average Monthly Stock Price as of Dec 31, 2018 [5]	Average Monthly Stock Price as of Jan 31, 2019 [6]	Annualized Dividend as of Aug 31, 2018 [7]	Annualized Dividend as of Sep 30, 2018 [8]	Annualized Dividend as of Oct 31, 2018 [9]	Annualized Dividend as of Nov 30, 2018 [10]	Annualized Dividend as of Dec 31, 2018 [11]	Annualized Dividend as of Jan 31, 2019 [12]	Dividend Yield as of Aug 31, 2018 [13]	Dividend Yield as of Sep 30, 2018 [14]	Dividend Yield as of Oct 31, 2018 [15]	Dividend Yield as of Nov 30, 2018 [16]	Dividend Yield as of Dec 31, 2018 [17]	Dividend Yield as of Jan 31, 2019 [18]	Average Dividend Yield [19]
ALLETE	\$76.95	\$75.36	\$76.05	\$77.17	\$77.62	\$74.77	\$2.24	\$2.24	\$2.24	\$2.24	\$2.24	\$2.24	2.91%	2.97%	2.95%	2.90%	2.89%	3.00%	2.94%
Alliant Energy	\$42.62	\$42.96	\$43.36	\$44.14	\$43.63	\$42.65	\$1.34	\$1.34	\$1.34	\$1.34	\$1.34	\$1.42	3.14%	3.12%	3.09%	3.04%	3.07%	3.33%	3.13%
Amer. Elec. Power	\$71.11	\$71.33	\$72.68	\$75.27	\$76.79	\$75.93	\$2.48	\$2.48	\$2.48	\$2.68	\$2.68	\$2.68	3.49%	3.48%	3.41%	3.56%	3.49%	3.53%	3.49%
Ameren Corp.	\$62.94	\$64.08	\$64.97	\$67.00	\$66.73	\$66.38	\$1.83	\$1.83	\$1.83	\$1.83	\$1.90	\$1.90	2.91%	2.86%	2.82%	2.73%	2.85%	2.86%	2.84%
CMS Energy Corp.	\$48.65	\$49.26	\$50.02	\$50.09	\$50.73	\$50.17	\$1.43	\$1.43	\$1.43	\$1.43	\$1.53	\$1.53	2.94%	2.90%	2.86%	2.86%	2.82%	3.05%	2.90%
DTE Energy	\$110.19	\$110.36	\$112.81	\$115.71	\$113.99	\$112.83	\$3.53	\$3.53	\$3.53	\$3.53	\$3.78	\$3.78	3.20%	3.20%	3.13%	3.05%	3.32%	3.35%	3.21%
Entergy Corp.	\$83.16	\$82.40	\$82.78	\$84.96	\$86.43	\$86.36	\$3.56	\$3.56	\$3.56	\$3.64	\$3.64	\$3.64	4.28%	4.32%	4.30%	4.28%	4.21%	4.21%	4.27%
Eversource Energy	\$56.59	\$56.74	\$55.98	\$58.30	\$58.09	\$56.49	\$1.84	\$1.84	\$1.84	\$1.90	\$1.90	\$1.90	3.25%	3.24%	3.29%	3.26%	3.27%	3.36%	3.28%
MGE Energy	\$65.21	\$65.25	\$63.48	\$63.27	\$62.80	\$61.45	\$1.35	\$1.35	\$1.35	\$1.35	\$1.35	\$1.35	2.07%	2.07%	2.13%	2.13%	2.15%	2.20%	2.12%
OG Energy	\$36.63	\$36.52	\$37.02	\$37.76	\$39.74	\$39.62	\$1.33	\$1.33	\$1.46	\$1.46	\$1.46	\$1.46	3.63%	3.64%	3.94%	3.87%	3.67%	3.69%	3.74%
Otter Tail Corp.	\$48.55	\$48.10	\$46.78	\$46.68	\$49.07	\$47.64	\$1.34	\$1.34	\$1.34	\$1.34	\$1.34	\$1.34	2.76%	2.79%	2.86%	2.87%	2.73%	2.81%	2.80%
WEC Energy Group	\$66.70	\$67.24	\$69.12	\$69.55	\$71.11	\$70.36	\$2.21	\$2.21	\$2.21	\$2.21	\$2.21	\$2.21	3.31%	3.29%	3.20%	3.18%	3.11%	3.14%	3.20%
AVANGRID Inc.	\$50.11	\$48.82	\$47.68	\$49.02	\$50.76	\$48.84	\$1.73	\$1.76	\$1.76	\$1.76	\$1.76	\$1.76	3.45%	3.61%	3.69%	3.59%	3.47%	3.60%	3.57%
Consol. Edison	\$79.31	\$77.93	\$76.91	\$77.16	\$79.09	\$75.64	\$2.86	\$2.86	\$2.86	\$2.86	\$2.86	\$2.86	3.61%	3.67%	3.72%	3.71%	3.62%	3.78%	3.68%
Duke Energy	\$81.11	\$80.89	\$81.80	\$85.06	\$87.06	\$85.47	\$3.71	\$3.71	\$3.71	\$3.71	\$3.71	\$3.71	4.57%	4.59%	4.54%	4.36%	4.26%	4.34%	4.44%
Eversource Energy	\$61.42	\$62.02	\$62.93	\$64.98	\$66.57	\$66.46	\$2.02	\$2.02	\$2.02	\$2.02	\$2.02	\$2.02	3.29%	3.26%	3.21%	3.11%	3.03%	3.04%	3.16%
Exelon Corp.	\$43.39	\$43.52	\$43.65	\$44.74	\$45.25	\$45.72	\$1.38	\$1.38	\$1.38	\$1.38	\$1.38	\$1.38	3.18%	3.17%	3.16%	3.08%	3.05%	3.02%	3.11%
FirstEnergy Corp.	\$36.56	\$37.12	\$37.67	\$37.96	\$37.61	\$37.86	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44	3.94%	3.88%	3.82%	3.79%	3.83%	3.80%	3.84%
NextEra Energy	\$170.55	\$169.53	\$171.51	\$175.20	\$174.49	\$174.77	\$4.44	\$4.44	\$4.44	\$4.44	\$4.44	\$4.44	2.60%	2.62%	2.59%	2.53%	2.54%	2.54%	2.57%
PPL Corp.	\$29.19	\$29.72	\$30.24	\$31.35	\$29.37	\$29.59	\$1.64	\$1.64	\$1.64	\$1.64	\$1.64	\$1.64	5.62%	5.52%	5.42%	5.23%	5.58%	5.54%	5.49%
Public Serv. Enterprise	\$52.18	\$52.25	\$54.14	\$54.14	\$52.78	\$52.33	\$1.80	\$1.80	\$1.80	\$1.80	\$1.80	\$1.80	3.45%	3.45%	3.33%	3.33%	3.41%	3.44%	3.40%
Southern Co.	\$46.53	\$44.28	\$44.42	\$46.01	\$45.24	\$45.97	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	\$2.40	5.16%	5.42%	5.40%	5.22%	5.31%	5.22%	5.29%
Unitil Corp.	\$50.27	\$50.91	\$49.19	\$48.84	\$50.62	\$50.08	\$1.46	\$1.46	\$1.46	\$1.46	\$1.46	\$1.46	2.90%	2.87%	2.97%	2.99%	2.88%	2.92%	2.92%
Edison Int'l	\$67.76	\$67.83	\$68.98	\$57.82	\$56.79	\$56.42	\$2.42	\$2.42	\$2.42	\$2.42	\$2.45	\$2.45	3.57%	3.57%	3.51%	4.19%	4.31%	4.34%	3.92%
El Paso Electric	\$62.65	\$59.96	\$58.09	\$56.86	\$52.86	\$50.31	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44	2.30%	2.40%	2.48%	2.53%	2.72%	2.86%	2.55%
Hawaiian Elec.	\$35.10	\$35.55	\$36.29	\$37.48	\$37.25	\$36.15	\$1.24	\$1.24	\$1.24	\$1.24	\$1.24	\$1.24	3.53%	3.49%	3.42%	3.31%	3.33%	3.43%	3.42%
IDACORP Inc.	\$95.66	\$99.15	\$97.42	\$97.24	\$96.18	\$93.50	\$2.36	\$2.36	\$2.36	\$2.52	\$2.52	\$2.52	2.47%	2.38%	2.42%	2.59%	2.62%	2.70%	2.53%
NorthWestern Corp.	\$60.10	\$58.95	\$59.21	\$61.55	\$61.51	\$60.72	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	\$2.20	3.66%	3.73%	3.72%	3.57%	3.58%	3.62%	3.65%
Pinnacle West Capital	\$80.55	\$79.16	\$82.41	\$85.79	\$87.89	\$85.03	\$2.78	\$2.78	\$2.95	\$2.95	\$2.95	\$2.95	3.45%	3.51%	3.58%	3.44%	3.36%	3.47%	3.47%
PNM Resources	\$39.60	\$39.45	\$39.25	\$40.48	\$42.43	\$41.46	\$1.06	\$1.06	\$1.06	\$1.06	\$1.06	\$1.16	2.68%	2.69%	2.70%	2.62%	2.50%	2.80%	2.66%
Portland General	\$45.97	\$45.99	\$45.74	\$46.81	\$47.07	\$46.26	\$1.45	\$1.45	\$1.45	\$1.45	\$1.45	\$1.45	3.15%	3.15%	3.17%	3.10%	3.08%	3.13%	3.13%
Sempra Energy	\$115.73	\$119.11	\$113.85	\$113.72	\$112.00	\$111.63	\$3.58	\$3.58	\$3.58	\$3.58	\$3.58	\$3.58	3.09%	3.01%	3.14%	3.15%	3.20%	3.21%	3.13%
Xcel Energy Inc.	\$47.30	\$47.75	\$48.52	\$49.97	\$51.13	\$50.14	\$1.52	\$1.52	\$1.52	\$1.52	\$1.52	\$1.52	3.21%	3.18%	3.13%	3.04%	2.97%	3.03%	3.10%

Sources and Notes:

[1] - [6]: Average of Intraday High Low Prices, Monthly.

[7] - [12]: Bloomberg dividend data, annualized.

[13] - [18]: Dividend yield = Annualized monthly dividends in [7] - [12] divided by corresponding monthly average price from columns [1] - [6].

[19]: (( [13] + [14] + [15] + [16] + [17] + [18] ) / 6).



**Table No. BV-5**  
**Electric Utility Sample**  
**LT EPS Growth Rate Forecast**

Company	IBES Long Term Growth Rate Forecast	Number of Analyst Estimates
	[1]	[2]
ALLETE	N/A	N/A
Alliant Energy	7.25%	2
Amer. Elec. Power	5.74%	2
Ameren Corp.	7.70%	2
CMS Energy Corp.	7.00%	4
DTE Energy	5.49%	4
Entergy Corp.	-3.77%	2
Evergy Inc.	9.20%	1
MGE Energy	N/A	N/A
OGE Energy	-2.25%	2
Otter Tail Corp.	N/A	N/A
WEC Energy Group	4.70%	3
AVANGRID Inc.	9.20%	1
Consol. Edison	2.90%	4
Duke Energy	4.41%	2
Eversource Energy	5.83%	4
Exelon Corp.	8.77%	3
FirstEnergy Corp.	-6.61%	2
NextEra Energy	7.45%	4
PPL Corp.	3.59%	1
Public Serv. Enterprise	7.21%	2
Southern Co.	1.68%	3
Unitil Corp.	3.70%	1
Edison Int'l	3.75%	4
El Paso Electric	5.10%	1
Hawaiian Elec.	7.80%	1
IDACORP Inc.	2.60%	1
NorthWestern Corp.	2.59%	2
Pinnacle West Capital	4.16%	3
PNM Resources	4.10%	1
Portland General	5.05%	2
Sempra Energy	8.69%	2
Xcel Energy Inc.	6.60%	2

Sources and Notes:

[1]&[2]: Long-term (i.e. 5 year) IBES estimates from Thomson Reuters.

**Table No. BV-6**  
**Electric Utility Sample**  
**Bloomberg Bond Yields**

Month Ending	Public Utility Bond Rating A Yield	Public Utility Bond Rating BBB+ Yield	Public Utility Bond Rating BBB Yield	Public Utility Bond Rating BBB- Yield
8/31/2018	4.21	4.49	4.60	4.80
9/30/2018	4.31	4.59	4.76	4.97
10/31/2018	4.48	4.75	4.98	5.14
11/30/2018	4.56	4.84	5.01	5.27
12/31/2018	4.40	4.71	4.85	5.18
1/31/2019	4.36	4.65	4.81	5.11
Average Yield	4.39	4.67	4.83	5.08

Sources and Notes:

Bloomberg as of January 31, 2019.

**Table No. BV-7**  
**Electric Utility Sample**  
**Long Term GDP Growth Rate Forecasts**

	<b>2020</b>	<b>2050</b>		<b>CAGR</b>
[1] <b>SSA - 2018</b> GDP in dollars (billions)	\$ 22,288	\$ 81,536		4.42% [a]
[2] <b>SSA - 2018</b> GDP in dollars (billions)	\$ 81,536	\$ 444,282		4.33% [b]
[3] <b>SSA - 2018</b> GDP in dollars (billions)	\$ 22,288	\$ 444,282		4.37% [c]
[4] <b>EIA</b> Real GDP Forecast	\$ 17,096	\$ 32,006	1.92%	
GDP Chain-Type Price Index (2009=1.000)	1.13	2.42	2.32%	
Nominal GDP Forecast	\$ 19,391	\$ 77,412		4.28% [d]
[5] <b>EIA (2018 - 2050)</b> Real GDP Growth (%)			1.89%	
GDP Chain-Type Price Index Growth (%)			2.33%	
Nominal GDP Growth (%)				4.27% [e]
[6] <b>EIA (2020 - 2050)</b> Real GDP Forecast	\$ 18,487	\$ 32,006	1.85%	
GDP Chain-Type Price Index (2009=1.000)	1.22	2.42	2.31%	
	\$ 22,514	\$ 77,412		4.20% [f]
[7] <b>EIA, estimated 2050 (2020 - 2050)</b> Real GDP Forecast, using historical GDP growth rate (1929-2017)	\$ 18,487	\$ 47,846	3.22%	
GDP Chain-Type Price Index (2009=1.000)	1.218	2.419	2.31%	
	\$ 22,514	\$ 115,721		5.61% [g]
[8] <b>Blue Chip Value Indicators (2025 - 2029)</b> Nominal GDP Growth Forecast (%)			4.10%	4.10% [h]
<b>UPDATED AVERAGE</b>				
Average (SSA, EIA, Blue Chip)				4.22% =average[c,f,h]
Average (SSA, EIA, Blue Chip)				<b>4.24%</b> =average[a,f,h]

**Sources and Notes:**

[1]-[3]: Social Security Administration: The 2018 OASDI Trustees Report, Table VI.G4.-OASDI and HI Annual and Summarized Income, Cost, and Balance as a Percentage of GDP, Calendar years 2018-95, Intermediate Assumptions.

