STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Rhode Island Division of
Public Utilities and Carriers
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November 13, 2015

Luly Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Blvd.
Warwick, RI 02888

In Re: Docket No. 4568– The Narragansett Electric Company d/b/a National Grid Review of Electric Distribution Rate Design Pursuant to R.I. Gen. Laws § 39-26.6-24

Dear Luly,

Please find the Division of Public Utilities and Carriers, (the "Division") Pre-Filed Direct Testimony of Alvaro E. Pereira, Ph.D., of Daymark Energy Advisors for filing and consideration by the Public Utilities Commission in the above captioned docket.

I appreciate your anticipated cooperation in this matter.

Very truly yours,

Jon G. Hagopian
Senior Legal Counsel

BEFORE THE
STATE OF RHODE ISLAND
PUBLIC UTILITIES COMMISSION

Electric Distribution Rate Design Proposal	:	
Proposal Pursuant to R.I. Gen. Laws	:	Docket No. 4568
§ 39-26.6-24 of the Narragansett Electric	:	
Company d/b/a National Grid	:	

DIRECT TESTIMONY

OF

ALVARO E. PEREIRA

REGARDING THE ELECTRIC DISTRIBUTION RATE DESIGN PROPOSAL
Of NARRAGANSETT ELECTRIC COMPANY d/b/a NATIONAL GRID

ON BEHALF OF THE

RHODE ISLAND DIVISION OF PUBLIC UTILITIES AND CARRIERS

November 13, 2015

INTRODUCTION

Q. Please identify yourself for the record.

A. My name is Alvaro E. Pereira. I am a Principal Consultant for Daymark Energy Advisors (formerly known as La Capra Associates, Inc.). My business address is Daymark Energy Advisors, One Washington Mall, Boston, MA 02108.

Q. Dr. Pereira, please summarize your experience and qualifications.

A. I have 20 years of experience in economic, technical, and policy analysis. In 2008, I joined La Capra Associates (now Daymark Energy Advisors), where I have worked on projects related to power procurement, renewable energy markets and project financial feasibility, resource planning and load forecasting, analyzing market rules and prices, and litigation support. I was at the Massachusetts Division, now Department, of Energy Resources (MA DOER) for nearly 9 years as the head of a group responsible for economic and technical analyses of policies, programs, and regulatory filings. Prior to the MA DOER, I was at the Massachusetts Institute of Technology as a Visiting Lecturer and Research Associate from September 1991 to February 1999. While at MIT, I taught graduate-level courses in Transportation Economics and Regional Economic Methods and Modeling and completed research studies in the areas of industrial business processes, transportation economics, and the economic modeling of environmental impacts, among others. My resume is provided in Appendix A.

Q. Have you previously prepared testimony before the Rhode Island Public Utilities Commission ("Commission")?

A. Yes, I have submitted direct testimony in dockets related to distributed generation and renewable energy. I have also supported testimony submitted by Daymark staff in several other dockets before the Commission. Additional detail can be found in the appendix.

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

A. Daymark Energy Advisors has been retained by the Division of Public Utilities and Carriers ("the Division") to (a) review and comment on the rate design proposal submitted by Narragansett Electric and (b) review and comment on, where appropriate, the direct testimony filed by intervenors. This testimony presents the results of this review and our conclusions and recommendations.

Q. Please summarize your overall conclusions and recommendations regarding the Company's Proposal.

A. I have reviewed the Company's filing and the relevant provisions of the Renewable Energy Growth Program Act ("the Act").[1] I do not comment on the portion of the Company's proposal related to the access charge, as this topic will be considered at a later date in separate testimony. Regarding the Company's proposals concerning the tiered customer charges and the consolidation of the G-32 and G-62 rate classes, I make the following findings and recommendations:

1) The Company's filing is consistent with the filing requirements of Section 39-26.6-24.

2) The Company's filing as regards to tiered customer charge should not be implemented for several reasons:

[1] R.I. Gen. Laws Ch. 39-26.6

a. The Company did not provide adequate discussion or evidence explaining how the proposal balances the factors and principles listed in Section 39-26.6-24 (b).

b. The Company has not provided a full vetting of the benefits and costs of their proposal.

c. The Company does not consider how its proposal for Rhode Island is consistent with or leverages lessons learned from distributed energy resource ("DER") integration, implementation of time varying rates and rate design, and grid modernization in other jurisdictions.

3) As an alternative to implementing the tiered customer charge for residential (A-16) and small commercial and industrial (small C&I, C-06) classes, the Commission could consider approving higher customer charges for these classes that are consistent with the full cost-of-service unit charge determined in Docket 4323, the most recent base rate case; this increase would necessitate some reduction in energy charges in order to be revenue neutral and compliant with the requirements of the Act.

4) The Company's filing as regards to rate class consolidation should be considered in the context of a full base rate proceeding and should not be implemented at the current time.

Q. Please summarize your review of intervenors' testimony:

A. I provide the following observations based on my review of intervenors' testimonies. I respond to certain issues raised by these parties, but if I do not respond to a particular issue, that lack of response should not be considered as agreement with any position taken by another party.

- Though I agree that providing customers the ability to pursue DER and otherwise control their usage may have important benefits, I do not agree that regulators should necessarily avoid reliance on fixed charges. Mechanisms

that provide a minimum amount of revenue per customer (fixed charges higher than customer-related costs or minimum bills[2]) may be appropriate to account for equitable allocation of costs that are incurred to serve all customers, especially where DER penetration is high.

- Though demand charges applied to non-coincident peaks are not as directly related to cost causation as charges applied to coincident peaks (or peak periods), demand charges more accurately reflect fixed cost causation than non-time-of-use energy charges or non-time-varying rates, more generally.
- Concerns with equitable allocation of distribution costs between customers with distributed generation ("DG") and customers without DG, as described by the Company, can be addressed with other (more targeted) rate changes, such as adjustments to net metering credits, ideally after analyzing the benefits and costs of different levels of DG penetration.
- The Company's proposal may reduce the amount of benefits received from energy efficiency but, given its limited impact on customer bills, it is unlikely to have an appreciable impact on adoption of energy efficiency; additional analysis could confirm the actual impacts on program cost effectiveness. Other factors, such as reduced standard offer and generation supply prices due to reductions in natural gas prices would likely have much greater impacts.

[2] Minimum bills can be implemented through an energy-only (kWh) charge or rate design.

