STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION

EnergyNorth Natural Gas, Inc. d/b/a National Grid NH

Docket DG 10-017

Direct Testimony
of
Susan F. Tierney

February 26, 2010

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1 **I. INTRODUCTION AND QUALIFICATIONS**

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

3 A. My name is Susan Fallows Tierney. I am employed at Analysis Group, Inc.,
4 located at 111 Huntington Avenue, 10th Floor, Boston, Massachusetts, 02199.

5

6 **Q. What is your position?**

7 A. I am one of Analysis Group's Managing Principals.

8

9 **Q. Please summarize your educational background and training.**

10 A. I hold a Ph.D. in regional planning from Cornell University (1980) and a Masters
11 in Regional Planning, also from Cornell University (1976). I taught as an
12 assistant professor for three and a half years at the University of California at
13 Irvine. I am currently teaching a course on methods of policy analysis at the
14 Massachusetts Institute of Technology.

15

16 **Q. Please describe your professional experience.**

17 A. I have been involved in issues related to public utilities, ratemaking and
18 regulation, and energy and environmental policy for over 25 years as a regulator,
19 policymaker, educator, and consultant. During this period, I have worked on
20 utility ratemaking and economics as a utility regulator, the chairman of the board
21 of directors of a major publicly owned water utility, a consultant to many publicly
22 owned and investor-owned utilities, a consultant to energy customers,

environmental groups, and state agencies, and an expert witness in litigation on utility ratemaking.

For approximately the past 15 years, I have been a consultant and advisor to private companies and governmental and other organizations on a variety of economic and policy issues in the public utility sector. Before that, I served in senior state and federal policy and regulatory positions for 13 years, having served as the Assistant Secretary for Policy at the U.S. Department of Energy, Massachusetts State government as Secretary of Environmental Affairs, Commissioner of the Department of Public Utilities, Executive Director of the Energy Facilities Siting Council, and Senior Economist for the Executive Office of Energy Resources. I currently sit on several corporate and non-profit boards and commissions, including co-chairing the National Commission on Energy Policy and chairing the Advisory Council of the National Renewable Energy Laboratory. My complete curriculum vitae is included as Attachment NG-SFT-1 to my direct testimony.

Q. Have you previously submitted testimony before the New Hampshire Public Utilities Commission ("the Commission") or other state or federal bodies?

A. I have not testified before the Commission. However, I have testified before a number of other state utility commissions, the Federal Energy Regulatory Commission, the U.S. Congress, several state legislatures, arbitration panels, and in federal and state court proceedings.

Q. What is the purpose of your testimony in this proceeding?

A. I have been asked by EnergyNorth Natural Gas, Inc. d/b/a National Grid NH ("EnergyNorth" or the "Company") to provide testimony on the Company's ratemaking proposal. I focus in particular on various factors that influenced the design of the ratemaking proposal and on revenue-decoupling and other ratemaking issues. I also summarize why this ratemaking filing is needed at this time and how it supports the Commission's regulatory policies and the state's energy policy goals and objectives.

Q. How is your testimony organized?

A. After this introductory section that provides background for my testimony, I describe my overall conclusions in Section II, including a high-level overview of the elements of some of the key aspects of the Company's ratemaking proposal. Section III provides important economic, financial and ratemaking context for the Company's filing, and explains why the elements of the Company's proposal are needed and how these factors influenced the Company's filing. In Section IV, I describe the core ratemaking elements of the Company's filing, including why they are needed and how they support the Commission's goals for assuring that rates are just and reasonable. Section V explains the Company's proposed revenue decoupling mechanism, and why it is needed and how it provides benefits to the Company's customers.

Q. Are you sponsoring any attachments as part of your testimony?

A. Yes. My attachments are:

- Attachment NG-SFT-1: Resume of Susan F. Tierney
- Attachment NG-SFT-2: Energy Distribution Company Productivity Offsets: Recent Study Estimates and Rulings
- Attachment NG-SFT-3: Energy Distribution Company Productivity Offsets: Analysis of Estimates from Recent Studies
- Attachment NG-SFT-4: 1989 Resolution passed by the National Association of Regulatory Utility Commissions

II. SUMMARY OF TESTIMONY

Q. What are the main themes and conclusions of your testimony?

A. This filing is made at a time of significant challenges in the environment in which the Company operates in New Hampshire. These challenges include: macroeconomic conditions that are difficult for customers and the Company alike; a prolonged period of declining average natural gas usage per customer, and slow customer growth; the need to make continuing and substantial investments to provide reliable and safe service to customers; the existence of a number of major elements of the Company's cost of service that are both volatile and affected significantly by factors outside the control of the Company; the application of traditional ratemaking policies that introduce significant regulatory lag; the inability of the Company to earn its allowed return on equity under rates

established by the Commission in 2009 and the resulting need to file for new rates for the second time in two years; the expectations about the heightened role of energy efficiency in helping customers manage their energy bills; and the need to introduce ratemaking policies that better align the Company's financial interests with those of its customers with respect to the adoption of cost-effective energy efficiency.

The Company's ratemaking proposal has been developed with these various conditions in mind. The filing has several core elements: the establishment of rates based on rate base as of the end-of-test year period (June 30, 2009) adjusted for certain types of non-growth capital expenditures through the end of September 2010; an expansion of the cast iron/bare steel ("CIBS") rate adjustment mechanism to include non-growth capital investment associated with public works projects and to include all CIBS capital costs without exclusion of the first $500,000 of investment; and targeted annual rate adjustment mechanisms that allow rates to reflect certain known and measurable and Commission-approved costs (e.g., for pensions and other post-employment benefits ("pension/OPEB"), for commodity-related bad debt, and for the effects of inflation). There is also a proposed revenue decoupling mechanism to de-link revenues from deliveries of natural gas.

In effect, there are two main parts of the Company's proposal: (a) the ratemaking proposal with its associated ratemaking elements, and (b) the revenue decoupling

mechanism. These two parts can be adopted together or the Commission may choose to adopt the former without the latter. The Company supports the Commission's adoption of both, since the first part is designed to assure a financially healthy company, which is critically important to the ability of the Company to provide high-quality, safe and affordable service to its customers, and the second part is designed to address ratemaking barriers that serve to pit the Company's financial interests against its customers' (and the state's) interest in the aggressive adoption of cost-effective energy efficiency services to help them manage their energy bills.

While the revenue decoupling proposal will better align the interests of the Company and customers in cost-effectively driving down high and volatile commodity charges, the Company's overall ratemaking proposal also benefits customers by supporting the Company's need to fund (on reasonable terms) investments that maintain and improve delivery service to customers and allowing rates to move down as well as up to reflect changes in certain highly volatile cost factors.

I note Mr. Stavropoulos' willingness to consider committing not to file a new rate case for a period of two years after the date of a Commission order if the Company and Staff were to reach agreement on a resolution that is consistent with the Company's proposal and if the return on equity approved for the Company reflected a premium for the additional risk such a commitment imposes. This

willingness underscores the Company's view that the package of elements in the Company's ratemaking package would restore its ability to fund utility operations in New Hampshire on a sustainable going forward basis.

Q. Is the Company's ratemaking proposal reasonable, appropriate and consistent with Commission ratemaking principles and policy goals?

A. Yes. Based on my experience in regulation and public policy, this proposal effectively leverages the Commission's strong ratemaking foundations and supports the Commission's long-standing overall ratemaking goals of assuring that rates are just and reasonable. By providing more timely cost recovery, the proposal will help to provide revenues to support the Company's investment in the system and its costs of providing service to customers. This plan also provides the utility with the opportunity to realize a return on its investment which falls within a range that is neither confiscatory nor unduly profitable and that reflects the utility's investment risk, and serves the public interest. I explain the bases for these conclusions in my testimony, below.

III. THE CONTEXT FOR THIS RATE CASE: CHALLENGES IN THE PROVISION OF GAS DISTRIBUTION SERVICE IN NEW HAMPSHIRE, WITH IMPLICATIONS FOR UTILITY RATEMAKING

Q. Please explain the "challenges" that you think have affected the development of this rate proposal.

1 A. Let me start by highlighting the fact that this is the Company's second rate case
2 filing in the past two years, as the Commission is well aware. As described in the
3 testimonies of Mr. Nickolas Stavropoulos, Mr. Frank Lombardo and Mr. Michael
4 Adams, and Mr. Robert Hevert, the current rates established in 2009 do not permit
5 the Company to earn its authorized rate of return.
6
7 That recent rate case was filed in February of 2008, after 16 years during which
8 there were no rate cases filed by the Company.[1] Over the period from 1992 to the
9 early part of the following decade, several factors in combination contributed to
10 allowing many years to pass between rate cases. During that particular period,
11 EnergyNorth experienced overall growth in the number of customers using
12 natural gas[2] and in total sales of natural gas.[3] This sales growth fueled revenue
13 increases with rates established at the beginning of the 1990s. However, the net
14 effect of these trends began to change starting around 2002-2003, as natural gas
15 commodity prices increased in the years thereafter (after a period of relatively flat
16 prices during the prior decade[4]) and as usage per customer declined faster than

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[1] A revenue-neutral rate case was filed in 2000.

[2] Between January 1992 and December 2000, for example, the total number of customers served by EnergyNorth across all service classes grew by 17 percent. (The number of customers taking firm gas service increased by 16 percent.) Data provided by EnergyNorth.

[3] From 1992 through 2000, EnergyNorth weather-normalized total sales across all customer classes increased by 53 percent. (Firm sales increased by 44 percent.) Data provided by EnergyNorth.

[4] During the 1990s, wellhead prices (on a dollar-per-mcf basis) of natural gas rose from $1.71 (in 1990) to $2.19 (in 1999). In the following decade, such prices rose from $3.68 (in 2000), to $8.07 (in 2008). The lowest price of the decade was in 2002, when it was $2.95. EIA, http://tonto.eia.doe.gov/dnav/ng/hist/n9190us3a.htm (accessed on December 31, 2009). Using delivered citygate prices in New Hampshire, the comparable prices in the 1990s were $3.51(in 1990), to $4.07 (in 1999), and in the following decade the prices were $5.34 (in 2000) and $9.71 (in 2008). The lowest price

new customers were added. These trends are shown below.

As shown in Figure NG-SFT-1, the Company saw some increase in the number of residential heating customers (including low income customers), and commercial and industrial customers it served between 2002 and 2008 (an increase of 15 percent and 17 percent, respectively). The number of residential non-heating customers decreased by over 20 percent during the same time period.

Figure NG-SFT-1

Notes:
[1] Individual customer classes have been grouped as follows: *Residential Non-Heating* = R-1 Residential Non-Heating; *Residential Heating (Incl. Low Income)* = R-3 Residential Heating and R-4 Low Income Discount Residential Heating; *Commercial and Industrial* = G-41 Small C&I High Winter Use, G-42 Medium C&I High Winter Use, G-43 Large C&I High Winter Use, G-51 Small C&I Low Winter Use, G-52 Medium C&I Low Winter Use, G-53 Large C&I Load Factor <90%, G-54 Large C&I Load Factor <110%, and G-63 Large C&I Load Factor > 110%.
[2] Annual total customers are calculated by averaging the monthly reported totals in a given year.
[3] Residential heating values are plotted on the secondary axis.
Source: Data provided by EnergyNorth.

While the Company served an increasing number of customers in some of its customer classes, there were countervailing trends. Figure NG-SFT-2 shows weather-normalized delivery data and illustrates that gas consumption per

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during the last decade was $4.24 in 2002, with a high price of $10.29 in 2007. EIA, http://tonto.eia.doe.gov/dnav/ng/hist/n3050nh3a.htm (accessed on January 23, 2010).

1 residential heating customer (including low income heating) actually declined 15
2 percent between 2002 and 2008. (While not shown, residential non-heating use
3 declined by 6 percent.) All together, residential (heating and non-heating)
4 customers' total gas consumption (weather-normalized) declined by 3 percent
5 from 2002 to 2008.[5] This decline in use by residential customers has been driven
6 by improvements made to homes to make them more energy efficient, customers
7 turning down their thermostats, and the installation by residential customers of
8 energy efficient equipment.[6] Note that gas consumption per commercial and
9 industrial customer increased 11 percent during this 2002-2008 period, and their
10 overall consumption increased 22 percent.[7])

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[5] Data provided by EnergyNorth.

[6] See Frederick Joutz and Robert P. Trost, "An Economic Analysis of Consumer Response to Natural Gas Prices," Prepared for and Published by the American Gas Association, March, 2007, page 2: "Residential natural gas consumption is strongly influenced by three factors: seasonal heating needs; response to price change; and the efficiency changes in appliances and home shells caused by a natural turnover rate to more efficient homes and gas appliances. On a weather-adjusted basis, the price and the long run conservation effects are key determinants of changes in residential natural gas consumption…. Short term effects are decisions made by consumers with the current capital stock. Residential customers "turning down the thermostat" would be considered a short term effect. Long term effects are distinguished from short term effects by the inclusion of the decision to purchase more efficient energy consuming appliances and prematurely retiring less efficient ones…. [footnote in the original: It should be noted that if natural gas prices decrease, consumers will not replace recently purchased efficient equipment with less efficient equipment. So there maybe asymmetry with respect to the impact of natural gas prices on appliance and shell efficiency. The efficiency gains in appliance equipment that have occurred in the last several years will not disappear if natural gas prices go down. However, declining prices may lead consumers turning up thermostats to increase comfort levels (in the short-run). In the very long-run, a decline in prices could lead to an increase in burner tips per customer.]"

[7] Data provided by EnergyNorth.

Figure NG-SFT-2

Notes:
[1] The Residential Heating (Incl. Low Income) group includes R-3 Residential Heating and R-4 Low Income Discount Residential Heating.
[2] Actual therm use by customer class is calculated by summing the total weather-normalized therm deliveries in a year and dividing by the average number of customers in a year.
Source: Data provided by EnergyNorth.

Natural gas prices increased dramatically during this period. Figure NG-SFT-3 pulls several metrics together, tracking trends in natural gas prices, average gas consumption across all customer classes, total customers, and total deliveries relative to the levels in 2002. As indicated, the total number of customers ("all customers") and total gas consumption ("weather-normalized therms used") rose slowly from 2002 through 2008; gas prices rose by a factor of 2.5; and average consumption per customer remained relatively flat, with declining gas consumption per residential customer (shown in Figure NG-SFT-2) nearly offset by rising gas consumption by commercial and industrial customers.

Figure NG-SFT-3

While the Company's revenues increased from $95 million (in 2002) to $175 million (in 2008), its expenses (including cost of gas) rose more quickly, from $83 million (in 2002) to $168 million (in 2008). This is in part because the cost of purchased gas, which is recovered as a pass-through to the Company's customers, rose by approximately 137 percent over this period – over 3.5 times the percentage increase in delivery expenses (which rose 39 percent from 2002 through 2008).[8] Assuming that the cost of commodity supply is recovered fully

[8] This reflects the change in "cost of gas" versus delivery-related operations and maintenance expenses

from retail customers who take bundled service, the remainder of revenues and costs are related to natural gas delivery. Focusing on delivery services alone, the Company's capital expenditures rose dramatically in the past few years, more than twice as fast as non-commodity/non-production operations and expenses (as shown in Figure NG-SFT-4).

Figure NG-SFT 4

Figure NG-SFT-5 tracks the net operating revenues of the Company from 2002 through 2008. This is the result of comparing year's total operating revenues with

(i.e., total operations and maintenance less purchased gas and production expenses), as reflected in Table 42-S of the annual filings submitted by the Company to the NH Public Utilities Commission.

total operating expenses (including commodity supply). It shows that the difference between revenues and costs narrowed in recent years compared to the beginning of this decade. Inflation alone had the effect of raising costs for utilities by 29 percent (from 2002-2008).[9] At the same time, the utility industry generally faced rapidly rising capital costs for infrastructure investment due to a combination of factors, including increasing prices for underlying raw commodities and materials.[10]

Figure NG-SFT-5

[9] Inflation measured using the producer price index for electric power and natural gas utilities (series ID PDU4981#263) prior to January 2004 and the producer price index for utilities (series ID PCU221---221) beginning in January 2004, as published by the Bureau of Labor Statistics.

[10] See Greg Basheda and Mark Chupka, "Sticker Shock: Increasing Prices for Materials, Equipment and Services are Driving Utility Infrastructure Costs into Uncharted Territory," *Public Utilities Fortnightly*, December 1, 2007.

During this period, the Company made significant capital investments to provide service to its customers, with gross plant assets increasing from $212 million in 2002, to $305 million at the end of 2008.[11] (See Figure NG-SFT-4 for the 2002-2008 period.) Among other things, these trends resulted in the Company's actual rate of return falling to very low levels over the course of the decade, as shown in Figure NG-SFT-6.

Figure NG-SFT-6

Q. In addition to the challenges that existed prior to the filing of the most recent rate case in 2008, what other challenges have affected the development of the Company's filing in *this* case?

[11] Data provided by EnergyNorth.

1 A. The challenging market conditions in the natural gas industry and in the
2 Company's service territory have combined with some of the ratemaking policies
3 in New Hampshire to make it difficult if not impossible for the Company to earn
4 its allowed return. As described by Mr. Stavropoulos, the rates approved in 2009
5 have not produced adequate revenue support for the Company's operations and
6 have not enabled the Company to earn its allowed return. While the
7 Commission's reliance on historic test-year average rate base as the basis for
8 setting rates may have worked well at a time in the past when sales growth (e.g.,
9 through customer additions, new loads from existing customers, and increasing
10 overall usage levels) supported revenue growth in parallel with rising costs, these
11 conditions no longer apply. There are increasing cost pressures associated with
12 the need to refurbish and modernize the Company's delivery infrastructure (as
13 described by Ms. Fleck), and there are significant costs in certain categories (such
14 as pension/OPEB costs, commodity-related bad debt) that tend to be volatile and
15 affected largely by factors outside of the Company's control. In the absence of
16 introducing ratemaking practices such as those proposed by the Company in this
17 case, the status quo will likely mean that the Company simply cannot earn its
18 allowed return and will have to turn to frequent requests for rate relief for the
19 foreseeable future. Similar concerns have been raised in recent commentaries
20 provided by investment analysts to various state utility commissions.[12]

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[12] See, for example, two presentations made to the Natural Gas Committee at the annual meeting of the National Association of Regulatory Utility Commissioners ("NARUC") in February, 2009: Mihoko Manabe (CFA, Vice President/Senior Credit Officer, Moody's Investor Services), "Credit Trends in the

1 **Q. Besides these financial factors, are there other factors that adversely affect**
2 **the Company's ability to have a fighting chance of earning its allowed return**
3 **on equity?**
4 A. Yes. As noted in these latter presentations from financial analysts, there are also
5 several ratemaking policy considerations in some states (like New Hampshire)
6 that reinforce those economic and financial factors. These ratemaking policies
7 include: adherence to a cost-of-capital methodology that produces allowed rates
8 of return in New Hampshire that are low relative to determinations made in other
9 states; the Commission's traditional reliance on an historic test year that is
10 typically not updated to reflect end-of-year rate base; the state's law that does not
11 allow for recovery of construction work in progress, further reinforcing regulatory
12 lag; use of few ratemaking mechanisms that allow adjustments to rates to reflect
13 changes in major cost elements over which the utility has little to no control; a
14 ratemaking practice that has not typically allowed the recovery of the advertising
15 and marketing expenses necessary to pursue new customer sales that could
16 support revenue growth; a continuing expectation that even if there were no
17 growth in customer counts and/or deliveries, the Company will need to make
18 capital investments in its delivery infrastructure in order to ensure safe and
19 reliable service to customers; and an unintended adverse consequence on the
20 Company's finances of successful adoption of energy efficiency measures.

Gas Sector Amidst the Financial Crisis," February 16, 2009 (http://www.narucmeetings.org/Presentations/moodys%202%2011%2009.pdf); David Whitcher (Executive Director, Global Power and Utilities Group, Morgan Stanley), "Cost of Capital Issues Affecting Utilities," February 16, 2009, http://www.narucmeetings.org/Presentations/Whitcher%20Speech %20(NARUC%20-%202-16-09).pdf.

Q. You mentioned that some of the Commission's policies contribute to significant regulatory lag. What is regulatory lag, and what are some of its implications?

A. "Regulatory lag" is the phrase used to describe the delay in ratemaking that arises between the time when rates no longer reflect the cost to provide service, and the time when new commission-approved rates go into effect. Even when costs in an historic test year are adjusted with updates during the course of a rate case or through use of forecasted information about conditions expected during the period when new rates go into effect (as they are in some other states), regulatory lag can arise as changes occur in the utility's actual costs to provide service or its overall level of sales, such that they no longer resemble the basic revenue and cost levels reviewed and approved when the regulators last established the utility's rates.

Additionally, regulatory lag is sometimes used to describe the situation where ratemaking policies (e.g., use of historic test year) create a gap in cost recovery such that the utility is inhibited from ever recovering a portion of and on investment made after a test year but before new rates go into effect.

Q. Are you aware that traditionally some regulators have viewed regulatory lag as having positive benefits to consumers, by introducing an incentive for utilities to manage their activities and contain expenditures even in the face of rising costs?

