



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Rhode Island Division of
Public Utilities and Carriers
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Warwick RI 02888
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February 12, 2014

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

**In Re: Distributed Generation Standard Contracts Act- Ceiling Prices, Class
Targets and Standard Contracts for 2014
Docket No. 4277 & 4288**

Dear Luly,

The Division of Public Utilities and Carriers, (the "Division") submits the attached Memorandum setting forth its findings and recommendations relating to Rhode Island Distributed Generation Standard Contracts Act- Ceiling Prices, Class Targets and Standard Contracts for 2014 for consideration by the Public Utilities Commission (the "Commission") in its review of the above captioned docket.

The Division submits this Memorandum in lieu of pre-filed testimony and will have its consultant available at hearing. I have also provided the curriculum vitae of Al Pereira and Richard Hahn of La Capra Associates for the Commission.

I appreciate your anticipated cooperation in this matter.

Very truly yours,

Jon G. Hagopian
Senior Legal Counsel

cc: Thomas F. Ahern, Administrator
Stephen Scialabba, Chief Accountant

To: Rhode Island Division of Public Utilities and Carriers
From: Al Pereira & Dick Hahn – La Capra Associates, Inc.
Re: Docket Nos. 4277 and 4288 Distributed Generation Standard Contracts Act - Ceiling Prices, Class Targets, and Standard Contract for 2014
Date: February 12, 2014

In this memo, we summarize the results of our review of the ceiling prices filed by the Distributed Generation Standard Contract Board (“Board”) on December 16, 2013. This filing is the first report filed by the Board, as prior reports (2011, 2012, and 2013) were filed by the Rhode Island Office of Energy Resources (“OER”). Attachment I to this memorandum contains a copy of Exhibit 2 from the OER filing that shows the revised ceiling prices and class targets. Overall, we believe that the 2014 prices and class targets are reasonable. This round of contract review is the first to feature competitive bidding for both large and small distributed generation classes, which provides an additional market-based check on the ceiling prices filed by the Board. We discuss below the analyses and review that we performed to arrive at this conclusion.

In addition to the Board’s filing, we have reviewed National Grid’s proposed Enrollment Application and Enrollment Process Rules for use in the 2014 DG Standard Contracts program that were amended to include the Board’s recommendations and filed on January 22, 2014. We find that the revisions related to the payment deadlines for the performance guarantee deposit, delay or cancellation of an enrollment and funding-source information requests to be reasonable.

The Distributed Generation Standard Contracts Act (“the DGSC Act”) requires National Grid to enter into aggregate standard contracts for at least 40 MW nameplate of Distributed Generation (“DG”) projects according to a four-year schedule.

- 5 MW in 2011 (one enrollment round)
- 15 MW in 2012 (three enrollment rounds)
- 10 MW in 2013 (three enrollment rounds)
- 10 MW in 2014 (three enrollment rounds)

The Board’s December filing indicated that through the 2011-2013 enrollment period, which included multiple rounds, NGRID has contracted with 33 projects totaling 27.6 MW of the 30 MW cumulative 2013 year-end target. For the 2014 enrollment period, the Board is

recommending totaling 13.352 MW for the 2014 enrollment year. This total is the sum of 2014 target of 10 MW plus approximately 2.4 MW (30 – 27.6 MW) that is rolled over from prior years and the capacity from the termination of a 2011 solar contract. The Board amended this recommended total in January 2014 by an addition of 3 MW carryover from the third 2013 enrollment period (and thus a reduction of 3 MW from the 27.6 MW under contract); the new recommended total target for 2014 is thus 16.352 MW, which represents the highest yearly total to date.

The Board further recommended that the allocation filed in the December report be maintained, with the decision to allocate the additional 3 MW be made following a review of the results from the first and/or second enrollment rounds in 2014. We support maintaining this flexibility in the allocation and support the Board’s recommendation to only fix the allocation for the initial 2014 round. We also support the allocation of the 13.352 MW target as specified in the December report, given the flexibility implied in the Board’s recommendations concerning the allocations to be used in each round in 2014.

The number of renewable energy classes or categories has been reduced in 2014 compared to the 2013 filing. This will be the second year that anaerobic digestion (“AD”) technology is eligible, and the first year that hydro is eligible. Table 1 below compares the 2013 and 2014 classes.

2013	2014
Solar >=500 kW	Solar 501 – 3000 kW
Solar 251 – 499 kW	Solar 201 – 500 kW
Solar 101 – 250 kW	Solar 50 – 200 kW
Solar 50- 100 kW	
Wind 1000- 1500 kW	Wind 1000 – 1500 kW
Wind 400 – 999 kW	Wind 50 – 999 kW
Wind 90 – 100 kW	
Anaerobic Digester 400 – 500 kW	Anaerobic Digester 50 - 1000 kW
Hydro 500 – 1000 kW	Hydro 50 – 1000 kW

Table 1. 2013 and 2014 Renewable Technology and Eligible Classes

We believe the move to reduce the number of categories but increase the size eligibility range to be reasonable; a more limited number of classes allows for a greater sample size for ceiling price determination, and we do not believe that the cost differences among the 2013 classes that were consolidated in 2014 are large enough to cause any measurable loss of precision.