[4] - [7]: Energy Information Administration Annual Energy Outlook 2019 Release with Projections to 2050 Released Jan. 2019, Table A20. Macroeconomic Indicators. Nominal GDP=(Real GDP)\*(GDP Chain-Type Price Index).

[7]: 2050 GDP forecasted using annualized GDP growth rate from 1929 - 2017 from U.S. Bureau of Economic Analysis (BEA). (Accessed February 2019).

[8]: Blue Chip Economic Indicators, Vol. 43, No. 3. "Top Analysts' Forecasts of the U.S. Economic Outlook for the Year Ahead." October 2018.

**Table No. BV-8**  
**Electric Utility Sample**  
**CAPM ROE Estimates**

Company	Div Yield	Proj. Growth	Cost of Equity	RFR	Risk Premium	Beta	Unadjusted Ke	Market Cap (\$Million)	Size Adjustment	Implied Cost of Equity
	[1]	[2]	[3] = [2]+[3]	[4]	[5] = [3]-[4]	[6]	[7] = [4]+[5]*[6]	[8]	[9]	[10] = [7] + [9]
ALLETE	2.58%	10.78%	13.37%	3.70%	9.67%	0.65	9.98%	\$3,955	0.98%	10.96%
Alliant Energy	2.58%	10.78%	13.37%	3.70%	9.67%	0.60	9.50%	\$10,492	0.89%	10.39%
Amer. Elec. Power	2.58%	10.78%	13.37%	3.70%	9.67%	0.55	9.02%	\$39,014	-0.35%	8.67%
Ameren Corp.	2.58%	10.78%	13.37%	3.70%	9.67%	0.55	9.02%	\$16,933	0.61%	9.63%
AVANGRID Inc.	2.58%	10.78%	13.37%	3.70%	9.67%	0.30	6.60%	\$15,410	0.61%	7.21%
CMS Energy Corp.	2.58%	10.78%	13.37%	3.70%	9.67%	0.55	9.02%	\$14,771	0.61%	9.63%
Consol. Edison	2.58%	10.78%	13.37%	3.70%	9.67%	0.40	7.57%	\$24,182	0.61%	8.18%
DTE Energy	2.58%	10.78%	13.37%	3.70%	9.67%	0.55	9.02%	\$21,422	0.61%	9.63%
Duke Energy	2.58%	10.78%	13.37%	3.70%	9.67%	0.50	8.53%	\$62,587	-0.35%	8.18%
Edison Int'l	2.58%	10.78%	13.37%	3.70%	9.67%	0.55	9.02%	\$18,562	0.61%	9.63%
El Paso Electric	2.58%	10.78%	13.37%	3.70%	9.67%	0.65	9.98%	\$2,129	1.66%	11.64%
Entergy Corp.	2.58%	10.78%	13.37%	3.70%	9.67%	0.60	9.50%	\$16,155	0.61%	10.11%
Evergy Inc.	2.58%	10.78%	13.37%	3.70%	9.67%	N/A	N/A	\$14,956	0.61%	N/A
Eversource Energy	2.58%	10.78%	13.37%	3.70%	9.67%	0.60	9.50%	\$21,995	0.61%	10.11%
Exelon Corp.	2.58%	10.78%	13.37%	3.70%	9.67%	0.65	9.98%	\$46,184	-0.35%	9.63%
FirstEnergy Corp.	2.58%	10.78%	13.37%	3.70%	9.67%	0.60	9.50%	\$20,049	0.61%	10.11%
Hawaiian Elec.	2.58%	10.78%	13.37%	3.70%	9.67%	0.60	9.50%	\$4,049	0.98%	10.48%
IDACORP Inc.	2.58%	10.78%	13.37%	3.70%	9.67%	0.55	9.02%	\$4,913	0.98%	10.00%
MGE Energy	2.58%	10.78%	13.37%	3.70%	9.67%	0.60	9.50%	\$2,230	1.66%	11.16%
NextEra Energy	2.58%	10.78%	13.37%	3.70%	9.67%	0.55	9.02%	\$85,543	-0.35%	8.67%
NorthWestern Corp.	2.58%	10.78%	13.37%	3.70%	9.67%	0.55	9.02%	\$3,444	1.51%	10.53%
OGE Energy	2.58%	10.78%	13.37%	3.70%	9.67%	0.85	11.92%	\$8,179	0.89%	12.81%
Otter Tail Corp.	2.58%	10.78%	13.37%	3.70%	9.67%	0.75	10.95%	\$1,922	1.66%	12.61%
Pinnacle West Capital	2.58%	10.78%	13.37%	3.70%	9.67%	0.55	9.02%	\$9,869	0.89%	9.91%
PNM Resources	2.58%	10.78%	13.37%	3.70%	9.67%	0.65	9.98%	\$3,393	1.51%	11.49%
Portland General	2.58%	10.78%	13.37%	3.70%	9.67%	0.60	9.50%	\$4,312	0.98%	10.48%
PPL Corp.	2.58%	10.78%	13.37%	3.70%	9.67%	0.70	10.47%	\$22,541	0.61%	11.08%
Public Serv. Enterprise	2.58%	10.78%	13.37%	3.70%	9.67%	0.60	9.50%	\$27,493	-0.35%	9.15%
Sempra Energy	2.58%	10.78%	13.37%	3.70%	9.67%	0.75	10.95%	\$32,053	-0.35%	10.60%
Southern Co.	2.58%	10.78%	13.37%	3.70%	9.67%	0.50	8.53%	\$48,551	-0.35%	8.18%
Unitil Corp.	2.58%	10.78%	13.37%	3.70%	9.67%	0.55	9.02%	\$780	2.08%	11.10%
WEC Energy Group	2.58%	10.78%	13.37%	3.70%	9.67%	0.50	8.53%	\$23,043	0.61%	9.14%
Xcel Energy Inc.	2.58%	10.78%	13.37%	3.70%	9.67%	0.50	8.53%	\$26,876	-0.35%	8.18%
<b>Minimum</b>										<b>7.21%</b>
Maximum										12.81%
Median										10.05%
Midpoint										10.01%
<b>Upper end of ZOR</b>										<b>12.81%</b>
Upper Midpoint										11.41%

Sources and Notes:

- [1]: Value Line Investment Analyzer as of 01/31/2019, weighted average dividend yield for dividend paying firms in S&P 500 Index.  
[2]: Weighted average of earnings growth rates from IBES for dividend-paying stocks in the S&P 500, accessed 1/31/2019.  
[4]: Forecast for 2020 10 Year Treasury Bond Yield + 50bps Spread, January 2019 Blue Chip Economic Indicators.  
[6]&[8]: Value Line Investment Analyzer as of 01/31/2019. Evergy Inc. market cap is from Bloomberg, as of 12/31/2018.  
[9]: Duff&Phelps 2017 Valuation Handbook U.S. Guide to Cost of Capital, 7-10 and 7-11.

**Table No. BV-9**  
**Electric Utility Sample**  
**CAPM Projected Growth Rate based on S&P 500 Dividend-Paying Stocks**

Company Name	Market Cap (\$Millions)	Annual Dividend Yield	Projected Growth Rate	Projected Growth Rate Greater Than 0% and Less Than 20%	Implied Cost of Equity Before Additional Screens	Projected Growth Rate Accounting for Low-End Outlier Test
	[1]	[2]	[3]	[4]	[5] = [2]+[4]	[5]
3M Company	\$116,632	2.73%	8.07%	8.07%	10.80%	8.07%
Abbott Labs.	\$128,177	1.77%	11.06%	11.06%	12.83%	11.06%
AbbVie Inc.	\$120,769	5.32%	7.76%	7.76%	13.08%	7.76%
ABIOMED Inc.	\$15,812	0.00%	N/A	N/A	0.00%	N/A
Accenture Plc	\$97,969	1.98%	8.69%	8.69%	10.67%	8.69%
Activision Blizzard	\$36,044	0.83%	9.14%	9.14%	9.96%	9.14%
Adobe Systems	\$120,853	0.00%	N/A	N/A	0.00%	N/A
Advance Auto Parts	\$11,605	0.15%	20.48%	N/A	0.15%	N/A
Advanced Micro Dev.	\$24,386	0.00%	N/A	N/A	0.00%	N/A
AES Corp.	\$10,855	3.30%	10.30%	10.30%	13.60%	10.30%
Affiliated Managers	\$6,140	1.52%	2.64%	2.64%	4.17%	N/A
Aflac Inc.	\$36,401	2.34%	9.14%	9.14%	11.48%	9.14%
Agilent Technologies	\$24,260	0.87%	10.51%	10.51%	11.38%	10.51%
Air Products & Chem.	\$36,105	2.80%	11.04%	11.04%	13.84%	11.04%
Akamai Technologies	\$11,060	0.00%	N/A	N/A	0.00%	N/A
Alaska Air Group	\$7,889	2.18%	12.17%	12.17%	14.34%	12.17%
Albemarle Corp.	\$8,573	1.65%	12.49%	12.49%	14.14%	12.49%
Alexandria Real Estate	\$13,143	2.97%	8.40%	8.40%	11.37%	8.40%
Alexion Pharmac.	\$27,432	0.00%	N/A	N/A	0.00%	N/A
Align Techn.	\$20,254	0.00%	N/A	N/A	0.00%	N/A
Allergan plc	\$8,161	0.97%	11.18%	11.18%	12.15%	11.18%
Allergan plc	\$48,550	2.05%	5.21%	5.21%	7.27%	5.21%
Alliance Data Sys.	\$9,696	1.26%	12.43%	12.43%	13.69%	12.43%
Alliant Energy	\$10,492	3.22%	7.25%	7.25%	10.47%	7.25%
Allstate Corp.	\$30,315	2.07%	14.32%	14.32%	16.40%	14.32%
Alphabet Inc.	\$776,946	0.00%	N/A	N/A	0.00%	N/A
Alphabet Inc. 'A'	\$783,559	0.00%	N/A	N/A	0.00%	N/A
Altria Group	\$92,781	6.50%	8.40%	8.40%	14.90%	8.40%
Amazon.com	\$840,459	0.00%	N/A	N/A	0.00%	N/A
Amer. Airlines	\$16,474	1.11%	18.43%	18.43%	19.53%	18.43%
Amer. Elec. Power	\$39,014	3.44%	5.74%	5.74%	9.17%	5.74%
Amer. Express	\$87,706	1.60%	17.33%	17.33%	18.93%	17.33%
Amer. Int'l Group	\$38,243	2.92%	26.58%	N/A	2.92%	N/A
Amer. Tower 'A'	\$76,184	2.02%	8.05%	8.05%	10.07%	8.05%
Amer. Water Works	\$17,278	2.04%	8.20%	8.20%	10.24%	8.20%
Ameren Corp.	\$16,933	2.80%	7.70%	7.70%	10.50%	7.70%
Ameriprise Fin'l	\$17,701	2.84%	18.84%	18.84%	21.67%	18.84%
AmerisourceBergen	\$18,083	1.91%	9.04%	9.04%	10.95%	9.04%
AMETEK Inc.	\$16,921	0.76%	14.90%	14.90%	15.66%	14.90%
Amgen	\$119,844	3.10%	5.00%	5.00%	8.10%	5.00%
Amphenol Corp.	\$26,490	1.05%	8.70%	8.70%	9.75%	8.70%
Anadarko Petroleum	\$23,376	2.48%	N/A	N/A	2.48%	N/A
Analog Devices	\$36,594	1.91%	9.34%	9.34%	11.25%	9.34%
ANSYS Inc.	\$13,809	0.00%	N/A	N/A	0.00%	N/A
Anthem Inc.	\$78,456	1.06%	15.26%	15.26%	16.32%	15.26%
Aon plc	\$37,683	0.96%	15.22%	15.22%	16.18%	15.22%
Apache Corp.	\$12,523	3.06%	76.32%	N/A	3.06%	N/A
Apartment Investment	\$8,166	3.10%	7.10%	7.10%	10.20%	7.10%
Apple Inc.	\$791,420	1.93%	13.00%	13.00%	14.93%	13.00%
Applied Materials	\$37,790	2.04%	10.77%	10.77%	12.81%	10.77%
Aptiv PLC	\$20,898	1.13%	10.80%	10.80%	11.93%	10.80%
Archer Daniels Mid'l'd	\$25,144	2.99%	N/A	N/A	2.99%	N/A
Arconic Inc.	\$9,095	1.30%	N/A	N/A	1.30%	N/A
Arista Networks	\$16,193	0.00%	N/A	N/A	0.00%	N/A
Assurant Inc.	\$6,012	2.47%	N/A	N/A	2.47%	N/A
AT&T Inc.	\$218,545	6.80%	6.25%	6.25%	13.05%	6.25%
Autodesk Inc.	\$32,238	0.00%	N/A	N/A	0.00%	N/A
Automatic Data Proc.	\$61,278	2.37%	16.36%	16.36%	18.73%	16.36%
AutoZone Inc.	\$21,367	0.00%	N/A	N/A	0.00%	N/A

**Table No. BV-9**  
**Electric Utility Sample**  
**CAPM Projected Growth Rate based on S&P 500 Dividend-Paying Stocks**

