APPENDIX A

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BEFORE THE PUBLIC SERVICE COMMISSION

OF SOUTH CAROLINA

DIRECT TESTIMONY OF

GLENN HUBBARD, PH.D.

ON BEHALF OF

SOUTH CAROLINA ELECTRIC & GAS COMPANY

DOCKET NO. 2017-370-E

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Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Robert Glenn Hubbard, and my business address is Graduate School of Business, Columbia University, 101 Uris Hall, 3022 Broadway, New York, New York 10027.

Q. WHAT IS YOUR OCCUPATION?

A. I am the Dean of the Graduate School of Business at Columbia University, where I hold the Russell L. Carson Professorship in Finance and Economics. In addition, I am a Professor of Economics in the Department of Economics of the Faculty of Arts and Sciences. My professional work has centered on analyzing and evaluating issues in corporate finance, public economics, industrial organization, monetary economics, and energy and natural resource economics.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL AND PROFESSIONAL QUALIFICATIONS.

A. I received my B.A. and B.S. degrees in Economics from the University of Central Florida (summa cum laude) in 1979, an A.M. in Economics from Harvard University in 1981, and a Ph.D. in Economics from Harvard University in 1983. During my professional career I have held many academic and government positions. From 1981 to 1983, I served as a Teaching Fellow and Resident Tutor at Harvard University. After receiving my Ph.D. in 1983, I served as a professor of economics at Northwestern University until 1988. During that time, I also held a half-time research appointment in the Center for Urban Affairs and Policy Research. Additionally, I served from 1987-1988 as a John M. Olin Fellow in residence at the

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1 National Bureau of Economic Research. In 1988 I became a professor of economics
2 and finance at Columbia University. I served as the Senior Vice Dean of the
3 Graduate School of Business from 1994-1997 and have served as Dean of the
4 Graduate School of Business at Columbia since 2004. During my service at
5 Columbia, I also have served as a visiting professor or visiting scholar at the
6 University of Chicago, Harvard, and the American Enterprise Institute. I have been
7 an advisor or consultant to the Board of Governors of the Federal Reserve System,
8 Congressional Budget Office, Federal Reserve Bank of New York, Internal
9 Revenue Service, International Trade Commission, National Science Foundation,
10 U.S. Department of Energy, and U.S. Department of the Treasury. From 1991 to
11 1993, I served as Deputy Assistant Secretary (Tax Analysis) of the U.S. Department
12 of the Treasury, where I was responsible for economic analysis of tax policy, the
13 administration's revenue estimates, and health care policy issues. From 2001 to
14 2003, I served as Chairman of the President's Council of Economic Advisers. Over
15 that time period, I also served as Chair of the Economic Policy Committee for the
16 Organization for Economic Cooperation and Development in Paris.

17 **Q. HAVE YOU BEEN ENGAGED IN ANY OTHER PROFESSIONAL**
18 **ACTIVITIES?**

19 **A.** Yes. I have had the privileged to serve as a director on the boards of several
20 public and private companies. I currently serve as a director on the boards of ADP,
21 Inc. and BlackRock Closed-End Fund and as a lead independent director at Met
22 Life. I previously served as a director on the boards of various other companies,

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including Capmark Financial Corporation, Information Services Group, and KKR Financial Corporation.

Q. HAVE YOU PREVIOUSLY TESTIFIED AS AN EXPERT WITNESS BEFORE THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA?

A. Yes. I provided expert testimony before the Public Service Commission of South Carolina (the "Commission") on behalf of South Carolina Electric & Gas Company ("SCE&G" or the "Company") regarding cost of capital issues in Docket No. 2005-113-G.

Q. HAVE YOU PROVIDED EXPERT TESTIMONY IN OTHER PROCEEDINGS AND BEFORE OTHER REGULATORY AGENCIES?

A. Yes. I have provided testimony regarding various financial and regulatory matters in a number of proceedings before regulatory agencies in other jurisdictions. In addition, I have provided expert testimony on financial and economic issues in many courts. A summary of my professional and educational background, including a list of other proceedings in which I prepared expert testimony or reports, is included as Exhibit No.____(GH-1) to this testimony.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY IN THIS PROCEEDING?

A. I have been retained by counsel for SCE&G to assess the likely impact of South Carolina Laws Acts 285 and 287 ("Acts") on SCE&G, its customers, and the general public interest of the state of South Carolina. In addition, my testimony will

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1 address the potential impact on these stakeholders if the rate reduction imposed by
2 the Acts is made permanent by the Commission.

3 **Q. WHAT IS YOUR UNDERSTANDING OF THE PROVISIONS OF THE**
4 **ACTS?**

5 A. I understand that the Acts reduce the rates SCE&G is permitted to collect for
6 the period from April 1 through December 21, 2018 by imposing an "experimental
7 rate" that excludes rate increases of approximately $367 million annually ($270
8 million from April 1 through December 21, 2018) that were approved by the
9 Commission under the state's Base Load Review Act ("BLRA").[1] These rate
10 increases reflect financing costs related to the construction of two nuclear facilities,
11 which were deemed prudent and approved by the Commission under the BLRA in
12 2009.[2] Such financing costs and the rates to recover those costs were approved by
13 the Commission and have been collected in rates by SCE&G since 2009.[3]

14 I understand further that the Acts mandate the rate reduction imposed by the
15 temporary experimental rate without providing SCE&G with the opportunity to
16 present evidence demonstrating the unreasonableness of the lower rate and the harm

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[1] "Base Load Review Act," A16, R28, S431, 117th Session 2007-2008, South Carolina General Assembly, 2007, available at https://www.scstatehouse.gov/sess117_2007-2008/bills/431.htm (accessed July 19, 2018); South Carolina Public Service Commission Directive, Order No. 2018-459; *South Carolina Electric & Gas Company v. Swain E. Whitfield et al.* No. 3:18-cv-01795-JMC. SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2017, at 14; Meg Kinnard, "Utility Wants Federal Judge to Stop Rate Cuts Over Reactor," *Associated Press*, July 30, 2018. I understand that $270 million of the annual revenue loss of $367 million would be incurred from April 1 to December 21, 2018.

[2] "Order Approving Revised Rates," The Public Service Commission of South Carolina, Docket No. 2009-211-E-Order No. 2009-696, September 30, 2009, at 7.

[3] "Order Approving Revised Rates," The Public Service Commission of South Carolina, Docket No. 2009-211-E-Order No. 2009-696, September 30, 2009, at 7.

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that will be caused by its implementation. Moreover, I understand that the Acts lack any mechanism for SCE&G to recover funds withheld under the Acts if the Commission were to determine later that the experimental rate is unreasonable.[4] Further, I understand that the Acts mandate new definitions of prudency that are to be applied retroactively to evaluate SCE&G's management of the nuclear project.

Notwithstanding the concerns mentioned above, I further understand that the Commission ordered implementation of the experimental rate by Order No. 2018-459 dated July 2, 2018.[5]

I understand that the current proceeding, among other things, will afford SCE&G an opportunity to provide evidence to the Commission about the harm that will result if the experimental rate is temporarily implemented or made permanent. My testimony in this proceeding will address the economic harm that will be caused to SCE&G and other stakeholders under either the temporary or permanent rate scenario.

Q. PLEASE SUMMARIZE THE KEY POINTS OF YOUR DIRECT TESTIMONY THAT RELATE TO THE IMPLEMENTATION OF THE ACTS.

A. The BLRA was passed in South Carolina in 2007. It was designed to promote the development of new nuclear power generation in South Carolina. Two major features of the BLRA were to provide prudency review prior to permitting a

[4] South Carolina General Assembly, 122nd Session, 2017-2018, A258, R287, H4375, at Section 58-34-40.
[5] South Carolina Public Service Commission Directive, Order No. 2018-459.

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1 project to be undertaken and, once approved, permit the utility to recover its
2 financing costs during construction. The BLRA also provided that the project would
3 be monitored on an ongoing basis by the South Carolina Office of Regulatory Staff
4 ("ORS") who would participate in additional prudency reviews during construction.
5 I understand that SCE&G secured an initial prudency review under the BLRA in
6 2009 to construct two nuclear power plants, and based upon that review and the
7 resulting permission granted, undertook the task of constructing the plants. Utility
8 construction projects, especially nuclear projects, often take years to complete and
9 require significant capital. The rules under which projects are initiated must be
10 predictable and stable to be reasonable from an economic perspective and provide
11 confidence to investors to finance the project.

12 The Acts will defeat this economically important predictability in the law by
13 retroactively changing the rules. Specifically, the Acts mandate what I understand
14 is the unprecedented removal from rates of previously approved financing costs
15 even though these costs were previously approved under the BLRA.
16 Implementation of the experimental rate mandated by the Acts would thus
17 retroactively abrogate the assurances and prudency findings that I understand the
18 state granted to SCE&G and upon which SCE&G relied in financing the
19 construction of the two nuclear power plants. In particular, I understand the Acts
20 mandate new definitions of prudency that are to be applied retroactively to evaluate
21 SCE&G's management of the nuclear project, long after ex ante prudency
22 determinations were made and approvals were granted by the Commission, with the

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consent of ORS, for the project to proceed. The retroactive change in law and the modification of the regulatory environment would cause economic harm of various types to SCE&G, its customers, and the general public interest of the state of South Carolina. Thus, given the retroactive character and economic and other consequences of implementing the Acts, the Acts can accurately and fairly be characterized from an economic perspective as a regulatory or political "shock."[6]

Q. PLEASE DESCRIBE THE TYPES OF HARM THAT THESE VARIOUS STAKEHOLDERS WILL SUFFER FROM IMPLEMENTATION OF THE ACTS, INCLUDING THE EXPERIMENTAL RATE.

A. SCE&G will suffer two types of economic harm, all else equal. First, SCE&G will suffer a permanent loss of approximately $270 million in revenue relative to the revenue that it will continue to collect if the Acts had not been implemented. Second, SCE&G will face reduced access to capital and an increase in its cost of capital due to the increased regulatory and political risk that investors will assign to investments in SCE&G due to implementation of the Acts. This increased cost of capital will harm SCE&G to the extent that it is unable to pass the additional cost along to its customers. Any such harm derived from the regulatory or political shock caused by the Acts could be long-lived and may have a significant negative impact on SCE&G's ability to provide the quantity and quality of services that customers require.

[6] From an economic perspective, a regulatory or political shock is an abrupt, *unexpected*, material change in regulation or to the political environment.

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1 SCE&G's customers also will suffer two types of economic harm, all else
2 equal. First, their rates will increase to the extent that SCE&G's higher cost of
3 capital is passed along to them in rates.[7] Second, SCE&G likely will have to reduce
4 its capital investments, thereby reducing the quality of service to its customers. This
5 behavior has been documented by economic research regarding utility investment
6 following political or regulatory shocks such as will occur in this case from the Acts,
7 including redefining the meaning of prudency under the BLRA and implementing
8 the experimental rate.

9 The implementation of the Acts also will cause economic harm to the general
10 public interest of the State of South Carolina. Apart from the direct economic harm
11 to SCE&G and its customers, economic researchers have found that disallowance
12 of a utility's recovery of its investment in nuclear power facilities specifically could
13 result in "spillover" effects that cause a reduction in similar investments by other
14 utilities in the state. All else equal, reduced investment in the state's electric system
15 will result in lower service reliability and quality, including potentially slower
16 recovery times following major hurricanes or other severe weather events, fewer
17 jobs, and slower economic growth. In addition, the unilateral and retroactive
18 reversal of an existing law under which there was significant advance prudency
19 review and participation in decision-making by multiple stakeholders, and under
20 which investors have committed significant sums of capital to SCE&G, is likely to

[7] An analysis of net harm would compare the present value of the higher future rates to the proposed $270 million rate reduction in 2018.

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1 reduce the confidence and willingness of utilities and other businesses to invest in
2 South Carolina.

3 **Q. HOW WOULD THESE IMPACTS CHANGE IF THE RATE REDUCTIONS**
4 **IMPOSED BY THE EXPERIMENTAL RATE MANDATED BY THE ACTS**
5 **WERE MADE PERMANENT AS PART OF THIS PROCEEDING?**

6 A. All of the impacts discussed above would be magnified. First, all else equal,
7 the most immediate impact if the experimental rate is permanently imposed would
8 be to increase SCE&G's annual loss of revenue after 2018 to $367 million per year.[8]
9 This increased reduction would cause SCE&G to suffer hundreds of millions of
10 dollars in additional lost revenue relative to the revenue that it will earn if the
11 experimental rate is not permanently imposed.

12 This large loss of current and future revenue would have a significantly larger
13 negative impact on SCE&G's financial condition, credit rating and cost of capital.
14 All else equal, this still higher cost of capital would harm SCE&G to the extent that
15 it cannot be passed on to customers in rates.

16 The higher cost of capital would have a similar impact on SCE&G's
17 customers to the extent that the higher costs are passed to them.

18 Finally, if the experimental rate is made permanent, or if a greater reduction
19 in revenue is ordered by the Commission as proposed by ORS and other parties to
20 this matter, the underinvestment effect also likely would be greater due to the

[8] South Carolina Public Service Commission Directive, Order No. 2018-459.

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increased size of the economic shock caused by a permanent rate reduction. This would increase the economic harm to both customers and the general public interest of the state of South Carolina.

Q. HOW IS THE REST OF YOUR DIRECT TESTIMONY ORGANIZED?

A. The rest of my direct testimony is organized as follows:

I. Background

II. Analysis of the Likely Effects of the Acts

III. Conclusion

I. BACKGROUND

A. <u>INTRODUCTION: REGULATED UTILITY RATEMAKING</u>

Q. PLEASE PROVIDE AN OVERVIEW REGARDING THE ECONOMIC PRINCIPLES UPON WHICH UTILITY RATEMAKING IS FOUNDED.

A. From a general economic perspective, the goal of effective utility rate regulation is to set rates in such a way that the supply- and demand-side incentives created by regulatory activity result in the provision of the appropriate quantity and quality of service at reasonable rates.[9] To achieve this result, states have created systems that rely on private suppliers of the utility services together with economically sensible regulation. Such systems allow the introduction of a profit motive to control costs, while at the same time providing for appropriate regulatory oversight. Economically sensible regulation within such systems recognizes that

[9] Bonbright, James (1961), *Principles of Public Utility Rates,* New York: Columbia University Press, at 48-62.