I. THE COMPANY'S PROPOSAL AND LEGISLATIVE REQUIREMENTS

Q. Please briefly describe the major components of the Company's proposal.

A. The Company's rate design proposal features a number of characteristics, some of which are mandated by legislation. I briefly discuss each of these below:

- Revenue Neutrality—The Company designed its rates to be "revenue neutral" on a customer-class basis. Thus, if a fixed charge increased, variable charges would have to decrease, assuming the same revenue requirement and billing units are used before and after the rate-design change.
- Reliance on last base rate case—The Company designed its rates to meet the revenue requirement targets for each individual rate class found in the last base rate case, which featured a test year ending December 31, 2011 and a rate year ending January 31, 2014. The Company also used the billing units and cost allocations from the last rate case in its proposal.
- Caps on Bill Impacts—The Company designed its proposal with the goal of limiting total bill impacts to +/- 5% for all residential and small C&I customers.
- Changes to metering and billing infrastructure and costs—The Company did not propose any investments in metering, hence proposed rates will be accommodated with existing metering infrastructure. The Company did mention the possible need to modify its billing system to implement changes in rates. There may also be additional customer outreach and education associated with the change in rates.
- Rate changes are limited to distribution rates—The Company is not proposing any changes to other delivery charges—transmission, transition, energy efficiency,

renewably energy, and RE Growth—or supply charges—Standard Offer and Renewable Energy Standard Charge.

- Tiered Customer Charges for Residential (A-16) and Small Commercial and Industrial Classes—The Company proposes to institute different fixed (customer) charges that would be applied on a 12-month basis based on customers' maximum monthly usage with prescribed usage tiers. These customer charges would represent increases from current levels, thus there would corresponding decreases in existing variable (kWh) charges.
- Greater Reliance on kW Demand Charges for the G-02 classes—The Company is proposing to reduce the customer charge for this rate class while increasing the kW demand charge.
- Consolidation of Large Commercial & Industrial ("C&I") rate classes—The Company is proposing to consolidate the G-32 and G-62 rate classes into a single rate class and also alter the rate design. Customer and energy charges will decrease, while KW demand charges will increase. Due to consolidation of rate classes, non-distribution charges will change for the G-62 class.
- No Rate Changes for Remaining Customer Classes—The Company is proposing no rate changes to the following rate classes: Rate A-60 (Low Income Rate), Rate X-01, Electric Propulsion, Rate M-01, Station Power; and Rates S-05, S-06, S-10, and S-14 (Outdoor Lighting Rates).

Q. Which of these characteristics are mandated by legislation?

A. Section 39-26.6-24 of the Act requires that the Company file a revenue-neutral, allocated cost of service study ("ACOSS") for all rate classes. The Company is required to use the

distribution revenue requirement that was used in the setting of current rates. The Act also requires that the Company file a proposal for new rates for all customers in each rate class. The legislation allows some leeway in terms of the allocated cost of service study used in the proposed rate design, the applicability of rate design proposals to energy efficiency, and the date the proposed rates would take effect. Notably, the Company has included a number of characteristics in its rate design proposal that are not mandated by the Act.

Q. Has the Company met the mandated requirements?

A. In my opinion, it does appear that the Company's filing has met the requirements. As noted above, the Company did not propose changes in rates for all customers and classes, thus the Company's proposal for new rates for certain classes is to maintain existing rates.

Q. Please discuss the factors and principles that the Commission is required to take into account and balance when reviewing the Company's proposal and possibly establishing new rates.

A. The legislation discusses a number of factors (also labeled principles in the text) that the Commission (not the Company) is required to take into account and balance. These factors are summarized as follows:

- Benefits of distributed energy resources ("DER");
- Distribution services provided to net-energy-metered ("NEM") customers when the customer's resource is not producing;
- Simplicity, understandability, and transparency of the proposed rates to all customers;
- Equitable ratemaking in terms of allocation of distribution-system costs;
- Cost causation;

- The legislative purposes underlying the creation of the distributed-generation growth program; and
- Other factors.

Q. Has the Company provided enough information for the Commission to appropriately account for these factors in their review?

A. No, I do not believe it has. The Company's filing provides no quantification of the benefits provided by DER, and their proposed rates do not take into account any of these benefits; in addition, the Company's proposal does not provide a detailed discussion of the services provided to its NEM customers versus its non-NEM customers. Rather, the focus is on equitable allocation of costs between customers with and without distributed generation ("DG"), and the Company does provide a great deal of information regarding the distribution services provided to all customers. Indeed, the Company lists "fair and equitable" allocation of costs as their primary objective, as shown by a decrease in the percentage of revenue requirements (or costs) collected through energy per-kilowatthour (kWh) charges and an increase in the percentage collected through fixed customer charges or per-kilowatt (kW) demand charges in the Company's rate design proposal. In my view, this is the single "benefit" of the Company's proposal.

Q. Who enjoys this benefit of a more equitable allocation?

A. This is not a benefit stream that accrues to the Company—the Company has a revenue decoupling mechanism ("RDM") already in place so it should be indifferent to the proposal. Rather, the benefit stream may accrue to non-DG owners at the expense of lower benefits to DG owners. I provide additional discussion of this benefit transfer in later sections.

Q. What information has the Company provided regarding the costs of their proposal?

A. The Company has not provided detailed discussion or quantification of the costs necessary to implement their proposal. The costs incurred by the Company would be due to customer education and changes to billing systems due to the proposed rate design changes; these latter costs are mentioned in the Company's proposal[3], but there is no quantification of these costs.

Costs would also be incurred by customers to learn and adapt to the new rate design. The Company concludes (or assumes) that the change in rate design is simple. The Company's filing provides a single paragraph that describes why the proposed rate designs will be easily understood and accepted by customers, and provides scant detail on how—in terms of materials, schedule, outreach—it intends to educate customers about the proposed rate design and the actions that can be taken to take advantage of the new rate structure. Interestingly, the Company believes that there would be "significant outreach and education" to transition existing residential and small C&I customers to a rate design with kW demand charges[4], but apparently does not believe its tiered customer charge poses similar challenges.

Finally, the Company's rate design proposal may have negative impacts on expansion of DER, as benefit streams in the form of avoided kWh may no longer be available at the same levels as under current rates. The Company states that the Act was enacted to facilitate the development of renewable DG systems, but does not provide any detailed analysis of any negative impacts of the proposal on the distributed-generation growth program.

[3] Direct Testimony of Company witnesses Peter T. Zschokke and Jeanne A. Lloyd, p. 9.
[4] Ibid, p. 22.

Instead, the Company merely states that their proposal will not discourage the implementation of DG.[5]

In sum, there is simply not enough information to evaluate the costs of the Company's proposal.

