

# P R E N T I S S

L • A • W • F • I • R • M

September 20, 2011

## VIA HAND DELIVERY & ELECTRONIC MAIL

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

**RE: Docket No. 4284** – EERMC Review and Approval of the 2012-2014 Energy Efficiency Procurement Plan’s Cost Effectiveness Pursuant to 39-1-27.7(c)(5)

Dear Ms. Massaro:

Pursuant to Rhode Island’s Least Cost Procurement law I am transmitting 10 copies of the Energy Efficiency and Resource Management Council’s (“EERMC”) review and approval of the cost-effectiveness of National Grid’s 2012-2014 Energy Efficiency Procurement Plan (“Plan”) as supported by Vermont Energy Investment Corporation’s (“VEIC”) Cost-Effectiveness Report completed for the EERMC, which is enclosed.

### Cost-Effectiveness Review

In 2010, the Rhode Island General Assembly enacted an amendment to R.I.G.L. § 39-1-27.7(c)(5) that tasks the EERMC with reviewing and approving the cost-effectiveness of the 3-Year Energy Efficiency Procurement Plan filed on September 7, 2011 by National Grid in Docket No. 4284. Pursuant to its responsibilities under the 2010 amendment, the EERMC commissioned VEIC to perform a cost-effectiveness analysis of the National Grid September 7 filing.<sup>1</sup>

In brief summary, the VEIC report finds that under the Total Resource Cost test, adopted by the Commission in Docket No. 3931 and consistent with national best practices, National Grid’s 2012-2014 Energy Efficiency Procurement Plan for electric and natural gas efficiency is cost-effective and lower cost than the acquisition of additional supply and compliant with applicable statutes and regulations. Accordingly, the EERMC accepts the VEIC report and recommends that the Commission approve the Plan as filed by National Grid to provide guidance to the

---

<sup>1</sup> Please see enclosed VEIC Cost-Effectiveness Report titled “the Cost-Effectiveness of National Grid’s 2012-2014 Energy Efficiency and System Reliability Procurement Plan.”

Company as it develops Rhode Island's annual Energy Efficiency Program Plans ("EE Program Plans").

On or before November 1, 2011, and each year thereafter, National Grid will file a detailed EE Program Plan for the Commission's review and consideration and pursuant to R.I.G.L. § 39-1-27.7(c)(5) the EERMC will subsequently file cost-effectiveness evaluations of these more detailed annual plans.

#### Note on the Energy Savings Targets

On September 1, 2010 the EERMC submitted proposed energy efficiency savings targets to the Commission in Docket 4202. In Order 20419, the Commission approved the EERMC's proposed savings targets of meeting 1.7%, 2.1%, and 2.5% of 2009 annual electric load and 0.8%, 1.0%, and 1.2% of 2009 natural gas load through energy efficiency program investments in 2012, 2013, and 2014, respectively. The 3-Year Plan submitted by National Grid will achieve these long-term electric energy savings, delivering lifetime benefits of more than \$785 million for Rhode Island customers. The electric savings goals will be met cost-effectively through existing measures and new program innovations and enhancements.

For natural gas efficiency, the 2012-2014 Procurement Plan proposes savings targets of 0.6%, 0.8%, and 1.0%, slightly lower than those approved in Docket 4202. Several factors currently combine to make it impossible to plan to fully reach the previously approved natural gas savings goals in a cost-effective manner. Those factors include lower natural gas supply costs, as determined by the 2011 Avoided Cost Study,<sup>2</sup> and updated realization rates from evaluation studies. Based on the best information available today, the Company, working with the EERMC and the Collaborative Subcommittee, examined many planning assumptions and the parties concluded and agreed that slightly lower natural gas savings levels are required to achieve them cost-effectively as required by the General Laws.

The EERMC and the parties understand that the efficiency savings targets are intended to serve as guideposts as the utility develops its 3-Year EE Procurement Plan and more detailed annual EE Program plans. As the parties described in a joint brief filed with the Commission in Docket 4202 on April 1, 2011:<sup>3</sup>

"It is important to note that the energy efficiency savings targets are just that, *targets* of what the EERMC assessment *estimates* is potentially available for cost-effective efficiency..."

...In summary, while the robust and detailed 3-Year Efficiency Procurement Plan and the related annual Efficiency Program Plans are subject to the cost-effectiveness standards of § 39-1-27.7(c) (5), the targets developed by the EERMC under R.I.G.L. § 39-1-27.7.1(e)(4) and (f) are not subject to the cost-effectiveness standard, because as high level estimates, the purpose of the targets is simply to guide the development of those plans. The 2010 legislation recognizes that the energy savings targets themselves do not constitute a plan, but rather the targets are just high-level

---

<sup>2</sup> "Avoided Energy Supply Costs in New England: 2011 Report," prepared by Synapse Energy Economics for the Avoided-Energy-Supply-Component (AESC) Study Group, July 2011. <http://www.synapse-energy.com/Downloads/SynapseReport.2011-07.AESC.AESC-Study-2011.11-014.pdf>.

<sup>3</sup> The joint brief is available at: [http://www.ripuc.org/eventsactions/docket/4202-EEMRC-JointRR\(4-1-11\).pdf](http://www.ripuc.org/eventsactions/docket/4202-EEMRC-JointRR(4-1-11).pdf)

estimates of the potentially available cost-effective efficiency, whose function is to guide the development of actual 3-year LCP and annual efficiency plans.”

Over the last four months, the EERMC, members of the Collaborative Subcommittee, and National Grid have reviewed the data and best information available, and determined that the original natural gas savings targets cannot be met cost-effectively at this time, and have proposed revised, slightly lower targets that are cost-effective. Accordingly, the EERMC supports the revised natural gas savings targets proposed in this Plan.

As additional evaluation studies help to refine planning assumptions, more certainty is gained with regard to natural gas supply costs, and program advancements and energy efficiency delivery innovation continue, it may become possible to cost-effectively reach the original natural gas savings targets in 2013 and 2014. In developing its annual EE Program Plans each year, National Grid and the EERMC will re-examine the planning assumptions, natural gas supply costs, and corresponding budgets and, if applicable, will propose different natural gas savings targets that cost-effectively reach, or get as close as possible to reaching, the targets approved in Order 20419.

In September and October the EERMC and the Collaborative Subcommittee will provide input to, help to oversee, and conduct an in-depth review of the cost-effectiveness of the annual efficiency program implementation and detailed budget plan for 2012. Under Rhode Island law, the 2012 Annual EE Program Plan has to be cost-effective and reviewed and approved by the EERMC as cost effective according to R.I.G.L. § 39-1-27.7(c)(5) and Section 1.2 A.4.a(5) of the Standards for Least Cost Procurement, as approved by the Commission on June 7, 2011. It is required that the detailed EE Program Plan be submitted to the Commission for review and consideration by November 1, 2011.

Thank you for your attention to this matter.

Respectfully submitted,

THE RHODE ISLAND ENERGY EFFICIENCY AND  
RESOURCES MANAGEMENT COUNCIL

By its attorney,

A handwritten signature in black ink, appearing to read 'R. Daniel Prentiss', with a long horizontal line extending to the right.

R. Daniel Prentiss  
One Turks Head Place, Suite 380  
Providence, RI 02903  
[dan@prentisslaw.com](mailto:dan@prentisslaw.com)

**The Cost-Effectiveness  
Of National Grid's  
2012-2014 Energy Efficiency and System  
Reliability Procurement Plan  
(Docket No. 4284, filed 9/7/2011)**

September 19, 2011



**An Assessment and Report by  
The VEIC/Optimal Consultant Team  
Working on Behalf of**

**The Energy Efficiency and Resource  
Management Council (EERMC)**



## **EERMC Consultant Team Findings**

*At its August 11, 2011 meeting the EERMC reviewed and approved the 2012-2014 Energy Efficiency and System Reliability Procurement Plan, directed its Consultant Team to conduct an independent cost-effectiveness review on its behalf, and authorized a Council subcommittee to submit the resulting Cost-Effectiveness Review to the Commission.*

The EERMC Consultant Team finds that the estimated spending and savings budgets contained in National Grid's 2012-2014 Energy Efficiency and System Reliability Procurement Plan (*"the Procurement Plan"*), filed on September 7, 2011, are cost-effective according to the Total Resource Cost Test (TRC).

The EERMC Consultant Team also finds that the proposed "Energy Efficiency Implementation Strategies" represent a significant planned advancement in efforts to secure cost-effective savings for both electric and natural gas customers consistent with the least cost procurement and system reliability procurement requirements of R.I.G.L. § 39-1-27.7 by going both wider and deeper in the state's energy efficiency ("EE") markets. The proposed Procurement Plan meets the R.I. Public Utilities Commission-approved Savings Targets for electric efficiency savings. The Procurement Plan proposes a small downward adjustment to the Natural Gas Savings Targets.<sup>1,2</sup>

The EERMC Consultant Team concludes that the Procurement Plan meets the cost-effectiveness requirements of R.I.G.L. § 39-1-27.7(c)(5) and therefore should be approved by the Commission and used by National Grid to develop more detailed, specific, and cost-effective annual implementation plans for 2012, 2013, and 2014 to be submitted to the Commission by November 1 annually.

---

<sup>1</sup> See discussion below.

<sup>2</sup> R.I.G.L. § 39-1-27.7.1 (e)(4)(f)

## I. Introduction

Beginning in 2010, R.I.G.L. § 39-1-27.7(c)(5) required the EERMC to review and approve the cost-effectiveness of National Grid's 3-year procurement and any related annual energy efficiency plans:

*The Commission shall issue an order approving all energy efficiency measures that are cost effective and lower cost than acquisition of additional supply, with regard to the plan from the electrical and natural gas distribution company, and reviewed and approved by the energy efficiency and resources management council, and any related annual plans, and shall approve a fully reconciling funding mechanism to fund investments in all efficiency measures that are cost effective and lower cost than acquisition of additional supply, not greater than sixty (60) days after it is filed with the commission.*

To comply with R.I.G.L. § 39-1-27.7(c)(5) and carry out the EERMC's required review and determination of whether National Grid's proposed *2012-2014 Energy Efficiency and System Reliability Procurement Plan* is cost-effective, the EERMC directed its Consultant Team to conduct a review and produce a report documenting its findings. The EERMC also directed that under the supervision of a Council subcommittee this report shall be submitted as evidence to the Commission of the EERMC's cost-effectiveness finding with regard to the Procurement Plan filed in Docket No. 4284. The EERMC Consultant Team conducted its cost-effectiveness review as requested by the EERMC and has presented its findings to an EERMC subcommittee for review, discussion, and oversight.

**This document represents a formal statement of the EERMC's Consultant Team's conclusion on cost-effectiveness on behalf of the EERMC – that National Grid's *2012-2014 Energy Efficiency and System Reliability Procurement Plan* is cost-effective and lower cost than the acquisition of additional supply pursuant to R.I.G.L. § 39-1-27.7(c)(5).** This document also describes the nature and process of the review it conducted, and documents the professional experience and qualifications of the Consultant Team to conduct such a Cost-Effectiveness Review of National Grid's *2012-2014 Energy Efficiency and System Reliability Procurement Plan* on the EERMC's behalf.

## **II. Summary of EERMC Consultant Team's Qualifications**

The EERMC Consultant Team is composed of Vermont Energy Investment Corporation (“VEIC”) serving as the lead contractor, Optimal Energy Inc. (“OEI”), Energy Futures Group, North Atlantic Energy Advisors, and Prah Consulting. VEIC’s Scudder Parker serves as the overall Project Manager. OEI’s Mike Guerard, a Rhode Island resident, coordinates the consultant interaction with National Grid and is the residential program lead and OEI’s Phil Mosenthal, the C&I program advisor, provides a deep level of expertise in commercial and industrial program design and extensive policy and analytical experience. Energy Futures Group provides deep expertise in residential program design. Douglas Baston of North Atlantic Energy Advisors assists on commercial and industrial program issues and Ralph Prah, of Prah Consulting, assists on evaluation, measurement, and verification (“EM&V”) issues.

This team brings a comprehensive understanding of, and experience with, energy efficiency policy, cost-effectiveness analysis, regulatory practice, program design, measure characterization, assessment of potential savings, and EM&V. Many of the individual consultants included on the VEIC Team have 15 to 25 years of direct experience in energy efficiency and broader utility regulatory policy. All participants also practice in other jurisdictions outside of Rhode Island (many of those in New England) and their experience in those settings provides an important context and perspective to inform the Rhode Island EERMC in its oversight role.

A full listing of qualifications of the various team members and the resumes of the participating individual consultants will be provided in Attachment A.

The EERMC Consultant Team has been involved in Rhode Island efficiency program oversight, program design, and implementation process since it was hired early in 2008. The Consultant Team assisted in the drafting of the Standards for Least Cost Procurement proposed by the EERMC in 2008, and the EERMC’s revision to the Standards in 2011, both of which were approved by the Commission. It has provided oversight of the Opportunity Report process in both Phase I and in Phase II and it has reviewed annual Energy Efficiency Program Plan filings by National Grid for program years 2009, 2010, and 2011. The Consultant Team was deeply involved in the planning and review process that led to the development of this 2012-2014 Procurement Plan. This strong familiarity with the Rhode Island EE policy, planning, implementation, and evaluation experience provides a high level of assurance that practice in Rhode Island is consistent with regional and national best practices in energy efficiency Least Cost Procurement.