Company Name	Market Cap (\$Millions)	Annual Dividend Yield	Projected Growth Rate	Projected Growth Rate Greater Than 0% and Less Than 20%	Implied Cost of Equity Before Additional Screens	Projected Growth Rate Accounting for Low-End Outlier Test
	[1]	[2]	[3]	[4]	[5] = [2]+[4]	[5]
AvalonBay Communities	\$26,641	3.21%		N/A	3.21%	N/A
Avery Dennison	\$9,089	2.11%	11.06%	11.06%	13.16%	11.06%
Baker Hughes a GE co.	\$9,711	2.96%		N/A	2.96%	N/A
Ball Corp.	\$17,811	0.77%	11.36%	11.36%	12.13%	11.36%
Bank of America	\$280,665	2.11%	20.69%	N/A	2.11%	N/A
Bank of New York Mellon	\$51,733	2.13%	9.43%	9.43%	11.56%	9.43%
Baxter Int'l Inc.	\$38,658	1.05%	12.32%	12.32%	13.38%	12.32%
BB&T Corp.	\$37,606	3.31%	3.97%	3.97%	7.28%	3.97%
Becton Dickinson	\$66,911	1.26%	11.99%	11.99%	13.25%	11.99%
Berkshire Hathaway 'B'	\$0	0.00%	N/A	N/A	0.00%	N/A
Best Buy Co.	\$16,113	3.76%	16.27%	16.27%	20.03%	16.27%
Biogen	\$67,251	0.00%	N/A	N/A	0.00%	N/A
BlackRock Inc.	\$65,931	3.17%	8.34%	8.34%	11.51%	8.34%
Block (H&R)	\$4,848	4.29%	10.00%	10.00%	14.29%	10.00%
Boeing	\$219,417	2.12%	23.58%	N/A	2.12%	N/A
Booking Holdings	\$85,457	0.00%	N/A	N/A	0.00%	N/A
BorgWarner	\$8,518	1.65%	9.08%	9.08%	10.73%	9.08%
Boston Properties	\$20,351	2.97%	6.00%	6.00%	8.97%	6.00%
Boston Scientific	\$52,788	0.00%	N/A	N/A	0.00%	N/A
Brighthouse Financial Inc	\$4,436	0.00%	N/A	N/A	0.00%	N/A
Bristol-Myers Squibb	\$80,582	3.29%	8.37%	8.37%	11.66%	8.37%
Broadcom Inc.	\$110,787	3.97%	15.28%	15.28%	19.26%	15.28%
Broadridge Fin'l	\$11,777	1.88%	10.00%	10.00%	11.88%	10.00%
Brown-Forman 'B'	\$22,614	1.39%		N/A	1.39%	N/A
C.H. Robinson	\$11,974	2.28%	7.59%	7.59%	9.87%	7.59%
Cabot Oil & Gas 'A'	\$10,829	1.12%	44.44%	N/A	1.12%	N/A
CA Inc.		N/A	N/A	N/A	0.00%	N/A
Campbell Soup	\$11,444	4.00%	-1.35%	N/A	4.00%	N/A
Capital One Fin'l	\$38,172	1.98%	6.10%	6.10%	8.08%	6.10%
Capri Holdings Ltd.	\$6,378	0.00%	N/A	N/A	0.00%	N/A
Cardinal Health	\$14,991	3.89%	8.90%	8.90%	12.79%	8.90%
CarMax Inc.	\$10,098	0.00%	N/A	N/A	0.00%	N/A
Carnival Corp.	\$40,306	3.47%	11.75%	11.75%	15.22%	11.75%
Caterpillar Inc.	\$78,579	2.63%	25.22%	N/A	2.63%	N/A
Choe Global Markets	\$10,411	1.32%	14.79%	14.79%	16.11%	14.79%
CBRE Group	\$15,595	0.00%	N/A	N/A	0.00%	N/A
CBS Corp. 'B'	\$18,548	1.45%	17.76%	17.76%	19.21%	17.76%
Celanese Corp.	\$12,975	2.43%	11.12%	11.12%	13.55%	11.12%
Celgene Corp.	\$61,825	0.00%	N/A	N/A	0.00%	N/A
Centene Corp.	\$26,813	0.00%	N/A	N/A	0.00%	N/A
CenterPoint Energy	\$13,344	3.73%	10.05%	10.05%	13.79%	10.05%
CenturyLink Inc.	\$16,554	14.16%	-7.42%	N/A	14.16%	N/A
Cerner Corp.	\$18,089	0.00%	N/A	N/A	0.00%	N/A
CF Industries	\$10,120	2.99%		N/A	2.99%	N/A
Charter Communic.	\$79,262	0.00%	N/A	N/A	0.00%	N/A
Chevron Corp.	\$219,070	3.85%	57.78%	N/A	3.85%	N/A
Chipotle Mex. Grill	\$14,719	0.00%	N/A	N/A	0.00%	N/A
Chubb Ltd.	\$61,350	2.19%	11.54%	11.54%	13.73%	11.54%
Church & Dwight	\$15,895	1.35%	10.59%	10.59%	11.93%	10.59%
Cigna Corp.	\$48,661	0.02%	18.11%	18.11%	18.13%	18.11%
Cimarex Energy	\$7,203	0.95%	260.33%	N/A	0.95%	N/A
Cincinnati Financial	\$13,198	2.60%	7.31%	7.31%	9.91%	7.31%
Cintas Corp.	\$19,712	1.09%	16.00%	16.00%	17.09%	16.00%
Cisco Systems	\$213,609	2.98%	8.93%	8.93%	11.91%	8.93%
Citigroup Inc.	\$157,420	3.11%	11.54%	11.54%	14.65%	11.54%
Citizens Fin'l Group	\$16,082	3.74%	16.96%	16.96%	20.70%	16.96%
Citrix Sys.	\$13,808	1.35%	9.13%	9.13%	10.48%	9.13%
Clorox Co.	\$18,934	2.56%	4.20%	4.20%	6.76%	4.20%
CME Group	\$61,950	1.53%	18.79%	18.79%	20.32%	18.79%

**Table No. BV-9**  
**Electric Utility Sample**  
**CAPM Projected Growth Rate based on S&P 500 Dividend-Paying Stocks**

Company Name	Market Cap (\$Millions)	Annual Dividend Yield	Projected Growth Rate	Projected Growth Rate Greater Than 0% and Less Than 20%	Implied Cost of Equity Before Additional Screens	Projected Growth Rate Accounting for Low-End Outlier Test
	[1]	[2]	[3]	[4]	[5] = [2]+[4]	[5]
CMS Energy Corp.	\$14,771	2.95%	7.00%	7.00%	9.96%	7.00%
Coca-Cola	\$204,841	3.41%	6.61%	6.61%	10.02%	6.61%
Cognizant Technology	\$40,414	1.14%	10.96%	10.96%	12.10%	10.96%
Colgate-Palmolive	\$56,098	2.58%	4.35%	4.35%	6.93%	4.35%
Comcast Corp.	\$166,375	2.28%	12.90%	12.90%	15.18%	12.90%
Comerica Inc.	\$13,066	3.39%	19.80%	19.80%	23.19%	19.80%
Conagra Brands	\$10,509	3.97%	6.30%	6.30%	10.27%	6.30%
Concho Resources	\$23,997	0.00%	N/A	N/A	0.00%	N/A
ConocoPhillips	\$77,928	1.78%	84.82%	N/A	1.78%	N/A
Consol. Edison	\$24,182	3.86%	2.90%	2.90%	6.76%	2.90%
Constellation Brands	\$32,971	1.84%	8.63%	8.63%	10.47%	8.63%
Cooper Cos.	\$13,687	0.02%	16.00%	16.00%	16.02%	16.00%
Copart Inc.	\$11,848	0.00%	N/A	N/A	0.00%	N/A
Corning Inc.	\$26,621	2.18%	N/A	N/A	2.18%	N/A
Costco Wholesale	\$94,554	1.16%	10.54%	10.54%	11.70%	10.54%
Coty Inc.	\$5,826	6.63%	7.88%	7.88%	14.51%	7.88%
Crown Castle Int'l	\$48,580	3.93%	15.60%	15.60%	19.53%	15.60%
CSX Corp.	\$55,478	1.33%	11.68%	11.68%	13.01%	11.68%
Cummins Inc.	\$23,611	3.11%	12.27%	12.27%	15.37%	12.27%
CVS Health	\$66,796	3.07%	12.35%	12.35%	15.42%	12.35%
Danaher Corp.	\$77,733	0.59%	7.30%	7.30%	7.88%	7.30%
Darden Restaurants	\$12,960	2.95%	13.23%	13.23%	16.18%	13.23%
DaVita Inc.	\$9,317	0.00%	N/A	N/A	0.00%	N/A
Deere & Co.	\$52,227	1.86%	19.27%	19.27%	21.12%	19.27%
Delta Air Lines	\$33,890	2.80%	14.33%	14.33%	17.14%	14.33%
Dentsply Sirona	\$9,334	0.83%	-0.28%	N/A	0.83%	N/A
Devon Energy	\$12,608	1.18%	40.32%	N/A	1.18%	N/A
Diamondback Energy	\$10,175	0.73%	28.34%	N/A	0.73%	N/A
Digital Realty Trust	\$22,261	3.96%	N/A	N/A	3.96%	N/A
Discover Fin'l Svcs.	\$22,806	2.34%	17.06%	17.06%	19.40%	17.06%
Discovery Commun. 'C'	\$13,915	0.00%	N/A	N/A	0.00%	N/A
Discovery Inc.	\$14,857	0.00%	N/A	N/A	0.00%	N/A
Dish Network 'A'	\$14,344	0.00%	N/A	N/A	0.00%	N/A
Disney (Walt)	\$165,942	1.58%	4.75%	4.75%	6.33%	4.75%
Dollar General	\$30,345	1.01%	14.03%	14.03%	15.03%	14.03%
Dollar Tree Inc.	\$23,043	0.00%	N/A	N/A	0.00%	N/A
Dominion Energy	\$46,007	5.19%	6.49%	6.49%	11.67%	6.49%
Dover Corp.	\$12,852	2.19%	14.10%	14.10%	16.29%	14.10%
DowDuPont Inc.	\$123,442	3.14%	8.15%	8.15%	11.29%	8.15%
DTE Energy	\$21,422	3.27%	5.49%	5.49%	8.76%	5.49%
Duke Energy	\$62,587	4.32%	4.41%	4.41%	8.72%	4.41%
Duke Realty Corp.	\$10,420	2.98%	-12.65%	N/A	2.98%	N/A
DXC Technology	\$18,107	1.17%	9.79%	9.79%	10.95%	9.79%
E*Trade Fin'l	\$11,981	1.18%	22.53%	N/A	1.18%	N/A
Eastman Chemical	\$11,286	3.04%	9.84%	9.84%	12.88%	9.84%
Eaton Corp. plc	\$33,047	3.45%	8.79%	8.79%	12.24%	8.79%
eBay Inc.	\$32,405	1.63%	10.77%	10.77%	12.40%	10.77%
Ecolab Inc.	\$45,691	1.16%	13.37%	13.37%	14.53%	13.37%
Edison Int'l	\$18,562	4.35%	3.75%	3.75%	8.10%	3.75%
Edwards Lifesciences	\$35,635	0.00%	N/A	N/A	0.00%	N/A
Electronic Arts	\$28,041	0.00%	N/A	N/A	0.00%	N/A
Emerson Electric	\$41,194	2.96%	8.78%	8.78%	11.74%	8.78%
Entergy Corp.	\$16,155	4.12%	-3.77%	N/A	4.12%	N/A
EQT Corp.	N/A	N/A	N/A	N/A	0.00%	N/A
Equifax Inc.	\$12,907	1.45%	1.71%	1.71%	3.15%	N/A
Equinix Inc.	\$31,517	2.62%	10.00%	10.00%	12.62%	10.00%
Equity Residential	\$26,703	3.00%	N/A	N/A	3.00%	N/A
Essex Property Trust	\$17,914	2.83%	N/A	N/A	2.83%	N/A
Everest Re Group Ltd.	\$8,904	2.56%	39.64%	N/A	2.56%	N/A

**Table No. BV-9**  
**Electric Utility Sample**  
**CAPM Projected Growth Rate based on S&P 500 Dividend-Paying Stocks**

Company Name	Market Cap (\$Millions)	Annual Dividend Yield	Projected Growth Rate	Projected Growth Rate Greater Than 0% and Less Than 20%	Implied Cost of Equity Before Additional Screens	Projected Growth Rate Accounting for Low-End Outlier Test
	[1]	[2]	[3]	[4]	[5] = [2]+[4]	[5]
Evergy Inc.	\$0	3.39%	5.60%	5.60%	8.99%	5.60%
Eversource Energy	\$21,995	3.05%	5.83%	5.83%	8.88%	5.83%
Exelon Corp.	\$46,184	3.06%	8.77%	8.77%	11.83%	8.77%
Expedia Group	\$17,795	1.05%	15.79%	15.79%	16.84%	15.79%
Expeditors Int'l	\$11,959	1.29%	12.20%	12.20%	13.49%	12.20%
Express Scripts		N/A	N/A	N/A	0.00%	N/A
Exxon Mobil Corp.	\$310,268	4.40%	16.67%	16.67%	21.07%	16.67%
F5 Networks	\$9,692	0.00%	N/A	N/A	0.00%	N/A
Facebook Inc.	\$478,900	0.00%	N/A	N/A	0.00%	N/A
Fastenal Co.	\$17,356	2.64%		N/A	2.64%	N/A
Federal Rlty. Inv. Trust	\$9,690	3.10%		N/A	3.10%	N/A
FedEx Corp.	\$46,354	1.45%	9.71%	9.71%	11.16%	9.71%
Fidelity Nat'l Info.	\$34,286	1.19%	13.67%	13.67%	14.86%	13.67%
Fifth Third Bancorp	\$17,584	3.28%		N/A	3.28%	N/A
First Republic Bank	\$15,921	0.73%	10.60%	10.60%	11.33%	10.60%
FirstEnergy Corp.	\$20,049	3.92%	-6.61%	N/A	3.92%	N/A
Fiserv Inc.	\$33,255	0.00%	N/A	N/A	0.00%	N/A
FleetCor Technologies	\$17,890	0.00%	N/A	N/A	0.00%	N/A
FLIR Systems	\$6,762	1.40%		N/A	1.40%	N/A
Flowserve Corp.	\$5,750	1.73%	19.01%	19.01%	20.73%	19.01%
Fluor Corp.	\$5,147	2.31%	35.50%	N/A	2.31%	N/A
FMC Corp.	\$10,746	1.86%	26.80%	N/A	1.86%	N/A
Foot Locker	\$6,337	2.51%	10.54%	10.54%	13.04%	10.54%
Ford Motor	\$35,006	6.88%	3.80%	3.80%	10.68%	3.80%
Fortinet Inc.	\$13,040	0.00%	N/A	N/A	0.00%	N/A
Fortive Corp.	\$26,232	0.38%	13.75%	13.75%	14.12%	13.75%
Fortune Brands Home	\$6,406	1.96%	10.20%	10.20%	12.16%	10.20%
Franklin Resources	\$15,145	3.61%	-4.21%	N/A	3.61%	N/A
Freep't-McMoRan Inc.	\$16,866	2.09%	1.83%	1.83%	3.91%	N/A
Gallagher (Arthur J.)	\$13,724	2.13%	13.75%	13.75%	15.89%	13.75%
Gap (The) Inc.	\$9,718	3.88%	9.99%	9.99%	13.87%	9.99%
Garmin Ltd.	\$13,062	3.06%	6.98%	6.98%	10.03%	6.98%
Gartner Inc.	\$12,352	0.00%	N/A	N/A	0.00%	N/A
Gen'l Dynamics	\$50,692	2.20%	11.15%	11.15%	13.35%	11.15%
Gen'l Electric	\$88,373	0.39%	2.91%	2.91%	3.31%	N/A
Gen'l Mills	\$26,517	4.48%	6.05%	6.05%	10.53%	6.05%
Gen'l Motors	\$54,628	4.02%	14.40%	14.40%	18.42%	14.40%
Genuine Parts	\$14,650	2.85%		N/A	2.85%	N/A
Gilead Sciences	\$90,593	3.25%	-5.80%	N/A	3.25%	N/A
Global Payments	\$17,761	0.04%	22.36%	N/A	0.04%	N/A
Goldman Sachs	\$73,806	1.63%	6.43%	6.43%	8.06%	6.43%
Goodyear Tire	\$4,937	3.14%	2.41%	2.41%	5.55%	N/A
Grainger (W.W.)	\$16,636	1.86%	13.70%	13.70%	15.56%	13.70%
Halliburton Co.	\$27,471	2.24%	27.00%	N/A	2.24%	N/A
Hanesbrands Inc.	\$5,406	3.95%	-1.12%	N/A	3.95%	N/A
Harley-Davidson	\$6,002	4.04%	8.50%	8.50%	12.54%	8.50%
Harris Corp.	\$18,016	1.78%	18.28%	18.28%	20.06%	18.28%
Hartford Fin'l Svcs.	\$16,829	2.55%	19.84%	19.84%	22.39%	19.84%
Hasbro Inc.	\$11,475	2.78%	4.05%	4.05%	6.83%	4.05%
HCA Healthcare	\$48,115	1.15%	16.30%	16.30%	17.45%	16.30%
HCP Inc.	\$14,806	4.87%	4.00%	4.00%	8.87%	4.00%
Helmerich & Payne	\$6,100	5.02%		N/A	5.02%	N/A
Henry (Jack) & Assoc.	\$10,322	1.10%	11.00%	11.00%	12.10%	11.00%
Hershey Co.	\$22,251	2.76%	9.25%	9.25%	12.01%	9.25%
Hess Corp.	\$15,998	1.80%	15.00%	15.00%	16.80%	15.00%
Hewlett Packard Ent.	\$22,185	2.87%		N/A	2.87%	N/A
Hilton Worldwide Hldgs.	\$22,118	0.81%	23.61%	N/A	0.81%	N/A
HollyFrontier Corp.	\$9,829	2.45%	41.18%	N/A	2.45%	N/A
Hologic Inc.	\$12,071	0.00%	N/A	N/A	0.00%	N/A



