



State of Rhode Island and Providence Plantations

DEPARTMENT OF ATTORNEY GENERAL

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Peter F. Kilmartin, Attorney General

January 7, 2015

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

**Re: Docket No. 4513 – National Grid’s Street Light Metering Pilot Program
Proposal Filing**

Dear Ms. Massaro,

Enclosed please find the Division’s Comments regarding the above referenced Street Light Metering Pilot Filing. Please note that electronic copies of the Division’s Comments were forwarded to the service list.

Thank you for your attention to this matter.

Sincerely,

Karen Lyons
Special Assistant Attorney General

cc: file

To: The Rhode Island Public Utilities Commission

From: Richard Hahn, La Capra Associates, Inc. on behalf of the Rhode Island Division of Public Utilities and Carriers

Re: NATIONAL GRID'S STREET LIGHT METERING PILOT PROGRAM PROPOSAL – DOCKET NO. 4513

Date: January 7, 2015

Summary

On October 23, 2014, National Grid (“NGRID” or “Company”) filed a proposal to implement a street light metering pilot program with the Rhode Island Public Utilities Commission (“Commission”). This filing was made pursuant to the Commission’s July 25, 2014 order in Docket 4442. On December 10, 2014, NGRID filed the pre-filed direct testimony of John Walter, Jeanne Lloyd, Jeffery Martin, and Larry Durante in support of the October 23rd application. The Rhode Island Division of Public Utilities and Carriers (“Division”) requested that La Capra Associates review the material filed in this docket. This memorandum presents the results of my review. I find that overall, the structure of the proposed pilot program is reasonable and, if properly implemented, is likely to yield useful information that will render any subsequent full-scale roll-out more efficient and cost-effective. I do have some concerns about certain details of the proposed pilot program and recommend modifications to address those concerns later in this memorandum.

Discussion

The proposed pilot program consists of four phases. (1) Stage I, phase 1 - laboratory testing of meters and equipment, (2) Stage I, phase 2 - field testing of meters and equipment, (3) Stage II, phase 1 - assessment of the communication network, and (4) Stage II, phase 2 - comparison of metered consumption versus unmetered consumption. NGRID proposes to install 2,000 LED

luminaires in four cities and towns to be selected as part of the pilot. NGRID proposed two alternative budgets. If NGRID pays for and owns the 2,000 LED luminaires, the proposed budget is \$3,080,000. If the cities and towns that participate in the pilot pay for and own the LED luminaires, the proposed budget is \$1,120,000. The difference of \$1,960,000 consists of \$360,000 to purchase the 2,000 LED luminaires, \$620,000 to install the 2,000 LED luminaires, and \$980,000 for removal of the 2,000 LED luminaires and replacing them with non-LED luminaires at the end of the pilot program. During the pilot program, which is expected to last for about one year, NGRID proposes to bill participating towns under the street light installations that existed prior to the pilot program. NGRID proposes to recover the cost of this pilot program via a charge assessed to all street light usage.

Overall, I find the four-stages of the program proposed by NGRID to represent reasonable components that would be part of testing any new utility system. I believe that each phase, if properly implemented, will yield useful information that will render any subsequent full-scale roll-out more efficient and cost-effective. I do have some concerns about certain aspects of the program, and will discuss these concerns in the ensuing paragraphs of this memorandum.

NGRID proposes to install an unspecified number of ERT¹ meters in parallel with the new IC² meters located within the new street light control nodes. The stated purpose of this redundant metering system is to verify the accuracy of the IC meters using conventional metering technology. Under the pilot program, NGRID will require that the manufacturer of each IC meter evaluated as part of the pilot to certify its accuracy. In addition, NGRID will test the accuracy of these meters in its own testing laboratory or via a third party. Given the extensive pre-installation testing being performed, it seems unnecessary to install parallel metering using ERT meters. I recommend eliminating this component of the proposed pilot program.

NGRID proposes to install 2,000 new LED luminaires in four cities or towns for this pilot program, or an average of 500 per municipality. According to NGRID's response to Division 1-

¹ ERT stands for Encoder, Transmitter, and Receiver and is a commonly used meter technology through the industry and is currently used by NGRID.