### **III. The Rhode Island Legal and Regulatory Framework**

Rhode Island's Comprehensive Energy Conservation, Efficiency, and Affordability Act of 2006 ("2006 Comprehensive Energy Act") established an energy policy that explicitly and systematically maximizes ratepayers' economic savings through investments in all cost-effective energy efficiency. By placing a requirement on the distribution utility to procure all cost-effective natural gas and electric energy efficiency, all sectors of Rhode Island ratepayers stand to save hundreds of millions of dollars in energy bills over the next decade.

The EERMC proposed to the Commission a set of "standards for energy efficiency and conservation procurement and system reliability" ("Standards") as required in the 2006 legislation,<sup>3</sup> that the EERMC recommended for adoption by the Commission on June 1, 2008. The purpose of these Standards was to guide National Grid in its 2009-2011 Least Cost Procurement and System Reliability Procurement Plan filed by the Company on September 1, 2008.

In Docket No. 3931, the Commission conducted a process that included both written evidence and public hearings on the draft Standards the EERMC filed with the Commission on Feb. 29, 2008. Subsequently, the Commission ordered a slightly revised version of those Standards in Open Meeting on June 12, 2008, and in a formal report issued on July 18, 2008.

In a similar manner and in accordance with Rhode Island's Least Cost Procurement law, the EERMC proposed revisions to the Standards in preparation for the second three-year planning cycle (2012-2014). Revised Standards were adopted by the Commission in Docket No. 4202, Order #20419, on July 25, 2011. In compliance with R.I.G.L. § 39-1-27.7.1(f), the EERMC also proposed, and the PUC approved in that same Order, Annual Energy Saving Targets for both electric and natural gas least cost procurement for the years 2012, 2013 and 2014.

The Standards ordered by the PUC identify the Total Resource Cost (TRC) test as the methodology to use in determining whether the measures, programs, and the portfolio of energy efficiency services are cost-effective and less expensive than supply under the law. In Section 1.2, A, 2, (a) and (b), the standard for determining cost-effectiveness is spelled out:

---

<sup>3</sup> R.I. General Laws §39-1-27.7.

- (a) *The Utility shall assess measure, program and portfolio cost-effectiveness according to the Total Resource Cost test (“TRC”). The Utility shall, after consultation with the Council, propose the specific benefits and costs to be reported and factors to be included in the Rhode Island TRC test.*
- (b) *That test shall include the costs of CO2 mitigation as they are imposed and are projected to be imposed by the Regional Greenhouse Gas Initiative. They shall include any other costs associated with greenhouse gas reduction that are actually being imposed on energy generation and can be identified and quantified.*

On September 2, 2008 National Grid filed its 2009-2011 Energy Efficiency Procurement Plan. This first 3-Year Procurement Plan was based on the guidance afforded by the Standards, and had substantial input from the EERMC and its Consultant Team as well as the Collaborative Subcommittee of the EERMC.

Similarly, the current *2012-2014 Energy Efficiency and System Reliability Procurement Plan* has had substantial input and review from the EERMC, its Consultant Team, and the members of the Collaborative Subcommittee including the Division of Public Utilities (“Division”), The Energy Council of Rhode Island (“TEC-RI”), and Environment Northeast (“ENE”).

The 2012-2014 Energy Efficiency Procurement Plan was also informed by Phase II of the EERMC’s Opportunity Report required by R.I.G.L. § 39-1-27.7 (c)(3). Phase II of the Opportunity Report, like Phase I, was conducted by Kema, Inc. on behalf of the EERMC and was submitted to the Commission on August 30, 2010.<sup>4</sup>

#### **IV. Consultant Findings**

**The EERMC Consultant Team finds that the estimated spending and savings budgets contained in National Grid’s *2012-2014 Energy Efficiency and System Reliability Procurement Plan* (“*the Procurement Plan*”), filed on September 7, 2011, are cost-effective according to the Total Resource Cost Test (TRC).**

**The EERMC Consultant Team also finds that the proposed “Energy Efficiency Implementation Strategies” represent a significant planned advancement in efforts to secure cost-effective savings for both electric and natural gas customers consistent with the least cost procurement and system reliability procurement requirements of R.I.G.L. § 39-1-27.7 by going both wider and deeper in the state’s energy efficiency (“EE”) markets. The proposed Procurement Plan meets the R.I. Public Utilities Commission-approved Savings Targets for electric efficiency**

---

<sup>4</sup> Phase II of the Opportunity Report is based on Rhode Island-specific surveys and site visits.

**savings. The Procurement Plan proposes a small downward adjustment to the Natural Gas Savings Targets.<sup>5</sup>**

**The EERMC Consultant Team concludes that the Procurement Plan meets the cost-effectiveness requirements of R.I.G.L. § 39-1-27.7(c)(5) and therefore should be approved by the Commission and used by National Grid to develop more detailed, specific, and cost-effective annual implementation plans for 2012, 2013, and 2014 to be submitted to the Commission by November 1 annually.**

The determination of cost-effectiveness for the Procurement Plan is by necessity and design at a higher level than the specific program analysis and modeling that is possible for Annual EE Program Plans. In effect, the Procurement Plan represents the second phase of a process that starts with three-year savings targets, and is finalized year by year in the Annual EE Program Plan review process.<sup>6</sup> The Procurement Plan lays out a longer term approach to meeting a sequence of three annual EE goals. It sets direction for program strategy and exploration of new efficiency markets and implementation approaches to save consumers money. Much of the analysis is based on current program experience, and as a high-level planning document it does not spell out a full suite of detailed implementation strategies. These will be completely designed, characterized, and modeled for precise cost-effectiveness screening during the annual plan process.

The cost-effectiveness analysis of this 3-year EE Procurement Plan is based on substantial program implementation experience, professional judgment of what actual program costs and benefits will be, and reasonable estimates of savings opportunities that are available. The decision to include lower savings targets for natural gas savings in this Procurement Plan is a result of lower natural gas supply costs as identified by the new 2011 Avoided Cost Study<sup>7</sup> and updated realization rates for natural gas efficiency programs from recent evaluation studies. These factors prevent preliminary planning from being able to meet the original projected Savings Targets for natural gas cost-effectively. Subsequent annual plans will continue to use the most recent data and information available on natural gas avoided costs and evaluation results to explore cost-effective natural gas efficiency opportunities and strategies in order to meet the objectives of least cost procurement. The Consultant Team agrees with the Company, the EERMC, and the Collaborative Subcommittee that slightly lower natural gas savings levels are required to achieve them cost-effectively as required by the General Laws.

---

<sup>5</sup> See discussion below.

<sup>6</sup> R.I. PUC Docket No. 4202. Joint Brief in Response to Commission's Inquiry regarding Energy Savings Targets for 2012-2014. April 1, 2011.

<sup>7</sup> "Avoided Energy Supply Costs in New England: 2011 Report," prepared by Synapse Energy Economics for the Avoided-Energy-Supply-Component (AESC) Study Group, July 2011. <http://www.synapse-energy.com/Downloads/SynapseReport.2011-07.AESC.AESC-Study-2011.11-014.pdf>.

The EERMC and the Consultant Team also recognize that approval of the *2012-2014 Energy Efficiency and System Reliability Procurement Plan* will not, in itself, result in a specific change to the current fully reconciling funding mechanism. Adjustments to the fully reconciling funding mechanism will be made by the Commission upon review and approval of detailed Annual EE Program Plans that will be submitted to the Commission by the Company annual by November 1.

In order to assess the cost-effectiveness of the *2012-2014 Energy Efficiency and System Reliability Procurement Plan*, the EERMC Consultant Team engaged in the following plan development and review processes:

1. Consistent and on-going oversight of actual National Grid energy efficiency planning and implementation activities, both through direct interactions with National Grid staff and through participation in the Collaborative Subcommittee process (documented in Section V).
2. Direct review of National Grid's cost-effectiveness assessment practices and its screening process (documented in Sections VI and VII).
3. Review of National Grid's Evaluation Process (documented in Section VIII).

## **V. Ongoing Oversight by the EERMC and its Consultant Team**

The EERMC, consistent with its statutory obligations under the Rhode Island Comprehensive Energy Conservation, Efficiency and Affordability Act of 2006, continues to play an involved and active role with National Grid to guide, facilitate, and support public and independent expert participation in the review, oversight, and evolution of utility energy efficiency procurement and program implementation. The EERMC believes this input is critical to having the energy efficiency programs and new cost saving mechanisms evolve into resource acquisition tools that can effectively implement the Rhode Island law to procure all cost-effective natural gas and electric energy efficiency.

Dockets No. 3931 and 4202 and the Standards require a consistent and effective process to guide the development and submission of National Grid's *2012-2014 Energy Efficiency and System Reliability Procurement Plan* to the PUC. Section 1.4 (D) and (E) of the Standards state:

*D. The Utility and Council shall report to the PUC a process for the Council input and review of its 2008 EE Procurement Plan and EE Program Plan by July 15, 2008 and triennially thereafter.*

*E. The Council shall vote whether to endorse the EE Procurement Plan by August 15, 2008 and triennially thereafter. If the Council does not endorse the Plan then the Council shall document the reasons and submit comments on the Plan to the PUC for their consideration in final review of the Plan.*

In accordance with Section 1.4 (D) the EERMC and National Grid submitted a plan for a process for Council review and input of the EE Procurement Plan and subsequent EE Program Plans. The plan included the following steps for EERMC review and input into the EE Procurement Plan:

- Three drafts of the Procurement Plan, with opportunity for EERMC and Collaborative Subcommittee review and response.
- Ongoing negotiations on specific issues, concepts and wording adjustments
- Negotiation of a Performance Incentive design
- A Community Review to provide public input and EERMC review opportunity, sponsored by the Office of Energy Resources.

The EERMC has met its review and input requirements both at its regularly scheduled monthly meeting and through the more frequently scheduled EERMC Collaborative Subcommittee meetings and phone calls, which is comprised of EERMC members, the EERMC Consultant Team, the Division, TEC-RI, and ENE all interacting with National Grid's energy efficiency team. The EERMC Consultant Team has had repeated direct contact with National Grid staff during the before, during, and after the Collaborative Subcommittee meetings in order to provide consistent oversight and input.

In accordance with Section 1.4 (E) of the Standards the EERMC voted on August 11, 2011 to endorse the *2012-2014 Energy Efficiency and System Reliability Procurement Plan*.

Throughout this process, the objectives of the Standards are followed to ensure that program concepts and designs will result in implementation that secures cost-effective energy efficiency resources that are lower than the cost of supply, are prudent and reliable, and deliver hundreds of millions of dollars in bill savings to Rhode Island customers.

## VI. Cost Effectiveness Overview

The Total Resource Cost (TRC) test is accepted as “best practice” for evaluating energy efficiency programs and is the most broadly used test for cost-effectiveness among states with energy efficiency procurement mandates and programs overseen by their Public Utility Commission, and by the efficiency industry generally. As noted above, the TRC is the cost-effectiveness test required for use in Rhode Island as determined by the PUC. In short, the TRC test indicates that an efficiency measure or program is cost-effective if the benefits to society outweigh the costs (“society” includes both customers and the utility).

Any cost-effectiveness test is an analysis comparing the costs and benefits of two scenarios. For an efficiency measure we compare the “business as usual case” of standard equipment and appliances to the “efficiency case” of higher-efficiency equipment over the life of the efficiency equipment. (The same applies to energy efficient processes and practices, and can be applied to codes and standards, such as high-efficiency building codes or design practices. It may also be used to assess the cost-effectiveness of behavior modification strategies.)

The TRC test was formally adopted as the best practice for evaluating the cost-effectiveness of energy efficiency measures and programs in 1983 when it was codified in the *Standard Practice for Cost-Benefit Analysis of Conservation and Load Management Programs*, published by the California Energy Commission. The “Standard Practice” manual has been revised several times since and has served as the *de facto* basis for determining energy efficiency cost-effectiveness by the majority of electric and gas utility efficiency programs. The manual is regarded as well-grounded in best-practices for cost-benefit analysis.

As noted above, the Commission ordered the TRC test for use in Rhode Island in 2008 in Docket No. 3931 on Standards for Energy Efficiency Procurement. Subsequently National Grid proposed the specific costs and benefits to be included in the Rhode Island TRC test in future annual and triennial Energy Efficiency Procurement Plans with support and input from the EERMC, which the Commission approved and ordered into effect. No changes to the TRC test were made in the 2011 revisions to the Standards, and no changes to the TRC are proposed in this Procurement Plan. We have reviewed this methodology and found it to be consistent with standard practice.

The TRC test includes the following costs:

- Program implementation costs including:
  - Program planning and administration
  - Marketing costs
  - Customer incentives and related implementation costs
- Customer contribution (above what they would have paid in the “business as usual case”); and,
- Program evaluation costs.

The program implementation costs include the costs of program planning and administration, marketing, customer incentives, and related implementation costs. The costs included in the TRC are those incurred by customers and the utility as a whole to support the efficiency programs that would not have been incurred without those programs.