A. Yes, but the value of regulatory lag in this regard is dependent upon the circumstances.

Q. Please explain further what you mean.

A. Regulatory lag should not be regarded as an end in and of itself. It is really more of an observable event than a principle of regulation. In fact, regulatory lag is a relatively crude tool and – depending upon the circumstances in which it occurs – can undermine other equally important goals of utility regulation. Regulatory lag can also lead to frequent requests for new rates, with the attendant impact on rate stability and on the resources of a regulatory agency, intervenors, and the utility. In short, under certain circumstances, regulatory lag can undermine the link between revenue recovery and cost of service, between sending customers appropriate price signals about the cost of providing them with utility service and motivating the utility and its investors to fund a reasonable and prudent level of capital investment to serve customers' needs. Moreover, regulatory lag can be detrimental to the financial health of the utility if it fundamentally deprives the utility of any meaningful chance of earning the return that a regulator decides is reasonable. This outcome, in turn, is likely to harm consumers by causing a higher cost of capital and potentially causing the Company to reduce investment and make other changes that can adversely affect the quality of service over the long run.

1 **Q. You also stated that significant regulatory lag can create a challenge for**
2 **administrative efficiency in ratemaking. Please explain what you meant.**
3 A. If regulatory lag is significant and contributes to a utility being unable to earn its
4 allowed return, then it is likely to lead to the filing of frequent rate cases. The
5 process of filing frequent rate cases is costly to consumers, the Commission, the
6 Company and other intervenors who participate directly and indirectly in the rate
7 case process. In the last case in 2008, for example, the total rate case expense
8 amounted to $801,094 (not including the cost associated with the motion for
9 rehearing), of which $788,416 was approved to be recovered from the Company's
10 customers.[13] For a Company with revenues amounting to $175 million in 2008, a
11 $0.8 million expense is noticeable if incurred on a yearly basis.
12
13 **Q. You also mentioned previously that another challenge facing the Company is**
14 **the pressure on revenues and recovery of the cost of providing utility service**
15 **that may occur as an unintended consequence if the state is successful in its**
16 **energy efficiency goals. Please explain further.**
17 A. As the Commission knows quite well, one important objective of pursuing cost-
18 effective energy efficiency is to enable customers to reduce their overall energy
19 cost by reducing their total gas consumption. Natural gas customers that adopt
20 energy efficiency measures forego the full expense of natural gas service – that is

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[13] Letter of Stephen P. Frink, Assistant Director, Gas & Water Division, NH PUC, to Debra Howland, Executive Director, NH PUC, dated December 3, 2009, regarding DG 08-009, Staff Report Re: Rate Case Expense Review, EnergyNorth Natural Gas, Inc., d/b/a National Grid NH Petition for Rate Increase.

to say: for any therms not used as a consequence of adopting some form of energy efficiency, these customers avoid purchasing units of gas delivery services as well as the natural gas commodity itself. This has important economic, financial, environmental and other benefits to consumers and to the state. But doing so, in combination with traditional ratemaking approaches, leads to a reduction in the Company's revenues, which further undermines the utility's ability to fund capital investment, contributing to the pressure on the Company to file frequent rate cases and potentially creating a situation in which the Company is never able to earn its allowed return.

Q. How does this contextual background on these various economic, market, financial and ratemaking challenges figure in to how the Commission should weigh the issues presented in this rate case?

A. Given these various conditions, it is critically important that the regulatory environment and the Commission's ratemaking policies provide balanced support for a number of important regulatory objectives. These include timely recovery of the costs of providing utility service; support for appropriate modifications to traditional ratemaking approaches that address the array of challenges facing the Company as it attempts to provide safe, reliable and economical service in the state; and mechanisms that adjust rates to assure appropriate support for needed investment and for attracting capital at reasonable costs. The traditional historic cost-of-service model introduces inherent and substantial regulatory lag that, when combined with flat or declining use per customer, no longer provides a

sufficient ratemaking platform unless it is adjusted to recognize the challenging conditions that now exist.

Thus, the Company has formulated a proposal that is a mix of the old and the new, but in almost all regards utilizes tools that the Commission itself has approved in various circumstances in the past. In that sense, this proposal leverages the ratemaking foundations established by the Commission over many years. In my opinion, this proposal should be viewed as both "pro-consumer" (in that it will help assure safe, reliable and high-quality service at affordable prices, with appropriate support for ratemaking mechanisms to assist customers in managing their energy bills through energy efficiency) and "pro-utility" (in that it will provide a meaningful opportunity to earn a reasonable rate of return). Adopting the proposal will also signal to investors that New Hampshire regulators recognize the challenging conditions that now exist in the industry, and that they will provide the Company with a fighting chance of earning the return that the Commission itself has authorized.

IV. OVERVIEW OF THE COMPANY'S RATEMAKING PROPOSAL: DESCRIPTION AND PURPOSE

Q. Please describe the core elements of the first part of the Company's ratemaking proposal (i.e., those elements other than revenue decoupling).

A. As I described in the summary of my testimony, the first part of the Company's ratemaking proposal includes: (a) the establishment of rates based on rate base as of the end of test year period with an adjustment for certain types of non-growth

capital expenditures through the end of September 2010; and (b) targeted annual rate adjustment mechanisms to allow for changes (positive and negative) in certain costs; and (c) a willingness of the Company to consider a two-year "stay-out" commitment under certain circumstances. While I encourage the Commission to adopt this part of the ratemaking proposal in conjunction with the revenue decoupling proposal I describe in Section V, it could be adopted either on a stand-alone basis or together with revenue decoupling. Both are designed to help assure a financially healthy company.

Q. Why is the Company proposing to update the test-year rate base?

A. Use of a test-year average rate base in an environment where there is (1) little or no growth in customers, (2) flat natural gas usage per customer, and (3) a substantial ongoing need for non-growth-related capital investment makes it effectively impossible for the Company to earn the rate of return authorized by the Commission regardless of what that return is. Recognizing that much of the Company's investment at present is tied to non-growth capital requirements (e.g., replacement of pipe for safety purposes, or changes in the location of pipe needed to be moved as part of public works projects),[14] the Company is proposing to update the rate base numbers to reflect changes in such capital investment that arise up through September 2010 (which will still be within the period in which the Commission is reviewing the Company's rate proposal and provide Staff with

[14] I understand from Ms. Fleck's testimony that more than half of the Company's capital investment in recent years has been for non-revenue producing projects.

1 the time to review such investment). This will reduce regulatory lag by affording
2 more timely recovery of and on this capital which is needed for safety or
3 reliability purposes and/or is occurring from external factors. The customers are
4 receiving the benefit of the Company's investment in such plant (e.g., plant
5 replaced in the context of public works projects and pipe replacement[15]) and
6 should support its costs in rates.
7
8 **Q. Has the Commission ever approved the use of rate-base updates (or other**
9 **updated information) in the past?**
10 A. Yes. For example, the Commission has previously approved the use of step
11 adjustments in base rates,[16] updates to test-period rate base,[17] and capital trackers

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[15] I note that under its current rates, the Company has a cost-recovery mechanism for investment in cast iron/bare steel replacement above $500,000. While this allows for more timely cost recovery, it does not – in itself – allow for the updating of rate base to reflect capital investments after the test year. Further, that adjustment mechanism does not include capital investment associated with replacing other system equipment in the context of public works projects.

[16] See, for example, the Commission's September 2009 order in the Aquarion Water Company rate case (DW 08-098; Order No. 25,019, September 25, 2009) in which the Commission noted that it "authorized step adjustments to rates as a means of ensuring that a regulated utility retains its ability to earn a reasonable rate of return after implementing large capital projects, and to avoid placing a utility in an earnings deficiency immediately after a rate case in which a revenue requirement was based on a historical test year." See also the Commission's September 2009 order in the Forest Edge Water Company rate case (DW 08-160; Order No. 25017, September 23, 2009) in which the Commission noted "the step adjustment avoids placing a utility in an earnings deficiency immediately after a rate case in which the revenue requirement was based on a historical test year."

[17] See, for example, the Commission's order in the recent Forest Edge Water Company rate case (DW 08-160; Order No. 25017, September 23, 2009) in which the Commission concluded that "if the Company undertakes and completes any capital improvement(s) called for in the study [of needed improvements to its system] by the end of 2011, it may request an additional step adjustment to its rates to reflect the cost of the capital improvements completed." Additionally, the Commission noted in its order on the recent Fryerburg Water rate case (DW 07-115; Order No. 24,950, March 20, 2009) that certain post-test-period capital additions were allowed and were "[c]onsistent with the [its] policy of allowing recovery of expenditures for large capital projects which, if not recoverable, would have a detrimental impact on a utility's rate of return, we find that these capital improvements ought to be recovered through a step adjustment to rates."

for cast iron/bare-steel replacement (e.g., as allowed in current Company rates).[18] As I described before, a benefit of this proposed approach is that it will support the Company's ability to earn its allowed return without resorting to frequent rate cases (assuming that this and other parts of the Company's proposal are approved).

Q. Please describe the annual adjustment mechanisms that are also a core part of the Company's rate proposal.

A. Another part of the proposal is for the Commission to adopt in this rate case an adjustment mechanism to permit recovery of revenues designed to capture the effects of certain capital costs and operating expenses. (I am describing it here as a ratemaking adjustment mechanism that allows for tracking different sub-component costs, even though these sub-components may be implemented on different filing schedules.) This revenue adjustment mechanism would allow for either net credits or surcharges in rates based on Commission reviews of actual information about known and measurable changes, as filed by the Company on an annual basis. Changes in applicable costs would be reflected in changes in the Local Distribution Adjustment Charge ("LDAC") or the Cost of Gas Adjustment ("CGA") charge. Specific detail about the timing of the filings related to the various sub-components of this adjustment mechanism can be found in the testimony of Ms. Ann Leary.

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[18] See the Commission's July 2007 order in the National Grid, Granite State Electric Company, and KeySpan Corporation merger transaction (DG 06-107; Order No. 24, 777; July 12, 2007), pages 27, 88.

Q. What cost elements would be tracked, with changes recovered in this ratemaking adjustment?

A. The adjustment mechanism would track the effect of three sub-components (in addition to the revenue decoupling reconciliation, discussed later in my testimony). These three sub-components are: (1) actual incremental changes in capital additions for replacement of cast iron and bare steel main and public works-related projects; (2) changes in costs for pension/OPEBs and commodity-related bad debt; and (3) the effect of inflation on certain costs.

Q. Please briefly describe the first cost sub-component relating to changes in capital expenditures in cast iron and bare steel main and public works-related projects after September 30, 2010.

A. The Company would track and submit annually[19] to the Commission information about capital expenditures since the prior filing related to replacement of cast iron and bare steel main and work performed in conjunction with public works projects undertaken by municipalities and other government entities. The annual filings would provide information about the relevant capital expenditures during the period, as well as their implications for revenue requirements to be collected in the revenue adjustment mechanism in the upcoming year.

[19] Specific detail about the timing of these filings can be found in the testimony (and appendix thereto) of Ms. Leary.

Q. Please describe the second cost sub-component relating to changes in certain operating expenses.

A. As described in the testimony of Mr. Lombardo and Mr. Adams, the Company would track and submit annually to the Commission information about changes in pension/ OPEB and commodity-related bad debt expenses relative to the test-year amounts included in base rates. As their testimony points out, these expenses are not only large relative to non-commodity expenses, but the annual changes in these expenses can vary significantly from year to year and are affected primarily by external forces rather than Company actions. As a consequence, the Company is requesting authorization for a ratemaking adjustment to capture the effect of changes (up or down) in pension/OPEB and commodity-related bad debt expenses relative to the allowance in base rates. Depending upon the direction of change from year to year, customers could see a positive adjustment (a credit) or a negative adjustment (a surcharge) for changes in pension/OPEB costs through the LDAC adjustment, and for changes in commodity-related bad debt expenses through the CGA adjustment. Specific detail about the timing of the filings can be found in the testimony of Ms. Leary.

Q. Please describe the third cost sub-component relating to the effects of inflation on certain of the costs of providing service.

A. The Company also proposes to include in the second year of the ratemaking proposal an adjustment to reflect the effect of inflation on certain elements of the Company's cost of service from the rate case. The specific proposal is to include

in the adjustment an amount to reflect the cumulative impact of inflation since the test year, net of an amount designed to provide an offset for productivity (on behalf of customers) (i.e., a "Net Inflation Adjustment"). If inflation in any year is less than the productivity offset, the adjustment would be negative.

Q. How is the revenue requirement determined for the Net Inflation Adjustment?

A. For each rate class, the LDAC after the first rate year would reflect the Net Inflation Adjustment. This would be calculated by multiplying (a) the applicable operating expenses of the Company's base distribution revenue requirement subject to the Net Inflation Adjustment times (b) the net inflation factor (compounded over the relevant time period since the test year used in the rate case). The net inflation factor reflects a measure of economy-wide inflation for the time period in question net of a fixed adjustment for industry productivity. Only the portion of the revenue requirement associated with operating expenses affected by inflationary pressures would be subject to adjustment. In particular, any amounts that are already subject to reconciliation would be excluded from the mechanism.

Q. Is the Company proposing a specific Net Inflation Adjustment?

A. Yes. The Company's Net Inflation Adjustment would use an indexing approach to capture the net effect of changes in inflation and productivity improvements. This proposed indexing approach captures the two key factors affecting a

company's cost of operations: (1) changes in the cost of its inputs to production, including labor, materials and services; and (2) potential increases in the productive efficiency with which a company provides goods and services to its customers. Depending on the particular industry, market conditions and recent technological change in the industry, these changes in productivity can offset changes in industry input costs to a varying degree. Under the Company's proposal, the Net Inflation Adjustment will be based on an annual net inflation factor, *"I"*, compounded over the relevant time period that begins one year after the end of the test year. This compounded net inflation factor will be applied to that portion of the Company's revenue that is recovering operations-related costs. The net inflation factor in each year will be based on the following formula:

$$I = \frac{GDPPI_Y}{GDPPI_{Y-1}} - P - 1$$

In this formula, "*GDPPI*" (or, "GDP-PI") is the Gross Domestic Product Price Index, and will be calculated as the average of the four quarterly measures of GDP-PI as of the second quarter of each year. *"P"* is the productivity offset (on consumer's behalf) which is fixed and reflects industry-level changes in productivity.[20]

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[20] The use of a fixed productivity offset is a fairly standard approach due to the volatility of year-to-year measurements of industry-wide productivity. In addition, in the event that there were to be a productivity factor that would vary year by year, it is likely that there would need to be litigated administrative proceedings to determine the factor, since this metric is not calculated and reported by an independent, third-party source and estimates would need to be developed by either state commissions or the utility in each year. Also, because the proposed measure of price inflation captures economy-wide inflation rather than price inflation for energy distribution companies, the productivity offset must capture both typical

Q. Why is the GDP-PI an appropriate measure of inflation?

A. GDP-PI is measured by the U.S. Department of Commerce's Bureau of Economic Analysis as one of its primary measures of price inflation in the U.S. economy. Many consider the GDP-PI to be more accurate and more stable than other economy-wide measures of inflation, such as the consumer price index. The GDP-PI is also available in a timely fashion. The GDP-PI is and has been a commonly used indexing mechanism in a variety of regulatory contexts, including in many other states.

Q. What do you propose to use as the productivity offset relative to inflation costs?

A. I have proposed to use 0.5 percentage points for the productivity offset. I recommend this based on the results of my assessment of recent estimates of utility productivity developed within the context of various regulatory proceedings addressing utility ratemaking issues (including incentive regulation and cost of capital). I have relied only on recent studies of utility productivity

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productivity for energy distribution companies and any differences between these two price inflation metrics. Two important differences must be considered. The first arises from the difference between the change in productivity for energy distribution companies and that for the economy as a whole. The second arises from differences between changes in input prices to energy distribution companies and those to all producing sectors within the economy. These adjustments can be described by the following formula:

$$trend\ I = trend\ GDPPI - \left[\begin{array}{l} \left(trend\ TFP_{Industry} - trend\ TFP_{Economy} \right) \\ - \left(trend\ Input\ Prices_{Industry} - trend\ Input\ Prices_{Economy} \right) \end{array} \right]$$

where TFP is total factor productivity, which is a measure of the productivity with which an industry or the economy uses all input factors when providing goods and services. Accounting for these differences in inflation measures is an important but standard step in the development of indexes to capture an industry's cost of operations.

1 developed from 2003 to the present so as to capture recent trends in industry
2 productivity, rather than relying upon studies that themselves used data samples
3 taken from periods in which economic, regulatory, and market conditions may
4 have differed substantially from those faced by energy distribution companies at
5 present. The studies I have considered are listed in Attachment NG-SFT-2:
6 Energy Distribution Company Productivity Offsets: Recent Study Estimates and
7 Rulings.
8
9 As part of my assessment, I have examined estimates of energy distribution
10 company total factor productivity ("energy distribution productivity") and
11 productivity offsets from studies in my sample. These estimates are reported in
12 Attachment NG-SFT-3, which shows that productivity offsets from the studies I
13 have analyzed range from negative 0.37 percent (from a study performed in a
14 Boston Gas Company rate case) to 1.09 percent (from a study in a Central Maine
15 Power Company rate case), while distribution productivity ranges from 0.53
16 percent (Boston Gas) to 1.99 percent (Central Maine Power). These estimates
17 generally support the conclusion that a productivity offset of 0.5 percent is a
18 conservative estimate of the appropriate productivity adjustment for use in the
19 Company's Net Inflation Adjustment.[21] To the extent that my estimate provides,

[21] First, only one of the studies – a rebuttal report in which sensitivity analyses of a testifying expert's model show an average productivity offset of 1.09 percent – results in an estimated productivity offset appreciably greater than the proposed value of 0.5 percent. Second, the average of productivity offset estimates from the studies I have examined vary from 0.28 percent to 0.5 percent, depending on the sample considered. The bottom of the Exhibit NG-SFT-3 reports these averages for various samples. The average productivity adjustment across all of the studies examined that report such estimates is 0.28 percent. The

from the customer perspective, a conservative estimate of the productivity offset, it implicitly provides consumers with a consumer dividend.

Q. How would these mechanisms work in each year of the ratemaking proposal?

A. In each year after new rates go into effect, the Company would submit documentation in filings to justify its proposed amounts to be included in the rate adjustment mechanism (part of the LDAC and CGA) for the upcoming year. (Ms. Leary describes the timing and sequencing of these filings.) These filings would include:

- Detailed cost and other support information about the Company's prior year investments in CIBS and public works projects, and their implications for changes in revenue requirements;
- The information about changes in costs of pension/OPEB and commodity-related bad debt, relative to the levels allowed in rates;
- The information about changes in revenues associated with applying the Net Inflation Adjustment to appropriate categories of revenue requirements; and
- A calculation of the rate adjustments (i.e., net surcharge or credit) and

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average across studies of energy distribution in the Northeast is 0.28 percent. And the one natural gas distribution company from the Northeast that is included in the study (i.e., Boston Gas) has a negative productivity offset. Third, my sample includes several studies that report estimates of energy distribution company productivity, but do not calculate a productivity offset (because such an offset is not necessary given the nature of the relevant regulatory proceedings.) When these estimates of energy distribution productivity are added to the sample averages, average energy distribution productivity falls for all of the samples I consider. For example, the average productivity falls from 1.21 percent for a sample including only those studies reporting an estimated productivity offset to 1.09 percent for a sample including all studies in my sample (i.e., "Gas or Electricity, All Regions"). Because, all else being equal, a lower utility productivity implies a lower productivity offset, these results further suggest that the average productivity estimates reported in Attachment NG-SFT-3 may understate the productivity estimates. Thus, these studies provide further evidence that a productivity offset of 0.5% is conservative.

showing information about the specific contribution of each element above), by service class.

Q. Please explain the stay-out proposal that the Company is willing to discuss with Commission staff.

A. As Mr. Stavropoulos indicates in his direct testimony, the Company would be willing to consider committing not to file a new rate case for a period of two years after the date of a Commission order if the Company and Staff reached an agreement on a resolution that is consistent with the Company's proposal and the return on equity approved for the Company reflected a premium for the additional risk such a commitment would impose.

Q. What might be the benefit of a stay-out commitment, from the customers' and the Company's point of view?

A. An obvious benefit would be tied to the cost and other resource savings associated with less frequent rate cases. These administrative efficiencies accrue to customers, the Commission, to intervenors, and to the Company. In addition to the benefits of reducing the frequency of rate cases, however, there are the very real benefits of the individual elements of the Company's proposal.

Q. Besides those elements you have described above, are there any other "core" parts of the Company's rate proposal?

A. Yes. The revenue requirement (as described in more detail in the testimony of Mr. Lombardo and Mr. Adams) reflects costs based on an historic test year ending June 30, 2009. For capital additions associated with non-revenue producing investment, the rate base will be updated during this case to reflect plant in service through September 2010.

Q. Considering all of the elements proposed to be included in the annual revenue adjustment mechanism, what benefits do they provide to customers and to the Company?

A. The Company's overall ratemaking package provides mechanisms that will help the Company provide continued safety-related improvements and high-quality service to customers, while also giving the Company a fighting chance of earning its allowed return. These proposals are built on Commission policy and then carefully sculpted to address updates (through the annual rate adjustment mechanism) associated with investments that are important for customer service, and with changes in costs that tend to be volatile and are affected by external forces. Such elements provide for the more timely cost recovery (when costs are rising) and for more timely downward adjustments in rates (either when costs subject to reconciliation are dropping or when operating costs are rising at a rate that is less than the proposed productivity offset). In this way, the proposal is symmetrical, balanced, and designed to provide a ratemaking tool that, allows for delivery prices that reflect the cost of service. In addition, the annual revenue adjustment mechanism being proposed by the Company provides a foundation for

the Company's willingness to consider a stay-out commitment, which would provide benefits to customers in terms of lower rate case costs.