Ceiling prices for 2014 were generally determined in the same manner as were the prices for the 2011, 2012, and 2013, but with updated assumptions for certain technologies. The Production Tax Credit (“PTC”) or Investment Tax Credit (“ITC”), a tax benefit for certain renewable energy technologies, expired at the end of 2013 for non-solar technologies. As a result, two sets of ceiling prices are provided for wind, anaerobic digestion, and hydro—a set of prices to account for use of bonus depreciation in conjunction with the PTC was also provided for a total of 3 sets of prices¹ for these technologies.

Although the PTC/ITC has been extended in the past, there is no guarantee (and possible lower chances than in previous years) that it will be extended again. Nevertheless, given the large impact that the PTC/ITC can have on the financial viability of a renewable energy project, this approach of having two sets of prices is reasonable. In addition, we agree with the Board’s recommendation on p. 6 of the December filing that for any project that qualifies for the federal tax or bonus depreciation benefits before the December 31, 2013 expiration date of the PTC/ITC utilize the corresponding prices shown in Attachment I; the corresponding prices should also be used in the event that the PTC/ITC is reinstated at a later date (as occurred in 2013). Moreover, we recommend that a project developer certify prior to commercial operation that it is not eligible for the specific federal benefit(s) that were excluded from the ceiling price applicable to its contract. It is important that project developers not be allowed to “double-dip” by both monetizing federal tax benefits and receiving the benefit of the higher ceiling prices.

As with the 2013 prices, 2014 solar DG projects show a decrease compared to the prior year’s prices; 2014 prices are between 4 and 6% lower than the 2013 prices, which is a lower decrease than found in 2013 due to an increase in interconnection cost assumptions and reduction in ITC monetization percentages. Similar to 2013, this change is largely driven by declining installed costs for solar, as solar costs regionally and nationwide continue to decline rapidly. We reviewed the data sources referenced in the Board’s filing and believe that the solar capital costs used to determine the 2014 ceiling prices are reasonable. Furthermore, competitive bidding should permit a greater capture of solar cost reductions than in past DGSC years.

The 2014 ceiling price for wind DG projects (for the 1.5 MW subclass) is 18% higher than the 2013 price, which was 26% higher than the 2012 price. Moreover, the ceiling price for wind filed on December 13 represents an increase from the prices shown in an October 15, 2013 presentation that was included in the December Board filing, presumably following further discussion and input from a wind developer. As in 2013, prices are higher for the larger size wind class, which is not consistent with our review of wind cost data. As a result, in order to further understand the process for determination of these final ceiling prices, we (a) reviewed and verified the CREST model results based on the assumptions discussed in the filing and (b)

¹ A set of prices with bonus depreciation without ITC/PTC was not provided.

discussed the wind results in some detail with the Board's consultant—Sustainable Energy Advantage (“SEA”).

Our discussion with SEA covered a number of topics including (a) the process by which input was received from stakeholders, (b) differences in the research and data request process from prior years, (c) the selection and analysis of the data sources for a number of assumptions, notably those related to capacity factor and capital cost, mentioned in the Board December filing, and (d) the reasons and justification for increasing the prices from SEA's initial estimates.

Based on this discussion and in the presence of competitive bidding for the small DG classes, we find that the ceiling prices for wind are reasonable. The increase in 2014 ceiling prices was due to increases in interconnection costs and decreases in the percentage of the PTC/ITC monetized, and increase in the cost of debt. We are satisfied that these changes were independently verified by SEA as applicable to a wide range of sites and projects, and not dependent on specific conditions at any one site or for any one project. We accept these changes, but note that two wind projects have signed DG contracts with prices lower than the 2014 filed prices.

Finally, ceiling prices for two technologies—AD and hydro—show no change from 2013 prices, and we see no reason or market/cost evidence to deviate from the analysis and assumptions used in last year's calculations.

Attachment I

Summary of 2014 Proposed Ceiling Prices and Class Targets

EXHIBIT 2

Rhode Island Distributed Generation Standard Contracts Board
Recommended Target Classes, Ceiling Prices, and Targets for the
2014 Distributed Generation Standard Contracts Program

The Board recommends that National Grid conduct three enrollments in 2014 with an annual goal of 13.352 MW of DGSC projects being awarded contracts.