**Table No. BV-9**  
**Electric Utility Sample**  
**CAPM Projected Growth Rate based on S&P 500 Dividend-Paying Stocks**

Company Name	Market Cap (\$Millions)	Annual Dividend Yield	Projected Growth Rate	Projected Growth Rate Greater Than 0% and Less Than 20%	Implied Cost of Equity Before Additional Screens	Projected Growth Rate Accounting for Low-End Outlier Test
	[1]	[2]	[3]	[4]	[5] = [2]+[4]	[5]
Home Depot	\$207,572	2.49%	14.09%	14.09%	16.59%	14.09%
Honeywell Int'l	\$106,328	2.27%	6.64%	6.64%	8.91%	6.64%
Hormel Foods	\$22,605	2.00%		N/A	2.00%	N/A
Horton D.R.	\$14,351	1.58%	9.67%	9.67%	11.24%	9.67%
Host Hotels & Resorts	\$13,348	4.60%	5.00%	5.00%	9.60%	5.00%
HP Inc.	\$34,367	2.88%	7.50%	7.50%	10.38%	7.50%
Humana Inc.	\$42,389	0.67%	15.89%	15.89%	16.56%	15.89%
Hunt (J.B.)	\$11,686	0.96%	14.41%	14.41%	15.37%	14.41%
Huntington Bancshs.	\$14,055	4.20%	9.00%	9.00%	13.20%	9.00%
Huntington Ingalls	\$8,877	1.67%	8.95%	8.95%	10.61%	8.95%
IDEXX Labs.	\$18,415	0.00%	N/A	N/A	0.00%	N/A
IHS Markit	\$20,631	0.00%	N/A	N/A	0.00%	N/A
Illinois Tool Works	\$45,560	2.98%	11.57%	11.57%	14.55%	11.57%
Illumina Inc.	\$41,129	0.00%	N/A	N/A	0.00%	N/A
Incyte Corp.	\$17,146	0.00%	N/A	N/A	0.00%	N/A
Ingersoll-Rand	\$24,575	2.10%	10.86%	10.86%	12.96%	10.86%
Intel Corp.	\$215,056	2.59%	10.67%	10.67%	13.26%	10.67%
Intercontinental Exch.	\$43,830	1.24%	13.67%	13.67%	14.91%	13.67%
Interpublic Group	\$8,898	3.71%	7.50%	7.50%	11.21%	7.50%
Int'l Business Mach.	\$122,160	4.86%		N/A	4.86%	N/A
Int'l Flavors & Frag.	\$13,004	2.10%	9.50%	9.50%	11.60%	9.50%
Int'l Paper	\$19,209	4.32%	11.50%	11.50%	15.82%	11.50%
Intuit Inc.	\$56,021	0.88%	14.57%	14.57%	15.44%	14.57%
Intuitive Surgical	\$59,800	0.00%	N/A	N/A	0.00%	N/A
Invesco Ltd.	\$7,494	6.54%	0.86%	0.86%	7.39%	0.86%
IPG Photonics	\$7,230	0.00%	N/A	N/A	0.00%	N/A
IQVIA Holdings	\$26,099	0.00%	N/A	N/A	0.00%	N/A
Iron Mountain	\$10,647	6.66%	-0.97%	N/A	6.66%	N/A
Jacobs Engineering	\$9,193	1.04%	12.12%	12.12%	13.16%	12.12%
Jefferies Fin'l Group	\$6,897	2.42%		N/A	2.42%	N/A
Johnson & Johnson	\$357,074	2.77%	6.51%	6.51%	9.28%	6.51%
Johnson Ctrls. Int'l plc	\$31,238	3.13%		N/A	3.13%	N/A
JPMorgan Chase	\$344,180	3.12%	14.09%	14.09%	17.21%	14.09%
Juniper Networks	\$8,952	2.94%	12.36%	12.36%	15.31%	12.36%
Kansas City South'n	\$10,755	1.36%	13.88%	13.88%	15.24%	13.88%
Kellogg	\$20,477	3.85%	3.35%	3.35%	7.20%	3.35%
KeyCorp	\$17,035	4.09%	6.80%	6.80%	10.89%	6.80%
Keysight Technologies	\$13,864	0.00%	N/A	N/A	0.00%	N/A
Kimberly-Clark	\$38,571	3.69%	4.17%	4.17%	7.86%	4.17%
Kimco Realty	\$7,240	6.64%	6.60%	6.60%	13.24%	6.60%
Kinder Morgan Inc.	\$39,920	4.36%		N/A	4.36%	N/A
KLA-Tencor	\$16,131	2.80%	4.80%	4.80%	7.60%	4.80%
Kohl's Corp.	\$11,334	3.93%	10.75%	10.75%	14.68%	10.75%
Kraft Heinz Co.	\$58,585	5.23%	5.62%	5.62%	10.85%	5.62%
Kroger Co.	\$22,607	2.21%	5.50%	5.50%	7.71%	5.50%
L Brands	\$7,656	4.42%	1.07%	1.07%	5.49%	N/A
L3 Technologies	\$15,474	1.61%	9.57%	9.57%	11.18%	9.57%
Laboratory Corp.	\$14,130	0.00%	N/A	N/A	0.00%	N/A
Lam Research	\$26,011	2.55%	16.44%	16.44%	18.99%	16.44%
Lamb Weston Holdings	\$10,591	1.10%	9.70%	9.70%	10.80%	9.70%
Lauder (Estee)	\$49,718	1.26%	9.76%	9.76%	11.02%	9.76%
Leggett & Platt	\$5,342	3.71%	0.70%	0.70%	4.41%	N/A
Lennar Corp.	\$15,662	0.34%	4.66%	4.66%	5.00%	N/A
Lilly (Eli)	\$126,970	2.13%	13.61%	13.61%	15.75%	13.61%
Lincoln Nat'l Corp.	\$12,562	2.59%	10.75%	10.75%	13.34%	10.75%
Linde plc	\$46,923	1.99%		N/A	1.99%	N/A
LKQ Corp.	\$8,343	0.00%	N/A	N/A	0.00%	N/A
Lockheed Martin	\$82,395	3.17%	12.01%	12.01%	15.18%	12.01%
Loews Corp.	\$15,086	0.52%	10.61%	10.61%	11.13%	10.61%

**Table No. BV-9**  
**Electric Utility Sample**  
**CAPM Projected Growth Rate based on S&P 500 Dividend-Paying Stocks**

Company Name	Market Cap (\$Millions)	Annual Dividend Yield	Projected Growth Rate	Projected Growth Rate Greater Than 0% and Less Than 20%	Implied Cost of Equity Before Additional Screens	Projected Growth Rate Accounting for Low-End Outlier Test
	[1]	[2]	[3]	[4]	[5] = [2]+[4]	[5]
Lowe's Cos.	\$77,505	2.16%	15.27%	15.27%	17.43%	15.27%
LyondellBasell Inds.	\$33,673	4.50%	6.66%	6.66%	11.16%	6.66%
M&T Bank Corp.	\$23,275	2.44%		N/A	2.44%	N/A
Macerich Comp. (The)	\$6,508	6.62%	6.65%	6.65%	13.27%	6.65%
Macy's Inc.	\$8,086	5.87%	-2.69%	N/A	5.87%	N/A
Marathon Oil Corp.	\$13,232	1.38%		N/A	1.38%	N/A
Marathon Petroleum	\$29,883	3.24%	35.22%	N/A	3.24%	N/A
Marriott Int'l	\$39,070	1.43%	18.57%	18.57%	20.00%	18.57%
Marsh & McLennan	\$44,407	1.84%	8.73%	8.73%	10.56%	8.73%
Martin Marietta	\$11,080	1.06%	12.15%	12.15%	13.21%	12.15%
Masco Corp.	\$9,824	1.45%	15.76%	15.76%	17.22%	15.76%
MasterCard Inc.	\$218,520	0.62%	20.79%	N/A	0.62%	N/A
Mattel Inc.	\$4,069	0.00%	N/A	N/A	0.00%	N/A
Maxim Integrated	\$15,036	3.37%	13.36%	13.36%	16.73%	13.36%
McCormick & Co.	\$16,279	1.85%	9.23%	9.23%	11.08%	9.23%
McDonald's Corp.	\$137,822	2.63%	6.55%	6.55%	9.18%	6.55%
Michael Kors Hldgs.		N/A	N/A	N/A	0.00%	N/A
Medtronic plc	\$118,989	2.26%	8.24%	8.24%	10.51%	8.24%
Merck & Co.	\$197,890	2.88%	9.42%	9.42%	12.29%	9.42%
MetLife Inc.	\$45,060	3.82%	16.69%	16.69%	20.51%	16.69%
Mettler-Toledo Int'l	\$15,983	0.00%	N/A	N/A	0.00%	N/A
MGM Resorts Int'l	\$15,660	1.61%	-6.31%	N/A	1.61%	N/A
Microchip Technology	\$18,984	1.83%	12.50%	12.50%	14.33%	12.50%
Micron Technology	\$42,806	0.00%	N/A	N/A	0.00%	N/A
Microsoft Corp.	\$802,022	1.79%	14.03%	14.03%	15.82%	14.03%
Mid-America Apartment	\$11,510	3.81%		N/A	3.81%	N/A
Mohawk Inds.	\$9,608	0.00%	N/A	N/A	0.00%	N/A
Molson Coors Brewing	\$14,374	2.48%	5.61%	5.61%	8.09%	5.61%
Mondelez Int'l	\$67,405	2.37%	6.78%	6.78%	9.15%	6.78%
Monster Beverage	\$31,651	0.00%	N/A	N/A	0.00%	N/A
Moody's Corp.	\$30,372	1.10%	13.60%	13.60%	14.70%	13.60%
Morgan Stanley	\$73,001	2.87%	14.46%	14.46%	17.33%	14.46%
Mosaic Company	\$12,443	0.61%	31.00%	N/A	0.61%	N/A
Motorola Solutions	\$19,115	1.93%	14.62%	14.62%	16.55%	14.62%
MSCI Inc.	\$15,085	1.46%	19.00%	19.00%	20.46%	19.00%
Mylan N.V.	\$15,443	0.00%	N/A	N/A	0.00%	N/A
Nasdaq Inc.	\$14,434	2.01%	9.24%	9.24%	11.25%	9.24%
National Oilwell Varco	\$11,301	0.67%		N/A	0.67%	N/A
Nektar Therapeutics	\$7,327	0.00%	N/A	N/A	0.00%	N/A
NetApp Inc.	\$16,198	2.43%	17.20%	17.20%	19.63%	17.20%
Netflix Inc.	\$148,051	0.00%	N/A	N/A	0.00%	N/A
Newell Brands	\$10,395	4.32%	9.40%	9.40%	13.72%	9.40%
Newfield Exploration	\$3,662	0.00%	N/A	N/A	0.00%	N/A
Newmont Mining	\$18,169	1.65%	-1.24%	N/A	1.65%	N/A
News Corp. 'A'	\$7,503	1.57%	12.57%	12.57%	14.14%	12.57%
News Corp. 'B'	\$7,538	1.56%	12.57%	12.57%	14.13%	12.57%
NextEra Energy	\$85,543	2.81%	7.45%	7.45%	10.26%	7.45%
Nielsen Hldgs. plc	\$9,116	5.47%	4.56%	4.56%	10.03%	4.56%
NIKE Inc. 'B'	\$129,125	1.08%	14.18%	14.18%	15.26%	14.18%
NiSource Inc.	\$9,907	2.91%	6.05%	6.05%	8.97%	6.05%
Noble Energy	\$10,719	1.97%	51.66%	N/A	1.97%	N/A
Nordstrom Inc.	\$7,839	3.26%	8.87%	8.87%	12.14%	8.87%
Norfolk Southern	\$45,684	2.03%	8.88%	8.88%	10.90%	8.88%
Northern Trust Corp.	\$19,585	2.71%	14.22%	14.22%	16.93%	14.22%
Northrop Grumman	\$47,871	1.76%	13.93%	13.93%	15.69%	13.93%
Norwegian Cruise Line	\$11,398	0.00%	N/A	N/A	0.00%	N/A
NRG Energy	\$11,861	0.29%	75.88%	N/A	0.29%	N/A
Nucor Corp.	\$19,225	2.60%	10.69%	10.69%	13.29%	10.69%
NVIDIA Corp.	\$87,688	0.44%	13.02%	13.02%	13.46%	13.02%

**Table No. BV-9**  
**Electric Utility Sample**  
**CAPM Projected Growth Rate based on S&P 500 Dividend-Paying Stocks**