V. OVERVIEW OF THE REVENUE DECOUPLING PROPOSAL: PURPOSE AND DESCRIPTION

A. Purpose of the Company's Revenue Decoupling Proposal

Q. You have previously described the fact that the Company's rate case filing includes a proposal to introduce a revenue decoupling mechanism ("RDM"). To begin, what is revenue decoupling?

A. Revenue decoupling is a ratemaking feature designed to break the link between the revenues a utility receives and the level of sales it makes. Because it eliminates the incentive for the utility to expand its sales, revenue decoupling has become a key ingredient of rate structure for many utilities that are aggressively pursuing increased energy efficiency. In practice, revenue decoupling is most commonly achieved through a process in which an allowed, or target, revenue requirement is first determined, and a subsequent reconciliation process ensures that the utility does not over- or under-collect this allowed revenue requirement.

Q. In your view, is revenue decoupling a necessary element of distribution utility ratemaking in order to accomplish emerging state and federal policy objectives related to energy, the economy and the environment?

A. Yes. A confluence of energy market events and environmental outcomes has led policymakers in many states (like New Hampshire) and in Washington, D.C. to

design policies to achieve a new set of objectives and goals. These goals include (1) the desire to promote procurement of least cost retail energy supply in the face of rising and increasingly volatile fuel prices and relatively high cost of new energy facilities; (2) the need to increase or maintain the reliability and safety of retail energy service, particularly as our energy infrastructure is aging; and (3) the need to address environmental impacts associated with energy production and use, particularly those related to climate change. A key component at the nexus of strategies aimed at accomplishing these policy goals is the aggressive pursuit of energy efficiency. Fully pursuing all cost-effective energy efficiency, however, depends upon a suite of regulatory and public policies to overcome barriers that impede the realization of all cost-effective energy efficiency. Some of these policies outside of the jurisdiction of utility commissions involve actions such as the adoption of appliance efficiency standards and energy-efficient building codes, and the provision of government loan and other financing tools to assist consumers in adopting efficiency measures. Policies within the bailiwick of utility regulators include the decoupling of utility revenues from their sales to mitigate the financial disincentives that would otherwise exist and that would impede utilities' full pursuit of cost-effective energy efficiency.

Q. How has energy efficiency emerged as a key element of energy policy in New Hampshire?

A. Over the course of many years, energy efficiency programs have become an important component of New Hampshire's energy policy. This reliance is rooted

in long-standing recognition in the New England region of the challenges posed by high energy costs.

New Hampshire has promoted energy efficiency programs for electric and natural gas utilities for many years. Its electric energy-efficiency programs are supported by system benefit charges on New Hampshire electric customers' bills. And gas customers in New Hampshire have the opportunity to participate in energy efficiency programs provided by the state's local gas distribution utilities and funded on customers' bills. Additionally, the state legislature enacted RSA 125-0:5-a in 2008, providing a fund to collect proceeds from the sale of emission allowances under the Regional Greenhouse Gas Initiative ("RGGI") and to use the fund "to support energy efficiency, conservation and demand response programs to reduce greenhouse gas emissions generated within the state."

Energy efficiency is clearly an important part of New Hampshire's larger energy strategy. Although the issues to be considered by the Commission in the instant proceeding are focused on assuring just and reasonable rates for customers of the Company's natural gas distribution service, there are nonetheless broader public policy implications of reduced energy demand from efficiency that are relevant for these issues. These are worth mentioning here because they provide collateral and compelling motivations for continued aggressive pursuit of energy efficiency in New Hampshire and for the adoption of state regulatory policies that support it. These other benefits include: (a) direct economic benefits for customers (by

1 reducing participating customers' total energy bills through lower usage); (b)
2 improved productivity and increased competitive advantage as a consequence of
3 the reduced energy intensity of production; (c) reduced energy supply costs as a
4 result of reduced energy demand, thereby indirectly further reducing customers'
5 energy costs; (d) reduced congestion on the natural gas pipeline system, reducing
6 the need for additional capital investment; (e) environmental benefits (e.g.,
7 improved air quality from reduced combustion of fossil fuel); (f) improvements to
8 natural resource conditions, public health, and global climate change; (g)
9 improved energy security (e.g., by lessening the state's vulnerability to events that
10 cut off energy supplies);[22] and (h) economic development benefits relative to
11 states with greater reliance on fossil-fueled power.[23]
12
13 **Q. Has the Commission expressed its support of energy efficiency in the past?**
14 A. Yes. The Commission has a long history of strong support for energy efficiency
15 programs. Without repeating that history here, I note its support for energy
16 efficiency programs delivered by the state's electric and gas utilities, and its

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[22] See U.S. Department of Energy, "State and Regional Policies that Promote Energy Programs Carried Out by Electric and Gas Utilities: A Report to the United States Congress Pursuant to Section 139 of the Energy Policy Act of 2005," March 2007 ("DOE 2007 Study"), pages E-1, 4-5, and Appendix page 5.

[23] According to a recent study prepared by researchers at the University of Massachusetts, deployment of energy efficiency provides significant direct job creation: the employment creation for energy efficiency (retrofitting and mass transit) is 2.5 to 4 times larger than that for oil and natural gas. See "The Economic Benefits of Investing in Clean Energy," Department of Economics and Political Economy Research Institute, University of Massachusetts, Amherst, June 2009.

1 adoption of certain rate mechanisms to help create incentives for utilities' pursuit
2 of energy efficiency.[24]
3
4 **Q. Has increased reliance on energy efficiency also emerged as a key element of**
5 **energy policy at the national level?**
6 A. Yes. Less than two years ago, the federal Energy Independence and Security Act
7 of 2007 established additional requirements for energy efficiency standards for:
8 heating and cooling technologies to be used in homes and commercial buildings;
9 industrial equipment; and the design and construction of high-performance
10 buildings (including residential, commercial, and federal buildings; public and
11 assisted housing; schools; and other buildings).[25]

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[24] See, for example: NH PUC, Energy Efficiency Rate Mechanisms, Order No. 24,934, Order Resolving Investigation, DE 07-064, January 16, 2009, pages 18-19 (" ….[T]he Commission created a Sustainable Energy Division that will focus its efforts on administering the two funds [the fund collecting alternative compliance payments for the Renewable Portfolio Standard, and the fund that receives payments for the sale of emissions allowances under Regional Greenhouse Gas Initiative (RGGI)] to make appropriate investments in energy efficiency and renewable energy. It is also our expectation that significant federal funds may be available to New Hampshire in 2009 for energy efficiency and renewable energy projects as part of a broad federal economic stimulus package…."); NH PUC orders in various energy efficiency cases of New Hampshire gas and electric utilities (e.g., NH PUC, EnergyNorth Natural Gas, d/b/a National Grid NH, Order No. 24,995, Order Approving Energy Efficiency Plan: Proposed Energy Efficiency Plan, July 31,2009; NH PUC, Electric Utility Restructuring: Energy Efficiency Programs, Order No. 23,574, Order Establishing Guidelines for Post-Competition Energy Efficiency Programs, DR 96-150, November 1, 2000; NH PUC, Concord Electric Company et. al., Order No. 23,850, Order Approving Settlement Agreement and Joint Request for Modification of Previous Commission Determination: Joint Petition for Approval of Core Energy Efficiency Programs, DE 01-057, November 29, 2001; NH PUC, Concord Electric Company et. al., Order No. 23,982, Order Approving Settlement Agreement and Authorizing Implementation of Programs: Joint Petition for Approval of Core Energy Efficiency Programs, DE 01-057, May 31, 2002); New Hampshire Office of Energy and Planning – links to programs offered by electric and gas utilities, http://www.nh.gov/oep/programs/energy/resources.htm.

[25] http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:h6enr.txt.pdf. Of course, the Energy Independence and Security Act of 2007 is just one of many recent federal statutes supporting increased efforts to increase the efficiency of appliances and buildings. The Energy Policy Act of 2005 amended the Energy Policy and Conservation Act, and introduced stronger incentives for the adoption of energy-saving technologies, more efficient appliances, and the construction of more efficient buildings. Federal regulators have recently encouraged – and in some cases, required – the adoption of policies in wholesale electricity markets designed to support demand-side bidding and resource use.

1 Further supporting the growing reliance on energy efficiency are various national
2 policies adopted as part of the February 2009 American Recovery and
3 Reinvestment Act ("ARRA"), with its provision for extraordinary infusions of
4 funding to states, localities and other entities to support the deployment of energy
5 efficiency measures around the country during a period spanning 2009 and 2010,
6 and shortly thereafter.
7
8 The new economic recovery programs will introduce approximately $60 million
9 in funding for weatherization, energy efficiency grants and local energy efficiency
10 improvements in New Hampshire alone.[26] While not all – or perhaps even a
11 major share – of this funding will take place on energy efficiency measures
12 affecting natural gas use in the Company's service territory in New Hampshire, it

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Various policies support investments to modernize the electric transmission and distribution system, so that consumers and energy companies may be better able to manage their energy use. Energy Policy Act of 2005, http://www.epa.gov/oust/fedlaws/publ_109-058.pdf.

[26] http://www.energy.gov/newhampshire.htm As reported by the U.S. Department of Energy, this funding for energy efficiency in New Hampshire includes:

- $23.2 million for the Weatherization Assistance Program (to support weatherization of homes, including adding more insulation, sealing leaks and modernizing heating and air conditioning equipment), and allow an average investment of up to $6,500 per home in energy efficiency upgrades and will be available for families making up to 200% of the federal poverty level – or about $44,000 a year for a family of four);
- $25.8 million for the State Energy Program (to provide rebates to consumers for home energy audits or other energy saving improvements; development of renewable energy projects for clean electricity generation and alternative fuels; promotion of Energy Star products; efficiency upgrades for state and local government buildings; and other innovative state efforts to help save families money on their energy bills); and
- $12.5 for the Energy Efficiency and Conservation Block Grant program (to provide further funding support energy audits and energy efficiency retrofits in residential and commercial buildings, the development and implementation of advanced building codes and inspections, and the creation of financial incentive programs for energy efficiency improvements, and other activities that conserve energy, projects to reduce and capture methane and other greenhouse gas emissions from landfills, renewable energy installations on government buildings, energy efficient traffic signals and street lights, deployment of Combined Heat and Power and district heating and cooling systems, and others).

http://www.energy.gov/media/statetotals.xls (accessed January 23, 2010). This spreadsheet has a typographical error.

is still the case that successful deployment of this funding on such applications could significantly impact the penetration of energy efficiency measures in the state and support the state's energy plan's goals to keep more energy dollars within the local economy, increase employment, increase energy cost savings, and enhance environmental quality. It will also likely have impacts on the level of revenues the natural gas distribution utilities and electric distribution utilities can expect, as their service obligations remain in place but their volumetric sales decline as intended with these policies.

Further, in agreeing to receive funds as a part of the ARRA, Governor Lynch has made assurances that were required under the law. The Governor wrote to Energy Secretary Steven Chu on March 2009, that:

> As a condition of receiving our State's share of the $3.1 billion funding for the State Energy Program (SEP) under the American Recovery and Reinvestment Act of 2009 (H.R. 1) (ARRA), I am providing the following assurances. I have written to our public utility commission and requested that they consider additional actions to promote energy efficiency, consistent with the Federal statutory language contained in H.R. 1 and their obligations to maintain just and reasonable rates, while protecting the public. I have also written to the State Legislature and requested that they consider actions to improve building energy codes, consistent with State law and State Constitutional requirements, and to consider the statutory language contained in ARRA. We are prioritizing our energy investments to take advantage of existing programs and expand programs where appropriate. Our State is committed to a robust improvement in energy efficiency and renewable energy, as well as a balanced State energy policy. I want to assure you that, within the limits of my authority, we will move forward in these critical areas. We look forward to immediate distribution of the Federal SEP funds to permit my State to make progress in energy efficiency and renewable energy.[27]

[27] http://www.energy.gov/media/Lynch_New_Hampshire.pdf

Q. Didn't the Commission itself weigh in on the need to adopt ratemaking policies aligned with energy efficiency goals?

A. Yes. The Commission issued an order in 2009 in which it concluded that "existing rate design and mechanisms, as a conceptual matter, can pose an obstacle to investment in energy efficiency. We conclude as well that there are different rate mechanisms that could be employed to further promote such investment.... We do not intend a general departure from cost-based regulation, but commit to finding ways to promote energy efficiency and demand reduction for the electric and natural gas utilities under the current cost-based regulatory regime."[28]

Q. Given that there are so many funding mechanisms and other programs to help support utilities' delivery of energy efficiency services to customers, why is decoupling needed to help New Hampshire accomplish these consumer benefits?

A. Funding for and support of utility energy services programs is necessary but not sufficient to see that all cost-effective energy efficiency and conservation is realized. These sources of funding and administrative assistance are essential to New Hampshire being able to pursue its goals for energy efficiency. But without other elements, such as decoupling and other mechanisms to align more fully the utility's financial interests with those of its customers, it will inevitably be more

[28] NH PUC, Energy Efficiency Rate Mechanisms, Order No. 24,934, Order Resolving Investigation, DE 07-064, January 16, 2009, pages 18-23.

1 difficult to accomplish the goal of adopting all cost-effective energy efficiency in
2 an efficient and effective way. Absent these other elements, questions arise as to
3 how far a company will push at the margins of a program when doing so is at best
4 neutral and more likely harmful to the financial performance of the corporation.
5 Decoupling has been proposed as the best approach to eliminating the tension that
6 inherently exists within a utility when its revenues increase with the volume of
7 sales of its product but it is also bound to implement programs that by design lead
8 to a reduction in sales. Decoupling focuses on mitigating this tension by
9 eliminating the so-called "throughput incentive"[29] which arises when a utility
10 recovers a large portion of its revenue requirements through usage-based charges
11 (e.g., mills per therm of use) such that total utility revenues rise or fall as total
12 customer usage rises and falls.[30]
13
14 **Q. Has decoupling been supported by state or federal regulators as an**
15 **important tool for achieving affordable and reliable energy delivery?**
16 A. Yes. State regulators have long been supportive of the potential benefits offered
17 by decoupling as reflected in a 1989 resolution of the National Association of

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[29] Shirley, Wayne et al., "Revenue Decoupling, Standards and Criteria," A Report to the Minnesota Public Utilities Commission, Regulatory Assistance Project, June 30, 2008.

[30] The well-recognized inherent disincentives to utility investments in energy efficiency derive from the traditional manner in which utilities are regulated and their rates are set. Under traditional cost-based regulation, a utility's rates are based on calculations of its revenue requirements with rates established based on an expected level of sales. All else equal, once rates go into effect, reduction in expected sales levels resulting from energy efficiency programs means that the utility erodes collection of the revenue requirement. Conversely, between rate cases, utilities have the opportunity to increase their revenues – and earnings – through increased sales. These downside and upside financial opportunities are fairly straightforward: increasing sales earns increased profits for their shareholders; and decreasing sales via energy efficiency investments may reduce profits.

Regulatory Utility Commissioners ("NARUC") (attached to my testimony as Attachment NG-SFT-4), in which NARUC urged its member commissions to "(1) Consider the loss of earnings potential connected with the use of demand-side resources; and (2) Adopt appropriate ratemaking mechanisms to encourage utilities to help their customers improve end-use efficiency cost- effectively; and (3) Otherwise ensure that the successful implementation of a utility's least-cost plan is its most profitable course of action."[31] Likewise, in its 2007 study for Congress, DOE also affirmed that: "Regulators should consider modifying policies to align utility incentives with the delivery of cost-effective energy efficiency by: (a) Addressing the typical utility throughput incentive and removing other regulatory and management disincentives to energy efficiency; (b) Providing incentives for the successful management of energy efficiency programs; (c) Providing sufficient certainty of cost recovery; and (d) Entertaining the [additional] option of creating independent or State-administered energy efficiency programs….Regulators should consider allowing utilities' returns at least as great from prudent investments in energy efficiency as from supply-side investments…"[32]

Q. What are some of the implications of decoupling for utility customers' bills?

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[31] NARUC 1989 Resolution: "Resolution in Support of Incentives for Electric Utility Least Cost Planning. Sponsored by the Committee on Energy Conservation, Adopted July 27, 1989."

[32] DOE 2007 Study, page v, and Appendix, page E-7.

A. In the first place, decoupling is being proposed in conjunction with much more aggressive energy efficiency programs that will lead to lower energy use per customer than would otherwise be the case without these efficiency measures in place. By supporting programs that are intended to implement all cost-effective opportunities for energy efficiency, decoupling will lead to decreased gas consumption and lower gas bills for customers that participate in these programs. This is illustrated in Figure NG-SFT-7, below, which indicates that as a typical customer reduces his or her energy use through adoption of energy efficiency measures, his or her customer *total bill* will fall. This occurs because as customers lower their gas usage, they also reduce their use of delivery service as well as reduce their purchase of more costly commodity service. Because the energy commodity component of customers' bills is typically much greater than the distribution component, the potential financial savings to customers from reducing their consumption of energy can be significant. Thus, these reductions in customer bills from increased energy savings will be far greater than any changes in customer bills that might potentially arise from changes in the bills for *distribution service* from revenue decoupling.[33]

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[33] In any year's revenue reconciliation under decoupling, the reconciliation may lead to a decrease or an increase in the revenue adjustment. As explained further below, the purpose of the revenue decoupling mechanism is to maintain stability in the overall revenues collected by the utility, even as actual revenues billed in any year after a rate case may rise or fall as a function of weather, economic activity, change in the number of customers, adoption of energy efficiency, adoption of more gas-using equipment, fuel-switching, and so forth. The combination of factors would affect the overall natural gas usage and revenue generation, which in any year would be reconciled with the annual target revenues obtained by the Company.

Figure NG-SFT-7

To further examine this question of bill impacts associated with revenue decoupling, I have reviewed various studies and surveys of revenue decoupling approaches adopted in various jurisdictions. Of particular note are: the recent survey of gas companies' adoption of revenue decoupling mechanisms conducted by the American Gas Association;[34] a comprehensive survey of electric and gas utilities' adoption of revenue decoupling that was published in June 2009 by

[34] American Gas Association ("AGA"), "A Periodic Update on Innovative Rate Designs: Update on Regulatory Approaches to Promoting Energy Efficiency," Natural Gas Rate Roundup, May 2009; and AGA, "A Periodic Update on Innovative Rate Designs: 2008 Update on Revenue Decoupling Mechanisms," Natural Gas Rate Roundup, July 2008.

1 Pamela Lesh;[35] and various presentations prepared by the Regulatory Assistance
2 Project.[36] Additionally, I have reviewed the specific mechanisms proposed by a
3 large number of individual gas and electric utilities as well as orders on revenue
4 decoupling mechanisms issued by various utility regulators.[37]
5
6 Figure NG-SFT-8 displays the American Gas Association's map depicting the
7 status of revenue decoupling in states around the country, as of February 2010,
8 which is the most up-to-date information I have seen on decoupling for local gas
9 distribution companies. It shows 34 gas utilities across the U.S. providing
10 service to 22 million residential customers (approximately one-third all residential
11 customers in the U.S.) have revenue decoupling. This represents an increase in
12 the past half year, compared to the results in the Lesh report, published just last
13 summer, which had indicated that a "total of 28 natural gas local distribution gas
14 utilities (LDCs) and 12 electric utilities, across 17 states, have operative

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[35] Pamela G. Lesh, "Rate Impacts and Key Design Elements of Gas and Electric Utility Decoupling: A Comprehensive Review," June 30, 2009. (Hereinafter, "Lesh Report".)

[36] Examples of recent presentations by Regulatory Assistance Project staff on revenue decoupling include: Lisa Schwartz, "The Role of Decoupling Where Energy Efficiency is Required by Law," Regulatory Assistance Project Issuesletter, September 2009; Richard Sedano, "Decoupling Utility Sales from Revenues," presentation to the Kentucky Public Service Commission April 9, 2009; and Richard Sedano, "Decoupling and a Survey of Activity in the U.S. to Address the Throughput Incentive," Ohio Workshop on Electric Decoupling, February 4, 2009.