Q. What is your assessment of how the Company's proposal advances the principle or goal of cost causation?

A. I see no evidence or discussion regarding how the Company's proposed rates promote cost causation to a greater extent than current rates. The Company explains that an "ideal" rate design would include (1) a fixed customer charges to account for customer-related costs, such as metering, billing and customer service and (2) demand charges that would account for demand (or capacity-related) costs. Since utility systems are built to meet peaks, a demand charge would communicate more accurate price signals to customers.[6] Moreover, the Company claims that demand rates would provide incentives to customers to manage demand throughout the day and reducing demand during peak periods, yet it has not proposed any rate proposals with time of use characteristics.

However, the Company's proposal does not recommend demand charges for its residential or small C&I customers, because existing metering capabilities do not permit this (and due to the complexity of the rate design). Instead, the Company has proposed tiered customer charges (with 12-month ratchets) based on maximum monthly consumption levels; the relationship between changes in these consumption levels, movement between tiers, usage during peak, and costs incurred to serve is vague at best. Finally, the Company designed

[5] Ibid, p. 40.
[6] Ibid, p. 25.

its rates so that no individual residential or small C&I customer will see bill changes of more than 5 percent, which appears to be too small to provide incentives to change behavior in a meaningful way.

Overall, it is unclear how the Company's proposal will have any significant impacts on more efficient use of the distribution grid (and thus enable possible cost savings and lower rates over the long term for all ratepayers). The Company's proposal is directed toward a more equitable collection of revenues[7], but their proposal does not necessarily lead toward a more equitable collection of actual costs incurred. This distinction is important.

Q. Has the Company provided any data regarding the cost to serve its different rate classes?

A. Yes. The Company has provided its last ACOSS (Workpaper NG-1 of the filing). The ACOSS determines the revenue amount to be collected from each class and the average rate of return on rate base for each class if the revenue amounts are collected. The ACOSS also breaks down the costs allocated to each class by function and by cost classification: i.e., demand, energy, or customer. Unfortunately, the ACOSS does not distinguish between customers with DG and customers without DG, and the data for unit costs (as shown in Schedule NG-11), which are useful in informing rate design, are not specifically available (or were not provided) for DG customers versus non-DG customers.

Q. Does the Company feel that now is the right time to implement its proposal?

A. Yes. The Act (as amended) sets certain parameters on the date of implementation—rates would go into effect for usage on and after April 1, 2016 with the possibility of extension

[7] Ibid, p. 26, lines 16-17.

to account for changes to billing system. Thus the Act contemplates that any new rates that have been approved would be implemented in relatively short order. Moreover, the Company expects deployment of DER to "grow substantially"[8], and that the current proposal represents the start of a larger effort to align rates with cost causation.

Q. What is your view on the urgency of implementing the Company's proposal?

A. The Company did not provide information regarding misallocation of costs in their filing. Rather, this information was provided in response to data requests. The extent of the "lost revenues" or "revenue shift" should be a critical determinant in whether a solution should be pursued. Setting aside the cross-subsidies that occur during the normal ratemaking process—in order to pursue some of the principles, such as stability and public acceptability, listed by the Company[9]--allocation of costs from one group of customers to another is often deemed acceptable to meet policy goals. For example, energy efficiency programs create shifts in revenue collection from program participants to non-program participants, but these are accepted based on the cost-effectiveness and benefits of the programs, including meeting certain environmental, economic development, and other policy goals.

The Company's response to CLF 1-16 provides useful information about the extent of the cost shift that is projected from the Renewable Energy Growth Program ("the Program"). Data show that the "cost" of the Program is approximately $8.3 million in Years 5 through 25. However, this value includes non-distribution revenues, which are not covered by the Company's rate design proposal. Displaced distribution revenues are estimated to be

[8] Ibid, p. 15.
[9] Ibid, pp. 19-20.

approximately $3.5 million. Dividing this figure by the total revenue requirement figure of approximately $250 million[10] yields approximately 1.4%. The Company's rate design proposal is expected to reduce the impact to approximately $2.6 million or approximately 1.1%. Thus, the impact of the proposed rate design on the revenue shift from the program is approximately 0.3% of revenue requirements. This minor impact is consistent with the Company's view that the proposal is a "first step."[11]

Data are also provided for the kWh displaced by the Program and compiled in the following table:

	KWh	MW
Year 1	28,864,200	25
Year 2	48,749,400	40
Year 3	48,749,400	40
Year 4	48,749,400	40
Year 5	24,374,700	20
Total	199,487,100	165

In way of comparison, data for 2014 annual savings from energy efficiency programs[12] are shown in the following table:

	KWh
Residential	91,208,000
Income-Eligible	8,186,000
Small Business	18,089,000
Large C&I	151,654,000
Total	269,137,000

2014 energy efficiency savings are actually greater than the projected total displaced kWh savings during the peak year of the Program, five years hence. Such energy efficiency

[10] Direct Testimony of Company witnesses Peter T. Zschokke and Jeanne A. Lloyd, Schedule NG-10.
[11] Ibid, p. 49.
[12] State of Rhode Island, Energy Efficiency & Resource Management Council, Annual Report, April 2015.

savings levels have been accommodated by ratepayers in Rhode Island, and the Company has not proposed rate design changes to address any cost shift concerns.

In sum, the amount of displaced revenues and kWh that is forecasted for the DG growth program do not appear extreme when examined as a percentage of total distribution revenues and compared to displaced kWh from energy efficiency programs. There may be concerns that the sum of displaced kWh from energy efficiency and DG programs may be getting too high, but these concerns need to be balanced with the energy, environmental, and economic development goals (as described in the Act) that the Program is expected to advance.

Q. Have the jurisdictions that the Company mentions as having high expansion of solar resources implemented similar rate design proposals to a significant degree?

A. No, they have not. According to the Solar Energy Industries Association ("SEIA"), the top 10 solar states by MW of solar installed[13] are: California, North Carolina, Nevada, Massachusetts, Arizona, New Jersey, New York, Texas, Hawaii, and New Mexico. Though a large portion of these MW are not DG, this list provides a good sample to examine rate designs. I was able to find only one similar rate design[14] to the Company's proposal, based on my review of rate structures for residential customers in the largest utilities in these states. California does feature tiered energy charges (on a per-kWh) basis, but these have been in place for quite some time and were a result of restructuring efforts rather than DG policy or expansion. Moreover, the state is currently in the process of

[13]Data are for 2014. http://www.seia.org/research-resources/2014-top-10-solar-states

[14]Arizona Public Service features a tiered customer charge. However, the tiered customer charge (along with an access charge) was implemented as an alternative to decoupling. The response to CLF 3-2 provides additional information concerning Arizona's rate regulation.

reducing the number of tiers from 4 to 2[15]. The residential rate structures feature minimum bills (but these are calculated using energy usage levels during the month) and no (or very small) fixed customer charges. National Grid's comparable rates (R-1 and G-1 rate classes) in Massachusetts (for Massachusetts Electric) do not feature tiered customer charges. In Hawaii, where solar DG expansion has been high, residential rates still feature non-tiered customer charges and energy charges[16].