Company Name	Market Cap (\$Millions)	Annual Dividend Yield	Projected Growth Rate	Projected Growth Rate Greater Than 0% and Less Than 20%	Implied Cost of Equity Before Additional Screens	Projected Growth Rate Accounting for Low-End Outlier Test
	[1]	[2]	[3]	[4]	[5] = [2]+[4]	[5]
Occidental Petroleum	\$50,351	4.61%	54.43%	N/A	4.61%	N/A
Omnicom Group	\$17,453	3.09%	6.80%	6.80%	9.89%	6.80%
ONEOK Inc.	\$26,413	5.37%	37.29%	N/A	5.37%	N/A
Oracle Corp.	\$182,435	1.50%	10.03%	10.03%	11.53%	10.03%
O'Reilly Automotive	\$27,692	0.00%	N/A	N/A	0.00%	N/A
PACCAR Inc.	\$22,919	5.05%	4.08%	4.08%	9.13%	4.08%
Packaging Corp.	\$8,913	3.32%	10.61%	10.61%	13.93%	10.61%
Parker-Hannifin	\$21,812	1.85%	9.37%	9.37%	11.22%	9.37%
Paychex Inc.	\$25,424	3.45%	9.46%	9.46%	12.91%	9.46%
PayPal Holdings	\$104,559	0.00%	N/A	N/A	0.00%	N/A
Pentair plc	\$7,151	1.76%	N/A	N/A	1.76%	N/A
People's United Fin'l	\$5,608	4.28%	13.73%	13.73%	18.01%	13.73%
PepsiCo Inc.	\$159,090	3.31%	6.86%	6.86%	10.17%	6.86%
PerkinElmer Inc.	\$10,053	0.31%	14.42%	14.42%	14.73%	14.42%
Perrigo Co. plc	\$6,311	1.81%	8.87%	8.87%	10.68%	8.87%
Pfizer Inc.	\$245,381	3.36%	8.63%	8.63%	11.99%	8.63%
PG&E Corp.	\$6,722	0.00%	N/A	N/A	0.00%	N/A
Philip Morris Int'l	\$119,263	6.02%	5.99%	5.99%	12.01%	5.99%
Phillips 66	\$43,996	3.62%	41.00%	N/A	3.62%	N/A
Praxair Inc.		N/A	N/A	N/A	0.00%	N/A
Pioneer Natural Res.	\$24,260	0.35%	70.53%	N/A	0.35%	N/A
PNC Financial Serv.	\$56,674	3.10%	8.33%	8.33%	11.43%	8.33%
PPG Inds.	\$25,294	1.82%	8.68%	8.68%	10.49%	8.68%
PPL Corp.	\$22,541	5.39%	3.59%	3.59%	8.98%	3.59%
Price (T. Rowe) Group	\$22,673	3.10%	3.97%	3.97%	7.07%	3.97%
Principal Fin'l Group	\$14,200	4.35%	6.38%	6.38%	10.73%	6.38%
Procter & Gamble	\$241,327	2.95%	6.97%	6.97%	9.92%	6.97%
Progressive Corp.	\$39,237	1.75%	14.89%	14.89%	16.64%	14.89%
Prologis	\$36,806	2.88%	N/A	N/A	2.88%	N/A
Prudential Fin'l	\$38,182	3.87%	8.73%	8.73%	12.60%	8.73%
Public Serv. Enterprise	\$27,493	3.45%	7.21%	7.21%	10.65%	7.21%
Public Storage	\$36,947	4.15%	8.00%	8.00%	12.15%	8.00%
PulteGroup Inc.	\$7,844	1.61%	0.47%	0.47%	2.07%	N/A
PVH Corp.	\$8,283	0.14%	13.50%	13.50%	13.64%	13.50%
Qorvo Inc.	\$8,173	0.00%	N/A	N/A	0.00%	N/A
Qualcomm Inc.	\$60,365	5.30%	14.36%	14.36%	19.66%	14.36%
Quanta Services	\$5,256	0.46%	22.37%	N/A	0.46%	N/A
Quest Diagnostics	\$11,880	2.42%	6.97%	6.97%	9.39%	6.97%
Ralph Lauren	\$9,349	2.16%	11.31%	11.31%	13.47%	11.31%
Raymond James Fin'l	\$11,724	1.72%	8.39%	8.39%	10.12%	8.39%
Raytheon Co.	\$46,957	2.09%	18.59%	18.59%	20.68%	18.59%
Realty Income Corp.	\$19,523	4.00%	5.00%	5.00%	9.00%	5.00%
Red Hat Inc.	\$31,435	0.00%	N/A	N/A	0.00%	N/A
Regency Centers Corp.	\$11,102	3.44%	N/A	N/A	3.44%	N/A
Regeneron Pharmac.	\$45,631	0.00%	N/A	N/A	0.00%	N/A
Regions Financial	\$16,633	3.78%	N/A	N/A	3.78%	N/A
Republic Services	\$24,900	1.99%	15.75%	15.75%	17.74%	15.75%
ResMed Inc.	\$13,561	1.58%	13.97%	13.97%	15.55%	13.97%
Robert Half Int'l	\$7,820	1.89%	7.10%	7.10%	8.99%	7.10%
Rockwell Automation	\$20,529	2.33%	10.28%	10.28%	12.61%	10.28%
Rollins Inc.	\$12,189	1.12%	8.20%	8.20%	9.32%	8.20%
Roper Tech.	\$29,298	0.63%	9.30%	9.30%	9.93%	9.30%
Ross Stores	\$34,182	1.05%	12.61%	12.61%	13.65%	12.61%
Royal Caribbean	\$25,088	2.37%	12.40%	12.40%	14.77%	12.40%
S&P Global	\$48,085	1.11%	13.70%	13.70%	14.81%	13.70%
salesforce.com	\$116,257	0.00%	N/A	N/A	0.00%	N/A
SBA Communications	\$21,255	0.00%	N/A	N/A	0.00%	N/A
Schein (Henry)	\$11,844	0.00%	N/A	N/A	0.00%	N/A
Schlumberger Ltd.	\$61,222	4.49%	21.30%	N/A	4.49%	N/A

**Table No. BV-9**  
**Electric Utility Sample**  
**CAPM Projected Growth Rate based on S&P 500 Dividend-Paying Stocks**

Company Name	Market Cap (\$Millions)	Annual Dividend Yield	Projected Growth Rate	Projected Growth Rate Greater Than 0% and Less Than 20%	Implied Cost of Equity Before Additional Screens	Projected Growth Rate Accounting for Low-End Outlier Test
	[1]	[2]	[3]	[4]	[5] = [2]+[4]	[5]
Schwab (Charles)	\$63,221	1.11%	23.92%	N/A	1.11%	N/A
Seagate Technology	\$12,670	5.57%	6.19%	6.19%	11.75%	6.19%
Sealed Air	\$6,199	1.60%	18.68%	18.68%	20.28%	18.68%
Semptra Energy	\$32,053	3.32%	8.69%	8.69%	12.01%	8.69%
Sherwin-Williams	\$39,465	0.83%	16.14%	16.14%	16.98%	16.14%
Simon Property Group	\$56,668	4.74%		N/A	4.74%	N/A
Skyworks Solutions	\$12,957	2.06%	N/A	N/A	2.06%	N/A
SL Green Realty	\$8,675	3.78%		N/A	3.78%	N/A
Smith (A.O.)	\$8,134	1.83%	9.35%	9.35%	11.18%	9.35%
Smucker (J.M.)	\$11,935	3.33%	8.40%	8.40%	11.73%	8.40%
Snap-on Inc.	\$9,325	2.30%	9.85%	9.85%	12.15%	9.85%
Southern Co.	\$48,551	5.07%	1.68%	1.68%	6.75%	1.68%
Stericycle Inc.		N/A	N/A	N/A	0.00%	N/A
Stanley Black & Decker	\$19,100	2.11%	8.31%	8.31%	10.42%	8.31%
Starbucks Corp.	\$84,719	2.23%	13.17%	13.17%	15.40%	13.17%
State Street Corp.	\$26,906	2.64%	7.99%	7.99%	10.63%	7.99%
Stryker Corp.	\$66,444	1.17%	10.54%	10.54%	11.71%	10.54%
SunTrust Banks	\$26,697	3.62%	9.82%	9.82%	13.43%	9.82%
SVB Fin'l Group	\$12,428	0.00%	N/A	N/A	0.00%	N/A
Symantec Corp.	\$13,285	1.31%	12.23%	12.23%	13.54%	12.23%
Synchrony Financial	\$21,590	2.83%	20.05%	N/A	2.83%	N/A
Synopsys Inc.	\$13,056	0.00%	N/A	N/A	0.00%	N/A
Sysco Corp.	\$33,212	2.45%	11.28%	11.28%	13.73%	11.28%
Take-Two Interactive	\$12,012	0.00%	N/A	N/A	0.00%	N/A
Tapestry Inc.	\$11,218	3.49%	9.58%	9.58%	13.07%	9.58%
Target Corp.	\$38,092	3.60%	8.00%	8.00%	11.60%	8.00%
TE Connectivity	\$28,471	2.16%	10.40%	10.40%	12.56%	10.40%
TechnipFMC	\$10,399	2.24%	22.93%	N/A	2.24%	N/A
Texas Instruments	\$97,142	3.02%	8.04%	8.04%	11.06%	8.04%
Textron Inc.	\$12,929	0.15%	17.30%	17.30%	17.45%	17.30%
Thermo Fisher Sci.	\$98,901	0.28%	10.80%	10.80%	11.07%	10.80%
Tiffany & Co.	\$10,816	2.66%	10.34%	10.34%	13.00%	10.34%
TJX Companies	\$61,324	1.64%	11.64%	11.64%	13.28%	11.64%
Torchmark Corp.	\$9,395	0.76%	10.50%	10.50%	11.26%	10.50%
Total System Svcs.	\$16,349	0.57%	14.22%	14.22%	14.79%	14.22%
Tractor Supply	\$10,429	1.56%	12.32%	12.32%	13.88%	12.32%
TransDigm Group	\$20,619	0.00%	N/A	N/A	0.00%	N/A
Travelers Cos.	\$33,243	2.43%	17.12%	17.12%	19.56%	17.12%
TripAdvisor Inc.	\$7,896	0.00%	N/A	N/A	0.00%	N/A
Twenty-First Century Fox	\$91,349	0.73%	8.48%	8.48%	9.21%	8.48%
Twenty-First Century Fox 'B'	\$90,886	0.73%	9.20%	9.20%	9.93%	9.20%
Twitter Inc.	\$25,519	0.00%	N/A	N/A	0.00%	N/A
Tyson Foods 'A'	\$22,663	2.42%	3.20%	3.20%	5.62%	N/A
U.S. Bancorp	\$83,035	3.00%	6.81%	6.81%	9.81%	6.81%
UDR Inc.	\$11,717	2.97%		N/A	2.97%	N/A
Ultra Beauty	\$17,358	0.00%	N/A	N/A	0.00%	N/A
Under Armour 'A'	\$9,298	0.00%	N/A	N/A	0.00%	N/A
Under Armour 'C'	\$8,426	0.00%	N/A	N/A	0.00%	N/A
Union Pacific	\$117,317	2.00%	16.43%	16.43%	18.43%	16.43%
United Cont'l Hldgs.	\$23,778	0.00%	N/A	N/A	0.00%	N/A
United Parcel Serv.	\$90,539	3.66%	10.56%	10.56%	14.22%	10.56%
United Rentals	\$10,213	0.00%	N/A	N/A	0.00%	N/A
United Technologies	\$94,572	2.47%	8.45%	8.45%	10.92%	8.45%
UnitedHealth Group	\$259,932	1.34%	15.80%	15.80%	17.14%	15.80%
Universal Health 'B'	\$12,261	0.30%	13.55%	13.55%	13.84%	13.55%
Unum Group	\$7,603	2.99%	10.08%	10.08%	13.07%	10.08%
V.F. Corp.	\$33,429	2.42%	13.39%	13.39%	15.81%	13.39%
Valero Energy	\$37,292	4.22%	34.06%	N/A	4.22%	N/A
Varian Medical Sys.	\$12,081	0.00%	N/A	N/A	0.00%	N/A

**Table No. BV-9**  
**Electric Utility Sample**  
**CAPM Projected Growth Rate based on S&P 500 Dividend-Paying Stocks**

Company Name	Market Cap (\$Millions)	Annual Dividend Yield	Projected Growth Rate	Projected Growth Rate Greater Than 0% and Less Than 20%	Implied Cost of Equity Before Additional Screens	Projected Growth Rate Accounting for Low-End Outlier Test
	[1]	[2]	[3]	[4]	[5] = [2]+[4]	[5]
Ventas Inc.	\$22,906	5.11%	9.70%	9.70%	14.81%	9.70%
VeriSign Inc.	\$20,508	0.00%	N/A	N/A	0.00%	N/A
Verisk Analytics	\$19,351	0.00%	N/A	N/A	0.00%	N/A
Verizon Communic.	\$227,509	4.42%	9.45%	9.45%	13.87%	9.45%
Vertex Pharmac.	\$48,799	0.00%	N/A	N/A	0.00%	N/A
Viacom Inc. 'B'	\$11,859	2.71%	5.30%	5.30%	8.01%	5.30%
Visa Inc.	\$274,745	0.77%	15.79%	15.79%	16.56%	15.79%
Vornado R'lty Trust	\$13,303	3.80%	2.80%	2.80%	6.60%	2.80%
Vulcan Materials	\$13,422	1.07%	25.85%	N/A	1.07%	N/A
Walgreens Boots	\$68,173	2.45%	10.12%	10.12%	12.57%	10.12%
Walmart Inc.	\$278,411	2.26%	5.01%	5.01%	7.27%	5.01%
Waste Management	\$40,863	1.95%	14.30%	14.30%	16.25%	14.30%
Waters Corp.	\$17,510	0.00%	N/A	N/A	0.00%	N/A
WEC Energy Group	\$23,043	3.24%	4.70%	4.70%	7.94%	4.70%
WellCare Health Plans	\$13,819	0.00%	N/A	N/A	0.00%	N/A
Wells Fargo	\$230,443	3.74%	10.94%	10.94%	14.68%	10.94%
Welltower Inc.	\$28,805	4.67%	13.00%	13.00%	17.67%	13.00%
Western Digital	\$13,002	4.26%	-9.50%	N/A	4.26%	N/A
Western Union	\$8,098	4.11%	3.83%	3.83%	7.94%	3.83%
WestRock Co.	\$10,320	4.70%	14.97%	14.97%	19.67%	14.97%
Weyerhaeuser Co.	\$19,659	5.08%	6.50%	6.50%	11.58%	6.50%
Whirlpool Corp.	\$8,513	3.46%	8.87%	8.87%	12.33%	8.87%
Williams Cos.	\$32,600	4.96%	8.00%	8.00%	12.96%	8.00%
Willis Towers Watson plc	\$21,139	1.44%	13.32%	13.32%	14.76%	13.32%
Wynn Resorts	\$13,375	2.38%	N/A	N/A	2.38%	N/A
Xcel Energy Inc.	\$26,876	3.07%	6.60%	6.60%	9.66%	6.60%
Xerox Corp.	\$6,916	3.51%	N/A	N/A	3.51%	N/A
Xilinx Inc.	\$28,339	1.29%	19.90%	19.90%	21.19%	19.90%
Xylem Inc.	\$12,805	1.37%	18.91%	18.91%	20.27%	18.91%
Yum! Brands	\$29,416	1.78%	11.90%	11.90%	13.68%	11.90%
Zimmer Biomet Hldgs.	\$22,350	0.86%	3.88%	3.88%	4.74%	N/A
Zions Bancorp.	\$9,145	2.48%	10.90%	10.90%	13.38%	10.90%
Zoetis Inc.	\$41,441	0.76%	16.22%	16.22%	16.98%	16.22%
<b>Weighted Average</b>		<b>2.58%</b>	<b>12.21%</b>	<b>10.68%</b>	<b>9.24%</b>	<b>10.78%</b>

Notes & Sources:

[1]-[2]: Value Line Analyzer as of January 31, 2019. Annual dividend yield calculated by dividing annual dividend yield by current stock price.