² IC stands for Integrated Circuit

10, the 2,000 figure was selected through the application of the ANSI Z1.4 standard, using a batch size of “50,001 and over”. This was based upon the fact that there are about 99,000 street lights in NGRID’s Rhode Island service territory. There are about 39 cities and towns in Rhode Island, or an average of 2,500 street lights per town. Because we do not know which towns will be selected to participate in the pilot, we cannot state with certainty what percentage of the street lights in each participating municipality will be changed. However, using the average figure of 2,500 street lights per municipality, 500 new pilot program LED luminaires per municipality will represent 20% of the existing street light inventory. This seems excessively high to perform a pilot program. NGRID has indicated that the cost of the pilot program is scalable, meaning that installing a lower number of new LED luminaires will proportionately lower the cost of the pilot program. I recommend that the number be reduced to 1,000 from 2,000 or 250 per participating municipality, which still represents on average 10% of the street light inventory in the participating municipalities. And the pilot does not have to have an equal number of lights in each of the participating municipalities. More new luminaires could be installed in larger cities and towns and fewer in smaller cities and towns, so long as the total is 1,000 new luminaires. This will reduce the cost of the pilot. If NGRID owns the new LED luminaires, the cost of the program to all Rhode Island cities and towns will be less. And if the cities and towns own the new LED luminaires, the cost to participate in the pilot program will be less.

The Company has stated that it will not change how it bills municipal street light customers during the pilot program. This statement appears to apply whether NGRID or the participating municipalities own the new LED luminaires. This approach serves as a disincentive for municipalities to participate in the pilot program under the option to own the LED luminaires, as they would need to fund the installation of the new LED luminaires, but not benefit from their reduced energy usage. The rationale for this approach is that NGRID’s tariff for Company-owned street lights (i.e., S-06, S-10, and S-14) does not have provisions for LED luminaires. However, the S-05 tariff for municipally owned street light fixtures does have provisions for LED luminaires with a fixed operating schedule. Therefore, if participating municipalities own the new LED luminaires to be installed as part of the pilot, program I recommend that these street lights be billed under the S-05 tariff. This approach will utilize the fixed operating schedule of the S-05 tariff, which will not capture any benefits from dimming or from

municipality-controlled operating schedules. However, it will provide benefits from the energy efficient nature of the LED luminaires. This benefit could offset some of the cost to participating municipalities and remove some or all of this disincentive to participate.

In the option where NGRID owns the new LED luminaires, the Company proposes to remove existing HID fixtures and replace them with new LED luminaires for the duration of the pilot program. At the end of the pilot, NGRID will remove the newly installed LED luminaires and replace them with new HID fixtures of like kind that existed before the pilot program. The alternative would be to store the HID fixtures that are removed as part of the pilot program and re-install them after the pilot. This option should be evaluated by the Company. However, the entire cost of the removal of the new LED luminaires could be avoided if the participating municipalities own them. The majority of pilot program activities could be implemented during 2015. I suspect that most municipalities have not budgeted for participation in this pilot program, and thus may desire to seek external sources of funding. One such potential source of funding is to use NGRID's energy efficiency program. On November 1, 2014, NGRID, the Division, and five other parties submitted a settlement agreement to the Commission seeking approval of the Company's ENERGY EFFICIENCY PROGRAM PLAN FOR 2015 ("2015 EEPP"). I understand that this plan was approved by the Commission. A review of this plan led me to the conclusion that there are no specific energy efficiency measures for retrofitting street light end uses, but the plan states that the "RIPEP team may include street lighting upgrades by municipalities (for customer owned lights) as part of this initiative".³ The Company's tariff assesses each street light customer the same \$0.00953 per KWH charge to fund this energy efficiency plan as is assessed on other customers. Street light customers pay into this plan, but may not receive benefits in the form of targeted measures. NGRID sells about 65 million KWH per year to street light customers. At the current energy efficiency charge, this equates to about \$600,000 being paid in 2015. If the number of new LED luminaries is reduced to 1,000 from 2,000 as I recommend, the cost of this portion of the pilot program would be about \$490,000. This figure is about half the value of \$980,000 proposed by the Company for 2,000 LED luminaires, which consists of \$360,000 of the 2,000 LED luminaires and \$620,000 to install

³ See page 7 of attachment 2 in the 2015 EEPP. Also see page 19 of attachment 2. RIPEP is the Rhode Island Public Energy Partnership.

them. LED luminaire removal costs of \$980,000 would be eliminated because the municipalities would own the LEDs and they would not need to be removed because they could be billed under the S-05 rate. The electric portion of the 2015 EEPP budget is \$81.7 million. Using \$500,000 to \$600,000 of this budget for street light end uses represents only about 0.6% to 0.7% of the total electric 2015 EEPP budget. I understand that other parties were involved in the settlement that led to the 2015 EEPP budget, and that these parties might need to be part of the discussion to amend the 2015 EEPP. It seems like a worthwhile effort to try and achieve such an amendment. I recommend that NGRID, the cities and towns, the Division, and the Commission explore the use of 2015 EEPP funds to pay for the new LED luminaires to facilitate ownership by the participating municipalities. The other components of the pilot program should be funded by NGRID and recovered via a separate charge.