Q. Is the Company investigating the future of the distribution utility in other jurisdictions?

A. Yes. The Company's response to Division 1-6 indicates that there are ongoing proceedings to investigate similar issues in Massachusetts and New York. The Company (through its affiliates) is participating in these proceedings. However, it is unclear how those proceedings are informing the Company's current rate design proposal and whether the current proposal helps achieve the goals discussed in the proceedings in these other states.

[15] California Public Utilities Commission, Decision 15-07-001, July 3, 2015.
[16] Hawaiian Electric Company ("HECO") rates feature tiered energy charges (similar to California). Minimum bills are in place.

II. ASSESSMENT OF THE COMPANY'S TIERED CUSTOMER CHARGE PROPOSAL

Q. Briefly describe the Company's proposal to implement tiered customer charges.

A. The Company is proposing to implement customer charges that will increase and will not be reduced for a 12-month period, but could possibly increase to the next tiered ratchet level, based on monthly energy consumption. Four tiers for the customer charge will be initially set based on the consumption during the month following implementation[17] and can be re-set based on monthly consumption levels following the 12-month period. This proposal would apply to non-low-income residential customers (rate A-16) and small C&I customers (rate C-06).

Currently, customer charges are fixed and do not change with consumption levels. Current customer charges are below the unit-cost values shown in Schedule NG-11, indicating that existing customer charges are not collecting the full cost of service from these customers. For residential customers, the Company's proposal will increase the customer charge to amounts greater than unit cost for 3 of the 4 tiers; the first tier will continue to have a lower customer value close to existing rates ($5.25 proposed compared to $5.00 current and $7.57 unit cost). For small C&I customers, the Company's proposal will cause only the lowest consumption tier to have a lower customer value than the unit cost ($10.50 proposed compared to $11.08 unit cost).

Q. What benefits will be provided by this proposal according to the Company?

[17] See Company's response to CLF 1-2.

A. The Company does not explicitly list benefits of this proposal (outside of the general benefits discussed above), but its proposal will fully collect customer-related costs through customer charges (for most residential customers and all small C&I customers). In addition, the proposal would increase the amount collected through fixed charges from 18% to 40% for residential customers and from 24% to 40% for small C&I customers. Finally, the Company's proposal appears to re-allocate costs from customers with lower usage to those with higher usage, which generally (but not in all cases) is correlated with higher income and greater usage of the system.

Q. Do you believe that the benefits of implementing this proposal outweigh any possible costs?

A. I do not. I believe that the potential for customer confusion coupled with the unclear linkage between the price signal that is sent by the tiered customer charge and possible changes in usage on the part of customers are of greater concern than the revenue transfer from DG-customers to non-DG customers. There are alternative rate designs—minimum bills based on energy charges and use of time varying rates—and more targeted approaches, such as adjusting the amount of net metering credits, that can be used to address any revenue transfer concerns. Of course, such alternatives will require more analysis and discussion than has been conducted during the current proceeding.

Q. Could the Commission approve a limited version of the Company's proposal?

A. Yes. One possible alternative would be to increase the customer charge to the unit charges specified in Company's currently approved ACOSS for residential customers. This change would not require any changes in metering infrastructure and there should be only minor changes to billing processes. The Company would have to also reduce energy charges to

maintain a revenue-neutral design. As illustrations, for the residential (A-16) class, raising the customer charge from $5.00 to $7.57 would require a reduction in the per kWh charge to (approximately) $0.0324 from the current charge of $0.03664; for the small C&I class, raising the customer charge from $10.00 to $11.08 would require a reduction in the per-kWh charge (approximately) $0.03145 from the current charge of $0.03253.

Q. Would bill impacts exceed the 5% guidelines proposed by the Company?

A. Yes. Utilizing the above values for customer charge and energy-based distribution charge would increase bill impacts most significantly for customers with low usage. Most of the customers with usage in the first residential tier, as defined in the Company's proposal, with usage between 0 to 250 kWh, and the first small C&I tier, with usage between 0 and 100 kWh, would feature bill impacts in excess of 5%. Indeed, this was the reason why the Company proposed customer charges for Tier 1 lower than the unit cost levels found in the ACOSS[18].

Q. Are there any advantages of this alternative compared to the Company's proposal?

A. There would be less potential for customer confusion and the need for customer education. Overall, the increase in fixed charges is more modest, thus any negative impacts on the economics of pursuing DG or energy efficiency should be lower. This alternative would also collect the appropriate per-customer costs from all customers, as determined by the recent ACOSS. On the other hand, such an alternative is also more modest than the Company's proposal in terms of increasing the portion of revenues collected from fixed or

[18] Company's response to CLF 1-9.

per-kW charges, and there would be bill impacts greater than 5% for some residential and small C&I customers.

III. ASSESSMENT OF THE COMPANY'S PROPOSAL for G-02 CUSTOMERS

Q. Briefly describe the Company's proposal for small and medium C&I customers in the G-02 rate class.

A. The Company is not proposing major rate design changes for the G-02 class compared to the changes discussed in the prior section. The Company is proposing to reduce the customer charge to a level closer to the customer-related unit cost calculated by the ACOSS. KW demand charges would increase and would be assessed on all kW rather than the kW in excess of 10 KW, which is in the current rate. A final proposed change is to adjust (reduce) the energy charge to ensure revenue-neutral rate design for the class.

Q. What benefits will be provided by this proposal according to the Company?

A. According to the Company, the benefits of the proposed rate design for this rate class is largely due to changing the percentage of revenues collected from fixed or customer charges. The percentage of revenue requirement collected from the customer charge and kW demand charges is expected to increase from 84% to 90%.

Q. Do you conclude that the Company's proposal for this rate class should be approved?

A. The Company's proposal for G-02 is less problematic from a customer confusion perspective, since there is not a structural change in rate design, simply a change in the values for the different billing components. There may still be a requirement for customer education, but G-02 customers should be well aware of differences between customer, energy, and demand charges. On the other hand, the G-02 rate class already had a relatively low percentage of their costs that were being collected through energy charges, so the extent of the revenue shift between DG customers and non-DG customers in this class is likely low relative to other classes.