[3]: Thomson Reuters as of January 31, 2019.

[4]: Excludes growth rates less than or equal to 0% and growth rates greater than or equal to 20%.

[5]: Adheres to the low-end outlier test, which excludes companies that have a lower implied return on equity than cost of debt for BBB bonds plus one hundred basis points.

**Table No. BV-10**  
**Electric Utility Sample**  
**Expected Earnings Method Applied to the FERC Electric Sample**

<b>Company</b>	<b>2021-23 Expected Return on Equity</b>	<b>Adjustment Factor</b>	<b>Adjusted Return on Equity</b>
	[1]	[2]	[3]=[1]*[2]
FirstEnergy Corp.	16.50%	1.039	17.15%
CMS Energy Corp.	14.00%	1.032	14.45%
PPL Corp.	13.50%	102.90%	13.89%
NextEra Energy	13.00%	1.023	13.29%
Edison Int'l	12.50%	1.020	12.75%
Southern Co.	12.50%	1.019	12.74%
Sempra Energy	12.00%	1.028	12.34%
WEC Energy Group	12.00%	1.013	12.16%
OGE Energy	11.50%	1.013	11.64%
Otter Tail Corp.	11.00%	1.042	11.47%
DTE Energy	11.00%	1.030	11.33%
Entergy Corp.	11.00%	1.029	11.32%
Amer. Elec. Power	11.00%	1.022	11.25%
Public Serv. Enterprise	11.00%	1.018	11.20%
Xcel Energy Inc.	10.50%	1.021	10.72%
Ameren Corp.	10.50%	1.021	10.72%
Pinnacle West Capital	10.50%	1.017	10.67%
Alliant Energy	10.50%	1.005	10.55%
PNM Resources	9.50%	1.025	9.74%
Exelon Corp.	9.50%	1.022	9.71%
Hawaiian Elec.	9.50%	1.021	9.70%
IDACORP Inc.	9.50%	1.017	9.66%
Eversource Energy	9.50%	1.014	9.64%
Evergy Inc.	9.50%	0.991	9.41%
MGE Energy	9.00%	1.045	9.40%
ALLETE	9.00%	1.015	9.14%
Portland General	9.00%	1.014	9.12%
NorthWestern Corp.	9.00%	1.012	9.11%
El Paso Electric	8.50%	1.013	8.61%
Consol. Edison	8.50%	1.013	8.61%
Duke Energy	8.50%	1.011	8.59%
AVANGRID Inc.	6.50%	1.007	6.55%
Unitil Corp.	N/A	N/A	N/A
<b>Minimum</b>			<b>6.55%</b>
Maximum			17.15%
Midpoint			11.85%
Median			10.70%
Median outlier Tested			10.67%
<b>Upper end of ZOR</b>			<b>14.45%</b>
Upper Midpoint			12.5%

Sources and Notes:

[1]: Value Line Investment Analyzer as of 01/31/2019.

FirstEnergy Corp. is excluded from the ROE estimation because it fails the outlier test.

Unitil Corp. is excluded from the sample due to data inavailability.

**Workpaper to BV-4**  
**Monthly High, Low, Average Price for Electric Sample**

Company	Monthly High Intraday Price						Monthly Low Intraday Price						Monthly Average Price					
	Month Ending Aug 31, 2018	Month Ending Sep 30, 2018	Month Ending Oct 31, 2018	Month Ending Nov 30, 2018	Month Ending Dec 31, 2018	Month Ending Jan 31, 2019	Month Ending Aug 31, 2018	Month Ending Sep 30, 2018	Month Ending Oct 31, 2018	Month Ending Nov 30, 2018	Month Ending Dec 31, 2018	Month Ending Jan 31, 2019	Month Ending Aug 31, 2018	Month Ending Sep 30, 2018	Month Ending Oct 31, 2018	Month Ending Nov 30, 2018	Month Ending Dec 31, 2018	Month Ending Jan 31, 2019
ALLETE	\$79.42	\$77.33	\$78.60	\$81.59	\$82.82	\$77.04	\$74.47	\$73.39	\$73.49	\$72.75	\$72.42	\$72.50	\$76.95	\$75.36	\$76.05	\$77.17	\$77.62	\$74.77
Alliant Energy	\$43.84	\$44.18	\$44.70	\$46.05	\$46.58	\$44.55	\$41.39	\$41.73	\$42.01	\$42.22	\$40.68	\$40.75	\$42.62	\$42.96	\$43.36	\$44.14	\$43.63	\$42.65
Amer. Elec. Power	\$72.91	\$73.74	\$76.05	\$78.47	\$81.05	\$79.61	\$69.32	\$68.92	\$69.31	\$72.07	\$72.53	\$72.26	\$71.11	\$71.33	\$72.68	\$75.27	\$76.79	\$75.93
Ameren Corp.	\$65.09	\$66.11	\$67.23	\$70.68	\$70.95	\$69.62	\$60.78	\$62.06	\$62.70	\$63.32	\$62.51	\$63.13	\$62.94	\$64.08	\$64.97	\$67.00	\$66.73	\$66.38
CMS Energy Corp.	\$50.12	\$50.81	\$51.91	\$52.25	\$53.82	\$52.36	\$47.18	\$47.70	\$48.13	\$47.92	\$47.63	\$47.97	\$48.65	\$49.26	\$50.02	\$50.09	\$50.73	\$50.17
DTE Energy	\$114.12	\$114.31	\$118.22	\$121.00	\$120.76	\$118.32	\$106.27	\$106.41	\$107.39	\$110.41	\$107.22	\$107.33	\$110.19	\$110.36	\$112.81	\$115.71	\$113.99	\$112.83
Entergy Corp.	\$85.62	\$85.81	\$86.00	\$87.85	\$90.79	\$89.49	\$80.70	\$78.99	\$79.57	\$82.08	\$82.06	\$83.24	\$83.16	\$82.40	\$82.78	\$84.96	\$86.43	\$86.36
Evergy Inc.	\$58.24	\$59.28	\$57.69	\$61.10	\$61.00	\$57.86	\$54.94	\$54.19	\$54.26	\$55.49	\$55.18	\$55.13	\$56.59	\$56.74	\$55.98	\$58.30	\$58.09	\$56.49
MGE Energy	\$67.40	\$68.05	\$66.39	\$66.26	\$68.95	\$66.16	\$63.03	\$62.45	\$60.57	\$60.29	\$56.64	\$56.74	\$65.21	\$65.25	\$63.48	\$63.27	\$62.80	\$61.45
OGE Energy	\$37.69	\$37.75	\$38.13	\$39.97	\$41.80	\$41.19	\$35.58	\$35.29	\$35.91	\$35.55	\$37.67	\$38.04	\$36.63	\$36.52	\$37.02	\$37.76	\$39.74	\$39.62
Otter Tail Corp.	\$49.75	\$49.35	\$48.74	\$49.14	\$51.88	\$49.33	\$47.35	\$46.85	\$44.82	\$44.22	\$46.26	\$45.94	\$48.55	\$48.10	\$46.78	\$46.68	\$49.07	\$47.64
WEC Energy Group	\$68.48	\$69.52	\$72.09	\$72.63	\$75.48	\$73.51	\$64.92	\$64.96	\$66.16	\$66.46	\$66.75	\$67.21	\$66.70	\$67.24	\$69.12	\$69.55	\$71.11	\$70.36
AVANGRID Inc.	\$51.21	\$50.67	\$49.55	\$51.11	\$53.47	\$50.22	\$49.00	\$46.96	\$45.81	\$46.92	\$48.05	\$47.45	\$50.11	\$48.82	\$47.68	\$49.02	\$50.76	\$48.84
Consol. Edison	\$81.53	\$81.55	\$79.18	\$80.39	\$84.32	\$77.99	\$77.09	\$74.31	\$74.64	\$73.93	\$73.85	\$73.30	\$79.31	\$77.93	\$76.91	\$77.16	\$79.09	\$75.64
Duke Energy	\$82.72	\$83.77	\$85.08	\$89.23	\$91.35	\$88.48	\$79.51	\$78.00	\$78.52	\$80.89	\$82.77	\$82.46	\$81.11	\$80.89	\$81.80	\$85.06	\$87.06	\$85.47
Eversource Energy	\$63.53	\$63.88	\$65.29	\$68.39	\$70.53	\$69.82	\$59.30	\$60.15	\$60.56	\$61.57	\$62.61	\$63.10	\$61.42	\$62.02	\$62.93	\$64.98	\$66.57	\$66.46
Exelon Corp.	\$45.05	\$44.85	\$44.87	\$46.45	\$47.40	\$47.93	\$41.72	\$42.19	\$42.44	\$43.02	\$43.10	\$43.51	\$43.39	\$43.52	\$43.65	\$44.74	\$45.25	\$45.72
FirstEnergy Corp.	\$37.74	\$38.37	\$39.01	\$39.38	\$39.88	\$39.43	\$35.37	\$35.88	\$36.32	\$36.53	\$35.33	\$36.29	\$36.56	\$37.12	\$37.67	\$37.96	\$37.61	\$37.86
NextEra Energy	\$175.65	\$174.81	\$176.83	\$183.65	\$184.20	\$180.88	\$165.45	\$164.25	\$166.19	\$166.75	\$164.78	\$168.66	\$170.55	\$169.53	\$171.51	\$175.20	\$174.49	\$174.77
PPL Corp.	\$30.21	\$31.10	\$31.38	\$32.46	\$31.42	\$31.38	\$28.16	\$28.33	\$29.11	\$30.23	\$27.31	\$27.80	\$29.19	\$29.72	\$30.24	\$31.35	\$29.37	\$29.59
Public Serv. Enterprise	\$54.35	\$53.84	\$56.68	\$55.94	\$56.33	\$54.68	\$50.01	\$50.65	\$51.59	\$52.33	\$49.23	\$49.97	\$52.18	\$52.25	\$54.14	\$54.14	\$52.78	\$52.33
Southern Co.	\$49.43	\$45.98	\$46.33	\$47.69	\$47.98	\$48.68	\$43.63	\$42.57	\$42.51	\$44.33	\$42.50	\$43.26	\$46.53	\$44.28	\$44.42	\$46.01	\$45.24	\$45.97
Unitil Corp.	\$51.98	\$52.79	\$51.26	\$51.47	\$52.74	\$53.11	\$48.57	\$49.02	\$47.13	\$46.21	\$48.49	\$47.05	\$50.27	\$50.91	\$49.19	\$48.84	\$50.62	\$50.08
Edison Int'l	\$70.62	\$69.90	\$71.00	\$70.13	\$60.15	\$59.43	\$64.90	\$65.76	\$66.96	\$45.50	\$53.43	\$53.40	\$67.76	\$67.83	\$68.98	\$57.82	\$56.79	\$56.42
El Paso Electric	\$64.35	\$63.05	\$60.22	\$59.27	\$57.33	\$52.62	\$60.95	\$56.88	\$55.95	\$54.45	\$48.38	\$47.99	\$62.65	\$59.96	\$58.09	\$56.86	\$52.86	\$50.31
Hawaiian Elec.	\$36.03	\$36.33	\$37.69	\$38.38	\$39.35	\$37.23	\$34.16	\$34.78	\$34.88	\$36.58	\$35.15	\$35.06	\$35.10	\$35.55	\$36.29	\$37.48	\$37.25	\$36.15
IDACORP Inc.	\$99.28	\$101.49	\$101.89	\$101.41	\$102.44	\$97.69	\$92.03	\$96.81	\$92.94	\$93.06	\$89.91	\$89.31	\$95.66	\$99.15	\$97.42	\$97.24	\$96.18	\$93.50
NorthWestern Corp.	\$62.16	\$60.97	\$62.19	\$64.76	\$65.74	\$64.11	\$58.03	\$56.93	\$56.23	\$58.33	\$57.28	\$57.33	\$60.10	\$58.95	\$59.21	\$61.55	\$61.51	\$60.72
Pinnacle West Capital	\$82.83	\$81.12	\$86.71	\$90.06	\$92.64	\$88.42	\$78.27	\$77.19	\$78.11	\$81.51	\$83.14	\$81.63	\$80.55	\$79.16	\$82.41	\$85.79	\$87.89	\$85.03
PNM Resources	\$40.95	\$40.75	\$40.59	\$43.29	\$45.35	\$43.20	\$38.25	\$38.15	\$37.90	\$37.67	\$39.52	\$39.71	\$39.60	\$39.45	\$39.25	\$40.48	\$42.43	\$41.46
Portland General	\$47.56	\$47.54	\$47.53	\$49.21	\$50.40	\$48.49	\$44.38	\$44.44	\$43.94	\$44.40	\$43.73	\$44.03	\$45.97	\$45.99	\$45.74	\$46.81	\$47.07	\$46.26
Sempra Energy	\$118.06	\$127.22	\$117.89	\$118.80	\$119.11	\$117.16	\$113.39	\$110.99	\$109.81	\$108.64	\$104.88	\$106.09	\$115.73	\$119.11	\$113.85	\$113.72	\$112.00	\$111.63
Xcel Energy Inc.	\$48.72	\$49.49	\$50.53	\$52.49	\$54.11	\$52.58	\$45.87	\$46.01	\$46.52	\$47.44	\$48.16	\$47.70	\$47.30	\$47.75	\$48.52	\$49.97	\$51.13	\$50.14

Sources and Note: Bloomberg as of 1/31/2019. Monthly average calculated as (Monthly High Price + Monthly Low Price)/2