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1 the private suppliers of public utility services and their investors must have proper
2 incentives to invest and work hard to provide the desired quality and quantity of
3 service, and must be protected against regulation that unnecessarily increases costs
4 or retroactively changes the rules for recovering investments.[10]

5 These principles work to the benefit of customers because the primary
6 incentive that private utility firms have for providing good service is the ability to
7 earn sufficient revenue to recover their operating and capital costs plus a return on
8 invested capital that is at least equal to the firm's opportunity cost of capital. The
9 opportunity cost of capital is the expected return on investments of equivalent
10 business and financial risk.[11] Accordingly, if utility firms are able to offer investors
11 a rate of return equal to or greater than their opportunity cost of capital, they will be
12 able to compete for and attract sufficient capital at reasonable rates to provide the
13 appropriate quality and quantity of service.[12]

14 Thus, once projects have been commenced and investments secured under
15 prescribed legal rules such as the BLRA,[13] then from an economic perspective, it
16 is important that regulators provide protection to the economic property interests of

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[10] There is a significant amount of research that has been undertaken on these concepts. *See*, for example, Bonbright, James (1961), *Principles of Public Utility Rates,* New York: Columbia University Press; Bergara, Mario, Witold Henisz, and Pablo Spiller (1998), "Political Institutions and Electric Utility Investment: A Cross-Nation Analysis," *California Management Review,* 40(2), 18-35; Heller, William, and Mathew McCubbins (1996), "Politics, Institutions, and Outcomes: Electricity Regulation in Argentina and Chile," *The Journal of Policy Reform*, 1(4), 357-387; Knittel, Christopher (2006), "The Adoption of State Electricity Regulation: The Role of Interest Groups," *The Journal of Industrial Economics,* 54(2), 201-222.

[11] Berk, Jonathan, and Peter DeMarzo (2017), *Corporate Finance*, 4th ed., Boston: Pearson Education, at 161.

[12] These fundamental financial principles are reflected in two Supreme Court decisions that I understand provide legal standards in utility rate making proceedings. These are *Fed. Power Comm'n v. Hope Nat. Gas Co.,* 320 U.S. 591, 603 (1944) and *Bluefield Waterworks & Imp. Co. v. Pub. Serv. Comm'n of W. Va.*, 262 U.S. 679, 692-93 (1923).

[13] "Base Load Review Act," A16, R28, S431, 117th Session 2007-2008, South Carolina General Assembly, 2007, available at https://www.scstatehouse.gov/sess117_2007-2008/bills/431.htm (accessed July 19, 2018).

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private suppliers of utility services and their investors. As I discuss further below, this framework is economically sensible because supply-side factors as well as demand-side factors determine economic outcomes.

Q. WHY IS IT NECESSARY FOR ELECTRIC UTILITIES TO BE ABLE TO ACCESS CAPITAL MARKETS?

A. Electric and gas utilities require substantial amounts of capital to provide reliable electric power and gas services to their customers at reasonable rates. According to Edison Electric Institute,[14] total investments made by U.S. investor-owned electric utilities in 2017 amounted to more than $113 billion[15] and have exceeded $90 billion each year since 2013.[16] Operating cash flows are often insufficient to cover the ongoing investment needed for a utility to maintain its existing infrastructure and build new facilities needed to serve its market.[17] The nature of utility rate regulation means that the money spent to build or improve infrastructure can only be recovered slowly over the useful life of the project (often decades), whereas the expenditure to build new infrastructure occurs upfront.[18] If

[14] Edison Electric Institute is "the association that represents all U.S. investor-owned electric companies." http://www.eei.org/about/Pages/default.aspx (accessed July 19, 2018).
[15] Edison Electric Institute (2017), "2017 Financial Review," at 14-15.
[16] Total investments each year from 2013 to 2016 are $90 billion, $96 billion, $104 billion, and $113 billion, respectively. Edison Electric Institute (2016), "2016 Financial Review," at 16; Edison Electric Institute (2014), "2014 Financial Review," at 16.
[17] For example, as shown in the aggregate financial statements compiled for the electric utility industry by the Edison Electric Institute, cash flow provided by operating activities is typically less than net cash used in investing. Edison Electric Institute (2017), "2017 Financial Review," at 14; Edison Electric Institute (2016), "2016 Financial Review," at 16; Edison Electric Institute (2014), "2014 Financial Review," at 16.
[18] The Regulatory Assistance Project (2011), "Electricity Regulation in the US: A Guide," at 40, 46; Bonbright, James (1961), *Principles of Public Utility Rates,* New York: Columbia University Press, at 76, 178.

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utilities cannot access capital markets, these investments cannot be made, leading to operational problems that would negatively impact customers.[19]

B. <u>COST OF CAPITAL</u>

Q. **PLEASE EXPLAIN THE ECONOMIC PRINCIPLES UNDERLYING THE COST OF CAPITAL AND HOW UTILITIES AND OTHER FIRMS ACCESS CAPITAL MARKETS**.

A. All investments entail some measure of risk, which investors demand compensation for bearing. All else equal, greater risk means investors will require a greater expected future payment per dollar of capital provided. The amount of annual compensation, expressed as a percentage of the amount of capital invested, is known as the "cost of capital."

Capital can be provided either in the form of equity or debt.[20] Equity investors, as residual claimants, face a variety of risks.[21] Imposing additional risk on equity investors will typically reduce the amount they are willing to pay for the equity security, thereby increasing the cost of equity.[22]

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[19] The Regulatory Assistance Project (2011), "Electricity Regulation in the US: A Guide," at 27; Bonbright, James (1961), *Principles of Public Utility Rates,* New York: Columbia University Press, at 50.

[20] In practice, there are instruments, such as preferred stock or convertible debt, that have economic characteristics of both debt and equity.

[21] Financial economists distinguish between systematic and non-systematic risks. Diversified investors can minimize their exposure to non-systematic (that is, idiosyncratic) risk by spreading their portfolio across many investments. As a result, in standard finance models such as the capital asset pricing model ("CAPM"), only the systematic portion of risk (beta) affects the cost of equity.

[22] The price paid for a security reflects both the expected cash flows and the discount rate. Strictly speaking, only systematic risk affects the discount rate. Here, the introduction of the possibility of an *ex post* regulatory expropriation is most precisely viewed as a reduction of the expected cash flows. However, the price reduction from the lower expected cash flows is observationally equivalent to an increase in the discount rate. As a result, I focus on the cost of capital interpretation for expositional simplicity in this declaration.

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1 Factors affecting the cost of debt include the expected profitability of the
2 business, the range of possible outcomes and the company's ability to service the
3 debt in downside scenarios, the seniority in the capital structure of a particular debt
4 issuance, the value of collateral or others forms of security, and other protections
5 such as covenants in the credit agreements.

6 **Q. HOW DO DEBT INVESTORS ASSESS THE MANY FACTORS THAT MAY**
7 **AFFECT THE RISK OF A DEBT INVESTMENT?**

8 A. To assess these myriad factors, debt investors often look to credit ratings as
9 a summary measure of risk. Credit rating agencies such as Standard & Poor's
10 Corporation ("S&P"), Fitch Ratings ("Fitch"), and Moody's Investors Service
11 ("Moody's") issue credit ratings for an issuer that provide an overall measurement
12 of creditworthiness and represent their opinion of an issuer's capacity and
13 willingness to meet its financial commitments as they come due.[23] AAA is the
14 highest and safest credit rating that S&P or Fitch assigns to an issuer, while Aaa is
15 the highest and safest rating from Moody's.[24] S&P and Fitch also further refine
16 their letter ratings with plus and minus "modifiers" to indicate whether a given
17 issuer is at the high end or low end of a given letter rating. For example, a rating of

[23] *See*, for example, S&P, "S&P Global Ratings Definition," https://www.standardandpoors.com/en_US/web/guest/article/-/view/sourceId/504352 (accessed July 20, 2018); FitchRatings, "Rating Definitions," https://www.fitchratings.com/site/definitions (accessed July 20, 2018); Moody's, "Ratings Definitions," https://www.moodys.com/Pages/amr002002.aspx (accessed July 20, 2018).

[24] The credit ratings S&P and Fitch use for issuers that are not in default are AAA, AA, A, BBB, BB, B, CCC, CC, and C. S&P Global Ratings (2018), "Guide to Credit Rating Essentials," at 13; FitchRatings (2010), "Definitions of Ratings and Other Forms of Opinion," at 31-35. The corresponding credit ratings from Moody's are Aaa, Aa, A, Baa, Ba, B, Caa, Ca, and C. Moody's Investors Service (2018), "Rating Symbols and Definitions," at 6.

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1 A+ is higher than a rating of A, which, in turn is higher than a rating of A-. Moody's
2 uses numerical modifiers of 1, 2, or 3 to correspond to the "+," neutral, and "-"
3 modifiers. The rating agencies describe such incremental changes in their ratings
4 in terms of "notches." For S&P and Fitch, an A+ rating is one notch above A and
5 three notches above BBB+. For Moody's, an A1 rating is one notch above A2 and
6 three notches above Baa1.

7 **Q. DO CREDIT RATINGS AFFECT A COMPANY'S COST OF CAPITAL**
8 **AND ACCESS TO CAPITAL?**

9 A. Yes. Typically, higher credit ratings correspond to lower expected rates of
10 default and higher expected rates of repayment. As a result, the interest rates that
11 investors demand on debt securities are related to those securities' credit ratings. As
12 I note above, investors require a higher rate of return for exposure to increased risks.
13 Thus, in order to compensate investors for an increased risk of default from a lower-
14 rated security or issuer, an issuer with lower-rated debt will have to pay a higher
15 interest rate than if the debt were more highly rated.

16 Conservative investors who place a premium on avoiding losses will tend to
17 invest toward the AAA-rated end of the ratings spectrum, while those willing to take
18 on more risk may choose lower-rated debt that offers higher returns when the issuer
19 is able to service the debt. Many investors have a preference or mandate to hold
20 only issuances that have "investment grade" credit ratings, which means BBB-
21 (Baa3 on the Moody's scale) or higher. Issuers with ratings of BB+ (Ba1 on the
22 Moody's scale) or below are considered "non-investment grade" or "speculative,"

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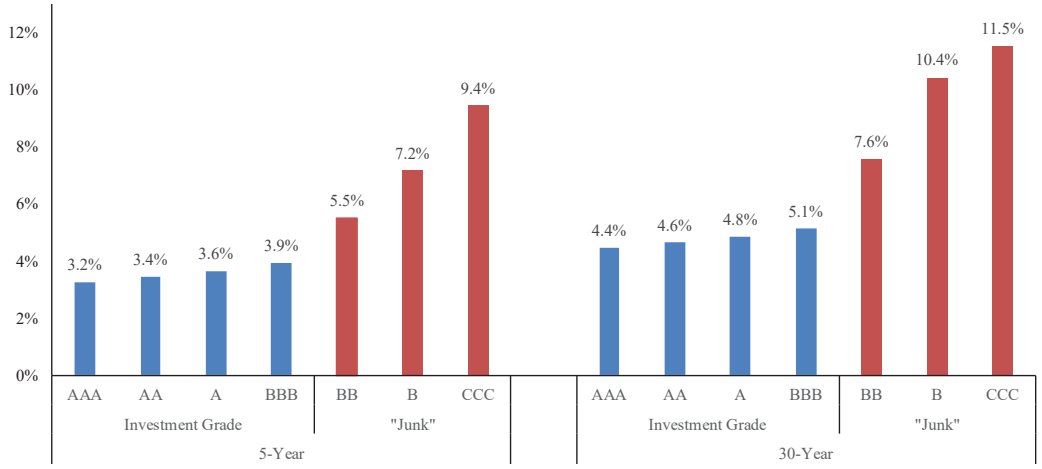
meaning credit rating agencies consider these issuers' ability to meet their financial commitments to be vulnerable to changing economic conditions. As a result of the more limited investor base for "speculative" issuers, the investment community tends to view dropping from BBB- to BB+ as a significant event, and yields rise sharply when moving from BBB- to BB+.[25]

FIGURE 1
YIELD BY CREDIT RATING
UTILITIES SECTOR



Notes and Sources:
From S&P Capital IQ.
Annual compounding rate.
Valuation date as of July 18, 2018.
Utilities Sector includes Electric Utilities, Gas Utilities, Multi-Utilities, Water Utilities, and Independent Power Producers & Energy Traders. *See* https://www.unm.edu/~maj/Security%20Analysis/GICS.pdf (accessed July 19, 2018).
Yields for credit rating AAA are derived. Yields for all other ratings are observed. S&P Capital IQ considers a curve to be observed when there is at least six credits over the whole term structure. S&P Capital IQ methodology derives curves based on all of the bond price information from the sectors and ratings.

For example, as shown in **Figure 1**, above, for a five-year corporate bond rated BBB, the yield, as of July 18, 2018, was 3.9 percent, which was 1.6 percentage

[25] Berk, Jonathan, and Peter DeMarzo (2017), *Corporate Finance,* 4th ed., Boston: Pearson Education, at 188-192.

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1 points lower than the yield on a corporate bond rated BB,[26] a gap over five times
2 greater[27] than the gap between the yields of bonds rated BBB and those rated A (0.3
3 percentage points).[28] Similarly, for a 30-year corporate bond rated BBB, the yield,
4 as of July 18, 2018, was 5.1 percent, which was 2.5 percentage points lower than
5 the yield on a corporate bond rated BB,[29] a gap over eight times greater[30] than the
6 gap between the yields of bonds rated BBB and A, respectively (0.3 percentage
7 points).[31]

8 **Q. WHAT ARE SCE&G'S CURRENT CREDIT RATINGS?**

9 A. As of July 20, 2018, SCE&G was rated at the lowest investment grade rating
10 by Fitch (BBB-) and Moody's (Baa3), and the second lowest investment grade
11 rating by S&P (BBB).[32] S&P has SCE&G on Negative Watch for a downgrade,
12 Moody's has identified SCE&G as being Outlook Negative, and Fitch has SCE&G
13 on an Evolving Watch.[33]

14 **C. <u>COST OF CAPITAL AS APPLIED IN REGULATED UTILITY</u>**
15 **<u>INVESTMENT AND RATEMAKING</u>**
16

[26] -1.6 percentage points = 3.9 percent - 5.5 percent.
[27] 5.3 = 1.6 percentage points / 0.3 percentage points.
[28] 0.3 percentage points = 3.9 percent - 3.6 percent.
[29] -2.5 percentage points = 5.1 percent - 7.6 percent.
[30] 8.3 = 2.5 percentage points / 0.3 percentage points.
[31] 0.3 percentage points = 5.1 percent - 4.8 percent.
[32] FitchRatings, "Fitch Maintains Rating Watch Evolving on SCANA and Subsidiaries," July 3, 2018; Moody's Investors Service, "Rating Action: Moody's Confirms SCANA, SCE&G and PSNC, Rating Outlook Negative," July 2, 2018; S&P Global Ratings, "Research Update: SCANA Corp. and Subsidiaries 'BBB' Ratings Remain on CreditWatch Negative on Passage of South Carolina Bill," July 3, 2018.
[33] FitchRatings, "Fitch Maintains Rating Watch Evolving on SCANA and Subsidiaries," July 3, 2018; Moody's Investors Service, "Rating Action: Moody's Confirms SCANA, SCE&G and PSNC, Rating Outlook Negative," July 2, 2018; S&P Global Ratings, "Research Update: SCANA Corp. and Subsidiaries 'BBB' Ratings Remain on CreditWatch Negative on Passage of South Carolina Bill," July 3, 2018.