Overall, the implementation of rate design changes only appear to help in reaching the goal of eliminating all revenue collection from energy charges. Given the other considerations in designing rates consistent with the principles discussed in the Act, I do not believe this rate design should be approved at the current time.

IV. ASSESSMENT OF THE COMPANY'S RATE CONSOLIDATION PROPOSAL

Q. What is the Company's proposal for the large C&I rate classes, G-32 and G-62?

A. The Company is proposing to consolidate the rates for these two classes into a single Large C&I rate class. In terms of rate design, the new rate class will feature a decreased customer charge from the levels found in the current G-32 and G-62 classes and an increase in the per-KW charge from current levels (and a concomitant decrease in kWh charges but also instituting a new per-kWh charge for G-62 customers). The per-KW charge will be applied to all kW rather than just demand above 200 kW.

Q. What is your overall assessment of the Company's proposal to consolidate the rate classes?

A. The Company's proposal to consolidate the large C&I rate classes do not appear to be directly related to the goals of the Section 39-26.6-24. There may well be good reasons to consolidate these two rate class. For example, the Company claims that the costs to serve classes G-32 and G-62 are substantially the same on a per unit basis;[19] there are only nine customers on G-62, with four of those customers no longer meeting the current availability size criteria. These reasons are relevant when allocating costs and establishing rate classes, but have little relevance to the requirements of the Act and the principles/factors listed in Section 39-26.6-24.

Q. Does the Company's rate design proposal change the percentage of revenues that is collected through customer and demand charges?

[19] Direct Testimony of Company witnesses Peter T. Zschokke and Jeanne A. Lloyd, p. 24.

A. Yes. The revenue requirement collected through these two charges increases from 73% to 86%, thereby reducing the amount collected through energy charges to 14% (from 27%). This may be consistent at a high level with the cost causation principle listed in Section 39-26.6-24—since distribution costs can be largely classified into customer- and demand-related costs—however, the Company has not discussed how this rate design impacts the current allocation of costs between the G-32 and G-62 rate classes; it is important to note that the G-32 rate class features the highest return on rate base (see NG-10, row 56), compared to the G-62 rate class, which features a negative rate of return (according to the last base rate case). The Company has not provided information regarding how its proposed rate design impacts these returns, and how the proposed rate design aligns with the other principles discussed in the Act.

Q. What are you recommendations regarding the Company's proposal to consolidate these two rate classes?

A. I do not recommend the consolidation at the current time. Rate consolidation could be pursued as part of the next base rate proceeding, where more current revenue requirements, cost of service, and customer usage data would be available.

V. CONCLUSIONS

Q. Do you believe that the Commission should approve the Company's proposal as filed?

A. No, I do not. The Company has not provided evidence that the rate design changes are needed at the current time. The Company has also not provided a compelling case for the benefits of the rate design relative to other benefits and costs of the proposal and distributed generation. The Company has not provided a comprehensive review of all the costs and benefits of its proposal. Finally, equitable allocation of costs is an important principle, but the Act includes other principles that need to be considered, and the record is incomplete in terms of evidence and discussion of these principles.

Q. Does this conclude your testimony?

A. Yes it does. I reserve the right to amend or expand this testimony if additional information becomes available.

Appendix A

Resume of Alvaro E. Pereira

Alvaro E. Pereira, Ph.D.

Principal Consultant

Alvaro Pereira is an accomplished energy professional with 20 years of experience in economic, technical, and policy analysis with expertise in renewable energy, power markets, and benefit-cost analyses. Dr. Pereira joined La Capra Associates (now Daymark Energy Advisors) in 2008, following nearly a decade with the Massachusetts Department of Energy Resources as the head of a group responsible for economic and technical analyses of policies, programs, and regulatory filings. At Daymark Energy Advisors, he works in a variety of areas including procurement, renewable energy project analysis and pro forma development, and analyses of energy and capacity market rules, prices, and performance. Dr. Pereira is an experienced expert witness, having testified on various occasions before regulatory commissions, and he has provided expert-witness research and testimony in cases involving energy markets, utility regulation, and costs and benefits. Dr. Pereira also has expertise in rate design and analysis, demand resources, and economic impact modeling and forecasting. He has an M.S. in Transportation and a Ph.D. in Urban and Regional Economics and Studies, both from M.I.T., and two bachelor degrees in Economics and Finance from UMass Amherst.

SELECTED PROFESSIONAL EXPERIENCE

Renewables

- Currently providing advisory and technical services in connection with Long Island Power's request for proposal process for renewable power.
- Currently providing advisory and technical services to PowerOptions for their request for proposals for long-term contracts with renewable facilities.
- Examined strategies, policies, and market rules regarding integration of grid-tied wind resources and pairing of resources in order to enable maximum participation and revenues from wholesale electricity markets.
- Provided advisory services to benefit-cost analysis used in the analysis of net metering policies and rules in Massachusetts.
- Provided independent evaluator services to Nevada Energy pertaining to the economic impact evaluation of renewable energy bids.
- Co-authored study of economic costs and benefits of solar (SREC-II program) in Massachusetts. Applied modeling framework that analyzed wholesale market, avoided transmission and distribution, and avoided generation benefits.
- Co-authored separate analyses of large offshore wind and solar expansion scenarios in New York. Led team that analyzed cost-benefit impacts of different resource buildouts. Developed modeling interface among pro forma, energy, and economic impact models.

- Co-authored report on the hedge value of offshore wind resources in Maryland. Work applied portfolio theory by examining offshore wind's price variability compared to non-renewable generation options and considering wind's price covariance with fossil-fueled generators to document price-related benefits.
- Provided analytical support for rate impact calculation of offshore wind legislation for the Maryland Energy Administration.
- Provided advice regarding market price/modeling and economic cost/benefit analysis to the New Jersey Board of Public Utilities in support of development of rules and regulations for the Offshore Wind Renewable Energy Credit (REC) program.
- Co-authored report on Delmarva Power's request for approval of solar REC contracts for the Delaware Public Service Commission Staff. Examined financial feasibility and underlying revenue/cost data of a 10 MW solar farm for reasonableness and public interest.
- Currently providing NEPOOL-GIS third-party verification services for NEPOOL-GIS for hydroelectric, landfill gas, solar, and wind facilities.
- Provided technical and market advice and wrote portions of the proposal for a 220-MW Maine-based wind farm submitted to the Massachusetts' utilities request for proposals for long-terms supply and RECs. Played a similar role in support of registration of an 80-MW Vermont-based wind farm for qualification in the ISO-NE forward capacity market.
- Evaluated the financial feasibility of a proposed offshore wind installation and shrouded turbine wind facility in Hull, Massachusetts, as well as for solar installations for a number of clients. Forecasted and analyzed different revenue streams (energy, renewable energy certificates, and capacity) and examined financing options, while incorporating new federal and state incentive programs and policies.
- Researched forward capacity market rules in New England regarding qualification requirements, auction administration, financial assurance, and resource availability adjustments as regards to renewable resources and other intermittent generators. Co-authored study that examined the feasibility and impacts of restricting imports of renewable generation into New England and for participation in the Massachusetts RPS.
- Co-authored Massachusetts regulations for state auction of Regional Greenhouse Gas Initiative (RGGI) CO2 allowances. Note: Massachusetts was the first state to draft regulations related to auctioning of carbon allowances.
- Supervised the economic modeling and impact analysis of changes in regional energy systems, including the expansion of renewable and DSM activities, due to the establishment of a regional cap and trade system for carbon emissions through the RGGI program. This work led to ratification and approval of the cap and trade system by a majority of the Northeastern states.