Workpaper to BV-10

Electric Utility

Adjustment Factor Calculation for FERC Electric Utility Sample

Company	2018			2023			Change in Equity	Adjustment Factor
	Equity Ratio	Total Capital (Millions)	Total Common Equity (Millions)	Equity Ratio	Total Capital (Millions)	Total Common Equity (Millions)		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
ALLETE	59.0%	\$3,640	\$2,148	59.5%	\$4,200	\$2,499	3.1%	1.0152
Alliant Energy	48.0%	\$8,300	\$3,984	48.0%	\$8,700	\$4,176	0.9%	1.0047
Amer. Elec. Power	45.5%	\$41,975	\$19,099	48.0%	\$49,800	\$23,904	4.6%	1.0224
Ameren Corp.	49.0%	\$15,650	\$7,669	49.5%	\$19,100	\$9,455	4.3%	1.0209
CMS Energy Corp.	35.5%	\$13,625	\$4,837	38.0%	\$17,500	\$6,650	6.6%	1.0318
DTE Energy	42.5%	\$24,100	\$10,243	44.0%	\$31,300	\$13,772	6.1%	1.0296
Entergy Corp.	35.0%	\$24,275	\$8,496	38.5%	\$29,400	\$11,319	5.9%	1.0287
Evergy Inc.	57.0%	\$15,675	\$8,935	52.5%	\$15,500	\$8,138	-1.9%	0.9907
MGE Energy	62.5%	\$1,325	\$828	66.5%	\$1,950	\$1,297	9.4%	1.0448
OGE Energy	56.0%	\$7,140	\$3,998	53.0%	\$8,550	\$4,532	2.5%	1.0125
Otter Tail Corp.	55.0%	\$1,360	\$748	60.5%	\$1,890	\$1,143	8.9%	1.0424
WEC Energy Group	51.0%	\$19,225	\$9,805	51.5%	\$21,700	\$11,176	2.7%	1.0131
AVANGRID Inc.	71.5%	\$21,350	\$15,265	63.5%	\$25,900	\$16,447	1.5%	1.0075
Consol. Edison	51.0%	\$32,075	\$16,358	51.5%	\$36,100	\$18,592	2.6%	1.0128
Duke Energy	45.5%	\$96,625	\$43,964	43.5%	\$112,400	\$48,894	2.1%	1.0106
Eversource Energy	47.5%	\$24,375	\$11,578	44.5%	\$30,000	\$13,350	2.9%	1.0142
Exelon Corp.	47.5%	\$65,775	\$31,243	50.0%	\$78,000	\$39,000	4.5%	1.0222
FirstEnergy Corp.	25.0%	\$24,675	\$6,169	31.0%	\$29,500	\$9,145	8.2%	1.0394
NextEra Energy	53.5%	\$64,000	\$34,240	54.0%	\$79,500	\$42,930	4.6%	1.0226
PPL Corp.	37.5%	\$32,300	\$12,113	44.0%	\$36,800	\$16,192	6.0%	1.0290
Public Serv. Enterprise	53.0%	\$27,350	\$14,496	50.5%	\$34,500	\$17,423	3.7%	1.0184
Southern Co.	36.5%	\$69,100	\$25,222	39.5%	\$77,300	\$30,534	3.9%	1.0191
Unitil Corp.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Edison Int'l	44.0%	\$27,400	\$12,056	46.0%	\$32,100	\$14,766	4.1%	1.0203
El Paso Electric	46.0%	\$2,565	\$1,180	44.5%	\$3,025	\$1,346	2.7%	1.0132
Hawaiian Elec.	54.5%	\$3,985	\$2,172	55.0%	\$4,850	\$2,668	4.2%	1.0206
IDACORP Inc.	56.0%	\$4,195	\$2,349	57.0%	\$4,875	\$2,779	3.4%	1.0168
NorthWestern Corp.	50.5%	\$3,790	\$1,914	53.5%	\$4,025	\$2,153	2.4%	1.0118
Pinnacle West Capital	52.0%	\$9,975	\$5,187	54.5%	\$11,225	\$6,118	3.4%	1.0165
PNM Resources	40.0%	\$4,280	\$1,712	42.0%	\$5,250	\$2,205	5.2%	1.0253
Portland General	53.0%	\$4,730	\$2,507	52.0%	\$5,525	\$2,873	2.8%	1.0136
Sempra Energy	41.0%	\$37,875	\$15,529	44.5%	\$46,300	\$20,604	5.8%	1.0283
Xcel Energy Inc.	43.0%	\$28,775	\$12,373	43.0%	\$35,600	\$15,308	4.3%	1.0213

Sources and Notes:

[1]-[2]&[4]-[5]: Value Line Investment Analyzer as of 01/31/2019.

[3]=[1]\*[2]

[6]=[4]\*[5]

[7]=([6]/[3])^(1/5)-1

[8]=(2+2\*[7])/(2+[7])

\*Data not available for Unitil Corporation.



**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

**Southern California Edison Company**    )  
                                                          )  
                                                          )                   **Dkt. No. ER19-\_\_\_\_\_-000**

**EXHIBIT SCE-28**

**EXHIBIT TO THE TESTIMONY OF  
DR. BENTE VILLADSEN**

**ON BEHALF OF  
SOUTHERN CALIFORNIA EDISON COMPANY**

**APRIL 2019**

BV-C1: Table of Content

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BV-C1:	Table of Content
BV-C3:	DCF Results for CINI Sample
BV-C4:	Calculation of Dividend Yield for CINI Sample
BV-C5:	Growth Rate Forecasts
BV-C8:	CAPM Results for CINI Sample
BV-C10:	Expected Earnings for CINI Sample

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The table numbering follow that of the FERC Electric Sample.

**Table No. BV-C3**  
**CINI Sample**  
**Summary of Cost of Equity Estimates using IBES Growth Forecast**  
**DCF Cost of Equity**

Company	S&P Credit Rating	Dividend Yield	Adjusted Dividend Yield	GDP Growth Forecast	IBES Growth Estimate	Combined Growth Rate	Implied Cost of Equity
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Delta Air Lines	BBB-	2.53%	2.69%	4.24%	16.82%	12.63%	15.3%
Southwest Airlines	BBB+	1.16%	1.23%	4.24%	15.90%	12.01%	13.2%
FedEx Corp.	BBB	1.14%	1.19%	4.24%	9.71%	7.88%	9.1%
United Parcel Serv.	A+	3.22%	3.37%	4.24%	11.59%	9.14%	12.5%
Atmos Energy	A	2.13%	2.19%	4.24%	6.45%	5.71%	7.9%
Chesapeake Utilities	A-	1.75%	-	4.24%	n/a	-	-
NiSource Inc.	BBB+	3.00%	3.08%	4.24%	5.92%	5.36%	8.4%
Northwest Natural	A	2.89%	2.95%	4.24%	4.00%	4.08%	7.0%
ONE Gas Inc.	A	2.30%	2.36%	4.24%	5.50%	5.08%	7.4%
Southwest Gas	BBB+	2.63%	2.70%	4.24%	6.20%	5.55%	8.2%
Spire Inc.	A-	3.06%	3.10%	4.24%	2.70%	3.21%	6.3%
Enable Midstream Part.	BBB-	8.05%	8.30%	2.12%	8.10%	6.11%	14.4%
Enterprise Products	BBB+	6.24%	6.46%	2.12%	9.39%	6.97%	13.4%
Magellan Midstream	BBB+	5.90%	6.08%	2.12%	8.02%	6.05%	12.1%
CSX Corp.	BBB+	1.25%	1.36%	4.24%	23.21%	16.89%	18.2%
GATX Corp.	BBB	2.17%	2.27%	4.24%	12.00%	9.41%	11.7%
Kansas City South'n	BBB	1.34%	1.41%	4.24%	14.70%	11.21%	12.6%
Union Pacific	A-	2.12%	2.26%	4.24%	18.27%	13.59%	15.9%
Heartland Express	n/a	0.41%	0.45%	4.24%	27.11%	19.49%	19.9%
Ryder System	BBB+	3.32%	3.50%	4.24%	14.61%	11.15%	14.7%
Amer. States Water	A+	1.76%	1.81%	4.24%	6.00%	5.41%	7.2%
Amer. Water Works	A	2.04%	2.11%	4.24%	8.20%	6.88%	9.0%
Middlesex Water	A	1.93%	-	4.24%	n/a	-	-
York Water Co. (The)	A-	2.13%	-	4.24%	n/a	-	-
MDU Resources	BBB+	2.99%	-	4.24%	n/a	-	-
EOG Resources	A-	0.72%	0.97%	4.24%	102.56%	69.79%	70.8%
National Fuel Gas	BBB	3.12%	-	4.24%	n/a	-	-
						Minimum	6.3%
						Maximum	70.8%
						Median	12.3%
						Maximum (Outlier Tested)	18.2%

Sources and Notes:

[1]: Bloomberg as of December 31, 2018.

[2]: See Table BV-C4.

[3] = [2] x (1 + (0.5 x [6]))

[4]: See Table No. BV-7. GDP forecast halved for MLPs.

[5]: See Table BV-C5.

[6] =  $\{(1/3) \times [4]\} + \{(2/3) \times [5]\}$

[7] = [3] + [6]

\* Companies are excluded for (i) the low spread between cost of equity and cost of debt, and/or (ii) negative growth rate.

**Table BV-C4**  
**CINI Sample**  
**Calculation of Dividend Yields**

Company	Average Monthly Stock Price as of Jul 31, 2018	Average Monthly Stock Price as of Aug 31, 2018	Average Monthly Stock Price as of Sep 30, 2018	Average Monthly Stock Price as of Oct 31, 2018	Average Monthly Stock Price as of Nov 30, 2018	Average Monthly Stock Price as of Dec 31, 2018	Annualized Dividend as of Jul 31, 2018	Annualized Dividend as of Aug 31, 2018	Annualized Dividend as of Sep 30, 2018	Annualized Dividend as of Oct 31, 2018	Annualized Dividend as of Nov 30, 2018	Annualized Dividend as of Dec 31, 2018	Dividend Yield as of Jul 31, 2018	Dividend Yield as of Aug 31, 2018	Dividend Yield as of Sep 30, 2018	Dividend Yield as of Oct 31, 2018	Dividend Yield as of Nov 30, 2018	Dividend Yield as of Dec 31, 2018	Average Dividend Yield
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
Delta Air Lines	\$51.79	\$55.90	\$57.96	\$53.91	\$58.04	\$54.49	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40	2.70%	2.50%	2.42%	2.60%	2.41%	2.57%	2.53%
Southwest Airlines	\$54.92	\$58.91	\$62.34	\$55.15	\$51.98	\$49.98	\$0.64	\$0.64	\$0.64	\$0.64	\$0.64	\$0.64	1.17%	1.09%	1.03%	1.16%	1.23%	1.28%	1.16%
FedEx Corp.	\$236.94	\$245.54	\$248.38	\$225.73	\$225.10	\$192.72	\$2.60	\$2.60	\$2.60	\$2.60	\$2.60	\$2.60	1.10%	1.06%	1.05%	1.15%	1.16%	1.35%	1.14%
United Parcel Serv.	\$113.15	\$121.08	\$120.41	\$111.52	\$110.46	\$103.59	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	\$3.64	3.22%	3.01%	3.02%	3.26%	3.30%	3.51%	3.22%
Atmos Energy	\$91.10	\$92.33	\$93.58	\$94.98	\$96.02	\$93.84	\$1.94	\$1.94	\$1.94	\$1.94	\$2.10	\$2.10	2.13%	2.10%	2.07%	2.04%	2.19%	2.24%	2.13%
Chesapeake Utilities	\$83.18	\$83.33	\$86.60	\$86.09	\$82.04	\$85.30	\$1.48	\$1.48	\$1.48	\$1.48	\$1.48	\$1.48	1.78%	1.78%	1.71%	1.72%	1.80%	1.74%	1.75%
NiSource Inc.	\$26.16	\$26.60	\$26.34	\$25.25	\$25.73	\$26.05	\$0.78	\$0.78	\$0.78	\$0.78	\$0.78	\$0.78	2.98%	2.93%	2.96%	3.09%	3.03%	2.99%	3.00%
Northwest Natural	\$64.63	\$63.55	\$67.54	\$68.19	\$67.13	\$63.19	\$1.89	\$1.89	\$1.89	\$1.90	\$1.90	\$1.90	2.92%	2.97%	2.80%	2.79%	2.83%	3.01%	2.89%
ONE Gas Inc.	\$75.73	\$77.90	\$80.85	\$82.01	\$81.72	\$81.63	\$1.84	\$1.84	\$1.84	\$1.84	\$1.84	\$1.84	2.43%	2.36%	2.28%	2.24%	2.25%	2.25%	2.30%
Southwest Gas	\$77.73	\$78.41	\$79.94	\$80.01	\$81.04	\$78.16	\$2.08	\$2.08	\$2.08	\$2.08	\$2.08	\$2.08	2.68%	2.65%	2.60%	2.60%	2.57%	2.66%	2.63%
Spire Inc.	\$72.53	\$73.78	\$74.35	\$73.54	\$76.19	\$75.48	\$2.25	\$2.25	\$2.25	\$2.25	\$2.25	\$2.37	3.10%	3.05%	3.03%	3.06%	2.95%	3.14%	3.06%
Enable Midstream Part.	\$17.97	\$17.27	\$16.16	\$15.98	\$14.36	\$13.85	\$1.27	\$1.27	\$1.27	\$1.27	\$1.27	\$1.27	7.08%	7.37%	7.87%	7.96%	8.86%	9.19%	8.05%
Enterprise Products	\$28.63	\$29.09	\$28.99	\$27.65	\$26.69	\$25.26	\$1.72	\$1.72	\$1.72	\$1.73	\$1.73	\$1.73	6.01%	5.91%	5.93%	6.26%	6.48%	6.85%	6.24%
Magellan Midstream	\$69.32	\$70.42	\$68.35	\$64.75	\$61.73	\$58.27	\$3.75	\$3.83	\$3.83	\$3.83	\$3.91	\$3.91	5.41%	5.44%	5.60%	5.92%	6.33%	6.71%	5.90%
CSX Corp.	\$67.73	\$73.17	\$73.80	\$69.66	\$71.10	\$66.19	\$0.88	\$0.88	\$0.88	\$0.88	\$0.88	\$0.88	1.30%	1.20%	1.19%	1.26%	1.24%	1.33%	1.25%
GATX Corp.	\$81.85	\$83.91	\$84.32	\$80.57	\$79.91	\$76.26	\$1.76	\$1.76	\$1.76	\$1.76	\$1.76	\$1.76	2.15%	2.10%	2.09%	2.18%	2.20%	2.31%	2.17%
Kansas City South'n	\$110.89	\$116.15	\$116.57	\$107.33	\$100.24	\$98.13	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44	\$1.44	1.30%	1.24%	1.24%	1.34%	1.44%	1.47%	1.34%
Union Pacific	\$144.08	\$150.36	\$157.67	\$150.40	\$147.67	\$143.86	\$2.92	\$3.20	\$3.20	\$3.20	\$3.20	\$3.20	2.03%	2.13%	2.03%	2.13%	2.17%	2.22%	2.12%
Heartland Express	\$19.77	\$19.87	\$20.51	\$18.79	\$19.92	\$19.01	\$0.08	\$0.08	\$0.08	\$0.08	\$0.08	\$0.08	0.40%	0.40%	0.39%	0.43%	0.40%	0.42%	0.41%
Ryder System	\$75.02	\$77.68	\$76.05	\$63.97	\$54.61	\$51.52	\$2.08	\$2.16	\$2.16	\$2.16	\$2.16	\$2.16	2.77%	2.78%	2.84%	3.38%	3.96%	4.19%	3.32%
Amer. States Water	\$59.40	\$60.08	\$59.96	\$60.84	\$64.26	\$66.38	\$1.02	\$1.10	\$1.10	\$1.10	\$1.10	\$1.10	1.72%	1.83%	1.83%	1.81%	1.71%	1.66%	1.76%
Amer. Water Works	\$86.59	\$88.15	\$87.83	\$89.78	\$91.01	\$92.04	\$1.82	\$1.82	\$1.82	\$1.82	\$1.82	\$1.82	2.10%	2.06%	2.07%	2.03%	2.00%	1.98%	2.04%
Middlesex Water	\$44.02	\$45.25	\$47.09	\$46.15	\$47.97	\$54.74	\$0.90	\$0.90	\$0.90	\$0.90	\$0.96	\$0.96	2.03%	1.98%	1.90%	1.94%	2.00%	1.75%	1.93%
York Water Co. (The)	\$32.26	\$30.03	\$30.25	\$31.28	\$32.19	\$32.99	\$0.67	\$0.67	\$0.67	\$0.67	\$0.67	\$0.69	2.07%	2.22%	2.20%	2.13%	2.07%	2.10%	2.13%
MDU Resources	\$28.97	\$27.64	\$26.78	\$25.56	\$26.05	\$24.85	\$0.79	\$0.79	\$0.79	\$0.79	\$0.79	\$0.81	2.73%	2.86%	2.95%	3.09%	3.03%	3.26%	2.99%
EOG Resources	\$126.36	\$121.30	\$121.40	\$117.08	\$103.51	\$95.41	\$0.74	\$0.74	\$0.74	\$0.88	\$0.88	\$0.88	0.59%	0.61%	0.61%	0.75%	0.85%	0.92%	0.72%
National Fuel Gas	\$54.30	\$54.76	\$55.91	\$56.59	\$52.95	\$52.94	\$1.70	\$1.70	\$1.70	\$1.70	\$1.70	\$1.70	3.13%	3.10%	3.04%	3.00%	3.21%	3.21%	3.12%