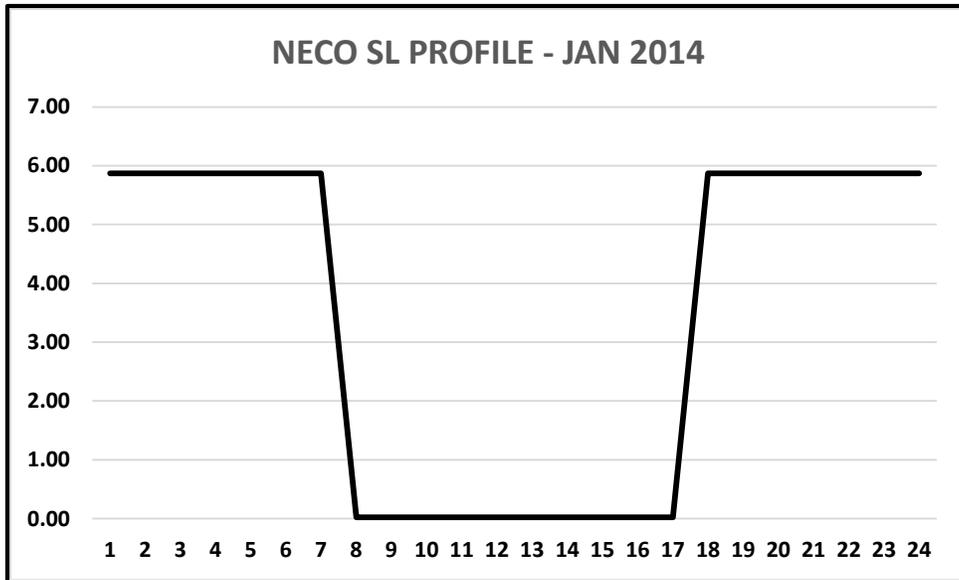
It appears from the filed description of the pilot program that the new controls, meters, and communication equipment will be tested only on the new LED luminaires installed as part of the pilot. I recommend that at least some existing HID fixtures be included in the pilot. This would involve replacing the existing photocell with a new control node. Assuming that the pilot program is successful and a full-scale roll-out ensues, it is possible that all HID fixtures will be replaced with LED luminaires. However, it is also possible that some HID fixtures may be retained. I understand that most existing HID fixtures are not dimmable. However, they can be remotely turned on and off and they can be metered, and these features should be evaluated as part of the pilot program.

Lastly, I understand that the new IC metering devices have the ability to record interval usage data, such as hourly or every 15 minutes. I also understand that many municipalities seek competitive power supplies for their street lighting load. All Meter Assets within the ISO New England system must have hourly usage data, so that the Load Serving Entities (“LSEs”) that are responsible for them can receive accurate billing statements. Because street lights are not currently metered, a typical, generic hourly usage profile is used.⁴ Figure 1 below shows an example of a daily generic load profile for January 2014. This approach is also used for other customers, such as residential users, for which actual hourly usage is not available. As part of

⁴ NGRID’s load profiles can be found at http://www.nationalgridus.com/energysupply/load_estimate.asp.

the pilot program, I recommend that the Company explore the possibility of using the capability of the IC meters to produce actual hourly usage, and not rely upon typical usage profiles. If this can be done, it would allow street light customers to optimize usage and maximize savings in power supply costs.

Figure 1





Richard S. Hahn

Principal Consultant

Mr. Hahn is a senior executive in the energy industry, with diverse experience in both regulated and unregulated companies. He joined La Capra Associates in 2004. Mr. Hahn has a proven track record of analyzing energy, capacity, and ancillary services markets, valuation of energy assets, developing and reviewing integrated resource plans, creating operational excellence, managing full P&Ls, and developing start-ups. He has demonstrated expertise in electricity markets, utility planning and operations, sales and marketing, engineering, business development, and R&D. Mr. Hahn also has extensive knowledge and experience in both the energy and telecommunications industries. He has testified on numerous occasions before the Massachusetts Department of Public Utilities, and also before FERC.