Procurement/Market Analysis

- Provided advisory services to PowerOptions, a leading energy buying consortium in Massachusetts in support of the competitive bidding process for suppliers for their electric and natural gas members. Assisted with all steps of the procurement process from review and creation of bid documents to evaluation of bidders.

- Providing ongoing procurement support (buy and sell sides) to a number of clients throughout the Northeast, including Amtrak, the Massachusetts Water Resources Authority, and the Massachusetts Port Authority. Supported and conducted numerous electricity solicitations, ranging from 5 MW to 100 MW. Also providing expert advice regarding participation (load and generation assets) in wholesale energy, capacity, REC, and reserve markets.
- Forecasted capacity market prices (in New England, New York, and PJM) for use in project evaluation and impacts on retail rates. Included discussion of bidding strategies for generators given different projections for auction clearing prices. Forecast work included determination of future implementation levels of energy efficiency and other demand-side resources as capacity resources.
- Participated in statewide procurement of electric, gas, and petroleum products for Commonwealth of Massachusetts agencies and facilities. Forecasted gas and electric prices for use in procurement decisions.
- Managed procurement of long-term renewable electricity for use by Massachusetts agencies and facilities. Calculated and compared costs of long-term renewable power versus short-term brown power procurements to inform state agency budgets.
- Managed technical assistance to municipalities seeking to aggregate their customers for purposes of procuring electricity.

Demand Resources

- Reviewed the energy efficiency plans and underlying testimonies of PPL and PECO in proceedings before the Pennsylvania Public Utility Commission in support of testimony evaluating the costs and benefits of plan components.
- Designed time-of-use rates for municipal utilities in order to provide incentives for reductions during summer peak. Calculated potential impacts of dynamic rates on both capacity payments by the utilities and bill savings to customers.
- Enrolled demand-side resources (energy efficiency and distributed generation) of various Massachusetts agencies into the New England Forward Capacity Market. Wrote monitoring and verification plans for a variety of demand-side resources.
- Lead author on annual report for Massachusetts that chronicled the cost-effectiveness, customer allocation of funds, short and long-term savings goals and the development of a competitive market for energy efficiency services.
- Developed modeling approach and methodology to estimating the energy system and economic impacts of DSM activities conducted in the Commonwealth.

Rates and Regulation

- Reviewed demand forecasts underlying the natural gas forecast and supply plans of NStar Gas (2014), Liberty Utilities (2014), Columbia Gas of Massachusetts (2013).
- Advised on and wrote sections of comments filed by the Massachusetts Department of Energy Resources in the investigation by the Massachusetts Department Of Public Utilities on its own motion regarding service quality standards for electric and gas utilities (D.P.U. 12-120)
- Conducted load forecast for Blackstone Gas Company in support of their 2014 and 2012 Long Range Supply (or Integrated Resource) Plans. Submitted written testimony in support of forecasts of

customer counts, sendouts (design day and normal monthly), and usage per customer. Conducted forecasts under a variety of weather and design day criteria.

- Reviewed load forecasts underlying Rocky Mountain Power's request to increase electric service rates. Analyzed methods, data sources, and assumptions. Conducted alternative forecasts of customer counts, sales per customer, and overall sales.
- Provided research and wrote portions of the Maryland Energy Administration's comments to the Maryland Public Service Commission proceeding on RFPs for generation capacity resources under long-term contracts (Case No. 9214).
- Assisted in writing expert testimony assessing the impacts of wholesale congestion costs on Pennsylvania default service customers. Investigated market mechanisms for financial transmission rights and made recommendations concerning procurement of relevant hedging products.
- Reviewed Vermont state load forecasts for impacts of energy efficiency. Analyzed alternative functional forms and modeling assumptions regarding the role of energy efficiency in peak shaving.

Policy and Planning Analysis

- Co-authored study of the costs of renewable, advanced, and traditional technologies and general comparison of rate impacts of these different resources. Study was conducted to provide the Office of the Ohio Consumers' Counsel ("OCC") with assistance in developing positions and conclusions on current and proposed Ohio energy policies regarding traditional generation technologies, renewable energy, advanced energy, and energy efficiency from the standpoint of residential electric consumers.
- Co-authored evaluative study of electric industry restructuring efforts in Massachusetts and New England. Examined the impacts of restructuring on market manipulation and consolidation and its effects on electricity costs. Reviewed the status of competition of generation and retail electric supply and discussed the prognosis for residential customer participation in retail markets.
- Reviewed transportation-related sections of Connecticut's Comprehensive Energy Strategy. Co-authored observations and comments on behalf of the Connecticut Energy Advisory Board.
- Authored study of strategies to reduce Maine's dependence on oil. Reviewed current and forecasted oil usage across all energy sectors and uses and the costs of different strategy choices. Study findings were used to inform legislative and policy recommendations.
- Authored study for the Massachusetts Department of Energy Resources regarding the costs and benefits of municipalization of utility-owned distribution and non-PTF transmission assets. Examined potential impacts on reliability, utility operations and revenues, municipal taxes, electricity rates, financing, energy efficiency programs, and low-income customers.
- Conducted analysis of state energy entities in Connecticut in terms of structure and functional roles. Performed survey of other states and compared and contrasted alternative structures with existing state structure. Wrote sections of Phase I report describing results of this work. Contributed to Phase II report that recommended changes to agency structure and roles, including analysis of a power authority option.
- Contributed to all phases of proceeding before Connecticut Siting Council regarding the 2008 Forecasts of Load and Resources. Prepared discovery and wrote comments to draft report. Recommended changes to promote consistency between forecast and 2008 Integrated Resource Plan that was in review and to clarify assumptions underlying different utilities' forecast for conservation and load management programs.