The benefits of the Total Resource Cost test include the discounted, monetized value of:

- Reduced energy (MWh),
- Reduced capacity (MW), which avoids the costs of providing both peak demand, and the transmission and distribution system,
- Reduced fossil fuel use (or increased use as a negative benefit),
- Reduced water and sewer use,
- Non-resource benefits, generally due to decreased operation and maintenance costs, and,
- Demand Reduction Induced Price Effect (DRIPE), as included in the avoided costs of electricity.

The benefits for reduced consumption of electricity (MWh and MW) and other resources are monetized based on avoided costs, which must reflect the true cost to society of delivering each MWh, MW, or unit of fossil fuel.

The costs and benefits of an efficiency program are discounted to present-value using a real discount rate, in order to discount the future value of money (i.e., money today is considered more valuable than the same amount of money in the future). A program is considered to be cost-effective if the present value of benefits exceeds the present value of costs, that is, when the TRC benefit-cost ratio (“BCR”) is greater than 1.0 the program is cost-effective.

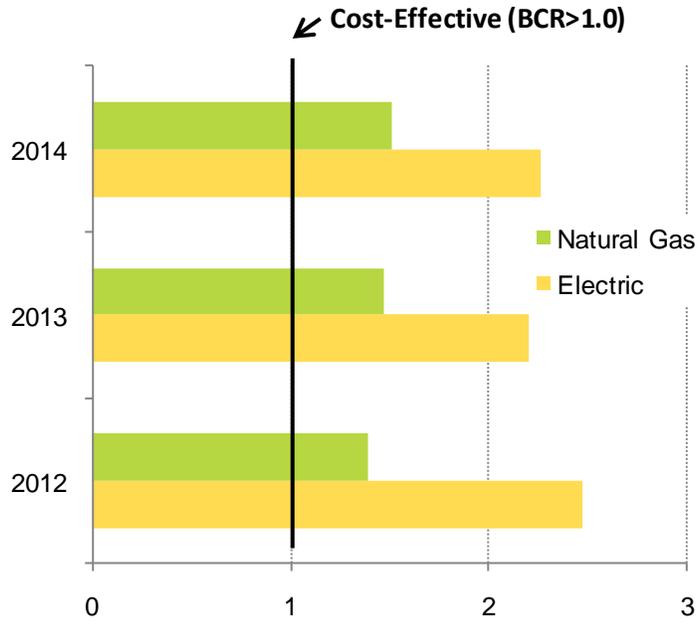
## **VII. Cost Effectiveness Review and Findings**

The Standards require the Company to propose a portfolio of programs that are cost-effective as determined by having a TRC benefit-cost ratio of greater than 1.0. The EERMC Consultant Team's review of the 2012-2014 EE Procurement Plan has found it to be cost-effective, with benefit-cost ratios greater than 1.0 for each year of electric and gas programs. In this section we summarize the cost-effectiveness of the EE Procurement Plan, followed by a description of our review methodology and findings.

The overall portfolio cost-effectiveness of National Grid's EE Procurement Plan for natural gas and electric efficiency programs for 2012-2014 is provided in Table 1 of the EE Procurement Plan. The overall portfolio of electric and gas programs are projected to be cost-effective in 2012, 2013, and 2014 with electric efficiency benefit-cost ratios of 2.47 in 2012, 2.20 in 2013, and 2.26 in 2014 and natural gas efficiency benefit-cost ratios of 1.39 in 2012, 1.47 in 2013, and 1.51 in 2014. Each program year for electric and natural gas efficiency has a BCR greater than 1.0 as required by the PUC's Standards for Energy Efficiency Procurement and R.I.G.L. § 39-1-27.7 (c)(5).

The bar chart below shows the cost-effectiveness of each year for the overall portfolio of electric and natural gas efficiency programs in National Grid's 2012-2014 EE Procurement Plan.

### Cost-Effectiveness of Proposed 3-Year Plan



Our review of the cost-effectiveness of the EE Procurement Plan addressed the methodology, mechanics, and assumptions used to estimate efficiency program costs and benefits for each year. The Consultant Team's previous, detailed review of National Grid's Annual Plan had confirmed their correct methodology for the TRC test, and provided detailed information on the mechanics of their cost-effectiveness model. Projections of costs and benefits for the 3-year plan are informed by detailed measure-level inputs and analysis, but are ultimately determined at a higher level than for an annual plan. This approach is appropriate given that there is less certainty in the inputs and assumptions for the 3-year period, and since a higher level of detail and associated effort is anticipated for the individual annual plans. With this in mind, the Consultant Team's review consisted of the following primary activities:

- Re-confirm National Grid's methodology for calculating the TRC test;
- Review draft versions of the EE Procurement Plan and its cost-effectiveness projections;
- Review key changes in assumptions, including new avoided energy supply costs, and the results of new evaluation studies;
- Review the impacts of updated assumptions on estimated efficiency costs and savings;
- Submit and review with National Grid specific questions on their methodology for projecting costs and savings;
- Review the screening model with National Grid staff, including new and dropped measures, changes to measure baselines due to new codes and standards, and updates to other inputs.

In addition, the Consultant Team has worked with National Grid over recent months on development of the first version of a Rhode Island Technical Reference Manual (TRM), which documents the algorithms and assumptions used to estimate the energy savings related benefits of prescriptive efficiency measures. This project has updated some of the savings assumptions that inform the projections of the 3-year plan. The TRM will be especially useful for the more detailed development and review of the annual plans.

The Consultant Team found National Grid's processes for revising their cost-effectiveness inputs and assumptions to be comprehensive as applied for the 3-year plan. National Grid appropriately adjusts baselines for new building codes and federal standards. In addition, the Company generally updated anticipated program costs based on recent program experience and new market information. As well, the proposed pilot programs are appropriate for determining the cost-effectiveness and viability of new

measures (e.g., behavioral measures) and their inclusion does not compromise the cost effectiveness of the full portfolio in any year.<sup>8</sup>

The Consultant Team’s review of the general model assumptions and inputs for the EE Procurement Plan’s projected costs and savings was performed via meetings with National Grid. The Consultant Team’s review focused on the general mechanics of the model as is appropriate for evaluating a high-level EE Procurement Plan. During the cost-effectiveness review of subsequent Annual EE Program Plans, the Consultant Team will examine inputs further and may suggest minor revisions while working with National Grid, the EERMC, and the Collaborative Subcommittee to keep everything appropriately updated.

In conclusion we find based on this review that National Grid’s 2012-2014 Energy Efficiency and System Reliability Procurement Plan is cost-effective based on the TRC test, and provides a solid platform for development of more detailed Annual Plans.

## **VIII. Review of Evaluation, Measurement and Verification (EM&V) Process**

Evaluation, measurement, and verification (EM&V) refers to the systematic collection and analysis of information to document the impacts of energy efficiency programs and improve the effectiveness of these programs. Impact evaluation, a specific type of EM&V activity, refers specifically to efforts to document program impacts.

From the perspective of this review of the cost-effectiveness of National Grid’s 2012-2014 Procurement Plan, the relevance of National Grid’s EM&V process is that it is a process that is responsible for confirming and/or refining over time the values of many of the parameter assumptions that go into National Grid’s cost-effectiveness analyses, particularly those pertaining to program benefits.

EM&V activities in Rhode Island have generally been managed by the evaluation department of National Grid, with input from the Collaborative Subcommittee and (more

---

<sup>8</sup>Pilot programs are important because while most measures can be found to be “cost-effective” or “non-cost-effective” in most standard applications, there may be highly cost-effective measures that are not cost-effective in certain applications, and some generally non-cost-effective measures that are cost-effective in certain situations. Pilot programs are crucial to overcoming key challenges of program design: refining the knowledge base of such situations; tailoring programs and services to avoid situations in which a measure is not cost-effective; and discovering the conditions and market segments in which a measure may prove to be cost-effective. The program and portfolio level analysis combined with increasing service delivery sophistication are positive characteristics of programs that help secure all cost-effective opportunities.

recently) the EERMC, following high-level regulatory direction set by the Commission, Division, and the Office of Energy Resources. Recently Northeast Energy Efficiency Partnerships (NEEP) has also begun to play an important and increased role in establishing regionally harmonized EM&V standards.

National Grid owns utilities in several states, including Massachusetts, New Hampshire and New York, along with Rhode Island. National Grid's evaluation department has EM&V-related responsibilities in all of these states. National Grid's evaluation department is highly experienced, and has a strong national reputation in the evaluation industry.

In New England, National Grid's EM&V planning, implementation and reporting activities have historically been tightly integrated with Massachusetts, New Hampshire and Rhode Island. Most EM&V studies that bear on Rhode Island's energy efficiency programs are planned, budgeted, implemented, reported, and filed in all three (or at least two) of these states.

In Rhode Island, the Consultant Team's work with National Grid's evaluation department to date has focused primarily on providing input into evaluation priorities, approaches, and spending levels. We have in-depth familiarity with these methods through our work with National Grid in Massachusetts, on a separate project for the Massachusetts Energy Efficiency Advisory Council. On the basis of this familiarity, we believe that National Grid's impact evaluation methods in New England have generally been consistent with, if not superior to, prevailing industry standards. We therefore conclude that the strength of National Grid's EM&V process serves to buttress the finding that National Grid's 2012-2014 Procurement Plan is cost-effective.

We have worked with and will continue to work with National Grid on behalf of the Council on approaches to producing more Rhode Island-specific results within current EM&V budget limitations.

## **IX. Conclusion**

For the reasons stated herein, the EERMC and the EERMC's Consultant Team finds that under the Total Resource Cost test, adopted by the Commission in Docket 3931 and consistent with national best practices, National Grid's 2012-2014 Energy Efficiency and System Reliability Procurement Plan is cost-effective and lower cost than the acquisition of additional supply pursuant to R.I.G.L. § 39-1-27.7 (c)(5).

## **Attachment A: EERMC Consulting Team's Qualifications**

### **Vermont Energy Investment Corporation**

Scudder Parker  
Betsy Harper  
Shawn Enterline  
Cheryl Jenkins

### **Energy Futures Group**

Glenn Reed  
Richard Faesy

### **Optimal Energy, Inc.**

Mike Guerard  
Phil Mosenthal  
Steve Bower  
Jeff Loiter

### **North Atlantic Energy Advisors**

Doug Baston

### **Prahl Consulting**

Ralph Prahl

**VERMONT ENERGY INVESTMENT CORPORATION:  
SELECTED ENERGY EFFICIENCY PROJECTS**

**Vermont Public Service Board (Efficiency Vermont)**

**2000-Present**

VEIC is well known for its highly successful role designing, developing and implementing Efficiency Vermont (EVT), the nation's first statewide energy efficiency utility. Efficiency Vermont has a three-year, \$100 million budget and supports technical assistance, customer service, training, and financial support for investment in efficiency by residential, commercial, and industrial customers throughout the state of Vermont. Through Efficiency Vermont, VEIC conducts extensive market development work with manufacturers, vendors, contractors, and retailers who play critical roles in bringing efficiency products and services to customers.

Efficiency Vermont is also responsible for research, development, and pilot testing new efficiency and retrofit technology. VEIC has operated Efficiency Vermont under contract to the Vermont Public Service Board since its inception in 2000 and has met or exceeded every contract goal during this period. In 2008 alone, Efficiency Vermont achieved incremental annual savings equal to 2.5% of Vermont's sales – more than any other state in the country - resulting in a second straight year of negative load growth in the state.

Efficiency Vermont is also a prime example of VEIC's extensive experience developing protocols and algorithms for efficiency measure savings and renewable energy generation. As part of its EVT work, it has developed an extensive Technical Reference Manual (TRM). (See *Vermont & Ohio Technical Reference Manuals* below for further information).

**Vermont & Ohio Technical Reference Manuals**

**2000/2009-Present**

VEIC has extensive experience developing protocols and algorithms for efficiency measure savings and renewable energy generation. As part of its EVT work, it has developed and actively maintained an extensive (i.e., 350+ page) Technical Reference Manual (TRM) that documents all assumptions concerning: measure savings, load shapes, incremental costs, measure lives, free rider rates, and spillover rates.

The basis for these assumptions, including specific evaluation references and engineering algorithms, is detailed for all of the efficiency measures that EVT implements to claim prescriptive savings. This manual was the first of its kind in the Northeast. VEIC has also developed, in cooperation with the Vermont Public Service Board (a client) and its Contract Administrator, a formal process by which new measure characterizations can be added to the TRM and older characterizations can be updated.

VEIC has also recently delivered a full TRM to the public Utilities Commission of Ohio for use by all regulated electric and gas utilities in the state, including recommendations for the design and implementation of an electronic platform for the Ohio TRM and for an ongoing TRM update and maintenance process.

**New Jersey Board of Public Utilities**

**2006-Present**

The New Jersey Clean Energy Program is part of a master plan initiated by the state to achieve a 20% reduction in energy consumption by the year 2020.

As part of a comprehensive team working on this program, VEIC leads work on program design, technical support (for a variety of initiatives including new construction, HVAC, lighting and appliances, and Home Performance with ENERGY STAR), preparing regulatory filings, modifying savings algorithms and evaluation planning for all statewide residential efficiency programs.

The residential efficiency initiatives offered by the program provide a wide range of market services, including contractor training, consumer education, and direct rebates and financing incentives to NJ homeowners. Through the end of 2008, these highly successful programs surpassed several major savings milestones including:

- Nearly 100 million dekatherms of natural gas savings installed or committed.
- Over 210,000 kilowatts and 7.5 million megawatt hours of electric savings installed or committed.
- Over 170,000 metric tons reduction in carbon dioxide emissions (annual).