Sources and Notes:

[1] - [6]: Average of Intraday High Low Prices, Monthly

[7] - [12]: Most recent quarterly dividend as of each month from Bloomberg, annualized

[13] - [18]: Dividend yield = Annualized monthly dividends in [7] - [12] divided by corresponding monthly average price (columns [1] - [6])

[19] = ([13] + [14] + [15] + [16] + [17] + [18]) / 6

**Table BV-C5**  
**CINI Sample**  
**LT EPS Growth Rate Forecasts**

Company	IBES Growth Estimate	Number of Estimates	ValueLine 3-5	
			Yr. Growth Rate Estimate	Weighted Average Short-Term Growth
	[1]	[2]	[3]	[4]
Delta Air Lines	16.8%	5	12.3%	16.1%
Southwest Airlines	15.9%	4	9.1%	14.5%
FedEx Corp.	9.7%	5	3.4%	8.7%
United Parcel Serv.	11.6%	7	6.6%	11.0%
Atmos Energy	6.5%	2	4.9%	5.9%
Chesapeake Utilities	n/a		9.8%	9.8%
NiSource Inc.	5.9%	3	8.5%	6.6%
Northwest Natural	4.0%	1	12.3%	8.2%
ONE Gas Inc.	5.5%	2	9.3%	6.8%
Southwest Gas	6.2%	2	8.1%	6.8%
Spire Inc.	2.7%	2	5.7%	3.7%
Enable Midstream Part.	8.1%	2	22.5%	12.9%
Enterprise Products	9.4%	3	8.6%	9.2%
Magellan Midstream	8.0%	2	0.7%	5.6%
CSX Corp.	23.2%	5	10.4%	21.1%
GATX Corp.	12.0%	1	6.0%	9.0%
Kansas City South'n	14.7%	2	11.5%	13.6%
Union Pacific	18.3%	5	10.4%	17.0%
Heartland Express	27.1%	1	15.3%	21.2%
Ryder System	14.6%	1	11.9%	13.2%
Amer. States Water	6.0%	1	10.9%	8.5%
Amer. Water Works	8.2%	1	8.1%	8.1%
Middlesex Water	n/a		5.9%	5.9%
York Water Co. (The)	n/a		9.8%	9.8%
MDU Resources	n/a		15.2%	15.2%
EOG Resources	102.6%	2	16.1%	73.7%
National Fuel Gas	n/a		7.3%	7.3%

Sources and Notes:

[1] & [2]: Thomson Reuters as of December 31, 2018.

[3]: ValueLine Investment Analyzer as of 12/31/2018. Calculated as compounding annual growth rate (CAGR) using current year EPS estimate and Projected 3-5 year EPS estimate.

[4] =  $([1] \times [2] + [3]) / ([2] + 1)$

**Table No. BV-C8**  
**CINI Sample**  
**CAPM ROE Estimates**

Company	RFR	Risk Premium	Beta	Unadjusted Ke	Market Cap (\$Million)	Size Adjustment	Implied Cost of Equity
	[1]	[2]	[3]	[4] = [1] + [2]x [3]	[5]	[6]	[7] = [4] + [6]
Delta Air Lines	3.70%	9.67%	1.20	15.3%	\$34,624	-0.35%	15.0%
Southwest Airlines	3.70%	9.67%	1.15	14.8%	\$26,316	-0.35%	14.5%
Atmos Energy	3.70%	9.67%	0.60	9.5%	\$10,141	0.89%	10.4%
Chesapeake Utilities	3.70%	9.67%	0.65	10.0%	\$1,306	1.72%	11.7%
NiSource Inc.	3.70%	9.67%	0.50	8.5%	\$9,199	0.89%	9.4%
Northwest Natural	3.70%	9.67%	0.60	9.5%	\$1,738	1.66%	11.2%
ONE Gas Inc.	3.70%	9.67%	0.65	10.0%	\$4,111	0.98%	11.0%
Southwest Gas	3.70%	9.67%	0.70	10.5%	\$3,729	0.98%	11.4%
Spire Inc.	3.70%	9.67%	0.65	10.0%	\$3,711	0.98%	11.0%
Enable Midstream Part.	3.70%	9.67%	1.25	15.8%	\$5,706	0.89%	16.7%
Enterprise Products	3.70%	9.67%	1.30	16.3%	\$52,908	-0.35%	15.9%
Magellan Midstream	3.70%	9.67%	1.20	15.3%	\$12,850	0.61%	15.9%
CSX Corp.	3.70%	9.67%	1.20	15.3%	\$52,405	-0.35%	15.0%
GATX Corp.	3.70%	9.67%	1.30	16.3%	\$2,718	1.51%	17.8%
Kansas City South'n	3.70%	9.67%	1.10	14.3%	\$9,753	0.89%	15.2%
Union Pacific	3.70%	9.67%	1.10	14.3%	\$101,143	-0.35%	14.0%
Heartland Express	3.70%	9.67%	0.90	12.4%	\$1,484	1.72%	14.1%
Ryder System	3.70%	9.67%	1.30	16.3%	\$2,551	1.51%	17.8%
Amer. States Water	3.70%	9.67%	0.70	10.5%	\$2,444	1.51%	12.0%
Amer. Water Works	3.70%	9.67%	0.55	9.0%	\$16,147	0.61%	9.6%
Middlesex Water	3.70%	9.67%	0.75	11.0%	\$851	2.08%	13.0%
York Water Co. (The)	3.70%	9.67%	0.75	11.0%	\$407	2.68%	13.6%
EOG Resources	3.70%	9.67%	1.45	17.7%	\$51,483	-0.35%	17.4%
MDU Resources	3.70%	9.67%	1.00	13.4%	\$4,567	0.98%	14.3%
National Fuel Gas	3.70%	9.67%	1.00	13.4%	\$4,460	0.98%	14.3%
FedEx Corp.	3.70%	9.67%	1.15	14.8%	\$42,033	-0.35%	14.5%
United Parcel Serv.	3.70%	9.67%	0.90	12.4%	\$83,993	-0.35%	12.1%
						<b>Min</b>	9.4%
						<b>Max</b>	17.8%
						<b>Median</b>	14.1%
						<b>Midpoint</b>	13.6%
						<b>Max (Outlier Tested)</b>	17.8%

Sources and Notes:

[1], [2]: See BV Table No. BV-8 Electric Utility Sample.

[3], [5]: Value Line Investment Analyzer as of 12/31/2018.

[6]: Duff&Phelps 2017 Valuation Handbook U.S. Guide to Cost of Capital, 7-10 and 7-11.

**Table No. BV-C10: Expected Earnings Method ROE for FERC Capital Intensive Sample**

Company	Ticker	2021-23 Expected Return on Common Equity	Adjustment Factor	Adjusted Return on
				Common Equity (full sample)
[1]	[2]	[4]	[5]	[6]
Delta Air Lines	DAL	25.5%	1.04	26.4%
Southwest Airlines	LUV	23.0%	1.02	23.4%
FedEx Corp.	FDX	18.0%	1.03	18.6%
United Parcel Serv.	UPS	NA	1.10	NA
Atmos Energy	ATO	11.0%	1.02	11.3%
Chesapeake Utilities	CPK	10.0%	1.05	10.5%
NiSource Inc.	NI	11.5%	1.01	11.6%
Northwest Natural	NWN	12.0%	1.02	12.2%
ONE Gas Inc.	OGS	11.0%	1.02	11.2%
Southwest Gas	SWX	9.5%	1.04	9.9%
Spire Inc.	SR	10.0%	1.02	10.2%
Enable Midstream Part.	ENBL	11.5%	1.02	11.7%
Enterprise Products	EPD	24.0%	1.00	24.1%
Magellan Midstream	MMP	46.0%	1.01	46.5%
CSX Corp.	CSX	30.5%	1.00	30.6%
GATX Corp.	GATX	11.0%	1.01	11.1%
Kansas City South'n	KSU	16.5%	1.01	16.7%
Union Pacific	UNP	43.0%	0.99	42.4%
Heartland Express	HTLD	14.0%	1.04	14.5%
Ryder System	R	11.5%	1.03	11.8%
Amer. States Water	AWR	14.0%	1.01	14.1%
Amer. Water Works	AWK	10.5%	1.03	10.8%
Middlesex Water	MSEX	13.0%	1.02	13.2%
York Water Co. (The)	YORW	13.5%	1.02	13.7%
MDU Resources	MDU	14.0%	1.03	14.5%
EOG Resources	EOG	17.0%	1.07	18.2%
National Fuel Gas	NFG	16.5%	1.06	17.5%

<b>Full Sample</b>	
Median	13.9%
Minimum	9.9%
Maximum	46.5%
Median (Outlier Tested)	12.0%
Maximum (Outlier Tested)	18.02%

Sources and Notes:

[4]: Value Line Investment Survey Reports published in October/November 2018. If Return on Common Equity not available, then used Return on Shareholder or Partner Equity.

[6] = [4] x [5]

[7]: [6] if included in subsample, see [3].

**WP-BV-C10: Adjustment Factor Calculation for FERC Capital Intensive Sample**

Company	2018			2021-2023			Change in Equity	Adjustment Factor
	Equity Share	Total Capital	Total Equity (Millions)	Equity Share	Total Capital	Total Equity (Millions)		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Delta Air Lines	N/A	N/A	\$14,820	N/A	N/A	\$21,460	7.7%	1.0370
Southwest Airlines	N/A	N/A	\$10,635	N/A	N/A	\$12,400	3.1%	1.0154
FedEx Corp.	N/A	N/A	\$19,416	N/A	N/A	\$26,450	6.4%	1.0309
United Parcel Serv.	N/A	N/A	\$3,470	N/A	N/A	\$9,625	22.6%	1.1017
Atmos Energy	65.5%	\$7,265	\$4,759	55.0%	\$11,000	\$6,050	4.9%	1.0240
Chesapeake Utilities	68.0%	\$795	\$541	70.0%	\$1,300	\$910	11.0%	1.0520
NiSource Inc.	41.0%	\$12,675	\$5,197	39.0%	\$15,005	\$5,852	2.4%	1.0119
Northwest Natural	52.5%	\$1,485	\$780	53.5%	\$1,750	\$936	3.7%	1.0183
ONE Gas Inc.	68.0%	\$3,000	\$2,040	62.0%	\$3,850	\$2,387	3.2%	1.0157
Southwest Gas	48.0%	\$4,150	\$1,992	52.5%	\$5,700	\$2,993	8.5%	1.0407
Spire Inc.	54.3%	\$4,156	\$2,256	55.0%	\$5,115	\$2,813	4.5%	1.0221
Enable Midstream Part.	N/A	N/A	\$7,470	N/A	N/A	\$9,000	3.8%	1.0186
Enterprise Products	N/A	N/A	\$23,400	N/A	N/A	\$24,000	0.5%	1.0025
Magellan Midstream	N/A	N/A	\$2,700	N/A	N/A	\$3,000	2.1%	1.0105
CSX Corp.	N/A	N/A	\$12,700	N/A	N/A	\$13,250	0.9%	1.0042
GATX Corp.	N/A	N/A	\$1,840	N/A	N/A	\$1,975	1.4%	1.0071
Kansas City South'n	N/A	N/A	\$4,650	N/A	N/A	\$5,200	2.3%	1.0112
Union Pacific	N/A	N/A	\$20,300	N/A	N/A	\$17,500	-2.9%	0.9852
Heartland Express	N/A	N/A	\$590	N/A	N/A	\$850	7.6%	1.0365
Ryder System	N/A	N/A	\$3,000	N/A	N/A	\$3,900	5.4%	1.0262
Amer. States Water	58.5%	\$1,010	\$591	54.0%	\$1,200	\$648	1.9%	1.0092
Amer. Water Works	43.5%	\$13,085	\$5,692	42.5%	\$18,625	\$7,916	6.8%	1.0330
Middlesex Water	62.5%	\$390	\$244	62.5%	\$460	\$288	3.4%	1.0165
York Water Co. (The)	62.0%	\$210	\$130	66.0%	\$230	\$152	3.1%	1.0153
MDU Resources	N/A	N/A	\$2,520	N/A	N/A	\$3,570	7.2%	1.0348
EOG Resources	N/A	N/A	\$19,250	N/A	N/A	\$38,000	14.6%	1.0679
National Fuel Gas	N/A	N/A	\$1,937	N/A	N/A	\$3,500	12.6%	1.0591

Sources and Notes:

[1],[2],[4],[5]: Value Line Investment Survey Business Reports published in October and November 2018.

[3]: [1] x [2] if common equity data available, otherwise shareholder or partner equity from Value Line Business Reports published in October and November 2018.

[6]: [4] x [5] if common equity data available, otherwise shareholder or partner equity from Value Line Business Reports published in October and November 2018.

[7] =  $(\frac{[6]}{[3]})^{(1/5)} - 1$

[8] =  $2 * (1 + [7]) / (2 + [7])$