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Q. PLEASE DESCRIBE SOME OF THE IMPORTANT CONSIDERATIONS THAT APPLY WHEN DETERMINING THE COST OF CAPITAL AND ALLOWED RATE OF RETURN FOR A REGULATED UTILITY SUCH AS SCE&G.

A. In determining an appropriate rate of return on common equity capital for a regulated public utility, the interests of both the customer and the Company need to be considered. The interests of the Company and customers are aligned in important ways. For example, the long-term viability of the Company is in the best interest of both the Company's customers and investors—the customers will have access to stable and reliable services and investors in the Company will receive a return on the capital they invested.

However, the Company and customers also have partially competing interests. All else equal, customers desire lower rates, which translate to a lower return on investment to the Company, while investors in the Company's debt and equity securities generally desire a higher return on investment. If the rate of return on investment is set too high, customers will be penalized. On the other hand, if the rate of return on investment is set too low, the Company will have a difficult time attracting equity and debt investment, thereby compromising its creditworthiness and the reliability of its existing operations, which could jeopardize the longer-term viability of the Company. Hence, when determining a "fair and reasonable" rate of return on investment, the differing interests of customers and the Company and its investors must be considered.

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Q. ARE YOU AWARE OF ANY LEGAL DECISIONS THAT ADDRESS THESE UNIQUE CONSIDERATIONS AND APPLY TO SETTING REGULATED RATES OF RETURN ON AN ECONOMICALLY SOUND BASIS?

A. Yes.

Q. PLEASE IDENTIFY THOSE DECISIONS AND PROVIDE KEY INFORMATION FROM THOSE DECISIONS THAT GUIDE ECONOMIC ANALYSIS IN UTILITY RATE MAKING PROCEEDINGS.

A. Two United States Supreme Court decisions, *Bluefield* (1923)[34] and *Hope* (1944),[35] address the appropriate legal framework and reasoning that underlie traditional rate-of-return regulation. As part of this traditional regulatory paradigm, regulators allow the utility to collect a return on its investments that the regulators deem are "prudently incurred" or are "used and useful." As the Supreme Court stated in *Bluefield*:

> The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties.[36]

And that:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on

[34] *Bluefield Waterworks & Imp. Co. v. Pub. Serv. Comm'n of W. Va.*, 262 U.S. 679 (1923).
[35] *Fed. Power Comm'n v. Hope Nat. Gas Co.*, 320 U.S. 591 (1944).
[36] *Bluefield Waterworks & Imp. Co. v. Pub. Serv. Comm'n of W. Va.*, 262 U.S. 679, 693 (1923).

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> investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures.[37]

Building on its earlier *Bluefield* decision, the Supreme Court stated as follows in its *Hope* decision:

> From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock. By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.[38]

Q. DO THESE EXCERPTS FROM THE SUPREME COURT'S OPINIONS IN *BLUEFIELD* AND *HOPE* REFLECT SOUND ECONOMIC REASONING?

A. Yes. From an economic perspective, *Bluefield* and *Hope* defined principles for how the partially competing interests of a regulated entity's stakeholders can be balanced in setting an appropriate rate of return to allow regulated utilities to earn on their invested capital. A primary principle derived from these decisions is that a utility and its investors should be allowed to earn a rate of return that is commensurate with returns on investments in other firms that have comparable risks. This is effectively a description of the fundamental principle of finance in which the cost of capital is defined as an opportunity cost. If the rate of return is set

[37] *Bluefield Waterworks & Imp. Co. v. Pub. Serv. Comm'n of W. Va.*, 262 U.S. 679 (1923).
[38] *Fed. Power Comm'n v. Hope Nat. Gas Co.*, 320 U.S. 591, 603 (1944).

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at the opportunity cost of capital, it will ensure that the firm is able to attract capital at reasonable rates in order to make needed investments, as well as maintain its creditworthiness and financial integrity. This is a sound framework from a financial and economic perspective.

Q. HOW HAVE PUBLIC UTILITIES TRADITIONALLY RECOVERED THE CAPITAL AND FINANCING COSTS OF INFRASTRUCTURE INVESTMENTS?

A. As noted by one researcher, traditional American utility rate regulation: "involves the ex post facto determination of a 'fair return' on capital already contributed in the absence of any definite public commitments as to how this return shall be measured."[39] Under such a regime, which by definition relies to an extent on hindsight, utilities build new infrastructure, such as a new power plant or gas transmission facilities, before receiving a prudency determination from the regulator.[40] During construction, the utility typically bears both construction and financing costs.[41] Upon completion, the regulator determines how much of the investment is to be considered prudent and adds that amount to the rate base after the new facility begins operations, thereby permitting the utility to then earn a return on its investment.[42]

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[39] Bonbright, James (1948), "Utility Rate Control Reconsidered in the Light of the Hope Natural Gas Case," *American Economic Review*, 38(2) Papers and Proceedings of the Sixtieth Annual Meeting of the American Economic Association, 465-482, at 475.
[40] The Regulatory Assistance Project (2011), "Electricity Regulation in the US: A Guide," at 40, 63.
[41] Teisberg, Elizabeth (1993), "Capital Investment Strategies Under Uncertain Regulation," *RAND Journal of Economics,* 24(4), 591-604, at 594-595; The Regulatory Assistance Project (2011), "Electricity Regulation in the US: A Guide," at 40.
[42] The Regulatory Assistance Project (2011), "Electricity Regulation in the US: A Guide," at 38, 40, 63.

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Q. DOES A RELIANCE ON THE TRADITIONAL AFTER-THE-FACT PRUDENCY DETERMINATION IMPACT UTILITY INVESTMENT?

A. Yes. Given the delay between when investment costs are incurred and when they are recovered, the rules under which projects are initiated must be predictable and stable to provide sufficient confidence to investors to finance the project at reasonable rates.[43] If regulators can disallow the recovery of certain costs after the fact, the company and its investors will realize a return that is lower than the return that was originally expected. If the disallowance is the result of political or regulatory expropriation, negative economic effects will follow, including reduced investment and provision of a lower quality or quantity of service than is optimal. [44]

In fact, the "used-and-useful" paradigm, which defines prudency after the fact, can create an asymmetric allocation of gains and losses that discourages investment:

> Defining prudency—as the used-and-useful doctrine does—on the basis of hindsight, and only for the failures, is to play a regulatory game of heads-the-consumer-wins, tails-the-investor-loses: In effect it expropriates stockholder dollars. Governments can do that once; but what do they do for an encore, the next time companies have to go out and raise capital?[45]

[43] *See,* for example, Bonbright, James (1961), *Principles of Public Utility Rates,* New York: Columbia University Press, at 186-187; Heller, William, and Mathew McCubbins (1996), "Politics, Institutions, and Outcomes: Electricity Regulation in Argentina and Chile," *The Journal of Policy Reform*, 1(4), 357-387.
[44] *See,* for example, Heller, William, and Mathew McCubbins (1996), "Politics, Institutions, and Outcomes: Electricity Regulation in Argentina and Chile," *The Journal of Policy Reform*, 1(4), 357-387.
[45] Kahn, Alfred, "Who Should Pay for Power Plant Duds?" *Wall Street Journal*, August 15, 1985 (emphasis added).

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In order to "maintain and attract capital," the expected returns available to investors must provide adequate compensation for the risks borne relative to other investment options. In the case of public utilities, they must face the standard financial and business risks faced by all companies, but they and their investors should not have to bear the risk of the legal framework being changed retroactively by political action after a project has been commenced.

Q. DID SOUTH CAROLINA ENACT LEGISLATION TO AVOID THE DISINCENTIVE TO INVESTMENT POSED BY THE EX-POST "USED AND USEFUL" PRINCIPLE?

A. Yes. South Carolina passed the BLRA in 2007. The stated purpose of the BLRA was to "provide for the recovery of the prudently incurred costs associated with new base load plants… while at the same time protecting customers of investor-owned electrical utilities from responsibility for imprudent financial obligations or costs."[46] By passing the BLRA, South Carolina provided a mechanism in which regulated utilities were required to obtain a prudency determination before constructing a base load plant with the assurance that financing costs could be recovered during construction. By requiring an *ex ante* prudency review, the BLRA protected the utility, its customers, and other stakeholders by assuring that only projects judged to be prudent would be undertaken.

[46] BLRA, Section 1.A.

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Prior to the passage of the BLRA, a utility in South Carolina could seek a prudency determination for a power plant only after its completion, and there was no mechanism for recovery of costs during construction. In such an environment, utilities found it difficult to attract the capital, at reasonable rates, needed to cover the significant cost and construction time for a nuclear plant without being able to provide investors assurance that the Commission would permit a return of and on the investment when construction was complete. The BLRA was designed to ameliorate this problem.

Q. WHAT ARE THE ECONOMIC BENEFITS OF OBTAINING A PRUDENCY DETERMINATION BEFORE CONSTRUCTING A NEW BASE LOAD PLANT PURSUANT TO THE BLRA?

A. Economic researchers have found that regulatory regimes that provide for prudency review in advance of investing, such as that provided for in the BLRA, are economically beneficial because they encourage optimal investment by public utilities.[47] This investment should, in turn, lead to more economically appropriate service quality and prices, all else equal.

In this case, I understand that the Commission explicitly reviewed and approved SCE&G's investments in the nuclear facilities at issue, and also approved the amount of financing costs related to those facilities to include in SCE&G's rates. These prior approvals would be unilaterally and retroactively reversed, at least

[47] Encinosa, William, and David Sappington (1995), "Toward a Benchmark for Optimal Prudency Policy," *Journal of Regulatory Economics,* 7, 111-130.

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temporarily, by the implementation of the Acts, thereby exposing SCE&G to financial risk not contemplated in the BLRA.

Q. HAVE ACADEMIC SCHOLARS STUDIED AND COMPARED EX ANTE VERSUS EX POST PRUDENCY DETERMINATIONS?

A. Yes. One research paper has addressed the pitfalls of this precise situation. The authors of this scholarly paper pose the following question:

> Should the financial risk to which the firm is exposed under a prudence review be limited when the regulator gives explicit or implicit approval of an investment before it is undertaken?[48]

The authors later answer the question as follows, in reference to a prudence review that takes place in advance of undertaking the project:

> **Favorable [results of the advance prudence review] should […] reduce the probability that [ex-post] prudence reviews are held and limit both the expected penalty from and the payment variation under a prudence review.[49]**

The authors go on to state (in the footnote to the quoted sentence) that:

> **Thus, this finding lends support to claims by industry experts that initial regulatory approval of a project should limit the subsequent down-side risk to which the firm is exposed if it undertakes the project. For example, Berlin (1984, 28) suggests that "where a regulatory commission has blessed a project, or declined to suggest its cancellation following the review of a utility's construction program, utilities and their investors should be permitted to rely on that decision..."[50]**

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[48] Encinosa, William, and David Sappington (1995), "Toward a Benchmark for Optimal Prudency Policy," *Journal of Regulatory Economics,* 7, 111-130, at 112.
[49] Encinosa, William, and David Sappington (1995), "Toward a Benchmark for Optimal Prudency Policy," *Journal of Regulatory Economics,* 7, 111-130, at 122-123 (emphasis added).
[50] Encinosa, William, and David Sappington (1995), "Toward a Benchmark for Optimal Prudency Policy," *Journal of Regulatory Economics,* 7, 111-130, at 123 (emphasis added).

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The authors' analysis implies that, if there is an advance prudency review, SCE&G's "expected penalty," "payment variation," and "downside risk" should be limited, in order for the economic benefits of the regime to be realized. In this case, implementation of the Acts would run counter to this prescription by imposing an unanticipated penalty on SCE&G. This action would effectively abrogate the BLRA, thereby reducing or eliminating the value of the law from an economic and public policy perspective. In addition to the direct harm to SCE&G and its investors, who relied on the BLRA being followed by the state of South Carolina, there would be economic harm to the general public interest.

D. <u>THE NUCLEAR PLANTS AT ISSUE</u>

Q. PLEASE PROVIDE AN OVERVIEW OF THE SEQUENCE OF EVENTS THAT LED TO THE ABANDONMENT OF THE NUCLEAR PLANTS AT ISSUE.

A. Leading up to 2008, SCE&G identified a need for an additional 600MW of capacity in 2016 and another 600MW in 2019 to meet its reserve margin target of 12% to 18 % through 2022.[51] At the time, natural gas supplies were declining and prices were volatile. Coal-fired plants faced rising environmental costs. SCE&G reviewed various options to meet this need and determined that nuclear power was superior to natural gas or coal. SCE&G further determined that building two new

[51] Direct Testimony of Joseph M. Lynch on Behalf of South Carolina Electric & Gas Company, Docket No. 2017-370-E, Exhibit G (Exhibit No. ___ (JML-1)), at 1.

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1 nuclear plants co-located on the site of the existing V.C. Summer nuclear plant
2 would lead to economies of scale in construction and ongoing operations.[52] SCE&G
3 partnered with the South Carolina Public Service Authority ("Santee Cooper") in
4 this construction.

5 SCE&G filed an application for a BLRA review order and other related
6 certificates on May 30, 2008.[53] This application requested approval for construction
7 and contingency costs of $6.3 billion (for SCE&G's 55 percent share).[54] The
8 Commission held a three-week hearing on the application in December 2008, and
9 entered Order No. 2009-104(A) granting the application on March 2, 2009.[55]
10 During construction of the plants, ORS monitored progress and presented the results
11 of its observations, research, audits, and expert opinions to the Commission at each
12 proceeding that was held to consider progress with the project.[56] To accommodate
13 developments in the project, SCE&G filed and the Commission approved revisions
14 to the schedule and budget on several occasions with the most recent three revisions

[52] Direct Testimony of Joseph M. Lynch on Behalf of South Carolina Electric & Gas Company, Docket No. 2017-370-E, Exhibit H (Exhibit No. ___ (JML-2)), at 8-11.
[53] "Order Approving Revised Rates," The Public Service Commission of South Carolina, Docket No. 2009-211-E-Order No. 2009-696, September 30, 2009, at 2.
[54] V.C. Summer Nuclear Station Units 2 & 3, Quarterly Report to the South Carolina Office of Regulatory Staff Submitted by South Carolina Electric & Gas Company Pursuant to Public Service Commission Order No. 2009-104(A), Quarter Ending March 31, 2015, at 7, 25.
[55] I understand that the South Carolina Supreme Court largely affirmed Order No. 2009-104(A) in 2010.
[56] *See,* for example, The Public Service Commission of South Carolina, Docket No. 2008-196-E - Order No. 2009-104(A), March 2, 2009; The Public Service Commission of South Carolina, Docket No. 2009-211-E - Order No. 2009-696, September 30, 2009; The Public Service Commission of South Carolina, Docket No. 2012-203-E - Order No. 2012- 884, November 15, 2012; The Public Service Commission of South Carolina, Docket No. 2015-103-E - Order No. 2015- 661, September 10, 2015; The Public Service Commission of South Carolina, Docket No. 2016-223-E - Order No. 2016- 794, November 28, 2016;

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occurring in 2012, 2015, and 2016. These revisions culminated in an approved cost of $7.7 billion for SCE&G's share of the project.[57]

In its initial approval of the project, the Commission authorized SCE&G to recover in rates $7.8 million in financing costs related to $66.0 million of prudently invested capital related to the project.[58] The annual recovery amount was determined by multiplying construction work in progress by the weighted average cost of capital including appropriate adjustments for taxes. In each of the next eight years, the Commission approved additional recovery through rates corresponding to the rising financing costs associated with the level of capital that was invested in the project. By 2016, the level of prudently invested capital reached $3.8 billion and the corresponding annual financing cost recovery in rates was $445 million.[59] As of December 31, 2017, the cumulative spending by SCE&G on the project had amounted to $5.1 billion.[60]

One noteworthy change to the project during the construction period was revision to the contract terms with Westinghouse, the lead contractor, that largely converted the agreement to a fixed price contract.[61] I understand that this change

[57] SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2017, at 85.
[58] The Public Service Commission of South Carolina, Docket No. 2008-196-E - Order No. 2009- 104(A), March 2, 2009, at 109.
[59] SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2016, at 87; SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2017, at 15, 30, 35.
[60] Direct Testimony of Kevin R. Kochems on Behalf of South Carolina Electric & Gas Company, Docket No. 2017-370-E, at 10.
[61] SCE&G's Brief in Support of its Motion to Dismiss, *Before* The Public Service Commission of South Carolina, Docket No. 2017-305-E, October 31, 2017, at 37; SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2017, at 38, 110.