- Wrote appendix detailing existing procurement processes and programs available to Connecticut policymakers. Appendix served as component of La Capra Associates' review of the 2008 Integrated Resource Plan submitted by the utilities.

Expert Witness

- Testified before the Rhode Island Public Utilities Commission on behalf of the Rhode Island Division of Public Utilities and Carriers regarding National Grid's Request for Approval of a Solicitation for Proposals for Clean Energy Projects Pursuant to R.I.G.L. § 39-31-1 ET SEQ. (Docket No. 4570, August 20, 2015).
- Testified before the Massachusetts Department of Public Utilities on behalf of the Massachusetts Attorney General regarding the petition for approval a base revenue adjustment by NStar Gas Company. (D.P.U. 14-150, April 15, 2015.)
- Testified before the Rhode Island Public Utilities Commission on behalf of the Rhode Island Division of Public Utilities and Carriers regarding National Grid's 2015 Electric Rate Filing and Renewable Energy Standard Charge and Reconciliations. (Dockets No. 4554 and 4490, March 16, 2015.)
- Testified (direct) before the Pennsylvania Public Utilities Commission on behalf of the Pennsylvania Office of Consumer Advocate regarding the petition submitted by People's TWP LLC for approval of their 2014 Purchased Gas Cost Filing. (Docket No. R- 2014-2456648, March 5, 2015.)
- Testified before the Rhode Island Public Utilities Commission on behalf of the Rhode Island
- Division of Public Utilities and Carriers regarding National Grid's Tariff's Advice Filing for Renewable Energy Growth (REG) Program and Solicitation & Enrollment Process Rules. (Docket No. 4536-A, February 1, 2015.)
- Testified (direct and surrebuttal) before the Pennsylvania Public Utilities Commission on behalf of the Pennsylvania Office of Consumer Advocate regarding the petition submitted by Citizens' Electric Company and Wellsboro Electric Company for approval of their proposed EDI project and charges (Docket No. P-2014-2419774, 2149776, October 10, 2014.)
- Testified (direct and surrebuttal) before the Pennsylvania Public Utilities Commission on behalf of the Pennsylvania Office of Consumer Advocate regarding the petition submitted by Citizens' Electric Company and Wellsboro Electric Company for approval of their proposed joint default supply service plan. (Docket No. P-2014-2425024, 2425245, August 8, 2014.)
- Testified (reply) before the North Carolina Utilities Commission on behalf of the Sierra Club and National Resources Defense Council regarding determination of avoided cost rates. (Docket No. E-100, Sub 140, May 30, 2014).
- Testified (direct) before the Public Utilities Regulatory Authority on behalf of MEPT Chapel Street, LLC regarding PURA's generic investigation of electric submetering. (Docket No. 13-01-26, May 30, 2014).
- Testified (direct) before The Régie de l'énergie - Gouvernement du Québec on behalf of the Quebec Association for Renewable Energy regarding Hydro Quebec Distribution's 2014-2023 Electricity Supply Plan. (Dossier R-3864-2013, May 15, 2014.)
- Testified (direct) before the Pennsylvania Public Utilities Commission on behalf of the Pennsylvania Office of Consumer Advocate regarding the petition submitted by People's TWP LLC for approval of their 2014 Purchased Gas Cost Filing. (Docket No. R-2014-2399598, March 5, 2014).
- Testified before the Rhode Island Public Utilities Commission on behalf of the Rhode Island Division of Public Utilities and Carriers regarding Recommendations for 2014 Distributed Generation Classes, Ceiling Prices, Targets, and Standard Contracts. (Dockets No. 4277 and 4288, February 26, 2014.)

- Testified (direct and surrebuttal) before the Massachusetts Department of Public Utilities on behalf of the Massachusetts Attorney General regarding the petition and revised petition for approval of the sale of New England Gas Company's assets. (D.P.U. 13-07, May 31, 2013.)
- Testified (direct) before the Pennsylvania Public Utilities Commission on behalf of the Pennsylvania Office of Consumer Advocate regarding the petition submitted by People's TWP LLC for approval of their 2013 Purchased Gas Cost Filing. (Docket No. R-2013-2341604, March 6, 2013.)
- Testified before the Rhode Island Public Utilities Commission on behalf of the Rhode Island Division of Public Utilities and Carriers regarding Recommendations for 2013 Distributed Generation Classes, Ceiling Prices, and Targets submitted by the Rhode Island Office of Energy Resources. (Docket No. 4288, January 11, 2013.)
- Testified (direct) before the Pennsylvania Public Utilities Commission on behalf of the Pennsylvania Office of Consumer Advocate regarding the petition submitted by Citizens' Electric Company and Wellsboro Electric Company for approval of their proposed joint default supply service plan. (Docket No. P-2011-2307827, 2307931, August 21, 2012.)
- Testified (direct and surrebuttal) before the Pennsylvania Public Utilities Commission on behalf of the Pennsylvania Office of Consumer Advocate regarding the petition submitted by PPL Electric Utilities for approval of its proposed reconciliation and competitive transition riders for default supply service. (Docket No.P-2011-2256365, November 2, 2011.)
- Testified (direct) before the Delaware Public Service Commission on behalf of the Delaware Public Service Commission Staff regarding the application of Delmarva Power and Light Company for approval of qualified fuel cell provider project tariffs. (PSC Docket No. 11-362, October 18, 2011.)
- Testified (direct) before the Massachusetts Department of Public Utilities on behalf of the Massachusetts Attorney General regarding the joint petition for approval of a merger between NSTAR and Northeast Utilities (D.P.U. 10-170, May 20, 2011.)
- Testified before the Maryland Public Service Commission on behalf of the Maryland Energy Administration regarding reliability pricing model and the 2013/14 delivery year base residual auction results (Administrative Docket PC22, October 15, 2010.)
- Testified (direct) before the Massachusetts Department of Public Utilities on behalf of the Massachusetts Attorney General regarding the request for a change in distribution rates by National Grid (D.P.U. 10-55, June 28, 2010.)
- Testified (direct) before the Massachusetts Department of Public Utilities on behalf of the Massachusetts Attorney General regarding the proposed solar program filed under the Green Communities Act by National Grid (D.P.U. 09-38, August 2009.)
- Testified (direct) before the Massachusetts Department of Public Utilities on behalf of the Massachusetts Attorney General regarding the proposed solar program filed under the Green Communities Act by Western Massachusetts Electric Company (D.P.U. 09-05, July 2009.)
- Testified before the Massachusetts Department of Public Utilities on behalf of the Massachusetts DOER regarding rate structures that will promote efficient deployment of demand resources. (D.P.U. 07-50, October 2007.)
- Testified (direct and surrebuttal) before the Massachusetts Department of Telecommunications and Energy on behalf of the Massachusetts DOER regarding the performance-based rates and earnings sharing mechanism proposed by Bay State Gas Company. (D.T.E. 05-27, July 2005.)