[37] I have reviewed the regulatory orders that have approved companies' decoupling mechanisms: orders of the Massachusetts Department of Public Utilities with respect to the revenue decoupling proposals of Bay State Gas Company (2009) and National Grid's electric utilities (2009) in Massachusetts; and orders of the New York State Public Service Commission with respect to the revenue decoupling proposals of Consolidated Edison Company's gas service (2007) and its electric service (2008), National Fuel Gas Company (2007), Orange & Rockland's electric service (2008), Niagara Mohawk (National Grid's) gas service (2009), KeySpan (National Grid's) gas service (2009), and Central Hudson's electric and gas service (2009). Additionally, I have reviewed the tariffs of many natural gas and electric utilities with revenue decoupling in place.

decoupling mechanisms.[fn] Six other states have approved decoupling in concept, through legislation or regulatory order, but specific utility mechanisms are not yet in place."[38]

Figure NG-SFT-8
Status of Revenue Decoupling Among Natural Gas Utilities –
Prepared by American Gas Association (AGA)

American Gas Association, available at http://www.aga.org/NR/rdonlyres/A557FD33-8BA0-43D3-8C4DEB3E8C4917E7/0/2010FebAGADecouplingFactSheet.pdf

In practice, utilities with revenue decoupling have implemented rate adjustments (to reconcile revenues) that have tended to be relatively small ("even miniscule") and tend to "go both ways, providing both refunds and surcharges to customers."[39] The Lesh Report summarized the effects for 2007: "Compared to total residential retail rates, including gas commodity and variable electricity costs, decoupling adjustments have been most often under two percent, positive or

[38] Lesh Report, page 3.
[39] Lesh Report, page 4.

negative, with the majority under one percent.[footnote in the original] Using Energy Information Administration (EIA) data for 2007 on gas and electric consumption per customer and average rates, this amounts to less than $1.50 per month in higher or lower charges for residential gas customers and less than $2.00 per month in higher or lower charges for residential electric customers."[40]

Changes in rates arising from revenue decoupling adjustments are likely to be small[41] relative to annual changes in rates that arise from existing adjustments and charges (such as commodity supply charges). This is illustrated in Figure NG-SFT-9, which displays information about the average bills of a residential heating customers taking bundled service from the Company during the 2002-2008 period. Figure NG-SFT-9 breaks out the amount of the average customer bill that went to pay delivery charges, commodity charges, and LDAC charges. This figure shows not only is there relatively small variation in delivery and LDAC payments compared to commodity-charge payments, but also that the level of payments for the latter two types of charges are low compared to payments related to commodity supply.

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[40] Lesh Report, page 4.

[41] Revenue decoupling of distribution rates will generally tend to have a small, and potentially positive or negative, impact on the volatility of customers' total electricity and natural gas bills. Thus, it will have no appreciable impacts on customer risk. (In fact, an empirical analysis of rates in California found that revenue decoupling actually *decreased volatility* for two the three utilities because positive revenue decoupling adjustments corresponded with smaller (or negatives) levels of other adjustments. Joseph Eto, Steven Stoft, and Timothy Belden, *The Theory and Practice of Decoupling*, Energy & Environment Division, Lawrence Berkeley Laboratory, LBL-34555, January 1994.)

Figure NG-SFT-9

These figures also illustrate an important point alluded to earlier. Revenue decoupling, while imposing minimal (if any) impacts on the level and volatility of customer bills, offers significant potential customer gains by helping customers realize greater energy efficiency, which can greatly reduce the larger and more volatile energy commodity portion of customer's bills. Thus, eliminating disincentives (and providing positive incentives) for distribution utilities to continue to provide energy efficiency and conservation services can help customers' better manage the largest and most volatile portion of their bills.

1 Because the distribution company has no financial stake in the sale of the
2 commodity *per se*, eliminating the indirect incentive to deliver such energy
3 supplies can help fully align the interests of the distribution company and its
4 customers in reducing the largest portion of consumers' bills through achieving
5 all cost-effective energy efficiency.
6
7 **Q. Does decoupling guarantee that the utility will earn the returns allowed in its**
8 **last rate case?**
9 A. No. Revenue decoupling is intended to stabilize a company's annual revenue,
10 which is only one part of the equation for utility earnings. However, revenue
11 decoupling does not address the Company's need for continued capital investment
12 nor remove the need for the utility to mitigate inflationary and economic pressures
13 on the cost side of the equation. For a company to actually earn the return
14 allowed by regulators when setting the most recent rates, the company will need
15 to manage costs so as to address its obligations to serve, the effects of regulatory
16 lag, the effects of changing input costs, and so forth. Revenue decoupling does
17 not guarantee a utility a certain level of earnings or a particular rate of return.
18
19 **Q. How might the introduction of revenue decoupling affect the overall process**
20 **of ratemaking for a utility?**
21 A. On the one hand, revenue decoupling would mean that the utility would come
22 before the Commission annually for the purpose of revenue reconciliation.
23 Depending upon the nature of the reconciliation process, this would provide the

Commission and other stakeholders with relatively transparent metrics about certain aspects of the Company's operations (e.g., revenue, therm sales levels, customer counts, etc.). On the other hand, revenue decoupling might also reduce – although not altogether remove – a utility's need to file frequent rate cases with the Commission in the face of declining customer demand as a result of Company energy efficiency programs. Because a full rate case imposes significant administrative costs (including personnel time, management attention, and third-party costs) on the Commission, parties and the Company, avoiding unnecessary rate cases can create valuable savings that customers would see in their utility bills. It will not remove in any way the ability of the Commission to investigate the propriety of utility rates, however.

Q. Are there alternatives to revenue decoupling that could eliminate a utility's throughput incentive?

A. Yes, but most alternatives to revenue decoupling lead to unintended consequences that generally make them inferior options for eliminating utility disincentives to promote energy efficiency. For example, one other approach is to reimburse utilities directly for "lost revenues" resulting from the implementation of utility energy efficiency programs. However, this method creates added pressure within administrative proceedings for parties to debate about what revenues were lost as a result of energy efficiency; by contrast, revenue decoupling takes as given that there are many reasons for changes in sales to occur, and then simply reconciles

to the revenue level established in the ratemaking procedure.[42] Moreover, reimbursing lost revenues in a manner that does not involve revenue decoupling also fails to address the utility's underlying incentive to increase its sales, which may lead it to be less than enthusiastic about the adoption of other policies and programs aimed at energy conservation, such as building codes, appliance standards, and programs run by state agencies.

B. Description of the Company's RDM Proposal

Q. What guidance did the Commission's recent order on revenue decoupling issues provide to the Company in helping it to shape the contents of the Company's proposed ratemaking plan?

A. The Commission concluded its recent investigation of energy efficiency rate mechanisms by acknowledging that:

> there are numerous details that would need to be addressed in order to fashion a rate mechanism that appropriately balances risks and benefits among customers and utilities while pursuing legislative policy goals. We find, therefore, that the best approach to implementing such rate mechanisms is on a company-by-company basis in the context of an examination of company specific costs and revenues inasmuch as each utility has a unique service territory and customer mix as well as company specific operating costs and rate base investment. Energy efficiency rate mechanisms will need to be tailored to the energy efficiency load loss and fixed and variable cost structure of each company.
>
> ...we encourage the utilities to consider the following when fashioning a proposal for energy efficiency rate mechanisms and incentives in a future rate case filing. ..Energy efficiency rate mechanisms such as

[42] Martin Kushler, et al. "Aligning Utility Interests with Energy Efficiency Objectives: A Review of Recent Efforts at Decoupling and Performance Incentives," American Council for an Energy Efficiency-Economy, Report Number U061, October 2006.

> revenue decoupling are intended to weaken the link between sales volumes and revenue recovery and lessen the impact on utility revenues associated with reductions in sales volumes from increased efficiency and conservation.…
>
> (3) Reconciling Rate Adjustments. Another option that can be used to implement revenue decoupling is a rate reconciling adjustment mechanism. This model can be either targeted or comprehensive. If revenue decoupling were to reflect a targeted approach, it would pertain only to specific sales volume reductions, such as volume reductions associated with the implementation of energy efficiency programs. In the alternative, if revenue decoupling were to reflect a comprehensive model, it would pertain to all or nearly all sales volume fluctuations, such as volume fluctuations associated with energy efficiency programs, price changes, weather changes, economic fluctuations, etc. Under this scenario, the utility should provide a reconciliation of actual revenues against target revenues,[fn] along with detailed explanations of the methodology used to reconcile actual revenues against target revenues. Regardless of the model used, it would be appropriate to propose revenue decoupling in the context of a rate case in order to avoid single-issue ratemaking.
>
> Further, depending on the specific company proposal, there could be a potential to inappropriately shift risks. That is, revenue decoupling could enhance the utility's revenue stability and reduce earnings volatility; hence, revenue decoupling may result in a shift of risk away from the utility and toward the customer. Therefore, any revenue decoupling model proposed should be in the context of a rate case so that a utility's return on equity (ROE) can be thoroughly analyzed. ….
>
> We will analyze each utility proposal and consider implementing appropriate energy efficiency rate mechanisms for New Hampshire utilities in order to promote cost effective energy efficiency measures… We will determine on a case-by-case basis whether utility specific energy efficiency rate mechanisms or incentives constitute alternative regulation pursuant to RSA 374:3-a and will apply appropriate standards of review to proposals that fall within RSA 374:3-a. We do not intend a general departure from cost-based regulation, but commit to finding ways to promote energy efficiency and demand reduction for the electric and natural gas utilities under the current cost-based regulatory regime.[43]

I note too, that the Commission has previously recognized the value of

[43] NH PUC, Energy Efficiency Rate Mechanisms, Order No. 24,934, Order Resolving Investigation, DE 07-064, January 16, 2009, pages 19-22.

1 ratemaking policies and structures in overcoming strong financial incentives to
2 promote sales of utility service.[44]
3
4 **Q. Please describe the Company's RDM proposal.**
5 A. An overview of the proposed mechanism is depicted in Figure NG-SFT-10. The
6 core elements of the RDM proposal are as follows:
7 • Target revenues and rate-year number of customers assumed in setting rates
8 will be established in the rate case for each customer group.
9 • Using those target revenues and customer counts for each customer class, a
10 Target Revenue per Customer will be established for each RDM
11 Reconciliation Group (see below) and for each season (peak season, off-peak
12 season).

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[44] In 2001, the Commission participated in preparing a report to the New Hampshire Legislature on regulatory barriers to water supply conservation in New Hampshire. New Hampshire Department of Environmental Services & New Hampshire Public Utilities Commission, *Regulatory Barriers to Water Supply Regional Cooperation and Conservation in New Hampshire: A Report to the New Hampshire Legislature As Required by Chapter 64,Laws of 2000,"* August 14, 2001 (hereinafter "PUC Water Conservation Report"). One of the report's recommendations was that the "PUC should convene a proceeding open to all water utilities and other interested persons, to consider innovative water utility ratemaking structures, rate design approaches…" (PUC Water Conservation Report, pages 15-16.) This recommendation flowed from findings that included: "Traditional ratemaking for PUC-regulated utilities provides strong financial incentives to promote greater water usage, rather than water conservation or efficiency that would reduce water use. This is because rates are set to recover a particular revenue requirement, and once rates are set, additional sales tend to increase income faster than costs (increasing net income), and conversely lower sales tend to depress income faster than cost savings (lowering net income). …Utility commissions, including the PUC in New Hampshire, have provided incentives for successful energy reduction efforts of electric or gas utilities. However, these forms of incentives or premiums on the rate of return are typically not large enough to overcome the earnings-reduction effect of usage reduction under the current method of computing revenue requirements…." (PUC Water Conservation Report, pages 11-12.)

Figure NG-SFT-10

- Reconciliation will begin at the start of the first full season after the Company's ratemaking proposal is filed (i.e., reconciliation will begin with the heating season beginning November 2010). For Rate Year 1, actual billed revenues in each of the two seasons for each RDM Reconciliation Group will be tracked,[45] as will the average count of existing customers in each RDM Reconciliation Group. Dividing these billed revenues by customer count will produce the Actual Revenue Per Customer for each RDM Reconciliation

[45] The Company will calculate actual billed revenue by multiplying seasonal billed volumes by seasonal non-discounted rates, such that the movement of customers between discounted and non-discounted rates does not impact the RDM.

1 Group for each season.

2 • To determine an amount of revenues that needs to be reconciled in the
3 following year for each RDM Reconciliation Group for each season, Actual
4 Billed Revenue Per Customer is subtracted from Target Revenue Per
5 Customer. If the amount is negative (i.e., actual revenue/customer exceed
6 target revenue/customer), then there will be credit flowed back to appropriate
7 customers; if the amount is positive, then there will be a surcharge on
8 customers' bills).

9 • The revenue/customer amount (either positive or negative for each RDM
10 Reconciliation Group for each season) is multiplied times the average number
11 of existing customers billed in that season and for that group.

12 • That total amount of revenues that needs to be reconciled for each RDM
13 Reconciliation Group for each season will be divided by the appropriate
14 number of billing determinants (therms) for that RDM Reconciliation Group
15 for the appropriate season. The cents/therm for each RDM Reconciliation
16 Group for each season will be charged to that group in the subsequent
17 appropriate season, with the RDM reconciliation adjustment being positive or
18 negative as is appropriate to each RDM Reconciliation Group for that season.

19 • The Target Revenue Per Customer for each subsequent rate year for each
20 RDM Reconciliation Group will remain the same as those established for Rate
21 Year 1, until new rates are authorized by the Commission.

22 • The RDM reconciliation process described above for the end of Rate Year 1
23 would apply to subsequent years, as well.

1 • The RDM reconciliation will take place for three "RDM Reconciliation
2 Groups" (discussed further below), in order to modulate the potential
3 volatility that might arise if customer groups included small numbers of
4 customers.
5 • Within an RDM Reconciliation Group, revenue adjustments will be based on
6 volumetric charges (i.e., mills per therm), based on the revenues divided by
7 the billing determinants for the appropriate period and customer group.
8 • The RDM revenue adjustment will flow through the LDAC, along with other
9 adjustments incorporated in the LDAC.
10 • The RDM proposal is for full revenue decoupling for existing customers –
11 without adjustments for the effect of weather, economic factors, adoption of
12 energy efficiency, or other influences, in order to fully decouple revenues
13 from volumetric sales and thereby better align the Company's financial
14 interests with the goal of more efficient use of energy (whether driven by the
15 Company's actions or other influences). An existing customer is defined as
16 an existing customer meter.[46]
17 • Revenues and customer counts for new customers (i.e., new meters hooked up
18 after the point at which new rates went into effect) will not be included in
19 determining the amount of revenues that need to be reconciled until the next
20 full rate case. Adopting this approach is important for ensuring that new
21 customers added to the system provide benefits to the system, for which the

[46] In other words, the meters that existed at the point when new rates go into effect are associated with "existing customers."

Company will be able to recover its costs. Specifically, when the Company evaluates whether to add a particular customer, whether there are costs that will be incurred by the Company in adding that customer, and, if so, whether to require a contribution in aid of construction ("CIAC"), the analysis should focus on the actual revenue the customer would contribute to the system, not a target revenue based on the revenue requirement in the last rate case. The Company will bear the costs and retain the revenues until the next rate case when these new customers will be rolled into their appropriate RDM Reconciliation Group for the purpose of revenue decoupling

- The Company will track Revenue Per Customer for the three RDM Reconciliation Groups on a monthly basis, and will implement the RDM reconciliation cycle on a seasonal basis. The seasonal RDM filing will provide billed Revenue Per Customer, compared with Target Revenue Per Customer for the season and for each RDM Reconciliation Group, and a complete calculation of the revenue adjustment (surcharge or credit) on customer bills.
- The timing of the Company's RDM reconciliation filings is described in further detail in the testimony of Ms. Leary.

Q. Why has the Company adopted a "full" revenue decoupling approach?

A. As compared with alternative approaches that only partially decouple revenues from sales, a full revenue decoupling approach more fully de-links the Company's incentive to increase throughout, provides stronger support for the implementation of efficiency measures designed to help customers lower their energy bills, and is

simpler to administer. A full revenue decoupling approach does not require the Commission to go through a complicated process to determine the portion of the positive or negative change in a company's actual revenues relative to target revenues that resulted from energy efficiency measures as compared to changes in commodity prices, the effects of weather or economic conditions. A full revenue decoupling approach more directly ties the Company's recovery of revenues to the amount the Commission determines is its revenue requirement, and leads to an outcome in which customers provide no more and no less than that allowed revenue amount.

Q. Please describe the proposed RDM Reconciliation Groups.

A. The Company is proposing to implement revenue reconciliation for three "RDM Reconciliation Groups":

- Residential heating customers (R-3 (residential heating) and R-4 (residential low-income heating))
- Residential non-heating customers (R-1 (residential non-heating))
- Commercial/industrial customers (G-41 (small C&I with high winter use), G-42 (medium C&I with high winter use), G-43 (large C&I with high winter use), G-51 (small C&I with low winter use), G-52 (medium C&I with low winter use), G-53 (large C&I with a load factor less than 90 percent), and G-54 (large C&I with a load factor greater than 90 percent).

Q. What is the Company's rationale for grouping the commercial and industrial customers into a single C&I Reconciliation Group?

A. Studies have shown that RDM reconciliations that involve a group of customers that is small relative to the total amount of revenues for that group will face the potential for volatile bill impacts, in the event that one or more customers leaves or is added to the customer group. As shown in Table NG-SFT-1, below, there is a large variation in the number of customers per rate class, with a few C&I rate classifications having very few customers. To avoid the potential volatility related to RDM reconciliations for remaining existing customers in certain classes (e.g., G-43, G-53 and G-54,) in the event that a single or a few customers stopped taking service, the proposal is to combine all C&I customers into a single RDM Reconciliation Group.

Table NG-SFT-1
Energy North Customers – Average Number of Monthly Customers by Class (1/2006 through 6/2009)

Rate Class	Average #
R-1 Residential Non-Heating	4,790
R-3 Residential Heating	63,304
R-4 Low Income Discount Residential Heating	5,015
Total Residential Heating	68,319
G-41 Small C&I High Winter Use	7,386
G-42 Medium C&I High Winter Use	1,468
G-43 Large C&I High Winter Use	42
G-51 Small C&I Low Winter Use	1,336
G-52 Medium C&I Low Winter Use	303
G-53 Large C&I Load Factor <90%	37
G-54 Large C&I Load Factor >90%	18

Q. How are low-income customers treated within the RDM process?

A. Non-discounted revenues associated with low-income customers are included in the process for the purpose of establishing the Target Revenue Per Customer (which incorporates both regular and low-income heating customers), Billed Revenue Per Customer, and in determining the RDM Revenue Adjustment for residential heating customers.

Q. Have you done an analysis of the expected rate impacts of the RDM proposal?

A. Yes. I have prepared an analysis to illustrate the kinds of effects on residential heating customer bills that might be expected under the Company's revenue decoupling proposal. My analysis simulates what residential heating customer rates might look like in future years if the RDM proposal were accepted. In this "what if" forecast, I have calculated rate impacts under three different scenarios that attempt to capture the effects of variations in achieved savings due to energy efficiency programs and revenue decoupling: (1) a "full impact" scenario in which annual savings from energy efficiency are assumed to be equal to the average annual savings achieved by the Company between 2002-2008; (2) a "half impact" energy efficiency scenario in which half as much savings from energy efficiency measures are captured annually; and (3) a "flat" energy efficiency scenario in which annual natural gas use per customer remains at the same levels as in the Test Year (July 2008-June 2009). As shown in Figure NG-SFT-11, the impacts on customer bills are expected to be quite small.

Figure NG-SFT-11

Note: Bill impact analysis of RDM on residential heating customers includes usage levels for all residential heating (including low-income) customers.
Source: Tierney analysis of data provided by EnergyNorth.

Q. Why hasn't the Company included new customers in its RDM proposal?

A. In order to create the appropriate basis for the Company's analysis of the net benefits of adding potential new customers and to assure an appropriate risk/reward benefit when such are added to the system, it is appropriate to keep these customers outside of the RDM process when determining the amount of revenues that need to be reconciled. Between the time the new rates go into effect and until changed by the Commission, customer counts and customer revenues associated with new customers (i.e., new customer meters) will be excluded from

the calculation of the level of RDM revenue adjustment. Revenues associated with these new customers will be retained by the Company until these customers are rolled into the RDM process after the next rate case. To assure that similarly situated customers pay similar rates, however, these customers, like all of the Company's customers, will have the RDM revenue adjustment flow through the LDAC assessed on their bills. Keeping this financial incentive in place is good for the Company as well as for its existing customers and the State in the long run: as new customers convert to natural gas, they tend to shift their energy use from a fuel with higher emissions (e.g., heating fuel) to one with lower emissions; and these newly added customers are able to participate in supporting the system's fixed cost recovery over time, thus potentially lowering the costs allocated to existing customers.

Q. You also mentioned that the Company's willingness to discuss the possibility of a stay-out commitment would not be contingent upon the Commission's approval of revenue decoupling. Why is that?

A. This reflects the Company's awareness that the Commission has not yet approved a revenue decoupling plan by any utilities in the state, and the Company respects the fact that to a large extent this is a case of first impression for the Commission.

VI. CONCLUSION

Q. Please summarize the reasons why you think that the Commission should approve the overall ratemaking proposal put forward by the Company in this case.

A. In my view, the Company's proposal is consistent with the Commission's ratemaking principles and, most importantly, is in the customers' best interests. It is built on and retains core principles of the Commission's traditional ratemaking approaches (including being grounded in historic cost-of-service ratemaking). Notably, the proposal adds some important tweaks needed to accommodate the traditional approach to today's realities, and helps to balance the Company's and customers' needs. It does this through a number of features: more timely cost recovery through updating rate base to reflect amounts closer to the time when rates go into effect; reducing but not eliminating regulatory lag, alleviating pressure on the Company to file frequent rate cases; the use of a rate adjustment mechanism to provide revenue support for known and measurable changes in (a) investments needed for safety and reliability, as well as to support system modifications needed as public works projects, and (b) significant changes in capital costs, commodity bad debt, and pension/OPEB that are largely outside the control of the Company; by the design of the revenue decoupling approach, which provides incentives for growth in customer counts for natural gas (but not increased throughput from existing customers), which can provide environmental and economic advantages to participating customers, the system, and the state's

energy requirements; affording the Company a genuine opportunity to earn its allowed returns, which sends favorable signals to the investment community about the regulatory environment in the state at a time when there is competition within and beyond the industry for limited capital; enhancing regulatory efficiency by avoiding frequent rate cases while retaining regulatory scrutiny and supervision and by enabling limited funds to be used for other more constructive purposes; and providing better alignment of the Company's financial interests with its customers' interests in energy efficiency measures to assist New Hampshire gas customers as they lower their energy use and the level of their overall energy bills.