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1 was made in response to increasing difficulties with Westinghouse's performance,
2 which was causing both increased costs and delays to the completion dates.[62]
3 In March 2017, Westinghouse filed for Chapter 11 bankruptcy and notified
4 SCE&G that it would seek protection from honoring its obligations under the fixed
5 price contract.[63] SCE&G and its partner Santee Cooper evaluated their options,
6 including completing one or both of the new power units. SCE&G determined that
7 its 55 percent share of the total cost to complete both units would be $8.8 billion, or
8 $7.1 billion for a single unit.[64] On July 31, 2017, Santee Cooper announced it was
9 suspending its participation, leaving SCE&G to face the full costs and risks of the
10 project alone.[65]
11 After careful consideration and under the unique circumstances that it faced,
12 SCE&G determined that abandonment was the most prudent decision for its
13 customers and the Company.[66] Therefore, pursuant to the abandonment provision
14 contemplated in §58-33-280(K) of the BLRA, SCE&G filed a petition with the
15 Commission on August 1, 2017 seeking a prudency ruling of its decision to abandon

[62] SCE&G's Brief in Support of its Motion to Dismiss, *Before* The Public Service Commission of South Carolina, Docket No. 2017-305-E, October 31, 2017, at 40.
[63] SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2017, at 110.
[64] Joint Application and Petition of South Carolina Electric & Gas Company and Dominion Energy, Inc., *Before* The Public Service Commission of South Carolina, Docket No.2017-370-E, January 12, 2018, at 37.
[65] Joint Application and Petition of South Carolina Electric & Gas Company and Dominion Energy, Inc., *Before* The Public Service Commission of South Carolina, Docket No.2017-370-E, January 12, 2018, at 39.
[66] SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2017, at 108-111.

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1 the project.[67] It withdrew that petition two weeks later in order to provide the
2 relevant parties time to assess the situation.[68]

3 **II. ANALYSIS OF THE LIKELY EFFECTS OF THE ACTS**

4 **Q. CAN YOU PLEASE SUMMARIZE THE LIKELY EFFECTS OF**
5 **IMPLEMENTING THE ACTS?**

6 A. Yes. All else equal, implementing the Acts, including retroactively
7 redefining the meaning of prudency and instituting the experimental rate, will first
8 cause immediate harm to SCE&G through a $270 million reduction in its revenue
9 relative to what it would collect if the Acts were not implemented. In addition,
10 implementing the Acts would further increase regulatory and political uncertainty
11 in the state of South Carolina, thereby increasing investors' perceptions of the risk
12 of investing in the state and raising SCE&G's cost of capital.

13 All else equal, implementing the Acts thus will subject SCE&G and its
14 customers to economic harm to the extent that each must bear a share of the higher
15 cost of capital. Furthermore, SCE&G's customers and the general public interest of
16 the state of South Carolina will suffer economic harm from underinvestment in
17 infrastructure caused by the increased regulatory and political uncertainty and risk.

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[67] SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2017, at 111.
[68] SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2017, at 111.

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If the rate reduction imposed by the Acts is made permanent, these negative economic effects of the rate reduction and perceived increase in regulatory and political risk will be magnified.

Q. DO CREDIT RATING AGENCIES TAKE INTO ACCOUNT REGULATORY AND POLITICAL RISKS WHEN DETERMINING A UTILITY'S CREDIT RATING?

A. Yes. Credit ratings provide an assessment of the issuer's ability to service its debt. The rating agencies use both quantitative and qualitative inputs to determine their assigned ratings. For example, Moody's places 25 percent weight on the regulatory framework, including "[c]onsistency and [p]redictability," and 25 percent weight on the "[a]bility to [r]ecover [c]osts and [e]arn [r]eturns."[69] Thus, a negative regulatory and/or political environment will result in a higher risk assessment and a lower credit rating, all else equal. Lower credit ratings are associated with higher debt yields.

Higher levels of regulatory or political risk assigned by investors to the securities of a utility also will increase investors' required return on equity.[70]

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[69] Moody's Investors Service, "Credit Opinion: South Carolina Electric & Gas Company," March 9, 2018, at 7. Moody's considers four quantitative metrics of SCE&G's financial strength, which collectively receive 40 percent weight. These metrics are three-year averages of: 1) operating cash flow before working capital ("CFO pre-WC") to Debt, 2) (CFO pre-WC less dividends) to Debt, 3) interest coverage (1 + CFO pre-WC / Interest), 4) Debt to Capitalization. Moody's places the remaining 10 percent weight on diversification (market position and diversity of generation and fuel).

[70] As I noted previously, introduction of the possibility of an *ex post* regulatory expropriation here is most precisely viewed as a reduction of the expected cash flows, not an increase to a utility's systematic risk. Strictly speaking, only systematic risk affects the discount rate. However, the price reduction from the lower expected cash flows is observationally equivalent to an increase in the discount rate. As a result, I focus on the cost of capital interpretation for expositional simplicity in this declaration.

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1 Together with higher debt costs, the higher required return on equity will increase
2 the utility's total cost of capital.

3 **Q. HOW HAVE THE RATING AGENCIES HISTORICALLY VIEWED THE**
4 **REGULATORY ENVIRONMENT IN SOUTH CAROLINA?**

5 A. Historically, the rating agencies viewed the Commission as a constructive
6 regulator, and this provided a "boost" to SCE&G ratings.[71] The rating agencies also
7 viewed the BLRA as a favorable factor in their ratings of SCE&G, as I describe
8 below.[72]

9 **Q. HAS THAT VIEWPOINT CHANGED OVER THE PAST YEAR?**

10 A. Yes. Over the past year, the rating agencies' view of the regulatory
11 environment in South Carolina has declined. Fitch described: "severe deterioration
12 in the legislative and regulatory construct in SC in recent days."[73] Moody's noted
13 that the political and regulatory backlash from SCE&G's abandonment decision
14 was: "much greater than our initial expectations."[74] A subsequent Moody's report
15 noted that: "what we have historically viewed as one of the most credit supportive

[71] *See, for example,* Moody's Investors Service, "Credit Opinion: South Carolina Electric & Gas Company," March 9, 2018, at 1.
[72] *See, for example,* Moody's Investors Service, "Rating Action: Moody's Downgrades SCE&G to Baa3 and SCANA to Ba1, Ratings Remain under Review," February 5, 2018, at 1; FitchRatings, "Fitch Downgrades SCANA to 'BB+' / SCE&G to 'BBB-'; Negative Watch Maintained," September 29, 2017, at 1.
[73] FitchRatings, "Fitch Downgrades SCANA to 'BB+' / SCE&G to 'BBB-'; Negative Watch Maintained," September 29, 2017, at 1.
[74] Moody's Investors Service, "Rating Action: Moody's Places SCANA and SCE&G on Review for Downgrade," November 1, 2017, at 1.

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1 political and regulatory environments in the country, has become one of the most
2 challenged and uncertain."[75]

3 In a January 3, 2018 report, Moody's wrote that "it will take some time to
4 prove the environment has permanently returned to a more normal state of long-
5 term credit supportiveness" and that there would be "heightened regulatory risk
6 inherent in the South Carolina political environment until a relationship track record
7 of predictable support can be established."[76] On the same day, Fitch stated that it
8 "remains concerned about the general constructiveness of the regulatory regime in
9 South Carolina over the medium term, even after a satisfactory recovery mechanism
10 for the stranded nuclear investment is achieved."[77]

11 **Q. HOW DID CREDIT RATING AGENCIES REACT TO THE PASSAGE OF**
12 **THE ACTS?**

13 A. The rating agencies responded negatively to passage of the Acts.

14 On July 3, 2018, Fitch wrote:

15 If allowed to stand, Fitch considers the magnitude of the cut to be
16 detrimental to SCE&G's and SCG's credit metrics, even after
17 consideration of SCG's 80% reduction of the common dividend.[78]

18 Despite the Legislature's characterization of the new rate as
19 "temporary," Fitch is concerned that the expected December order
20 could be of the same magnitude. If so, Fitch expects SCG's Total
21 Adjusted Debt/EBITDAR to average around 6.0x over the next three
22 years and SCE&G's to average around 5.7x, both above Fitch's
23 previously stated downgrade thresholds of 5.5x and 5.0x,

[75] Moody's Investors Service, "Credit Opinion: South Carolina Electric & Gas Company," March 9, 2018, at 4.
[76] Moody's Investors Service, "Rating Action: Moody's Changes Dominion Energy's Rating Outlook to Negative from Stable; Continues Review for Downgrade of SCE&G and SCANA," January 3, 2018, at 1-2.
[77] FitchRatings, "Fitch Revises Rating Watch on SCANA and Subsidiaries to Evolving," January 3, 2018, at 1.
[78] FitchRatings, "Fitch Maintains Rating Watch Evolving on SCANA and Subsidiaries," July 3, 2018, at 1.

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> respectively. SCG has filed a federal court challenge to the legislation and requested an injunction to stay. Absent prompt favorable legal intervention, Fitch is likely to downgrade the ratings of SCG, SCE&G, and PSNC by one notch. If the PSC issues an order in December 2018 with a permanent cut of a similar magnitude, additional downgrades may be warranted. Fitch also notes important changes to South Carolina utility regulation contained in HB4375 that, in Fitch's view, are likely to result in the continuation of SCG's adversarial regulatory relationship.[79]
>
> A decision by DEI to terminate the merger could also lead to multi-notch downgrades for SCG and its subsidiaries.[80]
>
> The ratings reflect the sharp deterioration in the legislative and regulatory environment in South Carolina since abandonment of the new nuclear project in July 2016 [*sic*]. In addition to HB 4375's legislatively mandated 14.8% rate cut, changes to definitions and statutory components of the state's utility regulation are likely to result in diminished regulatory support, in Fitch's opinion. Among such items are an expansive definition of prudence, removal of the mandate that the Office or Regulatory Staff (ORS) must consider preservation of a utility's financial integrity, and granting the ORS subpoena powers.[81]

On July 3, 2018, S&P wrote:

> We are maintaining the CreditWatch to reflect the potential for a downgrade if the Court does not issue an injunction prohibiting the SCPSC from implementing the new law. The rate reduction would significantly weaken the company's financial measures, despite its recent announced plan to reduce its dividend by about 80%.[82]
>
> We believe the enactment of House Bill 4375, which will temporarily reduce customer rates by approximately 15% or about $31 million per month, will weaken the company's financial measures, despite its recent decision to reduce its dividend by about 80%. Absent the Court issuing an injunction, prohibiting the SCPSC from implementing the

[79] FitchRatings, "Fitch Maintains Rating Watch Evolving on SCANA and Subsidiaries," July 3, 2018, at 1.
[80] FitchRatings, "Fitch Maintains Rating Watch Evolving on SCANA and Subsidiaries," July 3, 2018, at 1.
[81] FitchRatings, "Fitch Maintains Rating Watch Evolving on SCANA and Subsidiaries," July 3, 2018, at 1-2.
[82] S&P Global Ratings, "Research Update: SCANA Corp. and Subsidiaries 'BBB' Ratings Remain on CreditWatch Negative on Passage of South Carolina Bill," July 3, 2018, at 2.

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> new law, we could lower ratings to reflect our expectation of materially weaker financial measures. Specifically, we expect that the company's adjusted funds from operations (FFO) to debt would deteriorate to about the 13%-14% range from SCANA's current 17%-18% range.[83]

On July 2, 2018, Moody's wrote:

> The ratings confirmations consider the manageable impact of the legislated revenue reduction on SCE&G's and SCANA's credit quality and metrics, especially in light of the dividend cut, while also recognizing that ultimate authority for establishing permanent rates remains with the SCPSC.[84]
>
> Moody's believes the new legislation may further pressure the SCPSC to set rates that are unusually low or significantly delay or deny recovery; however we think it is unlikely they would establish rates that are lower than the temporary rates set by the new legislation.[85]
>
> If SCE&G's rates are adjusted in accordance with the legislation, Moody's anticipates cash flow credit metrics at SCE&G and SCANA will decline to levels that are commensurate with their current ratings. For example we expect the two companies will exhibit ratios of cash flow from operations excluding changes in working capital (CFO pre-WC) to debt in the low teens.[86]
>
> Downward pressure on the ratings could again increase if SCE&G is ordered to refund amounts previously collected under the BLRA, particularly without the benefit of a larger, better capitalized partner; or if rates established by the SCPSC later this year do not provide an opportunity for SCE&G to maintain a ratio of CFO pre-WC to debt that is at least in the low-teens on a sustained basis. Furthermore, if the company's liquidity becomes constrained, such as being unable to draw on its credit lines or to issue additional debt, there could also be downward movement in the ratings.[87]

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[83] S&P Global Ratings, "Research Update: SCANA Corp. and Subsidiaries 'BBB' Ratings Remain on CreditWatch Negative on Passage of South Carolina Bill," July 3, 2018, at 2-3.
[84] Moody's Investors Service, "Rating Action: Moody's Confirms SCANA, SCE&G and PSNC, Rating Outlook Negative," July 2, 2018, at 1.
[85] Moody's Investors Service, "Rating Action: Moody's Confirms SCANA, SCE&G and PSNC, Rating Outlook Negative," July 2, 2018, at 1.
[86] Moody's Investors Service, "Rating Action: Moody's Confirms SCANA, SCE&G and PSNC, Rating Outlook Negative," July 2, 2018, at 1.
[87] Moody's Investors Service, "Rating Action: Moody's Confirms SCANA, SCE&G and PSNC, Rating Outlook Negative," July 2, 2018, at 2.