- Testified (direct) before the Massachusetts Department of Telecommunications and Energy on behalf of the Massachusetts DOER regarding the appropriateness of standby distribution rates proposed by NSTAR Electric. (D.T.E. 03-121, March 2004.)

EMPLOYMENT HISTORY

Daymark Energy Advisors — Boston, MA
Managing Consultant — June 2011 – Present
Senior Consultant/Consultant — 2008 – May 2011

Massachusetts Division of Energy Resources — Boston, MA
Manager, Energy Supply & Pricing Group (December 1999 – 2008) — 1999 – 2008
Senior Economist (March 1999 – November 1999)

Massachusetts Institute of Technology — Cambridge, MA
Lecturer in the Department of Civil & Environmental Engineering — 1998 – 1999

Independent Consultant — Somerset, MA
Economist and Data Modeler — 1998

Massachusetts Institute of Technology — Cambridge, MA
Visiting Lecturer in the Department of Urban Studies and Planning — 1997 – 1998
Research Associate, Department of Urban Studies and Planning (September 1991 – August 1997)
Research Assistant, Department of Civil Engineering (September 1989 – August 1991)

EDUCATION

Massachusetts Institute of Technology — Cambridge, MA
Ph.D., Urban and Regional Economics and Studies — 1997
M.S., Transportation — 1991

University of Massachusetts — Amherst, MA
B.B.A., Finance (Summa Cum Laude) — 1989
A.B., Economics (Summa Cum Laude) — 1989

PROFESSIONAL TRAINING & SKILLS

Proficient in GRETL, Forecast Pro, and comparable statistical analysis programs, tsMetrix and comparable neural network programs, REMI, IMPLAN, and comparable economic-modeling packages, ENERGY2020 and comparable energy market simulation modeling programs. Familiar with C programming language and Visual Basic. Fluent in Portuguese. Working knowledge of Spanish.

ADDITIONAL PUBLICATIONS, PRESENTATIONS & CONFERENCES

The Economic Impacts of Failing to Build Energy Infrastructure in New England. Report prepared for the New England Coalition for Affordable Energy, October 2015.

Rene*wable Energy Development in the Shale Era.* Presentation to the AQPER Colloque 2014, Quebec Association for the Production of Renewable Energy, February 20, 2014, Quebec City, Canada.

The Economic, Utility Portfolio and Rate Impact of Clean Energy Development in North Carolina. Report prepared for North Carolina Sustainable Energy Association, February 15, 2013, Raleigh, NC.

Forward Capacity Market as Swiss Army Knife. Presentation to the 11th Annual Power Markets Conference: Strategic Planning for New England's Power Markets, Northeast Energy and Commerce Association, October 24, 2012, Westborough, MA.

Shale Gas and Renewable Energy: Friends or Foes? Presentation to Air & Waste Management Association—New England Section Fall 2012 Conference, October 12, 2012, Framingham, MA.

Failure to Act: The Economic Impact of Current Investment Trends in Electricity Infrastructure, in association with Economic Development Research Group, Inc. Report for the American Society of Civil Engineers, 2012."

RGGI Auction Process. Presentation to RGGI Implementation at the State Level: Regulations, Requirements & Strategies, Northeast Energy and Commerce Association Workshop, June 19, 2008, Boston, MA.

Electricity Price, Reliability and Markets Report 2005. A Report to the Great and General Court on the Status of Restructured Electricity Markets in Massachusetts. Commonwealth of Massachusetts, December 2006 (lead author).

Electricity Price, Reliability and Markets Report 2002-2004. A Report to the Great and General Court on the Status of Restructured Electricity Markets in Massachusetts. Commonwealth of Massachusetts, Spring 2006 (lead author).

Meeting New England's Future Natural Gas Demands: Nine Scenarios and Their Impacts. A Report to the New England Governors, Boston, Massachusetts, March 2005 (lead author).

Meeting New England's Future Natural Gas Demand. Presentation to the Center for LNG & U.S. Energy Association, LNG Conference, June 16, 2005, National Press Club, Washington, D.C.

The Intradependence of Natural Gas & Electricity Markets in New England. Presentation to Northeast Energy Efficiency Council and the Association of Energy Service Professionals Annual Conference, October 25, 2004, Marlboro, Massachusetts.

2002 Energy Efficiency Activities. An Annual Report to the Great and General Court on the Status of Energy Efficiency Activities in Massachusetts. Commonwealth of Massachusetts, Summer 2004 (lead author).

2001 Energy Efficiency Activities. An Annual Report to the Great and General Court on the Status of Energy Efficiency Activities in Massachusetts. Commonwealth of Massachusetts, Summer 2003 (lead author).

Retail Treatment of Zonal Generation Prices in Massachusetts. Presentation to the Massachusetts Electric Restructuring Roundtable, September 13, 2002, Boston, Massachusetts.

Future of Retail Competition in Massachusetts, Just the Facts, Massachusetts. Presentation to the Massachusetts Electric Restructuring Roundtable, January 18, 2002, Boston, Massachusetts.

Developing an Effective Demand Response. Presentation to the Electric Power Supply Association State Issues and Membership Meeting, July 24, 2001, Washington, D.C.

Emergency Prevention, Monitoring, and Communication. Presentation to the New England Disaster Recovery eXchange Meeting, June 13, 2001, Boston, Massachusetts.

Economic Development of the Boston Harbor: Informing the Process. Written for Boston Harbor Conference, May 11, 1998.

Regional Economic Modeling and the REMI Model Evaluation. Commissioned Manuscript for Appalachian Regional Commission, September 4, 1998 (co-author).

Logistics and Transportation Use in the Chicago Metalworking Sector: Implications for Transportation Planning. Presentation to the 43rd North American Meeting of the Regional Science Association International, November 16, 1996, Washington, D.C.

Transportation Policy and the 1990 Clean Air Act. In Research in Urban Economics, New Urban Strategies in Advanced Regional Economies, 1996 (co-author).

Regional Rail Planning in New England. Proceedings of the Transportation Research Board, 1994 (co-author).

A Study of STAA Truck Safety in New England. Presentation to a Conference of the New England Transportation Infrastructure Research Programs, June 14, 1993, The New England Center, Durham, New Hampshire.