### **ISO New England Forward Capacity Market**

**2005-Present**

ISO New England, which oversees New England's bulk electric power system and wholesale electricity markets, established a Forward Capacity Market (FCM) that pays suppliers to ensure sufficient capacity is available to meet future peak loads. Under the FCM, ISO New England projects the needs of the power system three years in advance and then holds an annual auction to purchase the resources necessary to satisfy the future regional requirements. This market is unique in that it allows energy efficiency and other demand resources to compete directly with generators. Participating in the FCM requires a considerable and complex bid including financial assurance, and associated claim activities.

In December 2006, after soliciting and considering input from stakeholders, the Public Service Board of Vermont issued an order directing VEIC to participate in the FCM on behalf of the State. VEIC was also authorized by the PSB to become a NEPOOL member, to participate in negotiations of final rules for the FCM, to support Vermont's efforts to secure resource parity for demand resources in the FCM, and to develop the necessary information for participating in the FCM auctions.

VEIC was one of the few efficiency program administrators to participate in workshops and negotiations with ISO-NE to delineate the rules and procedures for Demand Resources to participate in the FCM. The VEIC team continues to support and refine the market processes and mechanics necessary to ensure that efficiency resources are treated in a way that benefits ratepayers. VEIC has designed, and is implementing, extensive Measurement and Verification procedures for use by Efficiency Vermont to assure ISO, and other market stakeholders, that savings are reliable and accurate. VEIC has participated on behalf of Vermont's ratepayers in three successful auctions and continues to develop forecasts, materials, and related market processes. They continue to coordinate and advise other market participants, as well, including participation in regional and national forums to help develop future wholesale markets.

### **American Public Power –Ohio**

**2007-Present**

In August of 2007, American Municipal Power-Ohio (now American Municipal Power or "AMP") contracted with VEIC to evaluate how energy efficiency might fit into the portfolio being developed for its 124-member municipal utilities. AMP's goal was to find a stable, affordable, and sustainable portfolio of energy resource options that would help buffer their

member utilities from volatility in the wholesale power market - while also providing customer, community and environmental benefits.

VEIC provided AMP with an analysis of efficiency services, a proposed budget for deploying those services, and an estimate that showed that AMP could ramp up to 1% in annual energy savings for its members by 2015. Based on this initial analysis and subsequent negotiations, VEIC proposed to partner with AMP to become a full-service energy efficiency implementation entity referred to as the Efficiency Smart Power Plant (ESPP). The ESPP proposes to deliver efficiency services to a participating group of AMP's member utilities over a 3 year time period.

Through the relationship with AMP, VEIC is now planning the development of a "turnkey" integrated, performance-based implementation service, based on the Efficiency Vermont model.

Assuming critical mass participation is achieved, VEIC estimates the ESPP will yield:

- Projected cumulative annual savings of approximately 70,000 MWh for the first 3 years
- Levelized cost of 3.9 cents/kWh over life of the benefits
- Benefit/cost ratio of 2 to 1
- Creation of a roadmap for continued growth in energy efficiency gains
- Improvement in local economies and job growth

## **NYSERDA**

**2002 and 2005**

VEIC performed electric efficiency, gas efficiency and renewable potential studies for New York State and five load zones within the state. The studies examined the potential available from existing and emerging efficiency technologies and practices to lower end-use electricity requirements in residential, commercial, and industrial buildings. They also estimated renewable electricity generation potential from biomass, fuel cells, hydropower, landfill gas, municipal solid waste, solar, and wind. The study assessed New York's efficiency and renewable potential over three time horizons: five years (through 2007), 10 years (through 2012), and 20 years (through 2022)

**SCUDDER H. PARKER**

Director

Consulting Division

Vermont Energy Investment Corporation  
255 South Champlain Street, Burlington, Vermont 05401  
(802) 658-6060 x 1123  
sparker@veic.org

---

**PROFESSIONAL EXPERIENCE**

*Director, Consulting Division, Vermont Energy Investment Corporation (VEIC), Burlington, Vermont* 2010 – Present  
Lead strategic direction for consulting division. Hire, direct, and manage senior-level staff. Provide overall direction to staff work on projects that analyze energy efficiency and renewable energy markets, programs, and policies; client base is national and international. Provide training, mentoring, and other support. Lead marketing and business development efforts for new projects, including developing and maintaining relationships with key clients and business partners.

*Managing Consultant, Vermont Energy Investment Corporation, Burlington, Vermont* 2007 – 2010  
Managed complex projects focusing on achieving aggressive efficiency and renewable energy targets. This included energy policy recommendations for several jurisdictions; analysis of the role efficiency can play in deferring the need for new power plants and other supply side investments; plans for structuring and launching new and/or improved efficiency operations; led negotiations with utilities and other stakeholders regarding efficiency goals, budgets, efficiency program designs, integration of efficiency and renewable energy efforts; and the development and defense of regulatory testimony in both the U.S. and Canada. Current and recent projects include:

- *American Municipal Power.* Led team in developing a new implementation strategy for energy efficiency service delivery in Ohio. Designed a suite of programs for their 120+ municipal utilities, as well as approaches for dealing with the non-contiguous nature of their service territories.
- *Ontario Green Energy Coalition.* Provided regulatory testimony proposing and defending a aggressive suite of energy efficiency and distributed resource acquisition strategies as part of Ontario's energy resource planning.
- *Iowa Consumer Advocate.* Provided and defended testimony stating that a proposed 640 MW coal plant could be avoided or deferred through more aggressive and comprehensive implementation of energy efficiency programs.
- *Rhode Island Energy Efficiency Resource Management Council.* Led team in supporting implementation of an energy efficiency least-cost procurement design and aggressive distributed resource acquisition. Led negotiations with local utilities on goals, budgets, and designs of efficiency and renewable energy programs and strategies.
- *New Generation Partners.* Assisted development of a new business venture designed to support development of community scale renewable energy and combined heat and power projects.

*Independent Consultant, Montpelier, Vermont* 2007  
Assembled and led a coalition to develop legislation that would expand Vermont's Energy Efficiency Utility, Efficiency Vermont, to be a permanent provider of all-fuels efficiency. Excellent legislation passed; vetoed by Governor. Helped form and worked with a coalition of business, advocacy, utility, low-income groups, and professional associations.

*Public Policy Coordinator, Vermont Businesses for Social Responsibility, Montpelier, Vermont* 2004-2005  
Provided staff leadership for a Policy Committee on issues and policy development activities. Worked effectively with new Chair and members (of both political parties) of the House Natural Resources and Energy Committee to secure passage of innovative energy legislation, including expansion of authority of and funding for Efficiency Vermont, and passage of the SPEED program, an approach to affordable renewable energy development in Vermont.

*Independent Consultant, Montpelier, Vermont* 2003-2004  
Provided energy consulting services to a range of clients. Key clients and projects included:

- *Conservation Law Foundation.* Filed testimony in Docket No. 6860 on alternatives to construction by VELCO of a high-voltage power line in Vermont's northwest region.
- *Vermont Public Interest Research Group (VPIRG).* Assisted in preparation of an alternative electric energy supply plan for State of Vermont in 2020.
- *Synapse Energy Economics.* Co-authored paper on Independent Administrative Systems for delivery of energy efficiency programs.
- *Vermont Electric Cooperative.* Advised as VEC sought to acquire the larger adjoining service territory of an investor-owned electric utility. Assisted on all matters relating to acquisition terms, conditions and price. Facilitated process of integration planning between both utilities. Helped write the Integrated Resource Plan (IRP) for both utilities as an integrated and coherent document. Advised on energy efficiency, distributed generation, load control, and purchased power.

*Director-Energy Efficiency Division, Vermont Department of Public Service (DPS), Montpelier, Vermont 1990-2003*  
Appointed by Governor and served as the first Director of the Energy Efficiency Division. Created an entity that became an effective and innovative force to implement a landmark approach to providing energy security and affordability. Directly responsible for formulating and implementing policy related to Demand Side Management and renewable energy development. Worked with Commissioner and other Department Directors in policy development and implementation. Significant activities included:

- Co-authored two editions of the Vermont Comprehensive Energy Plan, and one edition of the Vermont Twenty Year Electric Plan.
- Built staff capacity to take responsibility for Demand Side Management activities in Department.
- Developed concept of a “consumerco,” a consumer cooperative to deliver comprehensive energy and efficiency services for customers.
- Proposed and developed the concept of an Energy Efficiency Utility (EEU) to deliver integrated statewide energy efficiency programs. Oversaw all aspects of designing, screening, writing, presenting, and defending this proposal. Led the transition process from utility programs to creation of the EEU. After implementation of Efficiency Utility, oversaw design and implementation of an evaluation effort involving DPS staff and consultants. Budget for this activity was over \$1 million for a 3-year period.
- Played a lead role in development of Distributed Utility Planning Collaborative under Docket 6290, resulting in settlement with numerous Vermont utilities on how to apply principles of Least Cost Planning to distribution and transmission constraints.
- Played major role in supporting development of renewable energy businesses in Vermont, including farm methane, biomass energy, solar energy, wind energy. Work included grant writing and administration, securing “earmark” funds for Vermont projects, and work with Vermont renewable energy businesses and trade association (REV). Led Department in creating the Biomass Energy Resource Center (BERC),
- Developed and secured legislative approval for proposals to use \$1.6 million in Oil Overcharge Funds, including programs in energy efficiency, working with Administration, state agencies, and the Legislature.
- Initiated efforts to promote energy efficiency with other state agencies, including State Buildings, Education, Labor and Industry, Transportation, and work with ANR on Air Quality and Act 250.
- Represented DPS and the Administration in successful legislative efforts including: passage of “least cost planning” legislation (1992), development and passage of Residential Building Efficiency Standards (1997), comprehensive electric utility restructuring legislation, (passed by Vermont Senate, 1997), and passage of “net metering” legislation” (1998). Prepared and presented legislative testimony, negotiated with parties, helped draft and revise legislation.
- Filed, presented, and defended expert testimony in numerous Dockets before the Vermont Public Service Board and in other venues.

## **EDUCATION**

**Union Theological Seminary:** MS Divinity, *cum laude*, 1968

**Williams College:** BA English Literature, *magna cum laude and Phi Beta Kappa*, 1965

**BETSY HARPER**  
Consultant  
Consulting Division  
Vermont Energy Investment Corporation  
100 Main Street, Suite 110, Concord MA 01742  
(802) 658 – 6060 x 1036  
bharper@veic.org

---

## PROFESSIONAL EXPERIENCE

*Consultant, Consulting Division, Vermont Energy Investment Corporation (VEIC), Boston, MA* 2008 – Present  
Consultant at VEIC specializing in residential loan programs and code compliance. Works with clients in MA, CT, RI and IN, working closely with the utilities in each state to improve residential program design. . Recently contributed significantly to the design of a residential loan program for the State of CT, and is currently working with several other clients to implement a portfolio of residential loan programs. Performed an analysis of financial program “best practices” throughout several recent programs launched in the U.S. Has regular, direct contact with DOE in their attempts to promote financial programs in several states throughout the country.

*Principal Consultant, Clean Energy Solutions, Cambridge, MA* 2007 – 2008  
One of three principal consultants hired to design and launch a comprehensive \$100 million energy efficiency program to generate a 10% reduction (50 MW) in energy consumption within the City of Cambridge. Worked extensively with large client team to define scope of project and to provide frequent communication with large group of internal and external stakeholders. Managed two teams for co-partner NStar. Evaluated synergies in direct customer contact, marketing, and educational awareness efforts. Built pro-formal financials and developed program attributes to raise Wall Street financing. Led design of residential loan program; solicited RFPs and recommended selected vendor. Managed new relationships with Harvard University and early-adopter Commercial & Industrial clients. Co-authored RFP response for Forward Capacity Market, developing complex multi-industry commitment to energy demand reduction.

*Senior Management Consultant, McKinsey & Company, Boston, MA* 1984 - 1988  
Five years experience in leading consulting teams for a wide variety of clients at CEO level. Performed extensive Excel-based analytic work in order to synthesize data into recommendations. Made senior executive level presentations of persuasive arguments for new strategic direction. Fact-based analysis often challenged mid-level managers’ conventional wisdom of barriers to growth. Conducted primary research (in-depth personal and phone interviews) with customers and potential customers to understand unmet needs and changing market dynamics. Demonstrated ability to work in a variety of technically-oriented industries (telecommunications, e-commerce) without a technical background, but an ability to synthesize complex technical issues into business problems and resolutions. Managed teams of 3-4 internal consultants and 2-12 client professionals. Responsible for all senior level client communications. Created scope of work, project budget, and interim and final report deliverables.

*Independent Consultant, Eliot Church of Newton, Newton, MA* 2008  
Built and analyzed spreadsheet with historical energy and water usage. Supervised two energy audits and prioritized recommendations by performing payback analysis. Developed plan with multi-stage implementation for extensive energy efficiency efforts. Implemented four programs with shortest paybacks, and anticipate future implementation of additional measures. Hired contractors to install insulation, remove asbestos and significantly overhaul heating distribution system. Drafted RFP for competitive bids for boiler and hot water replacement with high efficiency mechanicals.