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Q. PLEASE PROVIDE AN OVERVIEW OF HOW AN INCREASE IN REGULATORY OR POLITICAL UNCERTAINTY WOULD AFFECT INVESTMENT BY REGULATED UTILITIES IN SOUTH CAROLINA.

A. All else equal, if regulated utilities in South Carolina face increased risk of retroactive regulation changes that prevent them from recovering previously approved capital expenditures, then financial constraints may force utilities to eliminate or defer necessary maintenance and improvements to the electric power system, potentially leading to a less reliable electric power system and a lower quality of service for customers. Regulatory uncertainty may have a direct impact on utilities' capital expenditures – that is, utilities, out of financial necessity, may undertake fewer (or no) maintenance and improvement projects because of concern that they will be unable to recover the costs – or an indirect impact –that is, utilities will be unable to obtain adequate financing at an affordable rate to be able to implement proposed maintenance and improvement projects because investors are concerned they will not be repaid.

Academic research provides evidence that increased uncertainty can cause reductions and delays in investment.[88] Uncertainty can also cause investors to change the type of investments made. For example, uncertainty over future demand, fuel costs, or regulatory changes can cause utilities to invest in smaller, and potentially less cost-effective generation plants that require a smaller upfront

[88] *See,* for example, Dixit, Avinash, and Robert Pindyck (1994), *Investment under Uncertainty,* Princeton: Princeton University Press, at 135-145, 372-373; Hubbard, Glenn (1994), "Investment Under Uncertainty: Keeping One's Options Open," *Journal of Economic Literature,* 32(4), 1816-1831.

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investment and one that is more likely to be recovered, instead of building large generation plants that provide beneficial economies of scale but, due to size, scale, and time, may have an increased risk of having their costs disallowed by regulators.[89]

Q. ARE ELECTRIC UTILITIES VULNERABLE TO LEGISLATIVE ENACTMENTS OR REGULATORY PRONOUNCEMENTS THAT RETROACTIVELY CHANGE THE UTILITY'S FINANCIAL CIRCUMSTANCES?

A. Yes. As regulated monopolies, electric utilities are vulnerable to regulatory risk for three primary reasons: (i) investments are large and irreversible, (ii) generation, transmission, and distribution technologies are characterized by economies of scale and scope, and (iii) outputs are consumed by nearly every member of the population.[90] As explained by Bergara, *et al*. (1998):

> These features have traditionally raised the need for governmental regulation of utilities… [but] the fact that infrastructure services tend to be massively consumed implies that politicians and interest groups will care about the level of infrastructure pricing. Thus, massive consumption, economies of scale, and sunk investments provide governments (either national or local) with the incentive to behave opportunistically vis-à-vis the investing company.[91]

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[89] Dixit, Avinash, and Robert Pindyck (1994), *Investment under Uncertainty,* Princeton: Princeton University Press, at 51-54; Teisberg, Elizabeth (1993), "Capital Investment Strategies Under Uncertain Regulation," *RAND Journal of Economics,* 24(4), 591-604, at 591, 600.
[90] Bergara, Mario, Witold Henisz, and Pablo Spiller (1998), "Political Institutions and Electric Utility Investment: A Cross-Nation Analysis," *California Management Review,* 40(2), 18-35, at 19-20.
[91] Bergara, Mario, Witold Henisz, and Pablo Spiller (1998), "Political Institutions and Electric Utility Investment: A Cross-Nation Analysis," *California Management Review,* 40(2), 18-35, at 19-20.

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The incentive for regulators and politicians to behave opportunistically can then result in inefficiently low levels of investment by the utility and reductions in economic growth, given the dependence of other industries on reliable access to electric power at reasonable rates. Heller and McCubbins (1996), for example, review the theory behind regulatory expropriation of utilities' capital for political gain and its impacts:

> Utilities, as attractive and potent tools for redistribution, are particularly vulnerable to political winds. Political interference in production and pricing of utility services tends to be inefficient, as economic criteria often are low on the list of considerations for political decisions. Politically motivated redistributive efforts often drive away sources of long-term capital investment and hence seriously impede economic development… Risk, whether market or political, is an important determinant of private investment decisions. The greater the risk, all else constant, the lower the level of private investment (World Bank 1995; Levy and Spiller 1996). Governments can, however, increase the level of private investment by reducing the political risks associated with capital-intensive industries. These political risks are well known and are referred to as the "hold up" problem: governments can force utilities to shoulder burdensome taxes, to use input factors ineffectively, or to charge unprofitable rates for their service. Moreover, due to the capital intensivity [*sic*] of utility production, exit is often difficult, and thus governments can pursue strategies that depreciate the asset value of the investment, essentially expropriating the capital through regulation (Williamson 1983).[92]

Knittel (2006) reviews the shift from municipal- to state-level regulatory regimes in the United States at the beginning of the 20th century and finds that:

> The increase in the geographical breadth of electricity firms and the ability for *ex post* opportunism by corrupt municipal regulators likely led electricity firms to curb large sunk cost investments, resulting in

[92] Heller, William, and Mathew McCubbins (1996), "Politics, Institutions, and Outcomes: Electricity Regulation in Argentina and Chile," *The Journal of Policy Reform*, 1(4), 357-387, at 358.

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> inefficient levels of generation. If state regulators were less corrupt, or potentially less corrupt, then state regulators and interested parties would have seen state regulation as a means of relieving the contracting inefficiencies, thereby spurring investment in generation capacity.[93]

Based on his empirical analysis, he finds that a "[g]reater capacity *shortage* in a state is correlated with the adoption of state regulation," suggesting that "when capacity shortages were present, industrial consumers lobbied for state regulation" as a more efficient form of regulation.[94] Similarly, he finds that "[a]fter controlling for regional costs differences and cost differences due to hydroelectric output, states with low prices are more likely to adopt state regulation," suggesting that under municipal-level regulation prices may have been set "too low to support adequate generation and distribution investment levels."[95] In other words, at the beginning of the 20th century, empirical evidence suggests that state-level regulation was adopted in states where it was viewed as being less risky for utilities than municipal regulation.

Q. HOW DID THE DISALLOWANCES THAT OCCURRED IN THE 1980S IMPACT UTILITY INVESTMENT?

A. During the 1980s, regulators disallowed certain capital expenditures mainly related to new nuclear generation plants using hindsight reviews in a number of

[93] Knittel, Christopher (2006), "The Adoption of State Electricity Regulation: The Role of Interest Groups," *The Journal of Industrial Economics,* 54(2), 201-222, at 207.
[94] Knittel, Christopher (2006), "The Adoption of State Electricity Regulation: The Role of Interest Groups," *The Journal of Industrial Economics,* 54(2), 201-222, at 202.
[95] Knittel, Christopher (2006), "The Adoption of State Electricity Regulation: The Role of Interest Groups," *The Journal of Industrial Economics,* 54(2), 201-222, at 203.

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cases.[96] Thereafter, several articles examined the impact of these hindsight reviews by regulators on investment by electric utilities. These examinations determined that hindsight reviews may result in disallowances for a number of reasons, including because a plant is not deemed to be "used-and-useful" (for example, because of unexpectedly low growth in demand for electricity) or because of excessive costs (for example, because of unexpectedly high costs of construction).[97]

Prior to the 1980s, utilities had come to "expect that any costs that were 'prudently incurred' would be passed through to ratepayers. In the 1980s, however, many nuclear power plants turned out to have costs far beyond initial projections. A number of state Public Utility Commissions (PUCs) responded—with '20-20 hindsight'—by refusing to let utilities charge these higher costs to consumers."[98] In response, "a number of industry members and observers alleged that the implicit 'regulatory contract' between regulators and regulated firms was violated, with regulators opportunistically reneging on their end of the deal after fundamental demand and supply conditions had shifted."[99]

Indeed, based on data from 132 "investor-owned electric utilities (IOUs) for which continuous investment data were reported by the U.S. Department of Energy,

[96] Lyon, Thomas (1995), "Regulatory Hindsight Review and Innovation by Electric Utilities," *Journal of Regulatory Economics,* 7, 233-254, at 237.
[97] *See,* for example, Lyon, Thomas (1995), "Regulatory Hindsight Review and Innovation by Electric Utilities," *Journal of Regulatory Economics,* 7, 233-254, at 238.
[98] Lyon, Thomas (1995), "Regulatory Hindsight Review and Innovation by Electric Utilities," *Journal of Regulatory Economics,* 7, 233-254, at 237.
[99] Lyon, Thomas, and John Mayo (2005), "Regulatory Opportunism and Investment Behavior: Evidence from the U.S. Electric Utility Industry," *RAND Journal of Economics*, 36(3), 628-644, at 628.

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Electric Power Division (EPD) in its *Financial Statistics of Selected Electric Utilities*," Lyon and Mayo (2005) find that "investment peaked in the early 1980s and fell between 1985 and 1991" following the major disallowances by state commissions.[100]

Other articles find evidence that the types of investment shifted following the disallowances. Lyon (1995), for example, provides evidence that firms invested less in new technology in the 1990s relative to the 1970s[101] and demonstrates that the "threat of hindsight review may indeed cause underinvestment or a total refusal to invest in new capacity; in addition, it may cause a utility to switch from an innovative technology to a more costly conventional one."[102] Similarly, Teisberg (1993) examines the trend towards smaller, shorter lead-time plants in the 1970s and 1980s and demonstrates that "rational firms invest in smaller, shorter-lead-time plants, or delay investment when faced with uncertain and asymmetric profit and loss restrictions," such as those created by hindsight review.[103]

Lyon and Mayo (2005) demonstrate that utilities that experienced disallowances reduced their investment expenditures in the years following the

[100] Lyon, Thomas, and John Mayo (2005), "Regulatory Opportunism and Investment Behavior: Evidence from the U.S. Electric Utility Industry," *RAND Journal of Economics*, 36(3), 628-644, at 631-633.
[101] Lyon, Thomas (1995), "Regulatory Hindsight Review and Innovation by Electric Utilities," *Journal of Regulatory Economics,* 7, 233-254, at 236.
[102] Lyon, Thomas (1995), "Regulatory Hindsight Review and Innovation by Electric Utilities," *Journal of Regulatory Economics,* 7, 233-254, at 234.
[103] Teisberg, Elizabeth (1993), "Capital Investment Strategies Under Uncertain Regulation," *RAND Journal of Economics,* 24(4), 591-604, at 591. *See also,* Guthrie, Graeme (2006) "Regulating Infrastructure: The Impact on Risk and Investment," *Journal of Economic Literature,* 44(4), 925-972.

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1 disallowances.[104] They also hypothesize that if utilities believe disallowances
2 occurred because of regulatory opportunism, then other utilities in the same state
3 would reduce their investment after observing disallowances at another utility.[105]
4 While the authors do not find evidence of regulatory opportunism across all utilities
5 in their sample, they do find evidence of a spillover effect among nuclear plant
6 operators.[106] This study highlights that if the Acts passed by the legislature are
7 considered to be opportunistic by other utilities, large-scale investment by electric
8 utilities in the state, and consequently the reliability of the electric power system,
9 may suffer.

10 **Q. IS THERE ANY EVIDENCE FROM THE INTERNATIONAL**
11 **COMMUNITY REGARDING THE MANNER IN WHICH REGULATORY**
12 **REGIMES IMPACT INVESTMENT IN REGULATED UTILITIES?**

13 A. Yes. Similar to the research analyzing the effects of regulatory uncertainty
14 in the United States following the disallowances in the 1980s, there are many
15 articles studying whether cross-country differences in regulatory and/or political
16 regimes impact investment in regulated utilities. For example, Cubbin and Stern

[104] Lyon, Thomas, and John Mayo (2005), "Regulatory Opportunism and Investment Behavior: Evidence from the U.S. Electric Utility Industry," *RAND Journal of Economics*, 36(3), 628-644, at 637-638.
[105] Lyon, Thomas, and John Mayo (2005), "Regulatory Opportunism and Investment Behavior: Evidence from the U.S. Electric Utility Industry," *RAND Journal of Economics*, 36(3), 628-644, at 629. In the normal course, the expectation would be that all participants in the regulatory process would participate in good faith and not act opportunistically. If one of the participants does act opportunistically, then there will be negative economic consequences. In the case of opportunistic behavior by the firm, there can be a direct negative effect in the form of a disallowance, whereas in the case of opportunistic behavior by regulators or politicians, there can be both a direct negative economic effect on the firm (for example, through an unjustified disallowance) or an indirect negative economic effect due to increased regulatory and/or political risk as perceived by investors.
[106] Lyon, Thomas, and John Mayo (2005), "Regulatory Opportunism and Investment Behavior: Evidence from the U.S. Electric Utility Industry," *RAND Journal of Economics*, 36(3), 628-644, at 639-641.

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1 (2006) summarize the existing theory as: "[d]eveloping economies with high-
2 quality regulatory agencies (as measured by regulatory governance) should attract
3 more sustained investment into their utility service industries and at a lower cost of
4 capital. The regulated utilities should also have higher efficiency and growth
5 rates."[107] They demonstrate empirically that "[c]ontrolling for privatization and
6 competition and allowing for country-specific fixed effects, both regulatory law and
7 higher quality regulatory governance are positively and significantly associated
8 with higher per capita generation capacity."[108] Similarly, Bergara, *et al*. (1998) find
9 that political credibility and an independent judiciary increase per capita electricity
10 generation capacity.[109]

11 Studies on international capital markets provide additional perspective on
12 how regulatory uncertainty affects access to capital. A series of papers by La Porta,
13 Lopez-de-Silanes, Shleifer, and Vishny (LLSV) examine how investor protections
14 afforded by different legal environments affect the size of capital markets and asset
15 valuations in those markets. These authors find that countries that better protect
16 investors from expropriation have larger capital markets and higher asset valuations

[107] Cubbin, John, and Jon Stern (2006), "The Impact of Regulatory Governance and Privatization on Electricity Industry Generation Capacity in Developing Economies," *The World Bank Economic Review,* 20(1), 115-141, at 116.
[108] Cubbin, John, and Jon Stern (2006), "The Impact of Regulatory Governance and Privatization on Electricity Industry Generation Capacity in Developing Economies," *The World Bank Economic Review,* 20(1), 115-141, at 115.
[109] Bergara, Mario, Witold Henisz, and Pablo Spiller (1998), "Political Institutions and Electric Utility Investment: A Cross-Nation Analysis," *California Management Review,* 40(2), 18-35, at 24-26.

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than countries with weaker investor protections.[110] This research notes the importance of the consistent application of the rule of law:

> Where laws are protective of outside investors and well enforced, investors are willing to finance firms, and financial markets are both broader and more valuable. In contrast, where laws are unprotective of investors, the development of financial markets is stunted. … By limiting expropriation, the law raises the price that securities fetch in the marketplace.[111]

The consequence of the LLSV evidence for the electric utility market in South Carolina is that the retroactive mandates of the Acts will reduce investors' willingness to provide capital to electric utility companies in the state. This change in behavior would lead to less capital being available and at a higher price.