Recommended Technology Classes and Targets

Small DGSC Enrollment Program

<u>Technology & Class</u>	<u>kW Allocation</u>
Wind: 50-1,500 kW	3,000
Small Solar PV: 50-200 kW	500
Medium Solar PV: 201-500 kW	4,100
Small Scale Hydropower: 50-500kW	1,000
Anaerobic Digestion: 50-500 kW	1,000

Large DGSC Enrollment Program

Large Solar PV: 501-1,250 kW	3,752
Total kW	13,352 kW

Rhode Island Distributed Generation Standard Contracts Board
Recommended Ceiling Prices (¢/kWh), by Technology Class

Technology and Eligible Class	Ceiling Price w/ITC/PTC+ Bonus Depreciation	Ceiling Price w/ITC/PTC, No Bonus Depreciation	Ceiling Prices No ITC/PTC, No Bonus Depreciation
Small Solar: 50-200 kW	25.75	27.10	N/A
Medium Solar: 201-500 kW	25.90	27.30	N/A
Large Solar: 501 kW-3,000 kW	22.25	23.50	N/A
Wind: 50 kW-999 kW	15.55	16.20	19.95
Wind: 1,000 kW-1,500 kW	16.35	17.50	20.55
Anaerobic Digestion: 50-500 kW	17.70	18.55	19.55
Small Scale Hydropower 50-500 kW	17.25	17.90	18.85

Alvaro E. Pereira, Ph.D.

Managing Consultant

Alvaro Pereira is an accomplished energy professional with over 15 years of experience in economic, technical, and policy analysis with expertise in rate design, power markets, and climate change policy. Dr. Pereira joined La Capra Associates in 2008, following nearly a decade with the Massachusetts Department of Energy Resources (“DOER”) as the head of a group responsible for economic and technical analyses of policies, programs, and regulatory filings. At La Capra Associates, 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 to support winning arguments in cases involving environmental quality and demand resources. Dr. Pereira also has expertise in rate design and analysis, demand side management (“DSM”) programs, 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

Procurement/Market Analysis

- Providing ongoing procurement support 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.

Renewables/RGGI

- 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 rate, environmental, and cost-benefit impacts of different solar 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-term 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.

Demand Side Management

- 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

- Conducted load forecast for Blackstone Gas Company in support of their 2012 Long Range Supply (or Integrated Resource) Plan. 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.

Expert Witness

- 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.*)

Policy and Planning Analysis

- 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.
- Analyzed and computed national and regional generation, transmission, and distribution infrastructure capital investment needs. Advised on the modeling and impacts of failure to meet these investment needs on the economy.
- 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.

EMPLOYMENT HISTORY

La Capra Associates, Inc.

Managing Consultant

Boston, MA
June 2011 – Present

Senior Consultant/Consultant

2008 – May 2011

Massachusetts Division of Energy Resources

Manager, Energy Supply & Pricing Group (December 1999 – 2008)

Boston, MA
1999 – 2008

Senior Economist (March 1999 – November 1999)

Massachusetts Institute of Technology

Lecturer in the Department of Civil & Environmental Engineering

Cambridge, MA
1998 – 1999

Independent Consultant

Economist and Data Modeler

Somerset, MA
1998

Massachusetts Institute of Technology

Visiting Lecturer in the Department of Urban Studies and Planning

Cambridge, MA
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

Ph.D., Urban and Regional Economics and Studies

Cambridge, MA
1997

M.S., Transportation

1991

University of Massachusetts

B.B.A., Finance (Summa Cum Laude)

Amherst, MA
1989

A.B., Economics (Summa Cum Laude)

1989

PROFESSIONAL TRAINING & SKILLS

Proficient in STATISTICA, Forecast Pro, and comparable statistical analysis programs, tsMetrix and comparable neural network programs, REMI 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

Publications

"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).

"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).

"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).

"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).

Presentations & Conferences

"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.

"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.

"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.

"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.

"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.

"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.



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. 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.
2. 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.
3. 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.
4. 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.
5. Reviewed proposed 2013 -2015 Default Service Procurement Plan for PECO Energy on behalf of the Pennsylvania Office of Consumer Advocate.
6. 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.
7. Analyzed the request to the Wisconsin Public Service Commission for a CPCN for the Hampton - Rochester - La Crosse Baseline Reliability Project.
8. 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.
9. Reviewed the proposed merger between Exelon and Constellation Energy for its impact on market power; filed testimony before the Pennsylvania Public Utilities Commission.
10. 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.
11. 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.