Q. Do you think that the Company's RDM proposal is an alternative ratemaking proposal within the meaning of the Commission regulations (Puc 206.06).

A. No. Without attempting to provide a legal opinion but rather relying on my experience as a former utility regulator with significant experience in interpreting regulatory statutes, I think that the proposal need not be viewed as alternative ratemaking. Notably, the Commission's alternative ratemaking rules define ratemaking proposals filed by a utility that is not "based on cost of service, rate base and rate of return."[47] As described above, the Company's ratemaking

[47] PUC 206.01 "Definitions. (a) "Alternative form of regulation" means a method of utility rate regulation pursuant to RSA 374:3-a other than methods which are based upon cost of service, rate base and rate of return."

1 proposal – with or without RDM – relies squarely on traditional cost of service
2 principles, rate base regulation and rate-of-return regulation. The target rates that
3 would be used are based on the revenue requirement established in this case. The
4 revenue reconciliations are based on actual billed revenue per customer as
5 compared to cost-based target revenues.
6
7 **Q. In the event that the Commission determined that the Company's proposal**
8 **constituted alternative ratemaking, do you think that the proposal would**
9 **satisfy the requirements of alternative ratemaking regulations?**
10 A. Yes. I have summarized the reasons why I think so in Table NG-SFT-2, which is
11 on the following two pages.
12
13 **Q. Does this conclude your testimony?**
14 A. Yes it does.

Table NG-SFT-2 Summary of Effects of the Company's Ratemaking Proposal (page 1 of 2)		
PUC 206.06 – Variable for which an effect would need to be described:	Description of the proposed rate proposal's effect (if any)"	Other testimonies that address this issue:
Competition	Neutral impact with regard to competition for natural gas supply. There is nothing in the Company's proposed rates that impact competition among suppliers of natural gas commodity services; rather, it supports the ability of energy efficiency measures to compete with natural gas supply to provide service to natural gas customers.	
The safety, adequacy and reliability of public utility service	The rate proposal supports the ability of the Company to fund and install in a timely fashion the infrastructure needed to address safety and operational concerns associated with bare pipe, leaks, and replacement of systems in the context of public works projects.	See testimony of Ms. Fleck.
Traditional regulatory balance which does not unfairly benefit or disadvantage utility consumers, utility investors and other stakeholders;	This overall package restores the proper balance between the interests of customers and the Company: under prevailing market and economic conditions, the traditional ratemaking approach in NH will always hinder the Company in its ability to earn the allowed return, in light of the significant regulatory lag. The goal of the proposed rate proposal is to rebalance the approach for the benefit of customers and the Company, with provisions to assure that the Company neither games the incentives nor has the ability to retain windfall profits. Additionally, the proposal to incorporate a cost-of-equity adjustment mechanism provides a tool to assure that both customers and Company shareholders are protected in the event of a significant change (positive or negative) in capital market conditions.	See testimony of Mr. Stavropoulos and Mr. Hevert
Administrative efficiency in the regulatory process for the utility and the Commission	The proposal includes several features (e.g., a two-year stay-out commitment; full revenue decoupling; indexed adjustment mechanisms) that support administrative efficiency: The proposal helps to avoid frequent rate cases; relies on transparent, easily-administered and verifiable indices; and uses a relatively simple RDM mechanism design.	
Economic development within New Hampshire	The multi-year nature of the rate proposal will allow the Company to enter into long-term agreements with contractors to carry out the infrastructure projects, with the ability to provide job commitments for this two-year period. Additionally, by including revenue decoupling (a ratemaking policy mechanism designed to support the implementation of all cost-effective energy efficiency), the proposal helps to support the jobs (e.g., installation services) associated with putting energy efficiency measures into customers' homes, offices, industrial facilities, and so forth.	

Table NG-SFT-2 Summary of Effects of the Company's Ratemaking Proposal (page 2 of 2)		
PUC 206.06 – Variable for which an effect would need to be described:	Description of the proposed rate proposal's effect (if any)"	Other testimonies that address this issue:
Access to basic utility service to residents throughout the state, also known as universal service	Neutral to positive impact: although there is no "right" of customers to have access to natural gas delivery service in New Hampshire, the Company's proposal provides financial incentives for the Company to market to and attract new natural gas customers where it provides net positive benefits to do so for the customer and the system.	
Innovation of services	The multi-year nature of the rate proposal will make it more likely that the Company can enter into long-term service agreements with contractors to carry out infrastructure projects, thus being able to negotiate a better deal for customers.	See the testimony of Ms. Fleck.
Infrastructure improvements	The rate proposal will help the Company to fund and install infrastructure needed to deal with bare pipe, leaks, and replacement of systems in the context of public works projects.	See testimony of Ms. Fleck and Mr. Stavropoulos
Environmental and conservation safeguards and incentives.	The rate proposal will help provide regulatory policies aligned with aggressive pursuit of energy efficiency – along with the associated environmental and other benefits. Additionally the rate proposal will provide incentives (combined with other new-customer connection standards) for the Company to sign up new natural gas customers, which typically mean that a customer is shifting from a heating source with higher emissions than natural gas.	See discussion above in Tierney testimony.

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Dr. Tierney, a Managing Principal at Analysis Group, is an expert on economics, regulation and policy in the electric and gas industries and utility sector. She has consulted to business, industry, government, and other organizations on energy markets, economic and environmental regulation and strategy, and energy facility projects. Her expert witness, business consulting and arbitration services have involved market analyses, wholesale and retail market design, contract disputes, resource planning and analysis, asset valuations, regional transmission organizations, the siting of generation and transmission and natural gas pipeline projects, natural gas markets, competitive power procurement design and monitoring, electric system reliability, ratemaking policy, energy efficiency and renewables, climate change policy, and other environmental policy and regulation. She has participated as an expert and advisor in civil litigation cases, regulatory proceedings before state and federal agencies, arbitrations, negotiations, mediations, and business consulting engagements.

Prior to joining Analysis Group, she was Senior Vice President at Lexecon, where she consulted on energy and environmental economics and policy. She has also served as the Assistant Secretary for Policy at the U.S. Department of Energy, appointed by President Bill Clinton and confirmed by the U.S. Senate. Previously, she was the Secretary for Environmental Affairs in Massachusetts under Governor William Weld, and Commissioner at the Massachusetts Department of Public Utilities, appointed by Governor Michael Dukakis. She served as Chairman of the Board of the Massachusetts Water Resources Authority, and executive director of the Massachusetts Energy Facilities Siting Council. She recently served as chair of the Massachusetts Ocean Management Task Force, and currently serves as the chair of the Massachusetts Oceans Advisory Commission. She co-chaired the Department of Energy Agency Review Team for the Obama/Biden Presidential Transition Team.

Dr. Tierney has authored numerous articles and speaks frequently at industry conferences. She serves on a number of boards of directors and advisory committees, including the co-chair of the National Commission on Energy Policy. She is chairman of the board of the Energy Foundation; a director of Evergreen Solar; a director of Ze-gen Inc.; a director of Clean Air – Cool Planet and its Climate Policy Center; a director of the World Resources Institute; a director of the Clean Air Task Force; a director of the Northeast States Clean Air Foundation; chair of the External Advisory Council of the National Renewable Energy Laboratory (NREL); a member of the Environmental Advisory Council of the New York Independent System Operator; and a member of the China Sustainable Energy Program's Policy Advisory Council. She was previously chair of the Electricity Innovations Institute, a director of Catalytica Energy Systems Inc., a director of Renegy Holdings, a director of the Electric Power Research Institute, a member of the Advisory Council of the New England Independent System Operator, a member of the Massachusetts Renewable Energy Trust Advisory Council, and a director of ACORE (American Council on Renewable Energy). She is currently teaching a course in the Department of Urban Studies and Planning at MIT. She has taught at the University of California at Irvine, and she earned her Ph.D. and M.A. degrees in regional planning at Cornell University and her B.A. at Scripps College.

EDUCATION

1980	Ph.D. in Regional Planning, Public Policy, Cornell University, Ithaca, NY Dissertation: *Congressional policy making on energy policy issues*
1976	M.A., in Regional Planning, Public Policy, Cornell University, Ithaca, NY
1973	B.A. in Art History, Scripps College, Claremont, CA
1971-72	Studied political science, L'Institut d'Etudes Politiques, Paris, France

PROFESSIONAL EXPERIENCE

2003-present	Analysis Group, Inc., Boston, MA *Managing Principal*
1999-2003	Lexecon, Inc., Cambridge, MA (formerly The Economics Resource Group, Inc.) *Senior Vice President*
1995-1999	Economics Resource Group, Inc., Cambridge, MA *Principal and Managing Consultant*
1993-1995	U.S. Department of Energy, Washington, DC *Assistant Secretary for Policy*
1991-1993	Commonwealth of Massachusetts, Executive Office of Environmental Affairs, Boston, MA *Secretary of Environmental Affairs,* *Chairman of the Board of Directors of the Massachusetts Water Resources Authority*
1988-1991	Commonwealth of Massachusetts, Department of Public Utilities, Boston, MA *Commissioner*
1984-1988	Commonwealth of Massachusetts, Energy Facilities Siting Council, Boston, MA *Executive Director*
1983-1984	Commonwealth of Massachusetts, Executive Office of Energy Resources, Boston, MA *Senior Economist*
1982-1983	Commonwealth of Massachusetts, Energy Facilities Siting Council, Boston, MA *Policy Analyst*
1982	National Academy of Sciences, Washington, DC *Researcher*
1978-1982	University of California at Irvine, Irvine, CA *Assistant Professor*

SELECTED CONSULTING EXPERIENCE

- **Various confidential engagements** involving power sales agreements, gas supply contracts, advisory services on gas and electric matters, oil market issues, water utility issues, and market power and monitoring issues.
- **Transmission consortium**
  Analysis of cost-allocation models for an interstate transmission project involving transmission utilities and merchant transmission companies (2009-present).
- **Massachusetts renewable energy trust**
  Analysis of transmission-related models and considerations for the development of offshore renewable energy (2009).
- **Major electric utility**
  Development of business models and approaches for deploying energy efficiency within the context of the American Climate and Energy Security Act framework (2009).
- **Major industrial electricity consumer**
  Assistance in analyzing the implications of the American Climate and Energy Security Act for the company, in light of impacts on energy prices and trade considerations (2009).
- **National Grid**
  Assistance in developing a revenue decoupling mechanism for retail distribution service, and providing expert witness assistance in electric distribution rate cases in Massachusetts, Rhode Island, New York and New Hampshire (2009-present).
- **Sandia Pueblo**
  Assistance in valuing a transmission corridor on tribal reservation land (2008-present).
- **Major electric and gas company**
  Analytic and strategic support for company's development of a business plan for energy efficiency and other energy-related investments on the customer side of the meter (2008).
- **AEP Transmission**
  Prepared a white paper on the design and cost allocation framework for a high-voltage transmission system designed to support renewable and other resources (2008).
- **Reliant**
  Prepared study assessing competition in the wholesale and retail electricity markets in ERCOT Texas (2008).
- **Major environmental organization**
  Analytic and strategic support for utility ratemaking policies for advancing energy efficiency in a state (2008-present).
- **Major Regional Transmission Organization**
  Supported strategic planning and assessment for the Board of Directors (2008-present).
- **Commonwealth Edison Company**
  Provided testimony on ratemaking policy issues relating to regulatory lag (2008).
- **Energy Association of Pennsylvania (EGA)**
  Analysis of proposed legislation to cap retail electricity rates in Pennsylvania after the expiration of rate caps (2008).
- **National Association of Regulatory Utility Commissioners (NARUC)**

Preparing study on best practices relating to state regulatory agency policies and utility practices on competitive procurement of resources to serve retail electricity customers. (2007).

- **KeySpan/Boston Gas**
  Analysis of the implications of utility ratemaking for valuation of utility assets for property taxation purposes (2008)
- **Electric company**
  Analysis of state's retail and wholesale power market structure (2008)
- **Electric company**
  Preparation of expert report on electric industry structure in the 1990s and 2000s (2007-2008).
- **Major electric company**
  Analytic support for company's development of strategic plan for company-wide greenhouse gas reduction commitments (2008).
- **Sierra Pacific Power Company**
  Provided testimony on policy issues relating to the use of historic, future, and hybrid test years in state utility rate cases (2007-2008).
- **Harvard University**
  Provides strategic assistance relating to regulatory issues affecting the planning and design of Harvard's "green campus" development in Allston Landing. (2007-2008).
- **Public Service Gas & Electric Company of New Jersey (PSEG)**
  Provided assistance in facilitating the development of a policy to address "leakage" of greenhouse gas emissions associated with the adoption of a cap-and-trade program in various Northeast states and the interstate sales of electricity in various Northeast/MidAtlantic power markets. (2007).
- **Electric Power Supply Association**
  Prepared white paper on economic, environmental & regulatory trends in the electric industry (2007).
- **Sempra Energy Company – San Diego Gas & Electric Company and SoCalGas Company**
  Provided testimony on policy issues relating to the provision of financial incentives to electric and gas utilities for the successful provision of energy efficiency programs. (2007).
- **PECO Energy Company**
  Provided advice on various economic and policy issues relating to electric industry restructuring policy. (2007).

  Provided testimony on issues relating to the market for alternative energy credits and the proposal of PECO to voluntarily solicit, procure and bank alternative energy credits. (2007).
- **Commonwealth Edison Company**
  Provided testimony on issues relating to the relationship of auctions for wholesale supply for basic service customers and alternative proposals for utility resource procurement. (2007).
- **ISO New England**
  Assisting Regional Transmission Organization in scenario planning process examining various future technology mixes for New England's electric system. (2006-2007).
- **PJM**
  Preparing report on market monitoring functions performed under various federal regulatory agencies with responsibility to oversee electricity and energy markets (i.e., the Federal Energy Regulatory Commission and the Commodities Futures Trading Commission). (2006-2007).
- **Major Industrial and Power Plant Company**

Assisted company (located outside of New England) in analyzing market and negotiating the price and other terms and conditions for long-term gas supply (2006-2007). Assisted company in valuing a power plant asset. (2007).

- **State of North Carolina**
  Provided expert witness services on electric utility economics and regulatory issues, on behalf of the North Carolina Attorney General in his nuisance lawsuit to require the Tennessee Valley Authority to put in place air pollution control equipment on coal-fired power plants in the TVA system. (2006-2008).
- **Major Regional Transmission Organization**
  Performed analysis of market conditions and trends, and benchmarking market rules and reliability performance with other comparable organizations – in support of RTO's strategic planning process. (2006-2007).
- **Special LNG Committee, Commonwealth of Massachusetts**
  Prepared report on the need for natural gas and liquefied natural gas in the Northeast, the need for LNG facilities, the role of government in the LNG facility siting process, and other issues relating to LNG proposals in the Commonwealth. Provided on *pro-bono* basis to the Commonwealth. (2006).
- **Ute Indian Tribe of the Uintah and Ouray Reservation**
  Prepared a report on economic and policy issues relating to use of tribal lands for energy rights-of-way, as called for in Section 1813 of the Energy Policy Act of 2005. (2006).
- **New York ISO**
  Prepared white paper on fuel diversity issues in the New York market (2008).

  Prepared white papers on long-term contracting issues in states with restructured electric industries, and on the economic foundations for single-clearing-price markets versus pay-as-bid markets. (2007).

  Performed economic benefit/cost study of the introduction of competition into the wholesale electric market in the region (2006-2007).
- **Commonwealth Edison Company**
  Provided testimony on appropriate ratemaking principles for recovery of pension-related costs in proceeding to set rates to go into effect following the transition period. (2006).
- **Commonwealth Edison Company**
  Provided testimony on economic principles associated with single-price auction design versus pay-as-bid auction design, for the procurement of wholesale power supplies to meet the needs of retail all-requirements customers. (2006).
- **Exelon Corporation**
  Provided analysis of designs of mandatory carbon control policies. (2005-2007).
- **Sonosky, Chambers, Sachse, Endreson & Perry, LLP, on behalf of various Indian Tribes**
  Provided analysis in support of comments filed with the Departments of Interior and Energy with respect to the study of energy rights of way on tribal land which was called for in Section 1813 of the Energy Policy Act of 2005 (2005-2006)

  Provided analysis in support of various tribal negotiations with energy companies with respect to valuation of energy rights of way on tribal reservation lands. (2007).
- **Electric utility company**
  Performed independent evaluator services in procurement for power resources. (2005-2006).
- **Power Generation Company**
  Provided analysis of product market development in MidWest and Eastern RTOs. (2005).
- **New England Energy Alliance**

Prepared a white paper on energy infrastructure needs in the New England states. (2005).

- **Committee on Regional Electric Power Cooperation (of the Western Interstate Energy Board)**
  Provides research and advising with respect to market monitoring and assessment for the Western wholesale electric markets. (2005-2007).
- **Southern California Edison Company**
  Provided Independent Evaluator services for a competitive procurement of new long-term generation resources and renewable resources. (2005).
- **LNG / Interstate Gas Pipeline project – Duke Energy/Excelerate project**
  Prepared regional market study for the project proposed for Massachusetts. (2004-2005).
- **Electric Generating Company**
  In a contract dispute, provided expert witness services relating to whether changes in a region's wholesale power market rules nullified a power sales agreement. (2004-2006).
- **Louisville Gas & Electric and Kentucky Utilities**
  For two vertically integrated electric companies, provided expert witness services in a state investigation of which regional transmission approach satisfies state policy objectives. (2004).
- **Independent Generating Company**
  For a power company owned by commercial lenders in a Northeast power market, provided consulting services to monitor state regulatory policies and actions with respect to utility regulation and environmental regulation, and legislation affecting power plants. (2004).
- **Major Electric and Gas Company**
  Performed confidential study of the benefits, costs and current conditions in certain wholesale and retail electric power markets. (2004-2005).
- **Regional Transmission Organization**
  For a confidential project, analyzed market monitoring and mitigation approaches (2004-2005).
- **Major Commercial Bank**
  For a confidential project, advise with regard to electric industry restructuring and profitability of large energy marketer and trading organization (2004-2005).
- **Consumer Energy Council of America**
  For a group of electric industry market participants, regulators, and interest groups, prepared white papers on the need for transmission enhancements in U.S. power markets. (2004).
- **Retail electric company**
  Provides confidential analysis of business models and regulation approaches for providing retail electric service in the state. (2004).
- **Independent system operator**
  Provided confidential analysis and research on alignment of retail and wholesale market policies. (2004).
- **California State attorney general**
  Provided expert witness services with regard to state resource adequacy & planning practices. (2004).
- **Pacific Gas & Electric Company**
  Provided expert witness services relating to the public benefits of the settlement between PG&E and the California Public Utility Commission, to enable PG&E to emerge from bankruptcy. (2003).
- **Independent power company**
  Provided consulting advice on economics of compliance strategies for air and water permits. (2003).

- **Major public utility company**
  Provided expert advisory services to a buyer of power supplies relating to the pricing and other terms for a long-term purchase power agreement. (2003).
- **Duke Power**
  Provided expert advisory services relating to state rate-making and other regulatory practices. (2003).
- **Exelon Generation**
  Provided strategic advice and analytic services relating to market conditions affecting the client's generating assets in New England. (2003).
- **Entergy Services Inc.**
  Provides services as the independent monitor of Entergy's Fall 2002, Spring 2003 and Fall 2003 Requests for Proposals for Supply-Side Resources. (2002-2005).
- **Power generation company in New England**
  Provided expert testimony in contract dispute regarding allocation of uplift costs in an agreement concerning the supply of wholesale power for standard offer service. (2002).
- **Connecticut Light and Power Company**
  Provided expert testimony in contract dispute regarding allocation of congestion costs in an agreement concerning the supply of wholesale power for standard offer service. (2002 - 2003).
- **Ocean State Power**
  Provided arbitration services in a dispute regarding a gas purchase contract between Ocean State Power and ProGas Ltd. (2002-2003).
- **Regional independent system operator**
  Provided strategic advice on regional transmission organization strategy. (2002).
- **PJM Interconnection**
  Provided advice to the appointed mediator as part of the Alternative Dispute Resolution process, in a dispute involving PJM and a market participant. (2002).
- **Duke Energy Corporation**
  Provided analysis on strategic issues in gas and electric regulatory policy for Duke Energy's corporate office, including with regard to code of conduct issues, wholesale competition, regional transmission organization policy. (2001-2002).
- **Pacific Gas and Electric Corporation**
  Provided expert witness testimony in proceedings of the Federal Energy Regulatory Commission on public benefits of the proposed restructuring of PG&E assets as part of its emergence from bankruptcy. (2001-2002).
- **Massachusetts Renewables Trust**
  Provided assistance in support of the Trust's renewables and power quality program. (2001-2002).
- **Major electric holding company**
  Prepared an analysis of the regulatory policies for reviewing merger applications in states where potential merger candidates are located. (2001).
- **Western Massachusetts Electric Company**
  Provided expert testimony in contract disputes regarding allocation of congestion costs in agreements concerning the supply of wholesale power for standard offer service. (2001-2002).
- **The Energy Foundation**
  Researched and wrote a white paper on California's process for permitting new power plants. (2001).
- **Cross-Sound Cable Company**

Provided expert testimony regarding public benefits of proposal to construct merchant transmission facility across Long Island Sound. (2001-2002).