Q. PLEASE SUMMARIZE THE LIKELY IMPACT OF THE ACTS ON INVESTMENT BASED ON THE FINDINGS OF ACADEMIC RESEARCH.

A. Academic research demonstrates that an increase in regulatory uncertainty, particularly if the regulatory change is seen as politically opportunistic, is likely to lead to decreased and delayed investments and cause the investments that are made to be less cost-effective and innovative.[112] This evidence includes theoretical

[110] La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (1997), "Legal Determinants of External Finance," *Journal of Finance*, 52(3), 1131–1150, at 1131; La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (2002), "Investor Protection and Corporate Valuation," *Journal of Finance*, 57(3), 1147–1170, at 1147. *See also,* Himmelberg, Charles, Glenn Hubbard, and Inessa Love (2000), "Investor Protection, Ownership, and Investment," working paper.

[111] La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (2002), "Investor Protection and Corporate Valuation," *Journal of Finance*, 57(3), 1147–1170, at 1147.

[112] As I discuss above, expropriation risk can be ameliorated to some extent by a credible regulatory regime, such as the BLRA, that allows for advance prudency determinations. However, in this case, implementation of the Acts would render the BLRA largely ineffective by showing that the advance prudency reviews and approvals were not certain to be honored.

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models as well as empirical studies of the development of state-level regulations in the United States, the response to prudency disallowances in the 1980s, and cross-country analyses.

Implementation of the retroactive mandates of the Acts will create regulatory and political uncertainty and amount to retroactively abrogating the assurances and prudency findings that I understand the state granted to SCE&G and upon which SCE&G and its investors relied in financing and constructing two nuclear power plants. Given the retroactive character and significant economic and other consequences of implementing the Acts, academic research suggests that utilities in South Carolina likely will eliminate or defer necessary maintenance and improvements to the electric power system, potentially leading to a less reliable electric power system and a lower quality of service for customers. For example, following the disallowances that occurred in the 1980s, utilities reduced investment and chose smaller, less innovative investments that could be constructed more quickly.[113] Similarly, countries with weaker investor protections have smaller capital markets, lower asset valuations, and less electricity generation per capita than countries with stronger investor protections.[114]

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[113] Lyon, Thomas (1995), "Regulatory Hindsight Review and Innovation by Electric Utilities," *Journal of Regulatory Economics,* 7, 233-254, at 236; Teisberg, Elizabeth (1993), "Capital Investment Strategies Under Uncertain Regulation," *RAND Journal of Economics,* 24(4), 591-604, at 591.

[114] La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (1997), "Legal Determinants of External Finance," *Journal of Finance*, 52(3), 1131–1150, at 1131; La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (2002), "Investor Protection and Corporate Valuation," *Journal of Finance*, 57(3), 1147–1170, at 1147; Cubbin, John, and Jon Stern (2006), "The Impact of Regulatory Governance and Privatization on Electricity Industry Generation Capacity in Developing Economies," *The World Bank Economic Review,* 20(1), 115-141, at 115; Bergara, Mario, Witold Henisz, and Pablo Spiller (1998), "Political Institutions and Electric Utility Investment: A Cross-Nation Analysis," *California Management Review,* 40(2), 18-35, at 24-26.

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Q. ARE THERE DIRECT AND COSTLY IMPACTS ASSOCIATED WITH RETROACTIVELY CHANGING THE RULES APPLICABLE TO INVESTED CAPITAL?

A. Yes. Most directly, the Acts immediately deprive SCE&G of $270 million in revenues that are due under the BLRA. As I discuss above, these disputed revenues resulted from a robust *ex ante* review process in which the Commission approved $3.8 billion of expenditures SCE&G made on the project over the better part of a decade.[115] During this period, I understand that a number of parties participated in hearings conducted by the Commission and had the opportunity to scrutinize the project and its costs. In particular, I understand that the ORS monitored progress on the project, audited SCE&G's expenditures, and presented the results of its oversight and audits in all nine rate approvals granted by the Commission.[116]

In determining to pursue the project, SCE&G relied upon the revised rates provided for under the BLRA. In addition, SCE&G disclosed BLRA-related payments to investors in its 10-Ks. For example, its 2016 10-K states:

> Under the BLRA, the SCPSC has approved, among other things, a milestone schedule and a capital costs estimates schedule for the New Units. **This approval constitutes a final and binding determination that the New Units are used and useful for utility purposes, and that the capital costs associated with the New Units are prudent utility costs and expenses and are properly included**

[115] SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2016, at 87.
[116] South Carolina Office of Regulatory Staff, "SCE&G Cumulative Rate Increases Approved Under the Base Load Review Act," November 21, 2016.

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> **in rates**, so long as the New Units are constructed or are being constructed within the parameters of the approved milestone schedule, including specified contingencies, and the approved capital costs estimates schedule. Subject to the same conditions, the BLRA provides that SCE&G may apply to the SCPSC annually for an order to recover through revised rates SCE&G's weighted average cost of capital applied to all or part of the outstanding balance of construction work in progress concerning the New Units. Estimated operating costs, including the depreciation of the utility plant costs, are then to be recovered through rates beginning when the construction of each New Unit is completed and placed into service. The BLRA also provides that, in the event of abandonment prior to plant completion, construction work in progress costs incurred, including AFC, and a return on those costs may be recoverable through rates, so long as SCE&G demonstrates by a preponderance of the evidence that its decision to abandon the New Unit(s) was prudent.[117]

SCE&G has disclosed the binding prudency filing to investors since February 2009.[118] During this period, SCE&G issued $2.9 billion in debt.[119] The Acts would unilaterally reverse an existing law under which investors committed significant sums of capital to SCE&G and, in doing so, relied upon the state of South Carolina being faithful to the rule of law under which the investments were made. Such a reversal has the potential to reduce businesses' confidence in investing in South Carolina.

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[117] SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2016, at 87 (emphasis added).

[118] *See,* for example, SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2008, at 52; SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2009, at 25; SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2010, at 16; SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2011, at 13; SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2012, at 61; SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2014, at 39; SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2015, at 78; SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2017, at 109

[119] Exhibit No.____(GH-2).

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1 As I note above, the credit rating agencies viewed BLRA revenues as
2 important to SCE&G's financial condition, and the regulatory and political
3 environment is an important factor in determining SCE&G's credit ratings. The
4 downward revision to the rating agencies' assessments of the regulatory and
5 political environment in South Carolina points to lower credit ratings even if its
6 quantitative credit metrics remain stable. In addition, a loss of the BLRA revenues
7 would reduce SCE&G's quantitative credit metrics and place additional pressure on
8 its credit ratings. For example, Moody's notes the importance of keeping CFO pre-
9 WC to Debt at least in the low teens.[120] Dropping below this level would place
10 SCE&G at risk for further downgrades in its credit ratings, which would in turn lead
11 to a higher cost of its debt. Indeed, given that SCE&G's credit ratings are at the
12 low-end of the investment grade portion of the scale, any downgrade would likely
13 put them below investment grade, resulting in a particularly large increase in
14 SCE&G's cost of debt.
15 The academic evidence discussed above also points to a higher cost of equity
16 due to the Acts. For example, LLSV provide evidence that investor expropriation
17 reduces the availability of capital and raises its price.[121] Thus, a retroactive change
18 to the BLRA's economic assurances upon which SCE&G and its investors relied

[120] Moody's Investors Service, "Rating Action: Moody's Downgrades SCE&G to Baa3 and SCANA to Ba1, Ratings Remain Under Review," February 5, 2018, at 1.
[121] La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (1997), "Legal Determinants of External Finance," *Journal of Finance*, 52(3), 1131–1150, at 1131; La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (2002), "Investor Protection and Corporate Valuation," *Journal of Finance*, 57(3), 1147–1170, at 1147.

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1 when deciding to pursue the project and provide capital to finance it introduces
2 regulatory and political uncertainty that will increase the cost of capital. This
3 increased cost would cause direct economic harm to SCE&G and its investors to the
4 extent that SCE&G is unable to pass the increased cost on to its customers.

5 I also understand that the Acts provide no mechanism for SCE&G to later
6 recapture the disputed $270 million,[122] making the harm to SCE&G and its investors
7 permanent and irreparable.

8 **Q. WHO ULTIMATELY WILL BEAR THE COSTS OF HIGHER RATES**
9 **REQUIRED TO ATTRACT CAPITAL INVESTMENT?**

10 A. Ultimately, customers will bear the costs required to attract capital
11 investment under the conditions imposed by the Acts. Despite the apparent intent
12 of protecting SCE&G's customers, the Acts will harm them in at least two ways.
13 First, the direct channel of harm is that customers will face higher rates, all else
14 equal, to the extent the Commission passes along SCE&G's higher cost of capital
15 in future rates.[123]

16 Second, to the extent that the Commission does not fully adjust rates to reflect
17 a higher cost of capital, customers face indirect harm in the form of reduced
18 investment by SCE&G and investors. As I discuss above, SCE&G estimates that
19 the necessary capital expenditures to maintain its generation, transmission, and

[122] The annual loss of revenue after 2018 would amount to $367 million, if the experimental rate is made permanent. South Carolina Public Service Commission Directive, Order No. 2018-459.
[123] Net harm would compare the present value of the higher future rates to the proposed $270 million rate reduction in 2018.

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1 distribution assets and provide safe and reliable service to its customers to be
2 between $400 million and $500 million per year for the next three years.[124] Funding
3 these critical investments requires ongoing access to capital. If the rates the
4 Commission allows SCE&G to charge its customers are insufficient to provide
5 investors the market-based cost of capital, the Company will be unable to maintain
6 and attract capital as necessary to serve its customers.[125]

7 This prediction that the implementation of the Acts would reduce investment
8 has support in the academic literature as I discuss above. For example, Dixit and
9 Pindyck (1994) show that uncertainty reduces investment,[126] and Teisberg (1993)
10 provides evidence that regulatory uncertainty in the 1980s can explain the shift to
11 smaller, shorter-lead-time, power plants.[127] Heller and McCubbins (1996) note that
12 it is possible to: "increase the level of private investment by reducing the political
13 risks associated with capital-intensive industries."[128] Knittel (2006) finds that states
14 with capacity shortages and low prices were more likely to shift from municipal- to
15 state-level regulation of electric utilities suggesting utilities expected a reduction in
16 regulatory expropriation under state-level regulation.[129] International evidence

[124] SCANA Earnings Presentation, Fourth Quarter and Full Year 2016, February 16, 2017, at 10.
[125] SCE&G's Reply Brief in Support of its Motion to Dismiss, *Before* The Public Service Commission of South Carolina, Docket No. 2017-305-E, December 7, 2017, Exhibit 3, at 6.
[126] Dixit, Avinash, and Robert Pindyck (1994), *Investment under Uncertainty,* Princeton: Princeton University Press, at 135-145, 372-373.
[127] Teisberg, Elizabeth (1993), "Capital Investment Strategies Under Uncertain Regulation," *RAND Journal of Economics,* 24(4), 591-604.
[128] Heller, William, and Mathew McCubbins (1996), "Politics, Institutions, and Outcomes: Electricity Regulation in Argentina and Chile," *The Journal of Policy Reform*, 1(4), 357-387, at 358.
[129] Knittel, Christopher (2006), "The Adoption of State Electricity Regulation: The Role of Interest Groups," *The Journal of Industrial Economics,* 54(2), 201-222, at 206-207.

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provides further support that weak investor protections are associated with reduced access to capital in general (LLSV),[130] and that electricity generation capacity, specifically, is lower when regulatory protection is lower (Cubbin and Stern (2006), Bergara, *et al*. (1998)).[131]

Q. IN ADDITION TO THE HARM TO SCE&G AND ITS CUSTOMERS, IS THERE OTHER ECONOMIC HARM CAUSED BY THE IMPLEMENTATION OF THE ACTS?

A. Yes. The general public interest of the state of South Carolina will be harmed by the implementation of the retroactive mandates of the Acts as well. First, abrogating the BLRA would cause economic harm by weakening the BLRA itself, an economically sensible law, which likely would lead to underinvestment across the state. The BLRA was designed to mitigate the uncertainty imposed on investors when the prudency review occurs after the plant is complete (Dixit and Pindyck (1994), Teisberg (1993), Encinosa and Sappington (1995)).[132] Additionally, if market participants view the retroactive mandates of the Acts as regulatory or

[130] La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (1997), "Legal Determinants of External Finance," *Journal of Finance*, 52(3), 1131–1150, at 1131; La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny (2002), "Investor Protection and Corporate Valuation," *Journal of Finance*, 57(3), 1147–1170, at 1147.

[131] Cubbin, John, and Jon Stern (2006), "The Impact of Regulatory Governance and Privatization on Electricity Industry Generation Capacity in Developing Economies," *The World Bank Economic Review,* 20(1), 115-141; Bergara, Mario, Witold Henisz, and Pablo Spiller (1998), "Political Institutions and Electric Utility Investment: A Cross-Nation Analysis," *California Management Review,* 40(2), 18-35, at 24-26.

[132] Dixit, Avinash, and Robert Pindyck (1994), *Investment under Uncertainty,* Princeton: Princeton University Press, at 135-145, 372-373; Teisberg, Elizabeth (1993), "Capital Investment Strategies Under Uncertain Regulation," *RAND Journal of Economics* 24(4), 591-604; Encinosa, William, and David Sappington (1995), "Toward a Benchmark for Optimal Prudency Policy," *Journal of Regulatory Economics,* 7, 111-130.

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political opportunism, it will raise the cost of capital to utilities in the state, curtailing investment.

As I note for the customers of SCE&G, underinvestment in the electric power system would lead to electric service that is less reliable and robust. Further, this decline in the quality of electric service, as well as the reduction in expenditures on construction and maintenance in the state, would reduce employment and economic growth.

In addition, unilaterally and retroactively reversing an existing law under which there was significant advance prudency review and participation in decision-making by multiple stakeholders, and under which investors committed significant sums of capital to SCE&G, also likely will reduce the confidence and willingness of utilities and other businesses to invest in South Carolina.

III. CONCLUSION

Q. PLEASE SUMMARIZE THE KEY OPINIONS THAT YOU HAVE EXPRESSED IN THIS TESTIMONY.

A. The retroactive change in law and the modification of the regulatory environment that results from implementing the mandates of the Acts will cause economic harm of various types to SCE&G, its customers, and the general public interest of the state of South Carolina.

Academic research provides compelling evidence that increased regulatory uncertainty can cause reductions and delays in investment and change the type of

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1 investments made. For example, following the disallowances that occurred in the
2 1980s, utilities reduced investment and chose smaller, less innovative investments
3 that could be constructed more quickly. Similarly, countries with weaker investor
4 protections have smaller capital markets, lower asset valuations, and less electricity
5 generation per capita than countries with stronger investor protections.