*Independent consultant to eco-conservation clients, Newton, MA* 2002 - 2004  
Performed wide variety of assignments, including: public awareness campaigns; fundraising and new membership drives; realignment of cost controls and elimination of unprofitable educational programs; market assessment and financial impact of new educational/recreational facility. Clients included Appalachian Mountain Club, Charles River Conservancy, and Newton Community Farm

## PROJECT MANAGEMENT

*Residential real estate development Assistant Project Manager, RCG, LLC* 2005 - 2007  
Proved the concept of green building at no additional cost to developer, achieving profitable financial return. Awarded ENERGY STAR Homes and GreenHomes Northeast Certification. Project highlighted in *Boston Globe Magazine*. Presented at BSA’s Residential Build Boston Conference.

- Hired with explicit goal of introducing energy efficient design and construction into firm with no history of energy efficient/sustainable development.

- Promoted to Co-Manager of multi-residential project targeted to be firm's first green development. Worked extensively with both architectural and mechanical engineering teams to determine most cost-effective sustainable elements: extremely tight building envelope design; downsized high-efficiency HVAC systems; water conservation; materials re-use.
- Negotiated contracts with sub-contractors; supervised construction quality; provided continual review of actual costs against pro-forma budget.

**Wellington Management: Product & New Business Manager, International and Global Equities** 1994 - 1998

- Bought in as turn-around manager to reverse client attrition in declining business (\$300M in assets).
- Worked with investment professionals to design innovative new product, utilizing firm's unique competitive strength in global research. Built on early successes to enhance product characteristics and prepare it for market launch.
- Determined elements of product launch which were critical to success within a very competitive market. Wrote all marketing materials and new business presentations. In conjunction with sales team, performed extensive prospecting calls and 100+ final presentations.

**Director of New Business Development, Putnam Investments** 1988 - 1994

- Created first-in-its-kind in the industry – a product with significantly higher investor returns compared to the traditional insurance company offering. Worked extensively with internal investment professional team to analyze sources of enhanced return and identify competitive attributes.
- Traveled extensively with sales team to develop relationships with gate-keeper consultants and identify initial early-adopter clients. Designed all product launch marketing materials.

## ENERGY-RELATED ADVOCACY

**Co-Chair, Newton High Performance Building Coalition (2007-2008)**

- Reviewed design of Newton North High School currently under construction. Solicited analysis by independent building science engineers. Provided recommendations to architect, Mayor, and Board of Aldermen, identifying missed opportunities – primarily in insulation details and air barrier standards.
- Supported efforts for new high school to achieve Silver LEED for Schools.
- Provided consulting to City of Newton Planning Board and Land Use Committee for energy and sustainability standards to be required of new developers seeking new construction approval.

## EDUCATION

Harvard Business School MBA with Distinction (top 10%) , 1984  
Williams College, Williamstown, MA BA Economics, *cum laude*, 1979



## SHAWN P. ENTERLINE

Consultant

Consulting Division

Vermont Energy Investment Corporation

255 South Champlain Street, Burlington, Vermont 05401

(802) 658-6060, x 1305

senterline@veic.org

---

### PROFESSIONAL EXPERIENCE

*Consultant, Vermont Energy Investment Corporation (VEIC), Burlington, Vermont* 2008 - Present

- *City of Topeka, Kansas. Energy Efficiency and Conservation Strategy.* Evaluated Topeka's carbon footprint and developed a set of cost effective strategies to reduce it in coordination with multiple City, County, and Community stakeholders.
- *New York League of Conservation Voters.* Authored a White Paper that was used as the platform for a seminar on energy efficiency policy recommendations for New York State.
- *New York Power Authority (NYPA). 100 MW Photovoltaic Initiative.* Advised NYPA on the design and procurement approach for their 100 MW PV Initiative. Authored a Strategic Assessment that examined the merits of using a Feed-In Tariff to procure Off Shore Wind Generation.
- *Vermont Electric Power Company (VELCO). DOE Smart Grid Investment Grant.* Led VEIC's participation in a successful \$137 million DOE grant proposal that will deploy smart grid infrastructure throughout Vermont.

*Resource Planner & Senior Financial Analyst, Burlington Electric Department (BED), Burlington, Vermont* 2003-2008

- *Integrated Resource Plan (IRP).* Created the power cost model for BED's 2004 & 2008 IRPs, and authored the IRP itself in cooperation with the engineering, finance and operations departments. Presented the results to the Burlington Electric Commission and various Neighborhood Planning Assemblies.
- *Financial Project Management.* Managed the first Cost of Service study in 10 years for BED. Hired the consultant, managed the analysis, presented the results, drafted testimony and gained regulatory approvals. Managed the preparation and implementation of BED's 2006 Rate Case.
- *Budgeting/Forecasting.* Analyzed and reported on the annual, 5-year, and 20-year budgets using statistical sensitivity and decision analysis tools, and recommended rate stabilizing price targets and risk management transactions.
- *Energy Management.* Recommended, negotiated, and implemented power supply and risk management strategies. Transacted over \$20,000,000 worth of energy transactions in first year at BED.

*Senior Pricing Planner, PG&E Gas Transmission Northwest (GTN), Portland, Oregon* 2000-2003

- *Capacity & Gas Marketing.* Negotiated and implemented short-term firm (STF) capacity sales worth \$5-10 million/year in cooperation with 5 Account Managers. Purchased and sold up to 100,000 Dth/month on the daily market to meet the pipeline's inventory gas requirements.
- *Communication.* Presented a monthly "Market Intelligence Meeting" for senior management. Represented the pipeline's market view and new service concepts at annual customer meetings and industry conferences.
- *Product Development.* Structured (price, term, volume) and implemented new service concepts such as Limited Firm Service (LFS) and spark spread capacity pricing.
- *Risk Management.* Recommended strategies for minimizing basis-spread risk and for capturing seasonal value in forward markets. Administered basis swap transactions.
- *Analysis.* Researched historical (and forecasted) hydro conditions, weather conditions, gas demand, power demand, maintenance schedules, and competing pipeline pricing. Responsible for presenting the results of this analysis to management each month to develop the pipeline's marketing strategy.
- *System Development.* Managed a 10-person team that designed, developed and implemented PG&E's \$250,000 "Assetview" data warehouse, which reported on all of GTN's capacity contracts and capacity release transactions.

*Senior Energy Analyst, Unitol Service Corporation, Hampton, New Hampshire* 1998-2000

- *Resource Planning.* Updated Unitol's semiannual cost of gas adjustment filing and analyzed loads and supply contracts to structure RFP's for seasonal energy requirements.
- *Power Marketing.* Monitored unit availability and purchased/sold power products in the daily and monthly markets to maintain a reliable, lease cost supply portfolio.
- *Gas Marketing.* Priced gas supplies for interruptible customers on a daily basis, and scheduled deliveries via Tennessee Gas Pipeline.

- *Committees.* Represented Unitil on two ISO-NE committees; Market Rule 20 (ICAP) Committee and Hydro Quebec Management Committee.
- *System Development.* Implemented Unitil's Load Estimation Systems as part of two teams that were charged with estimating and reporting retail load for competitive electricity and natural gas suppliers.

## **EDUCATION**

Pennsylvania State University: MS Mineral Economics, 1999  
Research and Teaching Assistant, 1996–1998

Pennsylvania State University: BS Mineral Economics, 1995



**CHERYL D. JENKINS**  
Consultant  
Consulting Division  
Vermont Energy Investment Corporation  
255 S. Champlain Street, Burlington, VT 05401  
(802) 658-6060 x 1103  
cjenkins@veic.org

---

## PROFESSIONAL EXPERIENCE

*Consultant, Vermont Energy Investment Corporation, Burlington, VT* 2005 – Present  
Provides project management, coordination, and development as well as analysis and research in the areas of energy efficiency and renewable energy. Develops internal management systems for the Planning and Evaluation group at VEIC. Responsibilities include research and analysis; project coordination; teaching, speaking, and writing; financial analysis; and facilitation. Recent projects include:

- Public Utilities Commission of Ohio: Manages the development of a statewide Technical Reference Manual (TRM) for the public gas and electric utilities in Ohio, including the design and launch of an electronic platform for the TRM and an ongoing TRM maintenance and update process. Responsibilities include: review and analysis of deemed savings and deemed calculated electric and gas efficiency measures; oversight of the development of custom measure protocols; interface with the Commission and staff, utilities, and other stakeholders; reports and public presentations; subcontractor and staff supervision, budgeting, and other management responsibilities.
- ISO-New England Forward Capacity Market – Efficiency Vermont: Project manager for Efficiency Vermont's participation in this regional wholesale capacity market. Responsibilities include: development of long-term efficiency savings forecasts, Qualifications Package filings, and auction participation; design and implementation of an ISO-NE-approved Measurement & Verification Plan; tracking and reporting; stakeholder representation in regional M&V and wholesale market activities and meetings with ISO-NE and regulators. Also provides coordination across staff, subcontractor management, and project budgeting and management reporting.
- Renewable Energy Resource Center (RERC): Managed the administration of the Vermont Small Scale Renewable Energy Incentive Program, which provides over \$1 million a year in incentives for customer-sited PV, solar hot water, small wind, and micro-hydro projects. Responsibilities included incentive design, program administration, planning, and evaluation, customer and contractor support, and reporting; interface with the state Department of Public Service and other stakeholders; reporting and program administration for the RERC's activities; and staff supervision, budgeting, and other management responsibilities.
- Long Island Power Authority (LIPA) Clean Energy Initiative: Provided program design and implementation assistance for renewable programs in LIPA's Clean Energy Initiative, including the Solar Pioneers program. Drafted and advised on the development of program extensions, including customer economics, program screening, and program recommendations for PV, small wind, and a solar hot water program offering.
- New Jersey's Clean Energy Program: Participated in the development of program policies and procedures, guidelines, and customer and contractor information for the Customer Onsite Renewable Energy (CORE) program.
- Quebec Energy Efficiency Target Study: Conducted research and analysis in support of a comparative review of large-scale, all-sector energy efficiency program targets for the Agency of Energy Efficiency in Quebec.
- Department of Energy, New Brunswick, Canada: Provided management and reporting coordination for DSM planning efforts for the new Efficiency New Brunswick program.
- Efficiency Vermont 2006-2008 Proposal: Played a critical role in the coordination and writing of the successful \$44 million proposal for the contract that VEIC was awarded to continue to operate Efficiency Vermont, Vermont's Energy Efficiency Utility, for the 2006-2008 contract period.

*Research Scientist, College of William & Mary, Williamsburg, VA* 2000 – 2003  
Provided project management; project design, development, and evaluation; and associated quantitative and statistical analysis for various research projects in grant-funded studies. Responsible for laboratory management, international field project logistics, meeting and workshop development, coordination, and administration, and student supervision and mentoring.

*HHMI Grant Program Administrator, College of William & Mary, Williamsburg, VA* 1998 – 2000  
Coordinated publicity, applicant review, award letters, and participant tracking for a \$1.6 million grant; collaborated in the development of program assessment strategies and coordinated the implementation of surveys and assessment procedures; assisted faculty in the development of program summaries; organized annual report preparation and filing with funding agency.

## **PREVIOUS EXPERIENCE**

*Managing Editor*, University of Chicago Press/College of William & Mary

*Research Scientist/Instructor - Zoology*, University of Texas, Austin

*Staff/Senior Auditor*, Coopers & Lybrand, Austin

*Researcher/Instructor - Accounting*, University of Texas, Austin,

*Water Quality Management Planner*, San Antonio River Authority

*Regional Development Planner*, Middle Rio Grande Development Council

*Zooplankton Biologist*, Texas Instruments, Northfield, MA

## **EDUCATION**

PhD, 1994, University of Texas, Austin – *Evolutionary Biology*

MPA, 1983, University of Texas, Austin – *Accounting*

BA, 1973, University of Texas, Austin – *Biology*

## **PROFESSIONAL ACTIVITIES**

Renewable Energy Vermont – Board of Directors, Vice-Chair; 2008-present

## **SELECTED PUBLICATIONS AND PRESENTATIONS**

*Scoping Analysis of Potential for Photovoltaics to Offset Transmission System Upgrades in Southern Vermont* - Presentation at the Renewable Energy Vermont Distributed Energy Conference, 2007.

*Playing with the Big Boys: Energy Efficiency as a Resource in the ISO-NE Forward Capacity Market* – Publication and presentation at ACEEE Summer Study on Efficiency in Buildings, 2008.

*Energy Efficiency as a Resource in the ISO-NE Forward Capacity Market* – European Council on an Energy Efficient Economy, 2009.

## ENERGY FUTURES GROUP

Energy Futures Group (EFG) is a consulting firm that provides clients specialized expertise on energy efficiency markets, programs and policies. It was founded in April 2010 by Chris Neme, Richard Faesy and Glenn Reed, each of whom has more than 20 years experience in the energy efficiency industry.