- **Major independent power company**
  Provides expert witness support in litigation surrounding power plant development project, involving viability of project's environmental and siting permitting. (2001 - 2004).
- **MASSPOWER Inc.**
  Mediator in a contract dispute involving pricing of power purchases. (2001).
- **NRG Energy and Dynegy**
  Provided expert witness support in regulatory proceeding to review these companies' acquisition of power plants being divested by Sierra Pacific and Nevada Power. (2001)
- **Occidental Chemical Corporation**
  Provided expert witness support and economic analysis of a major electric utility's transmission policies and practices, and review of the proposed RTO. (2000)
- **PP&L Global**
  Provided economic and environmental analysis and expert witness support for proposal to build the Kings Park Energy power plant in Long Island, New York. (2000).
- **Calpine Corporation**
  Provided economic and environmental analysis and expert witness support for proposal to build the Wawayanda power project in Rockland County, New York (2000).

  Provided environmental analysis and expert witness support for proposal to build the Towantic power plant in Oxford, Connecticut. (2001).
- **American National Power, Calpine, El Paso, NRG Energy, Sithe, Southern Energy**
  Provided support for the development of a proposal for a Regional Transmission Organization for New England. (2000 - 2001).
- **Duke Energy/Maritimes and Northeast Pipeline**
  Provided expert reports on the market and environmental impacts of new natural gas infrastructure and supply in New England and the public benefits of the Maritimes and Northeast Phase III and Hubline project. (2000-2003).
- **Arkansas Electric Distribution Cooperatives and Arkansas Electric Cooperative Corporation**
  Provided expert witness support and analysis on economic and public policy issues associated with various aspects of wholesale and retail competition in Arkansas. (2000 - 2001).
- **TransÉnergie U.S.**
  Provided expert testimony regarding public benefits of proposal to construct merchant transmission facility. (2000 - 2001).
- **Conectiv**
  Provided strategic wholesale market analysis and support for procurement of supplies for distribution utility company's provision of Basic Generation Services to retail customers. (2000).
- **SCS Energy Corp. – Astoria Energy**
  Provided economic and environmental analysis and expert witness support for proposal to build new power plant in New York City. (2000 - 2001).

- **HEFA Power Options**
  Provided strategic advice regarding wholesale power market for retail buyers' group. (2000-2003).
- **Major real estate development company**
  Provided strategic support for configuration of electric and gas infrastructure for large regional mixed-use development project. (2000 - 2001).
- **Investment company**
  Provided strategic advice to investment company with regard to potential investment in major electric generating equipment manufacturing company. (2000).
- **Major independent power company**
  Provided economic and environmental support for company's application to construct a merchant power plant in Florida. (2000).
- **Major railroad company**
  Provided expert witness support on economic and regulatory policy issues for railroad in state regulatory proceeding on a proposed utility merger. (2000).
- **Coalition of Wireless Telecommunications Carriers**
  Prepared an expert report on economic benefits of wireless telecommunications. (2000).
- **Major brownfield property developer**
  Provided economic valuation of property to be developed as site for new electric generating facility. (2000).
- **Fitchburg Gas and Electric Company**
  Provided litigation support for a gas and electric company on rate design policy. (2000).
- **Consortium of electric companies**
  Provided economic analysis, contract review, and litigation support for a consortium of electric companies with power purchase agreements with PURPA projects. (1999).
- **FirstEnergy Corp.**
  Provided expert witness support regarding generation asset valuation and the impacts of a new electric industry restructuring law on the company. (1999 - 2000).
- **Ozone Attainment Coalition**
  Provided strategic analysis and advice on electric system reliability issues relating to electric companies' implementation of 2003 NOx requirements issued by the U.S. EPA. (1999).
- **Municipal electric department**
  Provided expert witness services and analysis of the economics and need for a new natural gas pipeline proposed to serve an existing electric power plant in Massachusetts. (1998 - 2001).
- **Seneca Nation**
  Provided expert analysis and strategic advice regarding the value of transmission rights of way, in a dispute with an electric utility company. (1998 - 2000).
- **Major cable company**
  Provided strategic advice in a series of regulatory and court cases involving inter-affiliate transactions of electric utility company entering into competitive telecommunications and cable markets. (1998).
- **Major electric utility company**
  Provided expert witness support regarding structural changes in the electric industry, in litigation pertaining to the company's restructuring plans. (1998 - 1999).

- **Sithe Energies, Inc.**
  Provided strategic advice and regulatory support on a variety of issues (market analysis, transmission and ISO issues, federal and state market rules, legislation, siting, environmental strategy) relating to the company's participation in the New England, New York, and PJM markets. (1997 to 2003).

  Provided transition assistance to the company in its acquisition and integration of approximately 2,000-megawatts of existing fossil fuel generation from Boston Edison Company. (1997 - 1998).

  Provided transition assistance to the company in its acquisition and integration of approximately 4,100-megawatts of existing fossil and hydroelectric generation capacity from GPU Genco. (1998 - 1999).

  Provided support for the company's participation in electricity product markets structured by NEPOOL and operated by the Independent System Operator-New England, the New York power pool and the New York ISO, and PJM. (1997 to 2002).

  Provided strategic project development advice and expert witness support for the company's applications to construct three natural gas merchant power plants (totaling 2865 megawatts) in Everett, Weymouth, and Medway, Massachusetts. (1998 to 2001).

  Provided strategic guidance and regulatory support regarding design of air quality improvement plan for existing fossil units at Mystic Station. (1998 to 2001).

  Provided strategic guidance regarding company's natural gas-fired merchant power plant development projects in Ontario, Canada. (2000 to 2001).

- **Various private electric companies, state legislative committees, gas companies, electric asset investor groups**
  Provided workshops and presentations on changes under way in the electric industry, with focus on issues of strategic importance to these particular decision-makers and stakeholders. (1995 - present).

- **Natural Resources Canada**
  Prepared a white paper on the implications for electric system reliability in Canada that are associated with restructuring the electric industry in the United States. (1999).

- **Cummins Engine Company, Inc.**
  Provided strategic analysis on implications of national energy and environmental policies for the Company's long-term business opportunities. (1999).

- **Electric utility company**
  Provided advice and regulatory support with regard to the economics and prudency of an existing long-term power purchase agreement. (1998).

- **National Association of Regulatory Utility Commissioners (NARUC)**
  Assisted the Executive Director and NARUC leadership in updating its strategic plan and in preparing a business plan for its implementation. (1998).

- **State energy office**
  Assisted the office in analyzing options for supporting renewable resource development in the state and in designing a market-based strategy to implement a new legislative mandate for a "renewables portfolio standard." (1997-1998).

- **U.S. Generating Company (now PG&E Generating Company)**
  Provided analysis of the economic, reliability, and environmental benefits to the host state and region of a new merchant power generation facility: the 360-megawatt Millennium project in Massachusetts. Provided expert witness testimony on the results of this analysis to the Massachusetts Energy Facility Siting Board. (1996-1997).

Provided analysis of the economic, reliability, and environmental benefits of a new merchant power generation facility: the 792-megawatt Lake Road Generating Project in Connecticut. Provided expert witness testimony on the need for this project to the Connecticut Siting Board. (1997-1998).

- **Pennsylvania Power & Light Company**
  Provided strategic guidance, economic and policy analysis, and regulatory support for electric utility company as it developed and proposed its plan for restructuring its company for retail competition. Issues and tasks included electricity market price estimation, rate design, revenue analysis, consumer protection, corporate structure, and regulatory strategy. Provided expert witness testimony on rate design policy issues. (1996-1998).

- **Major diversified electric equipment company**
  Provided strategic advice and analysis on market opportunities and risk in various regions of the U.S. electric industry, under numerous restructuring scenarios. (1996-1997).

- **Major nationwide electricity consumer**
  Conducted analysis of buying options and strategies for acquisition of electricity services in states with customer choice in retail generation markets. Analysis included review and comparison of eight states' implementation of customer choice, from the perspective of how retail rate and function are unbundled, how the commercial and reliability functions are structured in the regional generation market, and how the customer should approach the market to competitively procure power across various states. (1997).

- **National Council on Competition in the Electric Industry**
  Prepared a Briefing Paper on Regional Issues in Electric Industry Restructuring, for the NCCEI—a joint project of the National Association of Regulatory Utility Commissioners, the National Conference of State Legislatures, the U.S. Department of Energy, and the U.S. Environmental Protection Agency. Analyzed regional issues, including electric system reliability, transmission access and siting, environmental protection, market power, interstate reciprocity in retail access policies, and regulation of multi-state electric utility companies. (1997).

- **Major western coal company**
  Analysis of western states' electric industry restructuring policies and market prices for power in various states within the Western Systems Coordinating Council area. (1996-1997).

- **Major gas pipeline company**
  Provided analysis of market structures and prices for generation and delivery services in electric service territories where the gas pipeline would locate facilities that use electricity. (1997).

- **Major electric supply company**
  Provided analysis of regional electricity market conditions to support this company's analysis of the value of various utility assets that were being divested as part of an electric utility company's corporate restructuring. (1997).

- **Massachusetts Division of Energy Resources**
  Analyzed Boston Gas Company's proposal for unbundling its retail service, its proposal for performance-based rates, and its plan for departing the merchant function. Provided analytic, policy and negotiation support on gas industry restructuring issues in a variety of cases. (1996-1998).

- **Massachusetts Division of Energy Resources**
  Assisted the state's energy office in developing policies for establishing a statewide fund to support renewable resource development as part of the state's electric industry restructuring plan. Provided analytic support to the energy office as it participated in a working group of stakeholders attempting to reach consensus on the institutional design of such a renewables fund. Drafted legislative language to create the fund and the non-bypassable charge on electric distribution service in the state. (1997).

- **Massachusetts Water Resources Authority Advisory Board**
  Analyzed opportunities for the MWRA, a public authority with major energy-using and -producing assets, to position itself beneficially as a participant in a restructured retail electricity market in New England. (1996-1997).

- **Coalition of marketers and independent power producers**
  Analyzed a state public utility commission's proposed rules for restructuring the electric industry, from the point of view of whether the proposed structure would assure a workably competitive market. Examined the regional power pool's proposal for an independent system operator. (1996-1997).

- **Major independent power producer**
  Analyzed market opportunities and risks for merchant plant development in a U.S. region (1996).

- **Major independent power producer**
  Analyzed the expected market price of power in two regions of the U.S. electricity markets. Presented results to company board of directors. (1996).

- **MCI, Inc.**
  Provided strategic regulatory advice in local competition proceeding before a state public utility commission. Provided testimony on local competition policy issues in public utility commission proceedings in Massachusetts and New York. (1996).

- **Group of municipal electric companies in New York State**
  Provided expert witness testimony on cost allocation issues in court litigation on wholesale power contracts. (1996).

- **Intercontinental Energy Corporation**
  Provided strategic guidance, analytic support, and regulatory support for the company, a major independent power producer, as it developed its position in the state's electric industry restructuring proceeding. Issues involved regional industry structure (including independent system operator proposals), stranded cost recovery policy, stranded cost calculation methodologies, horizontal and vertical market power issues, environmental protection, and securitization. Provided expert witness testimony in state retail restructuring proceedings in Massachusetts and New Jersey. (1995-1997).

- **Nextel Communications**
  Provided economic and policy analysis on barriers to entry in the local commercial mobile radio service market in region. Provided expert witness testimony before the Massachusetts Department of Public Utilities. (1995-1998).

- **Arizona Public Service Company**
  Provided expert witness testimony on regulatory reforms necessary to align traditional existing utility planning proceedings with competitive retail markets as being proposed in the state. (1995).

TESTIMONY ON BEHALF OF CLIENTS

Many confidential expert reports, testimonies, declarations, affidavits, and depositions in confidential arbitrations and mediations.

- **National Grid: Niagara Mohawk Power Corporation**
  Before the New York Public Service Commission, Investigation as to the Propriety of Proposed Electric Tariff Changes, Docket No. 10-E-0050, prefiled direct testimony (filed January 29, 2009).

- **National Grid: Narragansett Electric Company**

Before the Rhode Island Public Utilities Commission, Investigation as to the Propriety of Proposed Tariff Changes, Docket No. R.I.P.U.C. 4065, prefiled direct testimony (filed June 1, 2009; testimony under cross-examination, November 4, 2009).

- **National Grid: Massachusetts Electric Company and Nantucket Electric Company**
  Before the Massachusetts Department of Public Utilities, Investigation as to the Propriety of Proposed Tariff Changes, Docket No. D.P.U. 09-39, prefiled direct testimony (filed May 15, 2009; testimony under cross-examination, August 7 and 25, 2009, and September 8, 2009).

- **Amerada Hess Corp., et al.**
  Before the District Court of the United States for the Southern District of New York, on behalf of Amerada Hess Corp., et al., in *City of New York v. Amerada Hess Corp. et al.*, Case No. 1:00-1898, testimony in deposition, May 12, 2009.

- **State of North Carolina**
  Before the District Court of the United States for the Western District of North Carolina, on behalf of North Carolina in *State of North Carolina, ex rel. Roy Cooper, Attorney General, v. Tennessee Valley Authority*, Case No. 1:06CV20, testimony in deposition, May 17, 2007; testimony at July 22, 2008.

- **KeySpan Energy Delivery (National Grid)**
  Before the Massachusetts Appellate Tax Board, Boston Gas Company, d/b/a KeySpan Energy Delivery New England v. City of Boston, Docket No. F275055-F275056 (FY 2004), F279207-F279208 (FY 2005), F284088-F286194 (FY 2006), testimony and cross-examination, May 20-21, 28, and June 4, 2008.

- **Commonwealth Edison Company**
  Before the *Illinois Commerce Commission*, Investigation of Proposed General Increase in Electric Rates of Commonwealth Edison Company, Docket No. 07-0566, ComEd Exhibit 18.0, prefiled rebuttal testimony (filed April 12, 2008).

- **Sierra Pacific Power Company**
  Before the Public Utilities Commission of Nevada, In the Matter of the Application of Sierra Pacific Power, filed pursuant to NRS 704.110(3), for authority to increase its general rates charged to all classes of electric customers to reflect an increase in annual revenue requirement, Docket No. 07-12 (filed December 3, 2007), Prefiled Direct Testimony (with David Sosa); cross examination, April 17-18, 2008.

- **Amerada Hess Corp., et al.**
  Before the District Court of the United States for the Southern District of New York, on behalf of Amerada Hess Corp., et al., in *County of Suffolk and Suffolk County Water Authority v. Amerada Hess Corp. et al.*, Case No. 1:00-1898, testimony filed October 1, 2007.

- **Sempra Energy Company – San Diego Gas & Electric Company and SoCalGas Company**
  Before the *California Public Utility Commission*, Order Instituting Rulemaking to Examine the Commission's post-2005 Energy Efficiency Policies, Programs, Evaluation, Measurement and Verification and Related Issues, Rulemaking Docket 06-04-010 (Filed April 13, 2006), testimony filed May 3, 2007, cross examination, May 29, 2007.

- **Commonwealth Edison Company**
  Before the *Illinois Commerce Commission*, Investigation of Rider CPP of Commonwealth Edison Company, and Rider MV of Central Illinois Light Company d/b/a AmerenCILCO, of Central Illinois Public Service Company d/b/a/ AmerenCIPS, and of Illinois Power Company d/b/a Ameren IP, pursuant to Commission Orders regarding the Illinois Auction, Docket No. 06-0800, testimony filed April 6, 2007; cross-examination, April 24, 2007.

- **PECO Energy Company**
  Before the *Pennsylvania Public Utility Commission*, Petition of PECO for Approval of (1) a Process to Procure Alternative Energy Credits During the AEPS Banking Period, and (2) A Section 1307 Surcharge and Tariff to Recover AEPS Costs, Prefiled Direct Testimony, March 19, 2007.

- **Masspower**
  Before the Superior Court Department of Suffolk County, Massachusetts, *Massachusetts Municipal Wholesale Electric Company v. Masspower, et al.*, Civil No. 05-02710 (BLS1), on the changes in conditions in the electric industry in New England as they relate to Masspower's performance under its power supply agreement with MMWEC; Expert Report, September 11, 2006; oral testimony under cross examination at trial, October 16-17, 2006.

- **Commonwealth Edison Company**
  Before the *Illinois Commerce Commission*, Proposed general increase in electric rates, general restructuring of rates, price unbundling of bundled service rates, and revision of other terms and conditions of service, Docket No. 05-0597, Rebuttal Testimony, January 30, 2006; Surrebuttal Testimony, March 14, ,2006; oral testimony under cross-examination, March 23, 2006. Testimony on rehearing, September 20, 2006.

- **Commonwealth Edison Company**
  Before the *Illinois House of Representatives, Electric Utility Oversight Committee*, on the Pay-as-Bid versus Uniform Price Auction Approach To Procurement of Wholesale Power for ComEd's Full-Requirements Customers, January 18, 2006, Springfield, Illinois.

- **Louisville Gas & Electric Company and Kentucky Utilities Company**
  Before the *Kentucky Public Service Commission*, Application of LG&E and KU to transfer functional control of their transmission assets, Case No. 2005-xxxx, Direct Testimony, November 19, 2005.

- **Western Massachusetts Electric Company**
  Before the Superior Court Department of Norfolk County, Massachusetts, *Alternative Power Source, Inc., v. Western Massachusetts Electric Company*, Civil Action No. 00-1967, on the allocation of costs related to transmission congestion in wholesale power contract for standard offer service. Expert Report, September 19, 2001; deposition, October 15, 2001; testimony at trial, July 15, 2005.

- **Entergy Louisiana, Inc. and Entergy Gulf States Inc.**
  Before the *Louisiana Public Service Commission*, Application of Entergy Louisiana, Inc. for Approval of the Purchase of Electric Generating Facilities and Entergy Gulf States, Inc. for Authority to Participate in Contract for the Purchase of Capacity and Electric Power, Docket No. U27836, January 21, 2005.

- **Louisville Gas & Electric Company and Kentucky Utilities Company**
  Before the *Kentucky Public Service Commission*, Investigation Into The Membership of Louisville Gas and Electric Company and Kentucky Utilities Company In The Midwest Independent Transmission System Operator, Inc., Case No. 2003-00266, September 29, 2004; Supplemental Rebuttal Testimony, January 10, 2005; testimony at hearing, June 2005.

- **Entergy Services Inc.**
  Before the *Federal Energy Regulatory Commission,* Entergy Services Inc., et al., in support of the application for approval of market-based power purchase agreements under Section 205 of the Federal Power Act. Affidavit, February 28, 2003; Affidavit, March 31, 2003; Testimony, September 2003; Testimony at deposition, November 20, 2003; Rebuttal Testimony, May 11, 2004; Deposition, May 27, 2004, and June 10-11, 2004; Testimony under cross-examination, July 19-23, 26-27, 2004.

- **Pacific Gas & Electric Company**

Before the *California Public Utilities Commission*, In Re: Order Instituting Investigation into the ratemaking implications for Pacific Gas and Electric Company (PG&E) pursuant to the Commission's Alternative Plan of Reorganization under Chapter 11 of the Bankruptcy Code for PG&E, in the United States Bankruptcy Court, Northern District of California, San Francisco Division, In re Pacific Gas and Electric Company, Investigation 02-04-026, Pre-Filed Testimony, July 23, 2003, Testimony under cross-examination, September 12, 2003.

- **Entergy Louisiana, Inc.**
  Before the *Louisiana Public Service Commission, Entergy Service*, In Re: Application of Entergy Louisiana, Inc., for Authorization to Enter into Certain Contracts for the Purchase of Capacity and Energy, Docket No. U-27136, Rebuttal Testimony, April 25, 2003.

- **Pacific Gas and Electric Company/PG&E Corporation**
  Before the *Federal United States Bankruptcy Court, Northern District of California, San Francisco Division*, In Re: Pacific Gas and Electric Company, Debtor, Federal I.D. No. 94-0742640, on the public policy concerns raised by the proposed reorganization plan of PG&E Corporation. Expert report, November 8, 2002; rebuttal report, November 26, 2002.

- **PP&L Global**
  Before the *New York Public Service Commission, Article X Siting Board*, on the economic and environmental benefits of the Kings Park Energy power plant. Prefiled direct testimony (with James Potter, Stephen T. Marron, David J. Kettler, and Thomas Conoscenti), January 2002; rebuttal testimony (with James Potter, Stephen T. Marron, William C. Miller, Jr., N. Dennis Eryou, and Robert W. Brown), October 23, 2002.

- **Connecticut Light & Power Company**
  Before the *Federal United States District Court, District of Connecticut, Connecticut Light & Power Company v. NRG Power Marketing Inc.,* on their standard offer service wholesale sales agreement. Expert report, August 30, 2002; deposition, September 27, 2002.

- **Pacific Gas and Electric Company/PG&E Corporation**
  Before the *Federal Energy Regulatory Commission, in the Matter of Pacific Gas and Electric Company, PG&E Corporation, on behalf of its Subsidiaries Electric Generation LLC, ETrans LLC, and GTrans LLC,* on the public benefits of the application seeking approval under Section 203 of the Federal Power Act and Section 12 of the Natural Gas Act for various actions relating to restructuring of the company to emerge from bankruptcy, November 30, 2001.