6 Implementation of the retroactive mandates of the Acts, including redefining
7 the meaning of prudency and instituting the experimental rate, will result in SCE&G
8 losing millions of dollars of revenue, facing reduced access to capital, and incurring
9 an increased cost of capital, all of which are likely to cause SCE&G to reduce
10 investment. SCE&G's customers in turn, likely will face increased rates, to the
11 extent that SCE&G's higher cost of capital is passed along to them in rates, and a
12 lower quality of service, if SCE&G must reduce investment due to a lack of
13 affordable capital. Furthermore, as documented in the literature, abrogating the
14 BLRA and disallowing SCE&G's previously approved capital expenditures will
15 cause economic harm to the residents of South Carolina by discouraging utility
16 investment in the state. All else equal, reduced investment in the state's electric
17 system will result in lower service reliability and quality, including potentially
18 slower recovery times following major hurricanes and other severe weather events,
19 fewer jobs, and slower economic growth. In addition, by unilaterally and
20 retroactively reversing an existing law under which there were significant advance
21 prudency review and participation in decision-making by multiple stakeholders, and
22 under which investors had committed significant sums of capital to SCE&G,

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implementation of the Acts also will likely reduce the confidence and willingness of utilities and other businesses to invest in South Carolina.

If the rate reduction imposed by the Acts is made permanent in this proceeding, all of the negative impacts discussed above will be magnified, through the impact on SCE&G and its cost of capital. All else equal, this impact will cause SCE&G and its customers to suffer additional economic harm either through under-recovery on the part of SCE&G or through higher rates for customers. Customers also will suffer additional economic harm through lower capital investments in utility infrastructure.

Furthermore, if the retroactive mandates of the experimental rate and the reversal of previously made prudency decisions are made permanent, the underinvestment effect also likely would be greater due to the increased size of the economic shock caused by the permanent rate reduction, increasing the economic harm to both customers and the general public interest of the state of South Carolina.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

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Exhibit 1

ROBERT GLENN HUBBARD

Curriculum Vitae

PERSONAL DATA

Born: In Orlando, Florida.
Marital Status: Married, two children.

FIELDS OF SPECIALIZATION

Public Economics, Corporate Finance and Financial Institutions, Macroeconomics, Industrial Organization, Natural Resource Economics, Public Policy.

EDUCATION

Ph.D., Economics, Harvard University, May 1983.
Dissertation: *Three Essays on Government Debt and Asset Markets*, supervised by Benjamin M. Friedman, Jerry A. Hausman, and Martin S. Feldstein.

A.M., Economics, Harvard University, May 1981.

B.A., B.S., Economics, University of Central Florida, June 1979, *summa cum laude*.

HONORS AND AWARDS

Distinguished Eagle Scout Award, National Boy Scouts of America, November 2017.

Visionary Award, Council for Economic Education, 2016.

Silver Beaver Award, Boy Scouts of America, 2014.

Medal of Honor, Foreign Policy Association, 2014.

Homer Jones Lecture, Federal Reserve Bank of St. Louis, 2013.

Fiftieth Anniversary Award of Scholarship, University of Central Florida, 2013.

Franklin Delano Roosevelt Distinguished Service Award, Greater New York Council, Boy Scouts of America, 2012.

Bloomberg Markets, 50 Most Influential Members of the Global Financial Community, 2012.

National Association of Corporate Directors, Directorship 100: People to Watch, 2011.

Joint American Economic Association/American Finance Association Distinguished Speaker, 2008.

Cairncross Lecture, University of Oxford, 2007.

Fellow of the National Association of Business Economists, 2005.

William F. Butler Memorial Award, New York Association of Business Economists Award, 2005.

Exceptional Service Award, The White House, 2002.

Michelle Akers Award for Distinguished Service, University of Central Florida, 2001.

Alumni Hall of Fame, University of Central Florida, 2000.

Best Paper Award for Corporate Finance, Western Finance Association, 1998.

Exceptional Service Award, U.S. Department of the Treasury, 1992.

Distinguished Alumnus Award, University of Central Florida, 1991.

John M. Olin Fellowship, National Bureau of Economic Research, 1987-1988.

Teaching Commendations, Graduate School of Business, Columbia University.

Northwestern University Associated Student Government Teaching Awards, announced in 1985, 1986, and 1987.

Graduate Distinctions: National Science Foundation Fellowship, Alfred P. Sloan Foundation Fellowship.

Undergraduate Distinctions: National Merit Scholarship, National Society of Professional Engineers Award, Florida Society of Professional Engineers Award, National Council of Teachers of English Award, Omicron Delta Kappa, Financial Management Association Honor Society.

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POSITIONS HELD

2004-present	Dean, Graduate School of Business, Columbia University
1994-present	Russell L. Carson Professor of Economics and Finance, Graduate School of Business, Columbia University
1997-present	Professor of Economics, Faculty of Arts and Sciences, Columbia University
2017-present	Co-Chair, Aspen Institute Future of Work Initiative National Advisory Council
2017-present	Member, Aspen Institute Economic Strategy Group
2007-2017	Panel of Economic Advisors, Federal Reserve Bank of New York (also 1993-2001)
2003-2012	Featured commentator, *Nightly Business Report*
2003-2010	Featured commentator, *Marketplace*
2003-present	Visiting Scholar American Enterprise Institute (also 1995-2001)
1999-2004	Co-Director, Columbia Business School Entrepreneurship Program
2004-2005	Viewpoint Columnist, *Business Week*
2004-2006	Member, Panel of Economic Advisors, Congressional Budget Office
2001-2003	Chairman, President's Council of Economic Advisers
2001-2003	Chairman, Economic Policy Committee, Organization for Economic Cooperation and Development
2001-2003	Member, White House National Economic Council and National Security Council
2001-2003	Member, President's Council on Science and Technology
1997-1998	Visiting Professor of Business Administration, Harvard Business School
1995-2001	Visiting Scholar and Director of Tax Policy Program, American Enterprise Institute
1994-1997	Senior Vice Dean, Graduate School of Business, Columbia University
1994	MCI Fellow, American Council for Capital Formation
1994	John M. Olin Visiting Professor, Center for the Study of Economy and the State, University of Chicago
1991-1993	Deputy Assistant Secretary (Tax Analysis), U.S. Department of the Treasury
1988-present	Professor of Economics and Finance, Graduate School of Business, Columbia University
1987-1988	John M. Olin Fellow in residence at the National Bureau of Economic Research
1983-1988	Assistant Professor of Economics, Northwestern University, with half-time research appointment in the Center for Urban Affairs and Policy Research
1985	Visiting Scholar, Center for Business and Government, John F. Kennedy School of Government, Harvard University
1981-1983	Teaching Fellow (Department of Economics) and Resident Tutor in Economics (Dunster House), Harvard University

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DIRECTORSHIPS

2007-present	Met Life (Lead independent director)
2006-2008	Capmark Financial Corporation; Information Services Group
2004-present	ADP, Inc.; BlackRock Closed-End Funds
2004-2014	KKR Financial Corporation (Lead independent director)
2004-2008	Duke Realty Corporation
2004-2006	Dex Media/R.H. Donnelley
2003-2005	ITU Ventures
2000-2001	Angel Society, LLC; Information Technology University, LLC

CONSULTING OR ADVISORY RELATIONSHIPS

2016-present	55 Capital
2014-present	Fiscal Note
2007-present	Consulting or Speaking Engagements at Some Point: U.S. Department of Justice, Internal Revenue Service, Abbott, Access Midstream, Airgas, AlixPartners, Alternative Investment Group, Amazon, American Century, America's Health Insurance Plans, AMVAC, ApexBrasil, Association for Corporate Growth, Atlantic Point, Bank of America, Bank of New York Mellon, Barclays Services Corporation, BBVA Compass, BGC, BNP Paribas, Brevan Howard, Calamos, Capital Research, Carlyle Group, Citigroup, Commonfund, Compagnie Financiere Tradition, ComScore, Credit Suisse, Dell, Deutsche Bank, Donald Fewer, FactSet, Fidelity, Franklin Resources, Freddie Mac, Gartner, Goldman Sachs, Good, Government of Greece, Great-West, Sue Ann Hamm, The Hartford, Intel, Investcorp, Jarden, JP Morgan Chase, Key Bank, Kosmos, Macquarie, Microsoft, Morgan Stanley, Mylan, NAI, NAREIT, National Rural Utilities Cooperative Finance Corporation, New York Bankers Association, NMS Group, Nationwide, Ocwen, Oracle, Patriarch, Pension Real Estate Association, Pershing Square, PNC, Principal Management Corporation, Prium, Promontory, Rabobank, Real Estate Roundtable, Related Properties, Reynolds American, Rio Tinto, Royal Bank of Canada, Royal Bank of Scotland, Rural/Metro, SCG&E, SIG, Solera, SunTrust, Telia Sonera, Trust Company of the West, Tullett Prebon, Visa, Walter Energy, Wells Fargo, William Walters, Wilmington Trust
2005-2009	Arcapita
2005-2010	Nomura Holdings America
2008	Laurus Funds
2005-2008	Chart Venture Partners
2003-2009	Ripplewood Holdings

POSTS IN NON-PROFIT ORGANIZATIONS

2006-present	Co-Chair, Committee on Capital Markets Regulation
2004-present	Member, Advisory Board, National Center on Addiction and Substance Abuse
2003-present	Member, Manhattan District Council Board, Boy Scouts of America
2017-present	Trustee, Fifth Avenue Presbyterian Church, New York
2012-2015	Trustee, Fifth Avenue Presbyterian Church, New York
2010-2011	Co-Chair, The Study Group on Corporate Boards
2008-2011	Elder, Fifth Avenue Presbyterian Church
2008-2010	Chairman, Economic Club of New York
2006-2008	Member, Board of Directors, Resources for the Future
2003-2008	Trustee, Tax Foundation
2004-2010	Trustee, Economic Club of New York
2004-2007	Trustee, Fifth Avenue Presbyterian Church, New York

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PROFESSIONAL ACTIVITIES

1987-present	Research Associate, National Bureau of Economic Research (Monetary Economics, Corporate Finance, Public Economics, Economic Fluctuations, Industrial Organization)
2007-present	Life Member, Council on Foreign Relations
2017-present	Member, U.S.-China Economic and Security Review Commission
2003	Member, Committee of Visitors, National Science Foundation
2000	Panelist, Graduate Fellowship Selection Committee, National Science Foundation
1999-2001	Director, Project on Nonprofit Organizations, National Bureau of Economic Research
1997-2001	Member, COSSA-Liaison Committee, American Economic Association
1993-2001	Board of Advisors, Institutional Investor Project, School of Law, Columbia University
1995-1999	Member, Board of Academic Consultants, American Law Institute
1997	Member, Grants Panel for Integrative Graduate Education and Research Training Program, National Science Foundation
1994-1996	Member, Economics Grants Panel, National Science Foundation
1993-1996	Member, Federal Taxation and Finance Committee, National Tax Association
1990-1995	Co-organized research program on International Aspects of Taxation at the National Bureau of Economic Research, Cambridge, Massachusetts
1995	Member, Program Committee, American Economic Association Meeting
1983-1987	Faculty Research Fellow, National Bureau of Economic Research
1983-1986	Adjunct Faculty Research Fellow, Energy and Environmental Policy Center, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts
1986, 1988, 1994	Member of the Brookings Panel on Economic Activity
1985, 1987	Special guest of the Brookings Panel on Economic Activity
1990-1991	Organized research program on Environmental Economics and Public Policy at the National Bureau of Economic Research, Cambridge, Massachusetts
1988-1990	Co-organized research program on Dynamic Models of Firms and Industries at the National Bureau of Economic Research, Cambridge, Massachusetts
1985-1989	Organized research program and workshops on contracting in financial markets at the Summer Institute, National Bureau of Economic Research, Cambridge, Massachusetts
1988	Organized Economic Fluctuations program on Industrial Economics and Macroeconomics, National Bureau of Economic Research, Stanford, California
1986-1988	Organized research program and workshop on links between macroeconomics and industrial organization at the Summer Institute, National Bureau of Economic Research, Cambridge, Massachusetts
1991	Member, Program Committee, Econometric Society Winter Meetings
1982-1983	Member, Energy Modeling Forum VII Study Group, Stanford University, Stanford, California

1981-present	Consultant on research projects with private corporations and government and international agencies, including the Internal Revenue Service, Social Security Administration, U.S. Department of Energy, U.S. Department of State, U.S. Department of Treasury, and U.S. International Trade Commission; National Science Foundation; The World Bank; Board of Governors of the Federal Reserve System; Federal Reserve Bank of New York; Congressional Budget Office
Member:	American Economic Association, American Finance Association, Association for Public Policy and Management, Econometric Society, International Association of Energy Economists, National Tax Association, the Royal Economic Society, and the Institute for Management Science
Referee:	*American Economic Review; Canadian Journal of Economics; Columbia Journal of World Business; Econometrica; Economic Journal; Energy Economics; Energy Journal; International Finance; International Tax and Public Finance; Journal of Business; Journal of Business and Economic Statistics; Journal of Economic History; Journal of Economic Literature; Journal of Finance; Journal of Financial Economics; Journal of Financial Intermediation; Journal of Financial and Quantitative Analysis, Journal of Financial Services Research; Journal of Industrial Economics; Journal of International Money and Finance; Journal of Law and Economics; Journal of Macroeconomics; Journal of Money, Credit, and Banking; Journal of Monetary Economics; Journal of Political Economy; Journal of Public Economics; Journal of Regulatory Economics; Journal of Small Business Finance; Management Science; National Tax Journal; Quarterly Journal of Economics; Quarterly Review of Economics and Finance; RAND Journal of Economics; Review of Economic Dynamics; Review of Economic Studies; Review of Economics and Statistics; Review of Financial Economics; Scandinavian Journal of Economics; Southern Economic Journal; National Science Foundation*; C.V. Starr Center for Applied Economics (New York University); Addison-Wesley Publishing Company; Ballinger Press; Cambridge University Press; Harvard Business School Press; MIT Press; W.W. Norton; Oxford University Press
Associate Editor:	*Journal of Applied Corporate Finance*
Former Associate Editor:	*Federal Reserve Bank of New York Economic Policy Review; International Finance*; *International Tax and Public Finance; Journal of Industrial Economics; Journal of Macroeconomics; Journal of Small Business Finance; National Tax Journal*

PUBLICATIONS AND PAPERS

Edited Volumes

Transition Costs of Fundamental Tax Reform (with K.A. Hassett), Washington, DC: AEI Press, 2001.

Inequality and Tax Policy (with K.A. Hassett), Washington, DC: AEI Press, 2001.

Effects of Taxation on Multinational Corporations (with M. Feldstein and J.R. Hines), Chicago: University of Chicago Press, 1995.

Taxing Multinational Corporations (with M. Feldstein and J. R. Hines), Chicago: University of Chicago Press, 1995.

Studies in International Taxation (with A. Giovannini and J. B. Slemrod), Chicago: University of Chicago Press, 1993.

Financial Markets and Financial Crises, Chicago: University of Chicago Press, 1991.