We bring to our work a unique combination of technical, economic, program and policy expertise. Our participation on the Board of Directors of Residential Energy Services Network (RESNET), the Northeast HERS Alliance and the Program for the Evaluation and Analysis of Residential Lighting (PEARL); the Air Conditioning Contractors of America's (ACCA's) national quality installation committee; and various other national efficiency forums is testament to our extensive knowledge of building science and important technical aspects efficiency measures. We have taught short courses for the Association of Energy Service Professionals (AESP) and made invited conference presentations on cost-effectiveness screening of efficiency programs. We have critically reviewed literally hundreds of gas, electric, fuel oil and multi-fuel efficiency programs; played key roles in developing a number that have won national awards for excellence; and taught short courses on efficiency program design and implementation for Affordable Comfort and AESP. We have also helped shape a variety of policies for the promotion of energy efficiency including Ontario's first shareholder incentive mechanism for meeting efficiency program goals, federal efficiency standards for central air conditioners, rules for participation of demand resources in the New England ISO's Forward Capacity Market, and adoption of Energy Star standards as building codes in several Long Island Communities.

We use our expertise to assist clients with a variety of needs:

**Program design** – designs or critical reviews of others' designs of electric, natural gas, fuel oil or multi-fuel energy efficiency programs, with an emphasis on cutting edge strategies that are necessary to achieve deep levels of participation and savings.

**Program implementation support** – development of annual program goals and budgets, selection and oversight of implementation contractors, presentation of programs to key trade allies, technical trouble-shooting, and various other needs.

**Policy development** – support for the development of regulatory or legislative policies addressing goals and budgets for efficiency initiatives, administrative structures for program implementation, utility shareholder incentives, cost-effectiveness tests, equipment efficiency standards and building codes.

**Building energy codes** – support for the development of programs, policies and strategies that promote code adoption and maximize compliance.

**Collaborative engagements between utilities and other stakeholders** – serve as technical, program and policy advisors to non-utility parties, but work closely with utilities to develop innovative approaches to efficiency initiatives.

**Savings estimation** – development or critical review of assumptions or algorithms for the savings, cost, and lives of efficiency measures, often structured in the form of what are increasingly known as Technical Reference Manuals.

**Baseline studies** – assessments of new construction practices, existing home conditions, HVAC sales or other markets to inform program design, development of building codes or savings potential.

**Program evaluation** – planning for program evaluation needs, support in overseeing evaluators work and/or conducting process or impact evaluations themselves.

**Cost-effectiveness screening** – assessments of the cost-effectiveness of all types of efficiency programs, as well as the relative merits of different cost-effectiveness tests.

**Efficiency potential studies** – high level or detailed assessments of technical, economic and achievable efficiency potential, carefully calibrating analysis to local conditions.

**Expert witness testimony** – develop and stand cross-examination on testimony on efficiency program proposals and/or related policy issues.

EFG is currently working with a range of clients – consumer advocates, government agencies, environmental groups, other consultants and utilities – in more than 10 states and provinces. During the course of their careers, EFG principals have worked in more than 30 states and provinces, as well as several countries in Europe and Asia.

## EDUCATION

M.S., Energy Management and Policy, University of Pennsylvania, 1982

B.A., Biology, Wesleyan University, 1979

## EXPERIENCE

2010-present: Principal, Energy Futures Group, Hinesburg, VT

2005-2010: Managing Consultant, Vermont Energy Investment Corporation, Burlington, VT

2001-2005: Director of Regional Initiatives, Northeast Energy Efficiency Partnerships, Lexington, MA

1987-2000: Deputy Director of East Coast Consulting, XENERGY, Inc. (now KEMA), Burlington, MA

1983-1987: Principal Planner, Massachusetts Executive Office of Energy Resources, Boston, MA

## PROFESSIONAL SUMMARY

Glenn Reed has more than 25 years of expertise in demand-side management (DSM) program planning and evaluation; energy-efficiency policy development and implementation; building codes and appliance standards development; and group facilitation and consensus building. Mr. Reed currently is a lead residential advisor to the Massachusetts Energy Efficiency Advisory Council (EEAC) assisting and overseeing program design and implementation of residential lighting, appliance, HVAC, and consumer electronics programs. As the lead residential consultant to the Connecticut Energy Efficiency Board (EEB), he plays a similar technical assistance and oversight role in that state. For the Rhode Island Energy Efficiency Resource Management Council (EERMC) he provides oversight support on National Grid's lighting, appliances and gas and electric HVAC programs. In addition to his on-going work in Massachusetts, Connecticut, and Rhode Island, Mr. Reed has performed or directly overseen cost-effectiveness screening and program design for clients in New York, Prince Edward Island, and Vermont. Mr. Reed also developed or co-developed the Cost-effectiveness and Program Planning and Design modules for The Association of Energy Service Professionals' *DSM 101* training and presented this material to utility staff in several locations in the US. Prior to co-founding EFG, Mr. Reed was a Managing Consultant at the Vermont Energy Investment Corporation, Director of Regional Initiatives at the Northeast Energy Efficiency Partnerships (NEEP), and Deputy Director of East Coast Consulting at XENERGY (now KEMA).

## EXPERTISE RELEVANT TO THE STATEMENT OF WORK

- ***Programmatic and Technical Support, Massachusetts Energy Efficiency Advisory Council.*** Provides on-going technical and programmatic advice to, and oversight of, the Massachusetts gas and electric program administrators' residential efficient products (lighting, appliances and consumer electronics) and HVAC programs. This includes review of key screening tool inputs and development of three year program savings goals. Also assists Council evaluation consultants Leads Council engagement on the development of the residential measure characterizations for Massachusetts' new Technical Resource Manual.
- ***Residential Team Lead, Connecticut Energy Efficiency Board (EEB).*** Leads residential team to provide oversight of the state's electric and gas residential efficiency program. Works closely with the state's utilities to develop cost-effective program designs and goals for the annual Conservation and Load Management Plan. Connecticut's programs are subject to both utility and TRC test review by their regulators. These services are provided through the utilities' engagement with the ECMB.

- ***Programmatic and Technical Support, Rhode Island Energy Efficiency Resource Management Council.*** Senior Advisor providing on-going technical and programmatic advice to, and oversight of, Rhode Island's residential efficient products (lighting, appliances and consumer electronics) and HVAC programs. Works closely with National Grid staff to develop cost-effective program designs and goals for their energy efficiency plans. These services are provided through the utility's engagement with the EERMC.
- ***Residential Efficiency and Program Design, Vermont Electric Power Company.*** Managed the residential efficiency cost-effectiveness assessment and program design tasks for the VELCO Southern Loop project. This effort sought to avoid the construction of upgraded transmission lines in southern Vermont. The proposed programs would represent incremental activities above current Efficiency Vermont efforts in the area.
- ***Provincial Energy Efficiency Plan, Prince Edward Island.*** Managed a potential analysis, measure screening, and program design and cost-effectiveness assessment for the provincial government. This analysis included the residential, C&I, and transportation sectors. Both energy and carbon savings were analyzed and estimated.
- ***Efficiency Vermont.*** Senior Advisor for Retail Market efforts (efficient lighting, appliances and consumer electronics) for Vermont's statewide, award-winning energy efficiency utility.
- ***Programmatic and Technical Support, Long Island Power Authority (LIPA).*** Led the Vermont Energy Efficiency Corporation's residential team to provide ongoing technical and programmatic advice to LIPA on the design, implementation, and evaluation of their residential and renewable energy program. Responsible for detailed long-term program planning and cost-effectiveness screening, on-going program design and implementation review and assistance, and support of program evaluation efforts.
- ***Lead Program Development for Orange and Rockland (O&R).*** Led residential team to assess the cost-effective savings potential and to develop five-year program designs and budgets to attain this potential within prescribed budget caps. Potential analysis was informed by an on-site residential data collection task that was also part of their scope of work for O&R.
- ***Trainer, Association of Energy Services Professionals (AESP).*** Lead trainer for AESP's DSM 101 workshops in New York, Kansas, Illinois, Washington, and North Carolina. Developed or co-developed Residential and C&I Technology, Cost-effectiveness, and Program Planning and Design training modules. These workshops, lasting as long as five days, provided efficiency program staff with details on all aspects of energy efficiency program planning, design, implementation, and evaluation. Developed several of the training modules: Residential and C&I Technologies and Program Planning and Design.

#### RELEVANT PUBLICATIONS

- ***Pearls of Wisdom: Assuring Efficient Lighting Product Quality and Program Integrity.*** Elizabeth Titus, Glenn Reed, Noah Horowitz, and Chris Granda. 2005 International Energy Program Evaluation Conference, New York City, New York, August 2005.
- ***Engaging Industry: Better Their Money than Ours.*** Glenn Reed, Peter Bardhi, Ed Murphy, Jeff Pratt, and Subid Wagley. 2002 ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, California, August 2002.

**RICHARD FAESY**

rfaesy@energyfuturesgroup.com

---

**PROFESSIONAL EXPERIENCE**

2010 – Present

**Principal, Energy Futures Group**, Hinesburg, Vermont

Co-founder. Lead a variety of consulting projects for clients across the U.S. Focus on analysis of markets for efficiency technologies/practices, design of programs and policies to promote them, and evaluation of such programs and policies. Current projects include:

- Connecticut Energy Conservation Management Board: ENERGY STAR Homes Program advisor.
- Department of Energy / Oak Ridge National Laboratory: Senior Advisor and team co-leader operating DOE's Technical Assistance Network to communities that have received American Recovery and Reinvestment Act (ARRA) funds.
- Efficiency Vermont: Senior Advisor for residential program design and policy guidance for Vermont's statewide, award-winning energy efficiency utility.
- Groton School, Groton, MA: Lead the development of a campus-wide assessment and follow-on services resulting in significant multi-year investments in energy improvements.
- Iowa Office of Consumer Advocate: Team lead for utility program portfolio review, testimony development, and on-going program modifications and enhancements.
- Massachusetts Energy Efficiency Advisory Council: Consultant overseeing the ENERGY STAR Homes Program and existing homes programs in Massachusetts.
- New Jersey Office of Clean Energy, Board of Public Utilities: Senior Advisor for program design and oversight of New Jersey ENERGY STAR Homes Program as member of Honeywell Team.
- New York State Energy Research and Development Authority (NYSERDA): Senior Advisor for commercial/residential code compliance study.

2000 - 2010

**Energy Efficiency Division Manager, Vermont Energy Investment Corporation**, Burlington, VT. Led a staff of 12 in the Planning and Evaluation Team. Managed projects in the residential, institutional and multifamily building markets and provided expertise and direction in energy efficiency, HERS, codes and sustainable ("green") residential construction practices, equipment, and technologies. In addition to those listed above, projects included:

- Efficiency Maine: Team lead for comprehensive statewide residential new construction baseline study, resulting in influencing adoption of Maine's first energy code.
- Environmental Protection Agency: Subcontractor to ICF Consulting to assist with enhancements and modifications to EPA's ENERGY STAR Homes Program. Assisted with development of multifamily ENERGY STAR program, Advanced Lighting Package and remodeling program.
- LEED for Homes Provider: Led the Northeast team (of six firms) implementing the U.S. Green Building Council's LEED for Homes rating system in the Northeast U.S. and Canada.
- Long Island Power Authority: Team lead on program design, planning, policy guidance and technical assistance on residential and multifamily sectors and new homes baseline study.

- US Green Building Council: Sub-contractor to Building Knowledge Research Group LLC to help develop LEED for Homes residential green rating system and implementation strategy.

1986 – 2000

**Director, Energy Rated Homes of Vermont (ERH-VT)**, Burlington, VT. Responsible for leadership, development, and implementation of ERH-VT, a Home Energy Rating organization which was a national model for Energy Ratings and Energy Mortgages since 1986.

1989 – 2000

**Development Director, Single Family Services, Vermont Energy Investment Corporation**, Burlington, VT. Conducted energy and financial analyses of single- and multi-unit buildings, both existing and new construction.

## EDUCATION

<b>University of Pennsylvania</b>	1986
M.S. coursework in Energy Management & Policy	
<b>BS, University of Vermont</b>	1983
Resource Economics and Environmental Studies	

## CERTIFICATIONS / AWARDS / CURRENT AFFILIATIONS

- LEED 2.0 Accredited Professional, U.S. Green Building Council (2004)
- Certified Home Energy Rating System (HERS) Rater, VEIC / Northeast HERS Alliance / Residential Energy Services Network (RESNET) (2001)
- Member, US Green Building Council / LEED for Homes Core Committee, 2003 - 2008
- Board Director, Building for Social Responsibility (Vermont) 1990 – present (intermittently)
- Board Director, Residential Energy Services Network (RESNET), 2002 – 2101
- Member, Vermont Builds Greener Program Committee, 2000 - present
- Member, US Department of Energy HERS/EEMs Pilot States Working Group, 1995 – 2000
- Founding Board Director, Vermont Green Building Network, 2002- 2006
- Member – High-Rise Multifamily ENERGY STAR National Working Group, 2003 – 2007
- RESNET Lifetime Achievement Award (2001)

## SELECTED RECENT PUBLICATIONS AND PRESENTATIONS

“\$300,000, 4 Bedrooms and a ‘B+’ Energy Rating” – Transforming Markets with Mandatory Building Energy Labeling”(with Philippe Dunsky, et. al.), forthcoming in Proceedings of ACEEE 2010 Summer Study on Energy Efficiency in Buildings, August 2010.

“Building Rating and Residential Retrofit: From Theory to Practice”, ACEEE/CEE Market Transformation Symposium, Washington, DC, March 2010.

“ENERGY STAR Homes Update”, Affordable Comfort New Jersey Home Performance Conference, Atlantic City, New Jersey, March 2010.