- **Cross-Sound Cable Company LLC**
  Before the *Connecticut Siting Council*, on the public benefits of the proposed Cross Sound Cable Project's *Application for a Certificate of Environmental Compatibility and Public Need*, Docket No. 208. Prepared direct testimony, July 23, 2001; oral testimony under cross-examination, October 24-26, 29-30, 2001.

- **Sithe New England (Sithe Edgar LLC, Sithe New Boston LLC, Sithe Framingham LLC, Sithe West Medway LLC, Sithe Mystic LLC)**
  Before the *Federal Energy Regulatory Commission, in the Matter of NSTAR Electric & Gas Corp., v. Sithe Edgar LLC, Sithe New Boston LLC, Sithe Framingham LLC, Sithe West Medway LLC, Sithe Mystic LLC, and PG&E Energy Trading*, Docket No. EL01-79-000. Affidavit comparing historical cost recovery by Boston Edison for its portfolio of fossil generation units (pre-divestiture) under rate regulation, versus Sithe's revenue recovery for these same units (post-divestiture) under market prices, June 5, 2001.

- **NRG Energy Inc. and Dynegy Holdings Inc.**
  Before the *Public Utilities Commission of Nevada*, In Re: petition of the Attorney General's Bureau of Consumer Protection to issue an Order staying further proceedings regarding divestiture of

Nevada's electric generation assets and to open a docket to consider whether to issue a moratorium on divestiture in Nevada. Supplemental prepared direct testimony on behalf of Valmy Power LLC, April 6, 2001; testimony under cross-examination.

Before the *Public Utilities Commission of Nevada*, In Re: petition of the Attorney General's Bureau of Consumer Protection to issue an Order staying further proceedings regarding divestiture of Nevada's electric generation assets and to open a docket to consider whether to issue a moratorium on divestiture in Nevada, prepared direct testimony on behalf of Reid Gardner Power LLC and Clark Power LLC, April 3, 2001; testimony under cross-examination.

- **Sithe New England, LLC**
  Before the *Federal Energy Regulatory Commission, In the Matter of Maine Public Utilities Commission and The United Illuminating Company v. ISO New England, Inc.*, affidavit on the role of price "spikes" in compensating generators for the services that they provide in the region, September 7, 2000.

- **Arkansas Electric Distribution Cooperatives**
  Before the *Arkansas Public Service Commission, In the Matter of a Generic Proceeding to Establish Uniform Policies and Guidelines for a Standard Service Package*. Prepared joint reply testimony (with Janet Gail Besser), July 21, 2000; prepared joint surreply testimony (with Janet Gail Besser), August 3, 2000.

- **TransEnergie U.S.**
  Before the *Connecticut Siting Council*, on the public benefits of the proposed Cross Sound Cable Project. Expert report, July, 2000; prepared direct testimony, September 20, 2000; oral testimony, September 27, 2000; supplemental written testimony, December 7, 2000; oral testimony under cross-examination, December 14, 2000; oral testimony January 9-11, 2001.

- **SCS Energy Corp.**
  Before the *New York State Public Service Commission*, on the economic and environmental impact of a new combined cycle power plant in Queens, NY, June 19, 2000.

- **Reading Municipal Light Department**
  Before the *Massachusetts Energy Facilities Siting Board, Docket No. EFSB 97-4*, on the economics and need for a new natural gas pipeline, June 19, 2000; testimony under cross-examination September 19, 2000, September 21-22, 2000, October 5, 2000, and October 17, 2000.

- **Fitchburg Gas and Electric Light Company**
  Before the *Massachusetts Department of Telecommunications and Energy, Docket D.T.E. 99-66*, on gas and electric company rate design policy, testimony under cross-examination, January 14, 2000.

- **FirstEnergy Corp.**
  Before the *Public Utilities Commission of Ohio*, In the Matter of the Application of FirstEnergy Corp. on behalf of Ohio Edison Company, the Toledo Edison Company, and The Cleveland Electric Illuminating Company: for Approval of an Electric Transition Plan and for Authorization to Recover Transition Revenues (Case No. 99-1212-EL-ETP); for Approval of New Tariffs (Case No. 99-1213-EL-ATA); for Certain Accounting Authority (Case No. 99-1214-EL-AAM), on recovery of transition costs and calculation of the market value of generation assets. Joint testimony (with Dr. Scott T. Jones), December 22, 1999; supplemental testimony (with Dr. Scott T. Jones), April 4, 2000; deposition, April 7, 2000.

- **Sithe New England, LLC**
  Before the *Massachusetts Energy Facilities Siting Board, Docket EFSB 98-10*, in support of an application to construct a 540 MW gas-fired single cycle peaking power plant in Medway,

Massachusetts. Prepared direct testimony, April 1999; oral testimony under cross-examination, July 27, 1999.

- **Village of Bergen, et al.**
  Before the *Supreme Court of the State of New York*, *Index No. 081556*, Affidavit in Response to Defendant's Submission of February 25, 1999, in *Village of Bergen, et al., Plaintiffs, v. Power Authority of the State of New York, Defendant*, March 3, 1999.

  Before the *Supreme Court of the State of New York*, *Index No. 081556*, Affidavit in Support of Petition to Correct Rates, in *Village of Bergen, et al., Plaintiffs, v. Power Authority of the State of New York, Defendant*, October 17, 1996.

- **Sithe New England, LLC**
  Before the *Massachusetts Energy Facilities Siting Board, Docket EFSB 98-7*, in support of an application to construct a 750 MW gas-fired combined cycle power plant at the Fore River Station in Weymouth, Massachusetts (Edgar). Prepared direct testimony, February 10, 1999; oral testimony under cross-examination, July 26, 1999.

- **Sithe New England, LLC**
  Before the *Massachusetts Energy Facilities Siting Board, Docket EFSB 98-8*, in support of an application to construct a 1500 MW gas-fired combined cycle power plant at the Mystic Station in Everett, Massachusetts. Prepared direct testimony, February 10, 1999; oral testimony under cross-examination, May 25, June 2, 1999.

- **U.S. Generating Company**
  Before the *Connecticut Siting Board, Docket No. 189*, on an application to construct a new Lake Road Generating Project, September 1998. Oral testimony under cross-examination.

- **Central Hudson Gas & Electric Corporation**
  Before the *Supreme Court of New York, Index No. 255/1998, CHGE v. West Delaware Hydro Associates*, on issues relating to ratemaking treatment of costs relating to power contracts, April 13, 1998.

- **Sithe New England Holdings, LLC**
  Before the *Massachusetts Department of Telecommunications and Energy and the Massachusetts Energy Facilities Siting Board, Docket Nos. DTE98-84 and EFSB98-5,* on issues pertinent to forecast and supply planning by electric companies, September 14, 1998.

- **Sithe Energies, Inc.**
  Before the *Massachusetts Energy Facilities Siting Board, Docket No. EFSB98-3,* on issues related to the agency's rulemaking establishing a Technology Performance Standard, June 8, 1998.

  Before the *Massachusetts Energy Facilities Siting Board, Docket No. EFSB98-1,* on issues related to the agency's review of project viability as part of review of power plant applications, March 16, 1998.

- **Pennsylvania Power & Light**
  Rebuttal testimony on codes of conduct governing affiliate relations. *Pennsylvania Public Utility Commission, Docket Nos. A-122050F0003, A-120650F0006*, testimony under cross-examination, February 17, 1998.

  Rebuttal testimony on rate unbundling and rate design issues, on consumer protection issues. *Pennsylvania Public Utility Commission, Docket No. R-00973954,* testimony under cross-examination, August 5, 1997.

  Before the *Penn Public Utility Commission, Docket No. R-00973954,* on rate design, April 1, 1997.

- **Nextel Communications**

Before the *Massachusetts Department of Public Utilities, Docket 95-59-B,* on telecommunications facility matters, testimony under cross-examination, January 1997.

- **Arizona Public Service Company**
  Before the *Arizona Corporation Commission, Docket No. U-0000-95-506,* on integrated resource planning and competition, October 1996.

- **U.S. Generating Company**
  Before the *Massachusetts Energy Facilities Siting Board, Docket 96-4,* on an application to construct a new Millennium power generating facility, testimony under cross-examination, October 1996.

- **MCI Communications, Inc.**
  Before the *Massachusetts Department of Public Utilities*, in the NYNEX interconnection docket. Opening up the Local Exchange Market to Competition: Common Themes with Retail Competition in Electricity and Natural Gas Industries, August 30, 1996.

- **Intercontinental Energy Corporation**
  Before the *New Jersey Board of Public Utilities, No. EX94120585Y,* on the Energy Master Plan Phase I Proceeding to Investigate the Future Structure of the Electric Power Industry, July 1996.

  Before the *Massachusetts Department of Public Utilities, DPU 96-100,* on the Investigation Commencing a Notice of Inquiry/Rulemaking for Electric Industry Restructuring, July 1996.

PUBLICATIONS, REPORTS, ARTICLES

Tierney, Susan, with Andrea Okie and Stephen Carpenter, "Strategic Options for Investment in Transmission in Support of Offshore Wind Development in Massachusetts: Summary Report with Expanded Technical Information" Report prepared for the Massachusetts Renewable Energy Trust, January 2010.

Tierney, Susan, with Andrea Okie and Stephen Carpenter, "Strategic Options for Investment in Transmission in Support of Offshore Wind Development in Massachusetts: Summary Report," Report prepared for the Massachusetts Renewable Energy Trust, December 2009.

Tierney, Susan, "Allocating Investment Risk in Today's Uncertain Electric Industry: A Guide to Competition and Regulatory Policy During 'Interesting Times,' " A paper prepared for the Electric Power Supply Association, September 2009.

Tierney, Susan, "An Assessment of the McCullough Research Memo on Profitability Results of Selected Power Plants in New York State," A paper prepared for the New York ISO, September 2009

Tierney, Susan, "An Evaluation of the McCullough Research Report on New York's Wholesale Power Market," A report prepared for the New York ISO, March 25, 2009.

Tierney, Susan, Andrea Okie, Rana Mukerji, Michael Swider, Robert Safuto, Arvind Jaggi, "Fuel Diversity in the New York Electricity Market," A New York ISO White Paper, October 2008

Tierney, Susan, "ERCOT Texas's Competitive Power Experience: A View from the Outside Looking In," October, 2008.

Tierney, Susan, "A 21st Century "Interstate Electric Highway System" – Connecting Consumers and Domestic Clean Power Supplies," October 31, 2008.

Barmack, Matthew, Edward Kahn, Susan Tierney, Charles Goldman, "Econometric models of power prices: An approach to market monitoring in the Western US," *Journal of Utilities Policy,* 2008, 307-320.

Tierney, Susan, and Todd Schatzki, "Competitive Procurement of Retail Electricity Supply: Recent Trends in State Policies and Utility Practices," prepared for the National Association of Regulatory Utility Commissioners (NARUC), July 2008.

Tierney, Susan, et. al., "Pay-as-Bid vs. Uniform Pricing: Discriminatory auctions promote strategic bidding and market manipulation," *Public Utilities Fortnightly* (March 2008).

Tierney, Susan, "Statement on Pennsylvania House Bill No. 54 – Why Extending Electricity Rate Caps Ultimately Would Not Protect Consumers From Rising Electricity Prices," February 2008.

Tierney, Susan. "Pennsylvania's Electric Power Future: Trends and Guiding Principles," January 2008, Prepared for the Energy Association of Pennsylvania.

Tierney, Susan. "Decoding Developments in Today's Electric Industry — Ten Points in the Prism," October 2007, Prepared for the Electric Power Supply Association.

Baldick, Ross, Ashley Brown, James Bushnell, Susan Tierney, and Terry Winter. "A National Perspective on Allocating the Costs of New Transmission Investment: Practice and Principles," A White Paper Prepared by The Blue Ribbon Panel on Cost Allocation for WIRES, the Working group for Investment in Reliable and Economic electric Systems, September 2007.

Tierney, Susan, "Adaptation and the Energy Sector," National Summit on Coping with Climate Change, University of Michigan, Ann Arbor, May 8-10, 2007.

Tierney, Susan, and Edward Kahn, "A Cost-Benefit Analysis of the New York Independent System Operator: The Initial Years," March 2007.

Tierney, Susan, and Paul Hibbard, "Market Monitoring at U.S. RTOs: A Structural Review," March 2007 (Appendix 17 of PJM 2007 Strategic Report, April 2, 2007).

Tierney, Susan, "Recollections of a State Regulator," NRRI 30th Anniversary, *Journal of Applied Regulation*, Volume 4, December 2006.

Barmack, Matthew, Edward Kahn, Susan Tierney, and Charles Goldman, "A Regional Approach to Market Monitoring in the West," Prepared the Western Interstate Energy Board Committee on Regional Electric Power Cooperation and Office of Electricity Delivery and Energy Reliability, Department of Energy, LBNL-61313, October 2006.

"Electric Reliability," letter to the Editor, *Issues in Science and Technology*, Fall 2006, Forum.

"A Cost-Benefit Assessment of Wholesale Electricity Restructuring and Competition in New England," co-authored with Dr. Matthew Barmack and Dr. Edward Kahn, May 2006; forthcoming, *Journal of Regulatory Economics*.

Report to the Massachusetts Special Commission Relative to Liquified Natural Gas Facility Siting and Use, June 2006.

"Energy Policy Act Section 1813 Comments: Report of the Ute Indian Tribe of the Uintah and Ouray Reservation for Submission to the U.S. Departments of Energy and Interior," co-authored with Paul J. Hibbard, In Cooperation With The Ute Indian Tribe of the Uintah and Ouray Reservation, May 15, 2006.

"In support of a Sound plan," Op Ed co-authored with John DeVillars, *Boston Globe*, April 23, 2006.

"Let's Talk About the Weather: Interview with Susan Tierney on climate change risks that corporate boards should know about and address," *Corporate Board Member Magazine*, January/February 2006.

"New England Energy Infrastructure – Adequacy Assessment and Policy Review," White Paper prepared for the New England Energy Alliance; co-authored with Paul J. Hibbard November 2005.

"New energy bill doesn't do enough." Op Ed, *Boston Globe*, July 29, 2005.

"The Benefits of New LNG Infrastructure in Massachusetts and New England: The Northeast Gateway Project," Prepared for Northeast Gateway Energy Bridge, L.L.C., and Algonquin Gas Transmission, LLC, White Paper co-authored with Paul. J. Hibbard, June 2005.

"Principles for Market Monitoring and Mitigation in PJM: A Review of Economic Principles, Legal and Regulatory Structures, and Practices of Other Regions, with Recommendations," White Paper prepared for PJM Interconnection, January 3, 2005.

"Keeping the Power Flowing: Ensuring a Strong Transmission System to Support Consumer Needs For Cost-Effectiveness, Security and Reliability – A Report of the Transmission Infrastructure Forum of the Consumer Energy Council of America," co-authored the report with CECA staff for this CECA Transmission Infrastructure Forum, January 2005.

Signatory to "Ending the Energy Stalemate: A Bipartisan Strategy to Meet America's Energy Challenges, Summary of Recommendations," National Commission on Energy Policy, December 2004.

"Comments of Susan F. Tierney and Paul. J. Hibbard on their own behalf," before the *Federal Energy Regulatory Commission, in the Matters of Solicitation Processes for Public Utilities (Docket No. PL04-6-000) and Acquisition and Disposition of Merchant Generation Assets by Public Utilities (Docket No. PL04-9-000),* on the role of independent monitors in public utility resource solicitations, July 1, 2004.

"Energy and Environmental Policy in the United States: Synergies and Challenges in the Electric Industry" (with Paul J. Hibbard), prepared for Le Centre Français sur les Etats-Unis (The French Center on the United States), July 2003; presentation in Paris, October, 2003.

"Supplemental Report on the Benefits of New Gas Infrastructure in New England: The Everett Extension Project" (with Charles Augustine), prepared for Algonquin Gas Transmission Company, February 5, 2003.

"The Political Economy of Long-Term Generation Adequacy: Why an ICAP Mechanism Is Needed as Part of Standard Market Design" (with Janet Gail Besser and John Farr), *The Electricity Journal,* August/September 2002.

"Siting Power Plants in the New Electric Industry Structure: Lessons California and Best Practices for Other States" (with Paul J. Hibbard), *The Electricity Journal*, June 2002.

"Maritimes Phase III & Algonquin Hubline: 'Coastal Dependency'" *CZM Consistency Review*, May 2002.

"Siting Power Plants: Recent Experience in California and Best Practices in Other States" (with Paul J. Hibbard), prepared for The Hewlett Foundation and The Energy Foundation, February 2002.

"Economic and Environmental Benefits of the Kings Park Energy Project: System Production Modeling Report" (with Joseph Cavicchi), prepared for PPL Global, January 25, 2002.

"The Benefits of New Gas Infrastructure in New England: The Maritimes & Northeast Phase IV Pipeline Project" (with Charles Augustine), prepared for Maritimes & Northeast Pipeline, LLC, January 2002.

"Activating Ontario's Capacity Market: Design and Implementation Issues" (with Janet Gail Besser and John Farr), prepared for Sithe Energies, Inc., October 24, 2001.

White paper on "Ensuring Sufficient Capacity Reserves in Today's Energy Markets" (with Janet Gail Besser and John Farr), prepared for submission as part of comments filed by Sithe Power Marketing LLC, Sithe New England Holdings, FPL Energy LLC, in FERC Docket No. EX01-1-000, October 17, 2001.

"The Rationale and Need for Capacity Obligations and a Capacity Market in a Restructured Ontario Electricity Industry" (with Janet Gail Besser & John Farr), prepared for Sithe., September 27, 2001.

"Economic and Environmental Benefits of the Wawayanda Energy Center: System Production Modeling Report" (with Joseph Cavicchi), prepared for Wawayanda Energy Center, LLC, August 24, 2001.

"A Better CO_2 Rule," op-ed, *The New York Times*, May 16, 2001.

"Air Pollution Reductions Resulting from the Kings Park Energy Project" (with Joseph Cavicchi), prepared for PPL Global, January 24, 2001.

"Report on "Economic Benefits of Wireless Telecommunications," prepared on behalf of the N.H. Coalition of Wireless Carriers for the New Hampshire HB 733 Study Committee, November 13, 2000.

Expert Report: "Public Benefits of the Proposed Cross Sound Cable Project Prepared for TransÉnergie U.S. Ltd.," July 2000.

"The Benefits of New Gas Infrastructure in Massachusetts and New England: The Maritimes & Northeast Phase III Pipeline and the Algonquin Gas Transmission Company HubLine Projects" (with Wayne Oliver of Navigant Consulting), prepared for Maritimes & Northeast Pipeline, LLC and Algonquin Gas Transmission Company, October 2000.

"Production Modeling for the Astoria Project: Report on Results" (with John G. Farr), report for SCS Energy Corp., June 14, 2000.

"Observations from Across the Border: Implications for Canadian Reliability of Recent Changes in U.S. Electricity Markets and Policy," white paper for Natural Resources Canada, 1999.

"Research Support for the Power Industry" (with M. Granger Morgan), *Issues in Science and Technology,* Fall 1998.

"Maintaining Reliability in a Competitive U.S. Electricity Industry," Final Report of the Task Force on Electric System Reliability, U.S. Department of Energy, September 29, 1998.

"Regional Issues in Restructuring the Electric Industry," *The Electricity Industry Briefing Papers*, The National Council on Competition and the Electric Industry, April 1998.

"Fueling the Future: America's Automotive Alternatives" (with Philip Sharp), The American Assembly, Columbia University, Arden House, NY, September, 1995.

"Needed: Broad Perspective, Fresh Ideas," guest editorial, *The Electricity Journal*, November 1994.

Foreword in J. Raab, *Using Consensus Building to Improve Utility Regulation*, American Council for an Energy-Efficient Economy, Washington, DC, 1994

"Massachusetts' Pre-Approval Approach to Prudence in Massachusetts," *The Electricity Journal*, December 1990.

"Using Existing Tools to Pry Open Transmission—A New England Proposal," *The Electricity Journal*, April 1990.

"Sustainable Energy Strategy: Clean and Secure Energy for a Competitive Economy" (directed), National Energy Policy Plan, July 1995.

"The Domestic Natural Gas and Oil Initiative: First Annual Progress Report" (directed), U.S. Department of Energy, February 1995.

General Guidelines for Voluntary Reporting of Greenhouse Gases under Section 1605(b) of the Energy Policy Act of 1992 (directed), U.S. Department of Energy, October 1994.

"Fueling a Competitive Economy: Strategic Plan for the U.S. Department of Energy" (directed), 1994.

"The Domestic Natural Gas and Oil Initiative: Energy Leadership in the World Economy" (directed), U.S. Department of Energy, December 1993.

"Siting Needs: Issues and Options," U.S. Department of Energy, June 1993.

"The Nuclear Waste Controversy," in D. Nelkin, *Controversy: The Politics of Technical Decisions*, Sage, 1977; 1984 (second edition).

DATAWARS: Computer Models in the Federal Government (with Kenneth L. Kraemer, Siegfried Dickhoven, and John Leslie King), Columbia University Press, 1987.

"The Evolution of the Nuclear Debate: Role of Public Participation," *Annual Review of Energy*, 1978.

RECENT SPEECHES AND PRESENTATIONS

"Themes in federal energy and climate policy issues in Washington – end of 3rd Q, 2009," presentation to the Kennedy School, Harvard University, November 18, 2009.

"Update on federal energy and climate policy issues in Washington – end of 3rd Q, 2009," presentation to the New York Independent System Operator Environmental Advisory Council, October 23, 2009.