SELECTED EXPERIENCE – LA CAPRA ASSOCIATES

1. Reviewed the Application of Rocky Mountain Power seeking approval from the Public Service Commission of Utah to increase electric rates. The scope of the assignment was to review the proposed additions to plant in-service
2. Performed an audit of Rocky Mountain Power Company's 2013 Energy Balancing Account, including a review of the Company's hedging program.
3. Performed an asset valuation to estimate the market value of all power plants owned by Public Service of New Hampshire. Presented results to the New Hampshire Public Utilities
4. Reviewed a proposed Default Service Procurement Plan for PECO Energy for 2015-2017
5. Reviewed a proposed Default Service Procurement Plan for PPL Electric Utilities for 2015-2017
6. Reviewed a request by Wisconsin Public Service to increase retail rates.
7. Reviewed and analyzed a proposed tariff and related documents for Rhode Island to acquire street lighting assets owned by NGRID. Presented findings to the Rhode Island Public utilities Commission.
8. Analyzed a proposed interconnection of a 30mw off-shore wind project to the ISO New England grid. Presented findings to the Rhode Island Public Utilities Commission
9. Reviewed NGRID's 2014 Electric Retail Rate Filing requesting Commission approval of various charges and adjustment factors as well as NGRID's 2014 RES Charge and Reconciliation filing.
10. Reviewed proposed TOU rates by PPL Electric on behalf of the Pennsylvania Office of Consumer Advocate
11. Performed an analysis of a proposal to convert the Valley Power Plant in Milwaukee to switch from coal to natural gas; included a reliability assessment of the need for the plant to maintain local reliability
12. Reviewed the adequacy of the supply of renewable energy certificates for 2015 and 2016 for impact on the Rhode Island Renewable Energy Standard

13. Reviewed a purchased power agreement between National Grid and Champlain / Bowers Wind for the Rhode Island Division of Public Utilities and Carriers
14. La Capra Associates was retained by the Nova Scotia Small Business Advocate to review and analyze the 2013 Annual Capital Expenditure (“ACE”) Plan for Nova Scotia Power Incorporated (“the Company” or “NSPI”). I served as a key member of the team responsible for reviewed transmission projects.
15. Served as an advisor to the Belmont Municipal Light Department in its efforts to upgrade its transmission interconnection to 115KV.
16. Performed an assessment of the proposed merger of Peoples Natural Gas and Equitable Gas Company for the Pennsylvania Office of Consumer Advocate.
17. Reviewed the proposed default service procurement of UGI Utilities to procure standard offer service power supplies for its non-shopping customers for 2014 to 2017.
18. Performed an audit of Rocky Mountain Power Company’s 2012 Energy Balancing Account, including a review of the Company's hedging program.
19. Reviewed a request by Wisconsin Public Service to implement the System Modernization and Reliability Project, a large-scale capital program to improve system reliability in Northern Wisconsin.
20. Served as a member of a La Capra Associates team advising the Arkansas Public Service Commission Staff regarding Entergy's Application to transfer ownership of transmission assets to ITC.
21. Reviewed and analyzed NGRID proposed 2013 LTCRER factor; provided written comments to RI PUC.
22. Reviewed Rocky Mountain Power Company's Energy Balancing Account filing for 2011; filed testimony before the Utah PSC.
23. Reviewed NGRID proposed tariff revisions for recovery of Long-Term Renewable Energy Contracts; provided written comments to RI PUC.
24. Analyzed proposed environmental upgrades to the Flint Creek coal unit in Arkansas; filed written testimony before the Arkansas PSC.
25. WI CUB WEPCO 2013 Rate Case; review prudence of capital and fuel costs; filed written testimony before the Wisconsin PSC.
26. Reviewed and analyzed a request for an Advanced Determination of Prudence for a new wind generation facility; filed written testimony before the North Dakota PSC.
27. Reviewed proposed 2013 -2015 Default Service Procurement Plan for PPL Utilities; filed written testimony before the Pennsylvania PUC.
28. Analyzed forecast of projected capital additions to plant in service for forward-looking test year in Utah rate case. Filed testimony before the Utah Public Service Commission.
29. Review and analysis of National Grid's proposed 2013 Standard Offer Service and Renewable Energy Standard procurement plan on behalf of the Rhode Island Division of Public utilities and Carriers.
30. Review and analysis of National Grid's proposed long term renewable contracting plan on behalf of the Rhode Island Division of Public utilities and Carriers.