“Maine New Homes: How a Baseline Study Can Set You Straight”, (with L. Badger, P. Scheckel and D. Conant), 2008 Summer Study on Energy Efficiency in Buildings Proceedings, American Council for an Energy-Efficient Economy, Washington, DC, August 2008.

## **OPTIMAL ENERGY: COST-EFFECTIVENESS SELECTED PROJECTS**

Optimal Energy Inc has extensive experience in cost-effectiveness issues relating to all aspects of energy efficiency program planning and implementation. The work ranges from cost-effectiveness screenings to expert testimony; Optimal even produced the EPA *Guide for Conducting Energy Efficiency Potential Studies*, which includes guidance on selecting appropriate cost-effectiveness methodologies.

Optimal has established and implemented appropriate cost-effectiveness tests for a number of different utility program portfolios in a wide range of jurisdictions, to reflect the long-term benefits of energy efficiency. This work includes energy efficiency potential studies as well as program planning and measurement and verification. Recent work includes:

### **Forecast 20**

This project was a collaborative effort with Vermont Energy Investment Corporation (VEIC). The study examines the cost-effective potential of a variety of current and future technologies in an effort to direct future program effort over a 20 year time horizon. One of the many notable aspects of this study are several unique methodologies for estimating cost-effectiveness of emerging technologies, a market typically overlooked by most traditional potential studies.

### **Efficiency Maine Trust Triennial Plan**

For this project Optimal collaborated with Dunskey Energy Consulting in Montreal. The plan addressed 8 goals set forth by the Maine state legislature, centering on energy efficiency, by targeting all fuels, including un-regulated fuels. The goals ranged from reducing energy consumption in residences and business, to limiting greenhouse gas emissions, to jobs creation, but were focused through the lens of capturing all cost-effective energy efficiency opportunities.

### **Natural Gas Energy Efficiency Resource Development Potential in New York**

The NYSERDA Gas Study, identified several goals that centered on calculating the potential cost-effective natural gas efficiency savings in the state over a 10-year time horizon. The study also examined the level of cost-effective savings from a portfolio of recommended efficiency program efforts and a funding levels during that same time period. This project included a collaboration with VEIC.

### **NYPA Program Cost-Effectiveness Review**

Optimal was contracted by NYPA to review recent project files for their current demand-side management programs, assess program cost-effectiveness and compare NYPA's results to results found in other similar jurisdictions. The cost-effectiveness test results had to be analyzed using parameters specific to NYPA programs due to NYPA's financial assistance structures. As a result, Optimal developed a unique methodology for comparing alternative funding mechanisms with traditional funding mechanisms while maintaining comparable benefit/cost test results.

### **NEEP New England Meta-Analysis**

Optimal conducted a meta-analysis of electric energy efficiency potential studies in New England. The results were compared to current forecasts and screened for cost-effectiveness in an

effort to develop a cost-effective potential estimate for the New England region. As well as producing cost/benefit ratio metrics, Optimal also developed supply curve cost-effectiveness metrics. Based on end-use energy groupings, the supply curve metrics are designed to display savings potential and levelized cost simultaneously, and when compared to avoided energy cost projections, serve as another means of visualizing cost-effectiveness.

In these efforts, Optimal utilizes their proprietary Portfolio Screening Tool which compares the myriad costs associated with implementing energy efficiency programs, both now and in the future, against the avoided costs of supply-side resources. The cost-effectiveness methodology embodied in this tool was developed in response to a thorough public review process while keeping in line with the principles of the California Standard Practices Manual. In order to provide a precise accounting of both costs and benefits of efficiency investments, it incorporates several complexities that many other approaches lack. Optimal has also used this platform to develop project-level cost-effectiveness screening tools for efficiency program administrators at several utilities in New York and Massachusetts.

In addition to program planning and potential studies, Optimal has provided expert testimony on cost-effectiveness in a wide variety of contexts in New York, Vermont, Indiana, Florida, Virginia, Iowa, Illinois, South Carolina, Arkansas, Texas, Oklahoma, and several Canadian provinces.

Optimal also produced the *EPA Guide for Conducting Energy Efficiency Potential Studies*. This guide was commissioned by the EPA and the DOE as part of the National Action Plan for Energy Efficiency. The Guide provides guidance on standard approaches for building the policy case for energy efficiency, evaluating efficiency as an alternative to supply-side resources, and formulating detailed program design plans by understanding the potential for cost-effective energy efficiency. In short, this guide is a comprehensive, how-to manual for selecting and conducting cost-effectiveness studies analyzing the potential for energy efficiency.

## **Mike Guerard** **Managing Consultant**

Mike Guerard joined Optimal Energy, Inc. in July, 2008. He has over 20 years of experience in the energy efficiency, green building and the renewable energy industry. He has developed and managed a wide-range of energy efficiency programs throughout New England and the Pacific Northwest; green building initiatives including LEED for Homes and Earth Advantage; and consulted on the development of renewable energy standards and protocols for Massachusetts Housing Authorities. In addition to overseeing dozens of internal staff covering the field delivery, technical enhancements, marketing and administration of utility-sponsored programs, he has worked collaboratively with a wide range of stakeholders including utility staff, government officials, state building code and energy office staff, and leading building scientists to achieve positive program results and significant energy savings.

### **Professional Experience**

#### **Optimal Energy, Incorporated**

Slatersville, RI

*Managing Consultant, July 2008 to present*

Primary role is to provide project management, research, stakeholder coordination and technical analysis to support clients' development of strategies for achieving energy efficiency and attainment of least-cost resources. Main clients have included:

- Rhode Island Energy Efficiency and Resources Management Council.
- Massachusetts Energy Efficiency Advisory Council.
- Long Island Power Authority for the Clean Energy Initiative.

#### **Conservation Services Group, Inc. (1991 – 2008)**

Westborough, MA

*Senior Project Manager, 2006-June 2008*

- Primary responsibility to direct CSG's research, development and delivery of LEED for Homes provider services; the launch of a Northeast regional green building program, Earth Advantage; and multi-family new construction initiatives.
- Provided coordinated development of the technical, program, staff and business strategies to address serving these new initiatives for the company.

*Program Manager, Pacific Northwest New Construction Programs, 2004-2006*

- Developed, launched and managed the ENERGY STAR-labeled Home™ Program in the Pacific Northwest for the Energy Trust of Oregon and the Northwest Energy Efficiency Alliance, covering Oregon, Washington, Idaho, and Montana

- Hired and managed staff; coordinated operations with primary partner and minor partners; served as primary liaison with multiple stakeholders including state energy offices and universities
- Served on board of PNW Technical Review Committee, to establish and advance program technical standards and protocols

*Director, New England Residential Energy Services, 2000-2003:*

- Overall management of over 50 staff delivering thousands of energy audits and new home certifications annually throughout New England, along with the associated building science training and contractor infrastructure development required to successfully complete production levels.
- Provided primary interface with multiple utility clients and other funding sources, and oversight of all required tracking, reporting and analysis

*Program Management Roles, 1991-2000*

1998-2000, Program Manager, ENERGY STAR Homes

1996-1997, Developed successful grant request, and subsequently managed and delivered *HERS: Infrastructure Development for the Northeast HERS Alliance* funded by the U.S. Department of Energy

1995-1997, Developed successful grant request, and subsequently managed and delivered *Promotion and Evaluation of Energy Efficient New Construction in the Northeast* funded by the U.S. EPA

1994-1998, Program Manager, EUA Lighting Program

1994-1995, Program Manager, Advanced Retrofit pilot program

1991-1997, Program Manager, Energy Crafted Homes Program

## **Education**

University of Kansas and Goethe Institute, graduate studies

University of Rhode Island and Rhode Island College, Bachelor's degrees

**PHILIP H. MOSENTHAL**  
**PARTNER**

Mr. Mosenthal has over 25 years experience in energy efficiency consulting, including facility energy management, utility and state planning, program design, implementation, evaluation and research. He has particular expertise in the commercial, industrial and institutional sectors. Mr. Mosenthal has developed numerous utility, state and region integrated resource and DSM plans, and designed and evaluated residential, commercial and industrial energy efficiency programs throughout North America and in Europe and China. He has also been the lead analyst on numerous energy efficiency potential assessments. Mr. Mosenthal has played key roles in utility collaboratives and has successfully worked to build consensus among diverse parties in various assignments. Mr. Mosenthal also has designed program implementation procedures, managed implementation contracts, trained efficiency program and planning staff, and performed over 400 commercial and industrial facility energy efficiency analyses for end users.

**Professional Experience**

**Optimal Energy, Incorporated**

**Bristol, VT**

*Founding Partner, 1996-present*

Consult with electric and gas utilities, governments and other non-utility parties on energy efficiency, resource planning and regulatory issues. Develop strategies for achieving energy efficiency and least-cost resources, including administrator funding and incentive mechanisms, and program and market design and analysis. Current or recent projects include:

- Lead researcher on energy efficiency issues for EPA's Clean Energy Partnerships with State and Local Government to advance State Clean Energy Action Plans
- Manager of electric and natural gas efficiency and renewable potential assessments for New York State Energy Research and Development Authority
- Lead consultant for C&I gas program design, development and analysis for NYSERDA
- Chief architect of Efficiency Vermont, the nation's first and only state efficiency utility, as well as advisor on C&I planning and program design to Efficiency Vermont
- Advising two provincial governments in China on development of efficiency efforts that would serve as a model for long term national efforts
- Commercial and Industrial sector advisor to the Massachusetts Utility Collaborative.

**Resource Insight, Incorporated****Middlebury, VT***Senior Research Associate, 1995-1996*

Consulted on DSM planning, program design, monitoring and evaluation, and resource characterization, specializing in the commercial and industrial sectors. Projects performed on behalf of utility and non-utility parties, in both cooperative settings and in contested regulatory proceedings.

**Xenergy, Incorporated (now Kema)****Allendale, NJ***Chief Consultant, 1990-1995*

Managed the consulting division for Xenergy's (now Kema's) Research, Planning and Evaluation Group (RP&E) in its Mid-Atlantic Region. Responsibilities included direct utility consulting, as well as marketing, administration and staff management for RP&E. Consulting activities focused on assessment of DSM technology potential, DSM planning, program design and development, and process and impact evaluation for electric and gas utilities.

**Education**

M.S., Energy Management and Policy, University of Pennsylvania, Philadelphia, PA, 1990, 4.0 GPA.

B.A., Design of the Environment, University of Pennsylvania, Philadelphia, PA, 1982.

Certificate in Electrical Engineering, Pennsylvania State University, Ambler, PA, 1984.

**Highlights Of Project Experience****Efficiency Program Design and Planning**

- Lead advisor to the Ohio Office of Energy Efficiency on planning and program design on behalf of U.S. EPA's Clean Energy Partnerships with State and Local Government's to advance State Clean Energy Action Plans. Project includes reviewing past performance and current plans and funding, and advising on new programs and funding commitments. (2006 – present)
- Manager of program design, development and planning for Efficiency Vermont, the world's first Energy Efficiency Utility, as part of multi-organizational enterprise operating under a \$27 million contract with the Vermont Public Service Board to deliver statewide energy-efficiency programs for the customers of Vermont's twenty-one electric utilities. Includes design, development and start-up of programs to serve the commercial, industrial, institutional and agricultural sectors in Vermont. (2000 – present)
- Advisor for the commercial and industrial programs for the Massachusetts Energy Efficiency Advisory Council, on behalf of the Massachusetts Department of Energy Resources. Responsible for representing non-utility parties interests on the design, development, implementation and evaluation of all Massachusetts Program Administrator's portfolios of C&I programs. This

project involves supporting the PAs in developing and implementing a set of SBC-funded C&I programs. (1998 – present)

- Manager of NY statewide gas resource assessment and program design and analysis for all gas territories in NY. Responsible for coordinating a large multidisciplinary team to assess residential, commercial and industrial gas efficiency potential, and design and analyze a portfolio of efficiency programs to be delivered statewide. For NYSERDA (2005 – present)
- Advisor to the Illinois Attorney General on policy, planning, program design and evaluation and utility oversight regarding Commonwealth Edison's and Ameren Illinois' efficiency programs. This project included expert testimony on development of initial plans, funding mechanisms, policy and evaluation and verification issues. Currently, Mr. Mosenthal represents the AG in a collaborative addressing all issues surrounding planning, development, implementation and evaluation. For ILL AG (2007 – present).

### **Evaluation, Monitoring and Assessment**

- Development of M&V protocols and mechanisms for two Chinese provinces to sell energy efficiency portfolio carbon dioxide savings into the Clean Development Mechanism (CDM) established under the Kyoto Protocol. For Natural Resources Defense Council (2004 — present)
- Market assessment support to the NYSERDA Small C&I Lighting Program. This project included advising on scope of analysis and interpretation of interview and survey data, and review and recommendations on program design and implementation. (2003 - present)
- Lead advisor to Efficiency Vermont on C&I evaluation planning and coordination with Department of Public Service on evaluation and savings estimation and verification. Lead negotiator for Efficiency Vermont with the VT DPS on C&I savings estimates and verification. (2000 – present)
- Lead advisor to Long Island Power Authority on its C&I baseline analysis and market assessment. Project included support in developing program and market theory, evaluation plans and RFP, review of proposals, and ongoing advice and critique on third party analysis. (1999 - 2001)

**STEVEN T. BOWER, CEM**  
**MANAGING CONSULTANT**

Mr. Bower has served as project manager, lead analyst and support analyst on a wide variety of energy efficiency potential and program evaluation projects. He also has lead responsibilities for developing and maintaining Optimal's efficiency investment and economic modeling tools. He has 20 years of work experience in information systems design and development, data management and analysis, project management, and energy efficiency analysis. He has developed information systems ranging from small custom applications to data warehouses to large-scale, web-based transaction processing systems, spanning the entire lifecycle of information system development. Mr. Bower is a Certified Energy Manager (CEM).