"Challenges and Opportunities in Colorado's New Energy Economy – A View From Washington," presentation to the "Powering the Future – Colorado's New Energy Economy," Denver, Colorado – October 20th, 2009.

Financial Meltdown and Recovery: Challenges and Opportunities in the New Clean Energy Economy – Taking Stock in 3rd Q 2009," ABA Environment, Energy and Resources Law Summit 17th Section Meeting – Baltimore, September 25, 2009.

"Off-Shore Renewable Energy Development in NE: Massachusetts's New Ocean Management Plan," presentation to the New England Electric Restructuring Roundtable, September 18, 2009.

"Energy Policy for the 'Climate Change Era' – What's Your Definition of Green?" presentation to the 55th Annual Rocky Mountain Mineral Law Institute, San Francisco, July 23, 2009.

"The Goals for an Electricity Grid for the 21st Century: Where You Stand Depends Upon Where You Sit," presentation to the Aspen Institute Energy Policy Forum, Aspen, Colorado, July 9, 2009

"Linking Ends and Means in Energy & Environmental Policy: Intended and Unintended Consequences," presentation to the Harvard Electricity Policy Group, Cambridge, Massachusetts, May 28, 2009.

"Today's Energy Landscape: What's Coming Next for Energy & Resources Policy & Regulations," presentation to the Chief EH&S Officers Council (Joint with EH&S Legal Officers), The Conference Board – Washington, DC, May 14, 2009.

"Scanning Today's Energy Landscape in New England: Objects are Closer Than They Appear," Presentation to the New England Conference of Public Utility Commissioners, Newport, Rhode Island, May 3, 2009.

"Today's Energy Landscape: Objects are Closer Than They Appear." Presentation to the Energy Bar Association's 63rd Annual Meeting: Infrastructure, Policy, and Practice Amidst Economic Turmoil, Washington, D.C., April 23, 2009.

"Regulatory Treatment of Purchased Power: Pass Through or Profit Center? Give Away or Value Creation?" presentation to Harvard Electricity Policy Group, October 3, 2008., Harvard Electric Policy Group – Chicago, Illinois, October 3, 2008.

"Leadership Panel: Barriers to Acting in Time on Energy, and Strategies for Overcoming Them," Harvard University Conference: Acting in Time on Energy Policy, September 18, 2008.

"New England's Power Markets: The context for renewables development," Law Seminars International, September 8, 2008.

"Today's Business Environment for Electric Utilities – 10 Issues," presentation to the Public Utility Commissioners' Dialogue with the Investment Community, NYC, June 25, 2008.

"The Federal Role in Plug-In Vehicles," Plug-In Electric Vehicles 2008: What Role for Washington? Sponsored by the Brookings Institution and Google.org, June 12, 2008.

"State Policies for Energy Efficiency: Status and Observations," EIA's 2008 Energy Conference – 30 Years of Energy Information and Analysis, panel on The Role of Energy Efficiency in Meeting Future Demand, April 8, 2008.

"Resource Adequacy, Entry & Current Electric Industry Trends," American Antitrust Institute, 3-3-2008.

"Preliminary Findings: Study of Model State and Utility Practices for Competitive Procurement of Retail Electric Supply," Presentation to the NARUC/FERC Collaborative, February 17, 2008.

"Energy Systems and Adaptation to Climate Change" presentation at Annual Meeting of the American Meteorological Society, Panel on Adaptation to Climate Change, New Orleans – January 21, 2008.

"Decoding Developments in Today's Electric Industry —The Larger Context for Western Mass' Energy Situation," presentation to the Western Massachusetts Energy Forum, January 15, 2008.

"Decoding Developments in Today's Electric Industry — Ten Points in the Prism" COMPETE/EPSA Meeting, Washington, DC, November 5th, 2007

"Climate Science Research for the Energy Sector ," presentation to the National Academy of Science Working Group, U.S. Climate Change Science Program, Washington, D.C., October 17, 2007

"Climate and Energy – Facts on the Ground – A view from outside the region," Presentation to the Environmental Entrepreneurs Meeting, Boston, September 18, 2007.

"New England's Electric Industry in an Era of Climate Change, Globalization, and Alzheimer's: Where We Stand, Where We Need to Go. . ," Presentation to the New Hampshire Legislature, Electric Utility Restructuring Oversight Committee, Concord, New Hampshire, September 20, 2007.

"Summing Up," presentation to the Kleiner Perkins Caufield & Byers Greentech Innovation Network Forum, Aspen, Colorado, July 19, 2007.

"Market Monitoring at RTOs: Review of the Issues," presentation to the ISO/RTO Council – 2nd Annual IRC Board Conference, Boston, May 23, 2007.

"Adaptation and the Energy Sector," presentation to the University of Michigan – National Summit on Coping with Climate Change, Ann Arbor, May 8 2007.

"Lessons Learned from the Relationship Between Energy Legislation, Energy Strategy and Energy Institutions in the United States," presentation to the China Energy Law International Symposium, Diaoyutai State Guesthouse – Beijing, China, April 27-28, 2007

"Siting Energy Facilities in New England: What, Why, Where, and How," presentation to the Energy and Climate Forum, Tufts University, Medford MA, April 19, 2007

"New England's Electric Industry in an Era of Climate Change, Globalization, and Alzheimer's: Where We Stand, Where We Need to Go. . . . .," presentation, 100th Massachusetts Restructuring Roundtable, *"What Have We Accomplished With Electric Restructuring in New England Over the Past Decade, and What Do We Need To Accomplish Over the Next Decade?"* Boston, March 30, 2007

"Electricity and Gas – Two Unique Energy Commodities: How They Work," presentation to Law Seminars International course on Introduction to Electricity & Natural Gas Regulation – A Primer Law Seminars International, Washington, DC, March 15, 2007

"The Effect of Federal and State Policies on Traditional Generation Technologies." presentation to Yale School of Management; Yale School of Forestry and Environment – course on Energy Economics & the Environment, New Haven CT, February 21, 2007

"National Energy Policy – The one we've got, others being pursued: Formulating a Comprehensive (and Stakeholder-Driven) U.S. National Energy Policy," presentation to MIT course on Developing Energy/Environmental Policies for a Sustainable Future, Cambridge, February 12, 2007

"New England's energy outlook: How it looks from where I Sit," presentation to the Joint Meeting of the Board of the Massachusetts Technology Collaborative and the Governing Board of the John Adams Innovation Institute, Boston, February 12, 2007

"Climate Workshop – Approaches for Dealing with Costs: Safety Valve, Circuit Breaker, Offsets, Allocation," Senate Energy Committee, Washington DC, February 16, 2007

"Working together regionally on energy and environmental issues ," presentation to the Ministerial Forum – Conference of New England Governors and Eastern Canadian Premiers, Québec, February 11, 2007

"Revisiting the Energy Policy Act of 2005: What's Working – and What's Not?" presentation to the Analysis Group Seminar, Denver, November 15, 2006

OTHER PROFESSIONAL ACTIVITIES

Visiting Professor, Department of Urban Studies and Planning, Massachusetts Institute of Technology, Spring 2010.

Co-Lead, Department of Energy Agency Review Team, Obama/Biden Presidential Transition Team, Washington D.C., 2008-2009 (while on full-time leave for four months from Analysis Group).

Member, Board of Directors, World Resources Institute, 2009 to present.

Chair, Massachusetts Ocean Advisory Commission, 2008 to present.

Member, Board of Directors, Evergreen Solar, Inc., 2008 to present.

Member, Board of Directors, Ze-gen Inc., 2009 to present; member, Market Advisory Board, 2008-2009.

Member, Board of Directors, Renegy Holdings, 2007 to present.

Member, Blue Ribbon Commission on Cost-Allocation Issues for Transmission Investment, WIRES, 2007.

Chair, External Advisory Council, National Renewables Energy Laboratory, 2009-present; Member, 2006 to 2008.

Member, National Academy of Sciences Committee on Enhancing the Robustness and Resilience of Electrical Transmission and Distribution in the United States to Terrorist Attack, 2005 to 2008.

Member, New York Independent System Operator, Environmental Advisory Council, 2004 to present.

Member, National Commission on Energy Policy, member, 2002 to present; co-chair, 2009-present

Member, Board of Directors, Clean Air Task Force, 2008-present; Advisory Council member, 2002 to 2008.

Member, Board of Directors, Catalytica Energy Systems Inc., 2001 to 2007.

Member, Board of Directors, Climate Policy Center, 2001 to 2007.

Member, Advisory Committee, Carnegie Mellon Electricity Industry Center, 2001 to present.

Member, Policy Advisory Committee, China Sustainable Energy Project–A Joint Project of The Packard Foundation and The Energy Foundation, 1999 to present.

Director, NorthEast States Center for a Clean Air Future (formerly, Northeast States Clean Air Foundation), 1998 to present.

Chair of the Board of Directors, The Energy Foundation, 2000 to present; Vice-Chair, 1999-2000; Director, 1997 to present.

Chair of the Board of Directors, Clean Air–Cool Planet / Climate Policy Center, 2004 to 2009; director, 1999-present.

Member, Board of Directors, ACORE (American Council on Renewable Energy), 2006-2007.

Co-Chair, Energy/Environment Working Group, Governor Deval Patrick Transition Team (2006-2007).

Presenter, Economic Issues, National LNG Forums, U.S. Department of Energy, Boston Massachusetts; Astoria, Oregon (2006).

Chair of the Technical Review Panel, Critical Infrastructure Protection Decision Support Systems (CIP-DSS), Argonne, Los Alamos and Sandia National Laboratories, 2006.

Advisory Council member, New England Energy Alliance, 2005-2006.

Member, Board of Directors, Electric Power Research Institute, 1998 to 2003, 2005-2006.

Chair of the Laboratory Direction's Division Review Panel for the Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory, 2005.

Chair, Ocean Management Task Force, Commonwealth of Massachusetts, 2003-2004.

Co-Chair, RTO Futures: Regional Power Working Group, 2001-2002.

Chair, Board of Directors, Electricity Innovations Institute, 2002 to 2004; Director, 2001 to 2002.

Member, Florida Energy 2020 Study Commission, Environmental Technical Advisory Committee, 2001.

Technical Advisor, Mid-Atlantic Area Council/PJM, Dispute Resolution Procedure, 1998 to present

Member, "ISO-New England" (Independent System Operator) Advisory Committee, 1998 to 2003.

Director, The Randers Group (subsidiary of Thermo TERRATEK), 1997 to 2000.

Director, MHI, Inc. (electric utility aggregator in Massachusetts), 1997 – 1999.

Director, Thermo ECOTEK Corporation, 1996 – 1999.

Member, United States Department of Energy, Electricity Reliability Task Force, 1996-1998.

Member, Harvard Electricity Policy Group, 1993 to 2005.

HONORS AND AWARDS

Climate Champion Award, Clean Air – Cool Planet, 2009.

Distinguished Alumna Award, Scripps College, Claremont, CA, 1998

Award for Individual Leadership in Public Service, *The Energy Daily*, 1995

Special Recognition Award for Outstanding Contribution to the Industry, Cogeneration and Competitive Power Institute, Association of Energy Engineers, 1994

Leadership Award, National Association of State Energy Officials, 1994

Commencement Speaker and Honorary Doctorate of Laws, Regis College, Weston, MA, 1992.

Attachment NG-SFT-2
Energy Distribution Company Productivity Offsets: Recent Study Estimates and Rulings

Utility	Sample	Sample Period	Inflation Measure	Energy Distribution Productivity	Consumer Dividend	Productivity Offset (No Consumer Dividend)	Productivity Offset (with Consumer Dividend)	Ruling
[1] Boston Gas Company	Gas Distribution, Northeast	1990-2000	GDP-PI	0.53%	0.15%	-0.37%	-0.22%	0.41%
[2] Bay State Gas Company	Settlement		GDP-PI					0.51%
[3] Central Maine Power	Northeast	1993-2005	GDP-PI	1.57%	0.20%	0.24%	0.44%	1.00%
[4] Central Maine Power	Northeast, Sensitivity 1	1993-2005	GDP-PI	1.75%	0.5%-1.0%	0.54%	1.29%	1.00%
	Northeast, Sensitivity 2			2.35%	0.5%-1.0%	1.40%	2.15%	
	Northeast, Sensitivity 3			1.97%	0.5%-1.0%	0.87%	1.62%	
	Northeast, Sensitivity 4			1.88%	0.5%-1.0%	1.54%	2.29%	
[5] Central Vermont Public Service	Northeast	1996-2006	CPI^U	0.74%		0.18%		1.00%
[6] Kansas City Power & Light	National	1994-1998		1.60%				
		1998-2004		0.10%				
		1994-2004		0.70%				
[7] NStar	Settlement		GDP-PI					.50% - .75%
[8] San Diego Gas & Electric	National	1994-2004		1.08%				
[9] San Diego Gas & Electric	Northeast	1994-2004		0.99%				

Notes:

[2] Bay State Gas Company proposed that it be allowed to adopt the productivity offset approved for Boston Gas. The analysis in [1] was used as support.

[4] Energy Distribution Productivity is calculated by adding the US Economy Productivity as reported in Lowry (1.32%) to the Productivity Differentials calculated for each of the four sensitivity analyses. Sensitivity analysis performed. Sensitivity 1: Adjust Output and Labor Price; Sensitivity 2: Adjust Output and Labor Price, No Administrative and General Expenses Allocated to Production Operations; Scenario 3: Adjust Output and Labor Price, Weight Production O&M Expenses by 0.47 when Allocating Administrative and General Expenses; Scenario 4: Adjust Output and Labor Price, Weight Production O&M Expenses by 0.47 when Allocating Administrative and General Expenses, Geometric Capital. The Consumer Dividend is assumed to be 0.75 based on Bench's choice of "stretch factor somewhere between 0.5% and 1.0%."

[6] Productivity for Distribution operations is reported. Company-wide TFP for vertically regulated utilities ranges is 2.8% for 1994-1998, -0.8% for 1998-2004, and 0.6% for 1994-2004.

[7] NStar's productivity adjustment starts at 0.5 and increases by 0.05 annually until it reaches 0.75.

Sources:

[1] Kaufmann, Lawrence, Direct Testimony, Exhibits KEDNE/LRK-1 and KEDNE/LRK-2, on behalf of Boston Gas Company, Massachusetts Department of Telecommunications and Energy, Docket 03-40; Order, Massachusetts Department of Telecommunications and Energy, Docket 03-40, October 31, 2003.

[2] Kaufmann, Lawrence, Direct Testimony, Concerning Performance-Based Regulation, on behalf of Bay State Gas Company, Massachusetts Department of Telecommunications and Energy, Docket 05-27, Exhibit BSG/LRK-1; Order, Massachusetts Department of Telecommunications and Energy, Docket 05-27, November 30, 2005.

[3] Lowry, Mark, Testimony of, Volume IX, May 1, 2007, ARP 2008 Productivity Offset Factor, on behalf of Central Maine Power Company, Maine Public Utilities Commission, Docket No. 2007-215; Maine Public Utilities Commission, Docket Nos. 2007-215 and 2008-111, ARP 2008 Stipulation, June 6, 2008.

[4] Bench Analysis, Maine Public Utilities Commission, Docket No. 2007-215; Maine Public Utilities Commission, Docket Nos. 2007-215 and 2008-111, ARP 2008 Stipulation, June 6, 2008.

[5] Lowry, Mark et al., Revenue Adjustment Mechanisms for CVPS, June 23, 2008, on behalf of Central Vermont Public Service Company, Vermont Public Service Board, Docket No. 7336, Exhibit CVPS-Rebuttal-MNL-2; Order Approving Alternative Regulation Plan and Notice of Status Conference, Docket 7336, September 30, 2008.

[6] Camfield, Robert, Direct Testimony, State Corporation Commission of Kansas, on behalf of Kansas City Power & Light Company, Docket No. 06-KCPE-828-RTS.

[7] Settlement Agreement, Massachusetts Department of Telecommunications and Energy, Docket 05-85. Nstar's productivity adjustment starts at 0.5 and escalates by 0.05 annually until it reaches 0.75.

[8] Lowry, Mark, Prepared Direct Testimony of, December 2006, TFP Research for San Diego Gas & Electric, on behalf of San Diego Gas & Electric, California Public Utilities Commission, Application A.06-12-009.

[9] Division of Ratepayer Advocates, Report on Total Factor Productivity for San Diego Gas & Electric, Southern California Gas Company, General Rate Case, California Public Utilities Commission, Application A.06-12-

Attachment NG-SFT-3
Energy Distribution Company Productivity Offsets: Analysis of Estimates from Recent Studies

Utility	Sample	Sample Period	Energy Distribution Productivity	Productivity Offset (No Consumer Dividend)
[1] Boston Gas Company	Gas Distribution, Northeast	1990-2000	0.53%	-0.37%
[3] Central Maine Power	Northeast	1993-2005	1.57%	0.24%
[4] Central Maine Power	Northeast, Avg of Sensitivity Analyses	1993-2005	1.99%	1.09%
[5] Central Vermont Public Service	Northeast	1996-2006	0.74%	0.18%
[6] Kansas City Power & Light	National	1994-2004	0.70%	
[8] San Diego Gas & Electric	National	1994-2004	1.08%	
[9] San Diego Gas & Electric	Northeast	1994-2004	0.99%	
	Gas or Electricity, All Regions			
	With Productivity Offset Estimate		1.21%	0.28%
	All Studies		1.09%	
	Gas Only, All Regions			
	With Productivity Offset Estimate		0.53%	-0.37%
	Gas or Electricity, Northeast Only			
	With Productivity Offset Estimate		1.21%	0.28%
	All Studies		1.16%	

Notes:

[4] Reflects the average Energy System Productivity of the four sensitivities analyses performed in [4], as reported in Attachment NG-SFT-2.

[5] Based on the Energy Distribution Productivity for the 1996-2006 sample, which is the longest sample period of the three examined in [5].

Sources:

[1] Kaufmann, Lawrence, Direct Testimony, Exhibits KEDNE/LRK-1 and KEDNE/LRK-2, on behalf of Boston Gas Company, Massachusetts Department of Telecommunications and Energy, Docket 03-40.

[3] Lowry, Mark, Testimony of, Volume IX, May 1, 2007, ARP 2008 Productivity Offset Factor, on behalf of Central Maine Power Company, Maine Public Utilities Commission, Docket No. 2007-215.

[4] Bench Analysis, Maine Public Utilities Commission, Docket No. 2007-215.

[5] Lowry, Mark et al., Revenue Adjustment Mechanisms for CVPS, June 32, 2008, on behalf of Central Vermont Public Service Company, Vermont Public Service Board, Docket No. 7336, Exhibit CVPS-Rebuttal-MNL-2.

[6] Camfield, Robert, Direct Testimony, State Corporation Commission of Kansas, on behalf of Kansas City Power & Light Company, Docket No. 06-KCPE-828-RTS. Productivity is for Distribution operations is reported. Company-wide TFP for vertically regulated utilities is 0.6% for 1994-2004.

[8] Lowry, Mark, Prepared Direct Testimony of, December 2006, TFP Research for San Diego Gas & Electric, on behalf of San Diego Gas & Electric, California Public Utilities Commission, Application A.06-12-009.

[9] Division of Ratepayer Advocates, Report on Total Factor Productivity for San Diego Gas & Electric, Southern California Gas Company, General Rate Case, California Public Utilities Commission, Application A.06-12-009.

NARUC 1989 Resolution

Resolution in Support of Incentives for Electric Utility Least Cost Planning

WHEREAS, National and International economic and environmental conditions, long-term energy trends, regulatory policy, and technological innovations have intensified global interest in the environmentally benign sources and uses of energy;

WHEREAS, The business strategy of many electric utilities has extended to advance efficiency of electricity end-use and to manage electric demand; and

WHEREAS, Long-range planning has demonstrated that utility acquisition of end-use efficiency, renewable resources, and cogeneration are often more responsible economically and environmentally than traditional generation expansion; and

WHEREAS, Improvements in end-use efficiency generally reduce incremental energy sales; and

WHEREAS, The ratemaking formulas used by most state commissions cause reductions in utility earnings and otherwise may discourage utilities from helping their customers to improve end end-use efficiency;

WHEREAS, Reduced earnings to utilities from relying more upon demand-side resources is a serious impediment to the implementation of least-cost planning and to the achievement of a more energy-efficient society; and

WHEREAS, Improvements in the energy efficiency of our society would result in lower utility bills, reduced carbon dioxide emissions, reduced acid rain, reduced oil imports leading to improved energy security and a lower trade deficit, and lower business costs leading to improved international competitiveness; and

WHEREAS, Impediments to least-cost strategies frustrate efforts to provide low-cost energy services for consumers and to protect the environment; and

WHEREAS, Ratemaking practices should align utilities pursuit of profits with least-cost planning; and

WHEREAS, Ratemaking practices exist which align utility practices with least-cost planning; now, therefore, be it

RESOLVED, That the Executive Committee of the National Association of Regulatory Utility Commissioners (NARUC) assembled in its 1989 Summer Committee Meeting in San Francisco, urges its member state commissions to:

1) Consider the loss of earnings potential connected with the use of demand-side resources; and

2) Adopt appropriate ratemaking mechanisms to encourage utilities to help their customers improve end-use efficiency cost- effectively; and

3) Otherwise ensure that the successful implementation of a utility's least-cost plan is its most profitable course of action.

Sponsored by the Committee on Energy Conservation,
Adopted July 27, 1989