31. Review and analysis of a long-term renewable energy contract between Black Bear Hydro and National Grid on behalf of the Rhode Island Division of Public Utilities and Carriers.
32. Reviewed proposed 2013 -2015 Default Service Procurement Plan for PECO Energy on behalf of the Pennsylvania Office of Consumer Advocate.
33. Review National Grid's 2012 Electric Retail Rate Filing requesting Commission approval of various charges and adjustment factors for the Rhode Island Division of Public Utilities and Carriers.
34. Analyzed the request to the Wisconsin Public Service Commission for a CPCN for the Hampton - Rochester - La Crosse Baseline Reliability Project.
35. Performed an assessment of the TOU rates proposed by PPL Electric Utilities before the Pennsylvania Public Utilities Commission; Presented expert testimony providing the results of that assessment.
36. Reviewed the proposed merger between Exelon and Constellation Energy for its impact on market power; filed testimony before the Pennsylvania Public Utilities Commission.
37. Reviewed the proposed merger between Exelon and Constellation Energy for its impact on market power; filed testimony before the Federal Energy Regulatory Commission and the Maryland Public Service Commission.
38. Conducted an assessment of the request to the North Dakota Public Service Commission for an Advanced Determination of Prudence for the Montana Dakota Utilities GT; filed testimony before the North Dakota Public Service Commission.
39. Conducted an assessment of the request to the North Dakota Public Service Commission for an Advanced Determination of Prudence for the Big Stone Air Quality Control System; filed testimony before the North Dakota Public Service Commission.
40. Analyzed proposed 2012 monitored and non-monitored fuel costs, market sales and revenues, capacity position, and performance parameters for Wisconsin Electric Power; filed testimony before the Public Service Commission of Wisconsin.
41. Analyzed proposed ceiling prices for Distributed Generation procurement for the Rhode Island Division of Public Utilities and Carriers in Docket 4288.
42. Reviewed proposed changes to National Grid's interconnections standards for the Rhode Island Division of Public Utilities and Carriers in Docket 4276.
43. Reviewed proposed changes to National Grid's Distributed Generation Enrollment Process for the Rhode Island Division of Public Utilities and Carriers in Docket 4277.
44. Analyzed proposed 2012 monitored and non-monitored fuel costs, market sales and revenues, capacity position, and performance parameters for Northern States Power Wisconsin; filed testimony before the Public Service Commission of Wisconsin.
45. Analyzed proposed 2012 monitored and non-monitored fuel costs, market sales and revenues, capacity position, and performance parameters for Madison Gas & Electric; filed testimony before the Public Service Commission of Wisconsin.
46. Analyzed proposed 2012 monitored and non-monitored fuel costs, market sales and revenues, capacity position, and performance parameters for Wisconsin Public Service; filed testimony before the Public Service Commission of Wisconsin.
47. Reviewed the proposed merger between Duke Energy and Progress Energy for compliance with merger approval standards and the impact of the merger on customers; filed testimony

before the North Carolina Public Utilities Commission and the South Carolina Public Service Commission.

48. Analyzed the De-List Bid submitted by Vermont Yankee in ISO-NE capacity auctions. Filed statement at FERC presenting the results of that assessment.
49. Performed an assessment of a proposal by Nova Scotia Power to increase spending on vegetation management activities as part of the 2012 rate case; filed testimony before the Nova Scotia Utility and Review Board.
50. Reviewed and analyzed a proposed Purchased Power Agreement between National Grid and Orbit Energy; filed testimony before the Rhode Island Public Utility Commission in Docket 4265.
51. Conducted a study of non-transmission alternatives to a proposed substation and related transmission upgrades in Ascutney Vermont.
52. Reviewed and analyzed NGRID proposed SOS procurement plan and RES Compliance plan for 2012; provided testimony before the Rhode Island Public Utility Commission in Docket 4227.
53. Conducted a study of non-transmission alternatives to a proposed substation and related transmission upgrades in Bennington Vermont.
54. Prepared follow-on analysis of Utah resource acquisition in rate case in Docket 10-035-124
55. Reviewed and analyzed a proposed retail rate increase by Fitchburg Gas and Electric Company before the Massachusetts Department of Public Utilities. Provided expert testimony before the Massachusetts Department of Public Utilities regarding the Company's proposed Capital Spending Plan, and an accompanying recovery mechanism.
56. Conducted a study of non-transmission alternatives to a proposed substation and related transmission upgrades in Georgia, Vermont.
57. Reviewed and analyzed damages claimed in litigation between a developer of renewable energy facilities and the owner of the host site.
58. Evaluated the decision of PacifiCorp to acquire new generating resources in Utah. Filed testimony before the Public Service Commission of Utah.
59. Served as a principal advisor and key team member in La Capra Associates' assessment of strategic options for Entergy Arkansas, Inc. subsequent to its withdrawal from the Entergy System Agreement.
60. Reviewed the issues and documentation related to a complaint regarding the net metering issues for the Portsmouth Wind Turbine for the Rhode Island Divisions of Public Utilities and Carriers
61. Conducted a study of non-transmission alternatives to a proposed substation and related transmission upgrades in Jay, Vermont.
62. Reviewed and evaluated the construction of and cost recovery for a large cogeneration plant for a mid-west utility; utilized heat balance analysis to develop new cost allocators between steam and electric sales.
63. Analyzed fuel costs, market sales and revenues, capacity position, and performance parameters for a large- mid-west utility.