12. 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.
13. 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.
14. Analyzed proposed ceiling prices for Distributed Generation procurement for the Rhode Island Division of Public Utilities and Carriers in Docket 4288.
15. Reviewed proposed changes to National Grid's interconnections standards for the Rhode Island Division of Public Utilities and Carriers in Docket 4276.
16. Reviewed proposed changes to National Grid's Distributed Generation Enrollment Process for the Rhode Island Division of Public Utilities and Carriers in Docket 4277.
17. 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.
18. 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.
19. 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.
20. 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.
21. Analyzed the De-List Bid submitted by Vermont Yankee in ISO-NE capacity auctions. Filed statement at FERC presenting the results of that assessment.
22. 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.
23. 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.
24. Conducted a study of non-transmission alternatives to a proposed substation and related transmission upgrades in Ascutney Vermont.
25. 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.
26. Conducted a study of non-transmission alternatives to a proposed substation and related transmission upgrades in Bennington Vermont.
27. Prepared follow-on analysis of Utah resource acquisition in rate case in Docket 10-035-124
28. 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.

29. Conducted a study of non-transmission alternatives to a proposed substation and related transmission upgrades in Georgia, Vermont.
30. Reviewed and analyzed damages claimed in litigation between a developer of renewable energy facilities and the owner of the host site.
31. Evaluated the decision of PacifiCorp to acquire new generating resources in Utah. Filed testimony before the Public Service Commission of Utah.
32. 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.
33. 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
34. Conducted a study of non-transmission alternatives to a proposed substation and related transmission upgrades in Jay, Vermont.
35. 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.
36. Analyzed fuel costs, market sales and revenues, capacity position, and performance parameters for a large- mid-west utility.
37. 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.
38. 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.
39. 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.
40. Served as an advisor to the Pennsylvania Office of Consumer Advocate in reviewing 2011 default service plans for PECO Energy.
41. Served as an advisor to the Pennsylvania Office of Consumer Advocate in reviewing 2011 default service plans for PPL Electric Utilities.
42. 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.
43. 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.
44. Served as an advisor to the developer of a utility-scale Solar PV facility in Massachusetts.

45. 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.
46. Assessed the economic impact of an additional interconnection between ISO-NE and NYISO; analyzed impact on market prices and congestion.
47. Reviewed and analyzed the capacity position of a large mid-west utility and the impact of that position on electric rates.
48. 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.
49. 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.
50. 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.
51. 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.
52. 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
53. 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.
54. 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.
55. 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.
56. 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.
57. 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.

58. 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.
59. 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.
60. 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.
61. Served as a key member of a La Capra Associates Team evaluating wind generation RFPs in Oklahoma.
62. Performed an assessment of plans to procure Default Service Power Supplies for Pennsylvania utilities. Provided expert testimony before the Pennsylvania Public Utilities Commission.
63. Performed an assessment of a merchant generator proposal to construct, own, and operate 800 MW of large scale PV solar generating units in Maine.
64. 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.
65. 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.
66. 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.
67. Reviewed Pennsylvania Act 129 and Commission rules for Energy Efficiency Plans
68. Performed a study of non-transmission alternatives (NTAs) to a proposed set of transmission upgrades to the bulk power supply system in Maine.
69. 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.
70. Performed a study of non-transmission alternatives (NTAs) to a proposed set of transmission upgrades to the bulk power supply system in Vermont.
71. 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.

72. 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.
73. Served as an advisor to the Maryland Attorney General's Office in the proposed merger between Constellation Energy and the FPL Group.
74. Reviewed and analyzed outages for Connecticut utilities during the August 2006 heat wave. Prepared an assessment of utility filed reports and corrective actions.
75. 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.
76. 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.
77. 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.
78. Conducted an extensive study of distributed generation technologies, options, costs, and performance parameters for VELCO and CVPS.
79. Analyzed and evaluated proposals for three substations in Connecticut. Prepared and issued RFPs to seek alternatives in accordance with state law.
80. 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.
81. Prepared long term price forecasts for energy and capacity in the ISO-NE control area for evaluating the acquisition of existing powerplants.
82. 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.
83. Performed a long-term locational installed capacity (LICAP) price forecast for the NYC zone of the NYISO control area for generating asset acquisition.
84. 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.
85. 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.
86. 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.
87. 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.

88. 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.
89. 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.
90. 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.
91. Assisted in the review of the impact of a major transmission upgrade in Northern New England.
92. 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 indefeasible-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	Boston, MA	1993-1995
VP, Marketing, Boston Edison Company		1991-1993
Vice President, Energy Planning, Boston Edison Company		1987-1991

Manager, Supply & Demand Planning	1984-1987
Manager, Fuel Regulation & Performance	1982-1984
Assistant to Senior Vice President, Fossil Power Plants	1981-1982
Division Head, Information Resources	1978-1981
Senior Engineer, Information Resource Division	1977-1978
Assistant to VP, Steam Operations	1976-1977
Electrical Engineer, Research & Planning Department	1973-1976

EDUCATION

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

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	