Asymmetric Information, Corporate Finance, and Investment, Chicago: University of Chicago Press, 1990.

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Books

Balance (with T. Kane), Simon and Schuster, 2013.

Healthy, Wealthy, and Wise (with J.F. Cogan and D.P. Kessler), Hoover Institution Press and AEI Press, 1st ed., 2005; 2nd ed., 2011.

Seeds of Destruction (with P. Navarro), FT Publishing, 2010.

The Mutual Fund Industry: Competition and Investor Welfare (with M.F. Koehn, S.I. Ornstein, M. Van Audenrode, and J. Royer), New York: Columbia Business School Publishing, 2010.

The Aid Trap: Hard Truths About Ending Poverty (with W. Duggan), Columbia Business School Publishing, 2009.

Textbooks

Principles of Economics (with A.P. O'Brien), Pearson Prentice Hall, 1st ed., 2006; 2nd ed., 2008; 3rd ed., 2010; 4th ed., 2013; 5th ed., 2015; 6th ed., 2017; 7th ed., 2019.

Money, Banking, and the Financial System (with A.P. O'Brien), Pearson Prentice Hall, 1st ed., 2012; 2nd ed., 2013.

Macroeconomics (with A.P. O'Brien and M. Rafferty), Pearson Prentice Hall, 1st ed., 2012; 2nd ed., 2014; 3rd ed., 2018.

Money, the Financial System, and the Economy, Reading: Addison-Wesley Publishing Company, 1st ed., 1994; 2nd ed., 1997; 3rd ed., 2000; 4th ed., 2002; 5th ed., 2004; 6th ed., 2007.

Publications

Articles

"Establishing Credible Rules for Fed Emergency Lending" (with C. Calomiris, D. Holtz-Eakin, A.H. Meltzer, and H.S. Scott), *Journal of Financial Economic Policy* 8 (2017): 260-267.

"The Response of Deferred Executive Compensation to Changes in Tax Rates" (with A. Gorry, K.A. Hassett, and A. Mathur), *Journal of Public Economics* 151 (2017): 28-40.

"Country Characteristics and the Incidence of Capital Income Taxation on Wages: An Empirical Assessment" (with C. Azemar), *Canadian Journal of Economics* 48 (2015): 1762-1802.

"Taxing Capital's Gains: Capital's Ideas and Tax Policy in the Twenty-First Century", *National Tax Journal*, 68 (2015): 409-424.

Reforming the Tax Preference for Employer Health Insurance" (with J. Bankman, J.F. Cogan, and D.P. Kessler), *Tax Policy and the Economy*, volume 26, Cambridge, University of Chicago Press, 2012.

"The Effect of Tax Preferences on Health Spending" (with J.F. Cogan and D.P. Kessler), *National Tax Journal*, 64 (2011): 795-816.

"The Effect of Medicare Coverage for the Disabled on the Market for Private Insurance" (with J.F. Cogan and D.P. Kessler), *Journal of Health Economics* 29 (2010): 418-428.

"The Effect of Massachusetts' Health Reform on Employer-Sponsored Insurance Premiums" (with J.F. Cogan and D.P. Kessler), *Forum for Health Economics and Policy*, 2010.

"The Mortgage Market Meltdown and House Prices" (with C. Mayer), *The B.E. Journal of Economic Analysis & Policy* 9: Issue 3 (Symposium), Article 8 (2009).

"Competition in the Mutual Fund Industry: Evidence and Implications for Policy" (with J. Coates), *Journal of Corporation Law*, 33 (Fall 2007).

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"To Bundle or Not to Bundle: Firms' Choices Under Pure Building" (with A. Saha and J. Lee), *International Journal of the Economics of Business* 14 (2007): 59-83.

"The Economic Effects of Federal Participation in Terrorism Risk" (with B. Deal and P. Hess), Risk Management and Insurance Review 8 (2005): 177-209.

"The Effects of Progressive Income Taxation on Job Turnover" (with W.M. Gentry), *Journal of Public Economics* 88 (September 2004): 2301-2322.

"Business, Knowledge, and Global Growth", *Capitalism and Society*, 1 (2006).

"Precautionary Savings and the Governance of Nonprofit Organizations" (with R. Fisman), *Journal of Public Economics*, 2005.

"Government Debt and Interest Rates" (with E. Engen), in M. Gertler and K. Rogoff, *NBER Macroeconomics Annual 2004*, Cambridge: MIT Press, 2005.

"Entrepreneurship and Household Saving" (with W.M. Gentry), *Advances in Economic Analysis and Policy*, 4 (2004).

"Taxing Multinationals" (with M. Devereux), *International Taxation and Public Finance* 10(2003):469-487.

"The Effect of the Tax Reform Act of 1986 on the Location of Assets in Financial Services Firms" (with R. Altshuler), *Journal of Public Economics* 87 (January 2003):109-127.

"The Role of Nonprofit Endowments" (with R. Fisman), in E. Glaeser, ed., *The Governance of Not-For-Profit Organizations*, Chicago: University of Chicago Press, 2003.

"Are There Bank Effects in Borrowers' Costs of Funds?: Evidence from a Matched Sample of Borrowers and Banks" (with K.N. Kuttner and D.N. Palia), *Journal of Business* 75 (October 2002): 559-581.

"The Share Price Effects of Dividend Taxes and Tax Imputation Credits" (with T.S. Harris and D. Kemsley), *Journal of Public Economics* 79 (March 2001): 569-596.

"Tax Policy and Entrepreneurial Entry" (with W.M. Gentry), *American Economic Review* 90 (May 2000).: 283-287.

"Understanding the Determinants of Managerial Ownership and the Link Between Ownership and Performance" (with C.P. Himmelberg and D. Palia), *Journal of Financial Economics* 53 (1999): 353-384.

"A Reexamination of the Conglomerate Merger Wave in the 1960s" (with D. Palia), *Journal of Finance* 54 (June 1999): 1131-1152.

"Inflation and the User Cost of Capital: Does Inflation Still Matter?" (with D. Cohen and K.A. Hassett), in M. Feldstein, ed., *The Costs and Benefits of Achieving Price Stability*, Chicago: University of Chicago Press, 1999.

"Are Investment Incentives Blunted by Changes in Prices of Capital Goods?: International Evidence" (with K.A. Hassett), *International Finance* 1 (October 1998): 103-125.

"Capital-Market Imperfections and Investment," *Journal of Economic Literature* 36 (March 1998): 193-225.

"Fundamental Tax Reform and Corporate Financial Policy" (with W.M. Gentry), in J.M. Poterba, ed., *Tax Policy and the Economy*, volume 12, Cambridge: MIT Press, 1998.

"Distributional Implications of Introducing a Broad-Based Consumption Tax" (with W.M. Gentry), in J.M. Poterba, ed., *Tax Policy and the Economy*, volume 11, Cambridge: MIT Press, 1997.

"How Different Are Income and Consumption Taxes?," *American Economic Review* 87 (May 1997): 138-142.

"Tax Policy and Investment," (with K.A. Hassett), in A.J. Auerbach, ed., *Fiscal Policy: Lessons from Economic Research*, Cambridge: MIT Press, 1997.

"Assessing the Effectiveness of Saving Incentives" (with J. Skinner), *Journal of Economic Perspectives* 10 (Fall 1996): 73-90.

"The Political Economy of Branching Restrictions and Deposit Insurance: A Model of Monopolistic Competition Among Small and Large Banks" (with N. Economides and D. Palia), *Journal of Law and Economics* 39 (October 1996): 667-704.

"Tax Reforms and Investment: A Cross-Country Comparison" (with J.G. Cummins and K.A. Hassett), *Journal of Public Economics* 62 (1996): 237-273.

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"Benefits of Control, Managerial Ownership, and the Stock Returns of Acquiring Firms" (with D. Palia), *RAND Journal of Economics* 26 (Winter 1995): 782-792.

"Executive Pay and Performance: Evidence from the U.S. Banking Industry" (with D. Palia), *Journal of Financial Economics* 39 (1995): 105-130.

"Tax Policy, Internal Finance, and Investment: Evidence from the Undistributed Profits Tax of 1936-1937" (with C. Calomiris), *Journal of Business* 68 (October 1995): 443-482.

"A Reconsideration of Investment Behavior Using Tax Reforms as Natural Experiments" (with J.G. Cummins and K.A. Hassett), *Brookings Papers on Economic Activity* (1994:2): 1-59.

"Precautionary Saving and Social Insurance" (with J. Skinner and S. Zeldes), *Journal of Political Economy* 105 (April 1995): 360-399.

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"Institutional Investors, Boards of Directors, and Corporate Governance," Korn/Ferry, 1997.

"An Economic Analysis of Saving Incentives," Securities Industry Association, 1994, with Jonathan Skinner.

"Securities Transactions Taxes: Tax Design, Revenue, and Policy Considerations," Catalyst Institute, 1993.

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"Industrial Behavior and the Business Cycle: A Panel Data Study of U.S. Manufacturing," National Science Foundation (Economics Group SES-8420152), 1985-1987, with Ian Domowitz and Bruce Petersen.

"Efficient Contracting and Market Power: Evidence from the U.S. Natural Gas Market," Transportation Center, Northwestern University, Summer 1985.

"Constructing a Panel Data Base for Studies of U.S. Manufacturing," University Research Grants Committee, Northwestern University, 1985-1986.

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"Contracting and Price Adjustment in Product Markets," University Research Grants Committee, Northwestern University, 1983-1984.

PAPERS PRESENTED

University Seminars

Bard College, University of Bergamo, Butler Community College, University of California (Berkeley), University of California (Los Angeles), University of California (San Diego), Carleton, University of Chicago, Columbia, University of Dubuque, Emory, University of Florida, University of Central Florida, Florida Atlantic University, George Washington, Georgetown, Georgia Southern University, Harvard, Hendrix College, University of Illinois, Indiana University, Johns Hopkins, Laval, Lehigh, University College (London), University of Kentucky, London School of Economics, MIT, University of Maryland, University of Miami, Miami University, University of Michigan, University of Minnesota, New York University, Northwestern, Oxford, University of Pennsylvania, Princeton, Rice, University of Rochester, Stanford, Syracuse, University of Miami, University of Texas, Texas Tech University, Tufts, University of Virginia, University of Wisconsin (Madison), University of Wisconsin (Milwaukee), Virginia Tech, and Yale.

Conference Papers Presented

American Council for Capital Formation, Washington, DC, June 1994.

American Economic Association, Philadelphia, 2018; Chicago, 2017; San Francisco, 2016; Boston, 2015; Philadelphia, 2014; San Diego, 2013; Chicago, 2012; New Orleans, 2008; Chicago, 2007; Boston, 2006; Philadelphia, 2005; San Diego, January 2004; Atlanta, January 2002; New Orleans, January 2001; Boston, January 2000; New York, January 1999; New Orleans, January 1997; San Francisco, January 1996; Washington, D.C., January 1995; Boston, January 1994; Anaheim, January 1993; Washington, D.C., December 1990; Atlanta, December 1989; New York, December 1988; Chicago, December 1987; New Orleans, December 1985; Dallas, December 1984.

American Enterprise Institute, Conference on Corporate Taxation, 2016; Conference on Private Equity, 2007; Conference on Corporate Taxation, 2006; Conference on Multinational Corporations, 2004, 2003; Conference on Multinational Corporations, February 1999; Conference on Income Inequality, January 1999; Conference on Transition Costs of Fundamental Tax Reform, November 1998; Conference Series on Social Insurance Reform, 1997-1998; Conference Series on Fundamental Tax Reform, 1995-1998; Conference on Distributional Analysis of Tax Policies, Washington, D.C., December 1993.

American Finance Association, New Orleans, January 2008; San Diego, January 2004; Boston, January 2000; New York, January 1999; New Orleans, January 1997.

Association of Environmental and Resource Economists, Dallas, December 1984; San Francisco, December 1983.

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Brookings Panel on Economic Activity, September 2015, September 1994, April 1988, September 1987, September 1986, April 1986, September 1985.

Centre for Economic Policy Research Conference on Capital Taxation and European Integration, London, September 1989.

Conference on International Perspectives on the Macroeconomic and Microeconomic Implications of Financing Constraints, Centre for Economic Policy Research, Bergamo, Italy, October 1994.

Congressional Research Service Conference for New Members of Congress, Williamsburg, January 1999.

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Energy Modeling Forum, Stanford University, August 1983; February 1983; August 1982.

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Federal Reserve Bank of New York, Conference on Consolidation of the Financial Services Industry, New York, March 1998.

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Federal Reserve Bank of St. Louis, Conference on Economic Policy, St. Louis, October 1994.

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International Association of Energy Economists, Boston, November 1986; Philadelphia, December 1985; Bonn, June 1985; San Francisco, November 1984; Washington, DC, June 1983; Denver, November 1982; Cambridge (England), June 1982; Houston, November 1981.

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National Tax Association/Tax Institute of America, Washington, DC, June 2000; Atlanta, October 1999; Arlington, May 1992; Seattle, October 1983.

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Carlyle Capital Corporation Limited, Alan John Roberts, Neil Mather, Christopher Morris, Adrian John, Denis Rabet, solely in their capacity as Joint Liquidators of Carlyle Capital Corporation Limited (In Liquidation) v. William Elias Conway, Jr., James H. Hance, Jr., et al, Court File No. 1510, In the Royal Court of Guernsey, Ordinary Court. Provided testimony 2016.

Illinois Tool Works, Inc. & Subsidiaries v. Commissioner of Internal Revenue, United States Tax Court, Docket No. 10418-14. Provided trial testimony 2016.

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Appraisal of Dell Inc., Consol. C.A. No. 9322-VCL, In the Court of the Chancery of the State of Delaware. Provided deposition testimony and trial testimony in 2015.

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Tullett Prebon PLC, Tullett Prebon Financial Services LLC f/k/a Tullett Liberty Securities LLC and Tullett Prebon Americas Corp. v. BGC Partners, Inc., case No. L-003796-11, Superior Court of New Jersey, Hudson County. Provided trial testimony in 2014.

Basis Pac-Rim Opportunity Fund & Basis Yield Alpha Fund v. TCW Asset Management Company, Index No. 654033/2012, Supreme Court of the State of New York, County of New York. Provided deposition testimony in 2014.

Postova Bank, A.S. and Istrokapital SE v. The Hellenic Republic, case no. ARB/13/8, International Centre for Settlement of Investment Disputes. Provided arbitration testimony in 2014.

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EXHIBIT 2
DEBT ISSUED BY SCE&G

Year	Debt Issued by SCE&G (USD in millions)
2009	$325
2010	-
2011	$380
2012	$500
2013	$400
2014	$300
2015	$500
2016	$500
2017	-
Total	**$2,905**

Notes and Sources:
Includes debt issued by SCE&G only.
SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2009.
SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2010.
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SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2012.
SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2013.
SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2014.
SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2015.
SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2016.
SCANA Corporation and South Carolina Electric & Gas Company SEC Form 10-K for the fiscal year ended December 31, 2017.