64. Performed a review and analysis of the proposed merger between FirstEnergy and Allegheny Energy. Provided expert testimony before the FERC and the Pennsylvania Public Utilities Commission regarding merger policy, benefits and market power issues.
65. Performed a study of non-transmission alternatives to a proposed transmission project in the Lewiston-Auburn area of Central Maine Power Company's service territory. Testified before the Maine Public Utilities Commission.
66. Analyzed a proposed plan by National Grid to procure 2011 default service power supplies and comply with Renewable Energy Standards. Provided expert testimony before the Rhode Island Public Utilities Commission in Docket 4149.
67. Served as an advisor to the Pennsylvania Office of Consumer Advocate in reviewing 2011 default service plans for PECO Energy.
68. Served as an advisor to the Pennsylvania Office of Consumer Advocate in reviewing 2011 default service plans for PPL Electric Utilities.
69. Analyzed a purchase power agreement between National Grid and on offshore wind project in Rhode Island. Provided expert testimony before the Rhode Island Public Utilities Commission.
70. Reviewed and analyzed a proposed retail rate increase by Western Massachusetts Electric Company before the Massachusetts Department of Public Utilities. Provided expert testimony before the Massachusetts Department of Public Utilities regarding the Company's proposed Capital Plan, and an accompanying recovery mechanism.
71. Served as an advisor to the developer of a utility-scale Solar PV facility in Massachusetts.
72. Evaluated a proposed Solar PV installation for a large retail customer in Massachusetts. Performed an analysis of the appropriate rate of return and its impact on facility electric costs and financial feasibility.
73. Assessed the economic impact of an additional interconnection between ISO-NE and NYISO; analyzed impact on market prices and congestion.
74. Reviewed and analyzed the capacity position of a large mid-west utility and the impact of that position on electric rates.
75. Performed an economic evaluation of a proposed transmission line in New England. Assessed the project's ability to deliver renewable energy to load centers and the impact of the project on Locational Marginal Prices.
76. Analyzed a proposed interconnection of a large new industrial load in Massachusetts. Evaluated proposed substation configuration and developed alternatives that achieved comparable reliability at lower costs. Assessed cost recovery options.
77. Reviewed the Energy Efficiency and Conservation Programs proposed by Pennsylvania Power & Light in response to Act 129, Pennsylvania legislation that requires Electric Distribution Companies to achieve certain annual consumptions and demand reduction by 2013. Provided expert testimony before the Pennsylvania Public Utilities Commission regarding program design, benefit cost analyses, and cost recovery.
78. Reviewed the Energy Efficiency and Conservation Programs proposed by Philadelphia Electric Company in response to Act 129, Pennsylvania legislation that requires Electric Distribution Companies to achieve certain annual consumptions and demand reduction by 2013. Provided expert testimony before the Pennsylvania Public Utilities Commission regarding program design, benefit cost analyses, and cost recovery.

79. Assisted in the review and analysis of a proposed retail rate increase by National Grid before the Rhode Island Public Utilities Commission. Provided expert testimony before the Rhode Island Public Utilities Commission regarding the Company's proposed Inspection & Maintenance Program, its Capital Plan, its Storm Funding Plan, and its Facilities Plan
80. Reviewed and analyzed Time-of-Use rates proposed by Pennsylvania Power & Light. Provided expert testimony before the Pennsylvania Public Utilities Commission regarding compliance with Commission requirements, rate design, cost recovery, and consumer education issues.
81. Assisted in the review and analysis of a proposed retail rate increase by National Grid before the Massachusetts Department of Public Utilities. Provided expert testimony before the Massachusetts Department of Public Utilities regarding the Company's proposed Inspection & Maintenance Program, its Capital Plan, its Storm Funding Plan, and its Facilities Plan.
82. Performed a review and analysis of the proposed merger between Exelon and NRG. Provided expert testimony before the Pennsylvania Public Utilities Commission regarding merger policy, benefits and market power issues.
83. Reviewed the needs analysis and load forecast supporting a proposed Transmission Project in Rhode Island. Provided expert testimony before the Rhode Island Public Utilities Commission.
84. Performed an assessment of plans to procure Default Service Power Supplies for a Rhode Island utility. Provided expert testimony before the Rhode Island Public Utilities Commission.
85. Served as an advisor to Vermont electric utilities regarding the evaluation of new power supply alternatives. Developed and applied a probabilistic planning tool to model uncertainty in costs and operating parameters.
86. Conducted a review of Massachusetts Electric Company's proposal to construct, own, and operate large scale PV solar generating units. Served as an advisor to the Massachusetts Attorney General in settlement negotiations. Performed an analysis of the appropriate rate of return and its impact on ratepayer costs and financial feasibility. Provided expert testimony before the Massachusetts Department of Public Utilities.
87. Conducted a review of Western Massachusetts Electric Company's proposal to construct, own, and operate large scale PV solar generating units. Served as an advisor to the Massachusetts Attorney General in settlement negotiations. Performed an analysis of the appropriate rate of return and its impact on ratepayer costs and financial feasibility. Provided expert testimony before the Massachusetts Department of Public Utilities.
88. Served as a key member of a La Capra Associates Team evaluating wind generation RFPs in Oklahoma.
89. Performed an assessment of plans to procure Default Service Power Supplies for Pennsylvania utilities. Provided expert testimony before the Pennsylvania Public Utilities Commission.
90. Performed an assessment of a merchant generator proposal to construct, own, and operate 800 MW of large scale PV solar generating units in Maine.
91. Analyzed proposed environmental upgrades to the Columbia Energy Center coal-fired generating station in Wisconsin, including an economic evaluation of this investment compared to alternative supply resources. Provided expert testimony before the Public Service Commission of Wisconsin.

92. Analyzed proposed environmental upgrades to the Edgewater 5 coal-fired generating unit in Wisconsin, including an economic evaluation of this investment compared to alternative supply resources. Provided expert testimony before the Public Service Commission of Wisconsin.
93. Analyzed proposed environmental upgrades to the Oak Creek coal-fired generating units in Wisconsin, including an economic evaluation of this investment compared to alternative supply resources. Provided expert testimony before the Public Service Commission of Wisconsin.
94. Reviewed Pennsylvania Act 129 and Commission rules for Energy Efficiency Plans
95. Performed a study of non-transmission alternatives (NTAs) to a proposed set of transmission upgrades to the bulk power supply system in Maine.
96. Served as a key member of the La Capra Associates Team advising the Connecticut Energy Advisory Board (CEAB) on a wide range of energy issues, including integrated resources plan and the need for and alternatives to new transmission projects.
97. Performed a study of non-transmission alternatives (NTAs) to a proposed set of transmission upgrades to the bulk power supply system in Vermont.
98. Served as an advisor to the Delaware Public Service Commission and three other state agencies in the review of Delmarva Power & Light's integrated resource plan and the procurement of power supplies to meet SOS obligations.
99. Served as an expert witness in litigation involving a contract dispute between the owner of a merchant powerplant and the purchasers of the output of the plant.
100. Served as an advisor to the Maryland Attorney General's Office in the proposed merger between Constellation Energy and the FPL Group.
101. Reviewed and analyzed outages for Connecticut utilities during the August 2006 heat wave. Prepared an assessment of utility filed reports and corrective actions.
102. Conducted a study of required planning data and prepared forecasts of the key drivers of future power supply costs for public power systems in New England.
103. Reviewed and analyzed Hawaiian Electric Company integrated resource plan and its DSM programs for the State of Hawaii. Prepared written statement of position and testified in panel discussions before the Hawaii Public Utility Commission.
104. Assisted the Town of Hingham, MA in reviewing alternatives to improve wireless coverage within the Town and to leverage existing telecommunication assets of the Hingham Municipal Light Plant.
105. Conducted an extensive study of distributed generation technologies, options, costs, and performance parameters for VELCO and CVPS.
106. Analyzed and evaluated proposals for three substations in Connecticut. Prepared and issued RFPs to seek alternatives in accordance with state law.
107. Performed an assessment of merger savings from the First Energy – GPU merger. Developed a rate mechanism to deliver the ratepayers share of those savings. Filed testimony before the PA PUC.
108. Prepared long term price forecasts for energy and capacity in the ISO-NE control area for evaluating the acquisition of existing powerplants.

109. Conducted an assessment of market power in PJM electricity markets as a result of the proposed merger between Exelon and PSEG. Developed a mitigation plan to alleviate potential exercise of market power. Filed testimony before the PA PUC.
110. Performed a long-term locational installed capacity (LICAP) price forecast for the NYC zone of the NYISO control area for generating asset acquisition.
111. Served as an Independent Evaluator of a purchase power agreement between a large mid-west utility and a very large cogeneration plant. Evaluated the implementation of amendments to the purchase power agreement, and audited compliance with very complex contract terms and operating procedures and practices.
112. Performed asset valuation for energy investors targeting acquisition of major electric generating facility in New England. Prepared forecast of market prices for capacity and energy products. Presented overview of the market rules and operation of ISO-NE to investors.
113. Assisted in the performance of an asset valuation of major fleet of coal-fired electric generating plants in New York. Prepared forecast of market prices for capacity and energy products. Analyzed cost and operations impacts of major environmental legislation and the effects on market prices and asset valuations.
114. Conducted an analysis of the cost impact of two undersea electric cable outages within the NYISO control area for litigation support. Reviewed claims of cost impacts from loss of sales of transmission congestion contracts and replacement power costs.
115. Reviewed technical studies of the operational and system impacts of major electric transmission upgrades in the state of Connecticut. Analysis including an assessment of harmonic resonance and type of cable construction to be deployed.
116. Conducted a review of amendments to a purchased power agreement between an independent merchant generator and the host utility. Assessed the economic and reliability impacts and all contract terms for reasonableness.
117. Assisted in the development of an energy strategy for a large Midwest manufacturing facility with on-site generation. Reviewed electric restructuring rules, electric rate availability, purchase & sale options, and operational capability to determine the least cost approach to maximizing the value of the on-site generation.
118. Assisted in the review of the impact of a major transmission upgrade in Northern New England.
119. Negotiated a new interconnection agreement for a large hotel in Northeastern Massachusetts.

SELECTED EXPERIENCE – NSTAR ELECTRIC & GAS

President & COO of NSTAR Unregulated Subsidiaries

Concurrently served as President and COO of three unregulated NSTAR subsidiaries: Advanced Energy Systems, Inc., NSTAR Steam Corporation, and NSTAR Communications, Inc.

Advanced Energy Systems, Inc.

- Responsible for all aspects of this unregulated business, a large merchant cogeneration facility in Eastern Massachusetts that sold electricity, steam, and chilled water. Duties included management, operations, finance and accounting, sales, and P&L responsibility.

NSTAR Steam Corporation

- Responsible for all aspects of this unregulated business, a district energy system in Eastern Massachusetts that sold steam for heating, cooling, and process loads. Duties included management, operations, finance and accounting, sales, and P&L responsibility.

NSTAR Communications, Inc.

- Responsible for all aspects of this unregulated business, a start-up provider of telecommunications services in Eastern Massachusetts. Duties included management, operations, finance and accounting, sales, and P&L responsibility.
- Established a joint venture with RCN to deliver a bundled package of voice, video, and data services to residential and business customers. Negotiated complex infeasible-right-to-use and stock conversion agreements.
- Installed 2,800 miles of network in three years. Built capacity for 230,000 residential and 500 major enterprise customers.
- Testified before the Congress of the United States on increasing competition under the Telecommunications Act of 1996.

VP, Technology, Research, & Development, Boston Edison Company

- Responsible for identifying, evaluating, and deploying technological innovation at every level of the business.
- Reviewed Electric Power Research Institute (EPRI), national laboratories, vendor, and manufacturer R&D sources. Assessed state-of-the-art electro-technologies, from nuclear power plant operations to energy conservation.

VP of Marketing, Boston Edison Company

- Promoted and sold residential and commercial energy-efficiency products and customer service programs.
- Conducted market research to develop an energy-usage profile. Designed a variable time-of-use pricing structure, significantly reducing on-peak utilization for residential and commercial customers.
- Designed and marketed energy-efficiency programs.
- Established new distribution channels. Negotiated agreements with major contractors, retailers, and state and federal agencies to promote new energy-efficient electro-technologies.

Vice President, Energy Planning, Boston Edison Company

- Responsible for energy-usage forecasting, pricing, contract negotiations, and small power and cogeneration activities. Directed fuel and power purchases
- Implemented an integrated, least-cost resource planning process. Created Boston Edison's first state-approved long-range plan.
- Assessed non-traditional supply sources, developed conservation and load-management programs, and purchased from cogeneration and small power-production plants.
- Negotiated and administered over 200 transmission and purchased power contracts.
- Represented the company with external agencies. Served on the Power Planning Committee of the New England Power Pool.

- Testified before federal and state regulatory agencies.

EMPLOYMENT HISTORY

La Capra Associates, Inc. Principal Consultant	Boston, MA	2004 – present
Advanced Energy Systems, Inc. President and COO	Boston, MA	2001-2003
NSTAR Steam Corporation President and COO	Cambridge, MA	2001-2003
NSTAR Communications, Inc. President and COO		1995-2003
Boston Edison Company VP, Technology, Research, & Development VP, Marketing, Boston Edison Company Vice President, Energy Planning, Boston Edison Company Manager, Supply & Demand Planning Manager, Fuel Regulation & Performance Assistant to Senior Vice President, Fossil Power Plants Division Head, Information Resources Senior Engineer, Information Resource Division Assistant to VP, Steam Operations Electrical Engineer, Research & Planning Department	Boston, MA	1993-1995 1991-1993 1987-1991 1984-1987 1982-1984 1981-1982 1978-1981 1977-1978 1976-1977 1973-1976

EDUCATION

Boston College Masters in Business Administration	1982	Boston, MA
Northeastern University Masters in Science, Electrical Engineering	1974	Boston, MA
Northeastern University Bachelors in Science, Electrical Engineering	1973	Boston, MA

PROFESSIONAL AFFILIATIONS

Director, NSTAR Communications, Inc.	1997-2003
Director, Advanced Energy Systems, Inc.	2001-2003
Director, Neuco, Inc.	2001-2003
Director, United Telecom Council	1999-2003
Head, Business Development Division, United Telecom Council	2000-2003
Elected Commissioner – Reading Municipal Light Board	2005-2012
Registered Professional Electrical Engineer in Massachusetts	