**Professional Experience**

**Optimal Energy, Incorporated**

Bristol, VT

*Managing Consultant, March 2006 – present*

- Perform cost-effectiveness and savings analyses of efficiency measures, programs and portfolios, for both past and planned programs.
- Develop efficiency evaluation protocols, including measure deemed savings algorithms and efficiency program Technical Reference Manuals.
- Project manager for various efficiency projects, including potential studies and development of Technical Reference Manuals.
- Provide strategic planning for and management of Optimal Energy's software tools for energy efficiency and economic modeling, and related consultant services.
- Design and implement software functionality for efficiency portfolio planning and management.
- Perform energy audits/walk-throughs and subsequent analyses to identify opportunities for energy and cost savings.

**IDX Systems Corporation (now GE Healthcare)**

Burlington, VT

*Software Engineer and Project Manager, 2000-2006*

- Developed mission-critical radiology and cardiology imaging software applications.
- As Software Engineer, performed requirements analysis, software design and programming at all application tiers of web-based, mission-critical applications.
- As Project Manager, responsible for project scope, schedule and resources, assessing and mitigating project risks, and the quality of all project deliverables.

**GIS/Trans, Ltd.**

Cambridge, MA

*Senior Analyst, 1996-2000*

- Senior Analyst with consulting firm specializing in Geographic Information Systems (GIS) solutions for transportation. Technical Lead and Project Manager for various consulting projects.
- Technical lead for design, development and implementation of an Oracle-based data warehouse for the Maine Department of Transportation. Responsible for technical staff and success of all technical aspects through implementation.
- Technical Lead, Florida GIS Planning, Analysis and Implementation Project.

**Vermont Center for Geographic Information**

Burlington, VT

*Database Administrator, 1990-1996*

Administered statewide GIS database and data distribution system. Developed standards and guidelines for GIS data development, specifications, formats, metadata and data exchange. Designed and developed advanced GIS applications.

**VT Agency of Natural Resources and VT Department of Health**

Waterbury, VT

*Information Systems Consultant, 1989*

Assessed potential geographic databases for inclusion in the Vermont GIS. Developed procedures for converting databases to GIS format.

**U. S. Peace Corps**

Zaire (now Democratic Republic of the Congo)

*Peace Corps Volunteer, 1983-1986*

Asst. Professor of Physics (1985–1986), Institut Supérieur Pédagogique (teachers college), Bukavu, Zaire. High School Physics Teacher (1983–1985). Coordinator, Math-Physics Teacher Training (Summer 1985), Peace Corps Training Center.

**Education**

M.S., Natural Resources Planning (GPA 3.72), University of Vermont, Burlington VT, 1991.

B.A., Physics and Computer Science (Magna Cum Laude, GPA 3.65), Brandeis University, Waltham MA, 1982.

**Certifications**

- Certified Energy Manager, Association of Energy Engineers, 2009

## Highlights Of Project Experience

### Efficiency Evaluation and Assessment

- Technical lead for development of a Statewide, multi-jurisdictional electric and natural gas Technical Reference Manual for Massachusetts. (2009-2010)
- Project manager for development of C&I measures for a Technical Reference Manual for use by multiple Ohio utilities (2010).
- Project manager and lead analyst for Vermont 20-year electric efficiency potential study. (2009)
- Project manager and lead analyst for a New York statewide electric efficiency potential study, updating a 2003 statewide potential study also done by Optimal Energy. (2008-2009)
- Performed year-end cost-effectiveness screening of the Conservation and Load Management Programs for the Connecticut Municipal Electric Energy Cooperative. (2007)
- Performed cost-effectiveness and savings analysis screenings to support planning and design of Efficiency Long Island initiative of the Long Island Power Authority (LIPA), for multiple scenarios over 10- and 20-year time horizons. (2006-2008)
- Developed hourly “8760” efficiency savings profiles for multiple scenarios of efficiency program savings, for incorporation into LIPA’s power planning process. (2008-2010)
- Performed retrospective screenings of LIPA’s efficiency programs to support their annual reporting. (2006-2007)
- Developed energy consumption profiles for sixteen Connecticut schools in support of an energy management and planning services contract. (2006)

### Efficiency Investment Tool Development

- Developed and enhanced Optimal Energy’s Microsoft Excel-based cost-effectiveness analysis tool for custom commercial efficiency projects, customized for various clients. (2006-Present)
- Developed scope and incorporated enhancements to Optimal Energy’s Portfolio Screening Tool for the New York State Energy Research and Development Authority (NYSERDA). The tool performs cost-effectiveness analysis of energy efficiency measures, programs and entire portfolios. (2006-2007)

## Selected Publications and Reports

Steven T. Bower. 1994. “Techniques for Developing a Calibrated Road Route System.” Proceedings of the Fourteenth Annual ESRI User Conference, published on CD-ROM.

Steven T. Bower and Carlton M. Newton. 1993. “Boundary Problem for Triangulated Irregular Networks.” Cartography and Geographic Information Systems, Vol. 20, No. 4.

**JEFFREY M. LOITER**  
**MANAGING CONSULTANT**

Mr. Loiter has over 14 years of consulting experience in energy and natural resource issues. His energy experience includes policy, planning and program design, research on renewable and efficiency technologies, electricity transmission systems, integrated resource planning and savings verification. As a Managing Consultant, Mr. Loiter manages projects, oversees staff development, and contributes to firm management in the areas of hiring and business development.

## **Professional Experience**

### **Optimal Energy, Incorporated**

Bristol, VT

*Managing Consultant, 2006-present*

- Supporting Efficiency Vermont Business Energy Services group with technical analysis, market research, and program design consultation. Recent projects include market characterization studies of refrigeration, lodging establishments, and food service entities; and developing several Technical Resource Manual entries.
- Supporting Massachusetts Energy Efficiency Advisory Council on program planning and implementation and technical analysis. Currently participating in the CHP Working Group, guiding program implementation strategies and analytical approaches.
- Supporting program implementation and on-going program design and development for Orange and Rockland Utilities. Previously managed the preparation of a DSM plan and Commission filings for this client. The project included on-site customer audits and residential surveys, efficiency program designs, and an efficiency potential study.
- Prepared comments and related materials on utility IRP filings in support of the Missouri Department of Natural Resources. Review focused on compliance with IRP regulations and critique of filed DSM plans as compared to best-practice.
- Led Optimal's participation in preparing a Technical Resource Manual for the Mid-Atlantic States (Maryland, Delaware, District of Columbia), for the Northeast Energy Efficiency Partnerships' Regional EM&V Forum.
- Supported the Maryland Energy Administration in their review of utility energy efficiency plans and the design and implementation of state-delivered efficiency programs.
- For the Efficiency Maine Trust, developed a three-year plan for commercial buildings sector energy efficiency programs. Programs targeted electric, natural gas, and un-regulated fossil fuel consumption.
- Provided recommendations to improve a targeted DSM program being delivered under contract to a major northeast electric utility. Interviewed

program staff and provided recommendations based on best practice approaches for similar target markets.

- Prepared two documents for inclusion with EPA's National Action Plan for Energy Efficiency: a guidebook on conducting efficiency potential studies and a handbook describing the funding and administration of clean energy funds.
- Conducted potential analysis for a Canadian Atlantic province, including commercial and institutional sector program design and overall analytical oversight.
- Developed residential potential analysis for the non-transmission alternative to a proposed transmission line upgrade in Vermont.
- Prepared report on efficiency potential in Texas in support of discussions related to proposed expansion of coal-fired generating capacity, for two major NGOs.

**Independent Consultant**

Cambridge, MA

*2005-2006*

- For the Massachusetts Renewable Energy Trust SEED Initiative, evaluated renewable energy technology companies' applications for early-stage funding. Responsibilities included leading due diligence efforts on three applications and contributing to several others. Awards recommended for approval totaled \$1.4 million.
- Led an effort to draft a whitepaper on policies to encourage investment in electricity transmission facilities.
- Prepared two articles describing the potential impact of proposed federal legislation to increase domestic oil refining capacity, published in *Petroleum Technology Quarterly* (1Q 2006) and *BCC Research/Energy Magazine* (2006).

**Industrial Economics, Incorporated**

Cambridge, MA

*Associate, 1997-2000; Senior Associate, 2001-2004*

Managed multi-disciplinary qualitative and quantitative assessments of natural resource damages and environmental policy for clients such as NOAA, USFWS, USEPA, USDOJ, the National Park Service, the State of Indiana, and the United Nations.

**URS Consultants, Incorporated**

New Orleans, LA & Boston, MA

*1991-1995*

Prepared water, air, and solid and hazardous waste permit applications for state and federal agencies on behalf of industry clients.

## Education

M.S., Technology & Policy, Massachusetts Institute of Technology, Cambridge, MA, 1997.

B.S. with distinction, Civil and Environmental Engineering, Cornell University, Ithaca, NY, 1991.

## Publications

“From Resource Acquisition to Relationships: How Energy Efficiency Initiatives Can Work Effectively with Large Commercial & Industrial Customers,” (with E. Belliveau, J. Kleinman, D. Gaherty, and G. Eaton), *2008 ACEEE Summer Study on Energy Efficiency in Buildings*, Pacific Grove, CA, August 2008.

National Action Plan for Energy Efficiency (2007). *Guide for Conducting Energy Efficiency Potential Studies*. Prepared by Philip Mosenthal and Jeff Loiter, Optimal Energy, Inc. December.

Loiter J.M and V. Norberg-Bohm (1999), “Technology policy and renewable energy: public roles in the development of new technologies,” *Energy Policy* Vol.27 no.85-97

## **North Atlantic Energy Advisors**

### **New Jersey Joint Electric and Gas Electric Clean Energy Collaborative**

**2002-2003**

Doug Baston coordinated a joint NRDC/Utility team which designed a complete portfolio of gas and electric energy efficiency programs for the State of New Jersey – the New Jersey Clean Energy Program.

The New Jersey utility restructuring law created a System Benefit Fund that directed the state's utilities to design a portfolio of commercial, industrial, residential efficiency and renewable energy programs. As a result of environmental advocacy and other stakeholder concerns, the utilities agreed to conduct program design through a collaborative process, with the Natural Resources Defense Council to serve as the lead non-utility party.

Doug Baston was selected by the parties to coordinate C&I program development. He headed co-chaired program team consisting of efficiency program managers from the state's four electric and three gas utilities and outside consultants and experts.

As a result, an orderly, documented, harmonious and consensus-based program design process resulted in unanimous agreement of all parties on program designs and budgets. This was the nation's first fully integrated portfolio of gas and electric programs.

Budgets for “lost opportunity”- based commercial and industrial efficiency programs of \$34.1 million annually.

### **Massachusetts Energy Efficiency Advisory Council**

**2008-Present**

The Massachusetts Division of Energy Resources, working with a representative citizen stakeholder Energy Efficiency Advisory Council appointed by the governor, is charged with reviewing and approving plans submitted by the four Massachusetts electric and five gas utilities to delivery efficiency programs in the Commonwealth. DOER and the Council, through its consultants, are also responsible for monitoring utility performance against these plans.

Doug Baston was selected by, and represents, the DOER and Council in this oversight role. As Coordinator of the Commercial & Industrial Advisor Team, he participates in and helps guide all efficiency program development and enhancement activities at National Grid Electric and Gas, NSTAR Electric and Gas, Western Massachusetts Electric, Cape Light Compact, Fitchburg Gas & Electric, Bay State Gas, Berkshire Gas, and New England Gas. He works in collaboration with his counterpart managers at each utility and staff from three other advisor firms. He also participates in formal and informal evaluations of program performance and helps guide the Joint Utility Standing Technical Committee.

This “collaborative process” has proven over time to be a successful and cost-effective program development and oversight model. Massachusetts programs are recognized as being in the first tier nationally and internationally by almost all independent best practices assessments or surveys.

Budgets for both retrofit and “lost opportunity”- based commercial and industrial efficiency programs of over \$250 million annually.

# NORTH ATLANTIC ENERGY ADVISORS

18 Sheepscot Road, Alna, Maine 04535

Phone: 207.882.7221

Fax: 207.882.4194

E-mail: dcbaston@northatlanticenergy.com

## DOUGLAS C. BASTON

### **NORTH ATLANTIC ENERGY ADVISORS, Alna, Maine (1992-Present)**

**Principal:** Firm concentrates in the areas of conservation and renewables program design and management for utilities and public programs, market research and strategy, energy efficiency advocacy support, and policy analysis of the regulatory issues which accompany utility-sponsored conservation programs and electric utility deregulation.

#### ***PAST and PRESENT CLIENTS:***

American Council for an Energy Efficiency Economy

Aspen Systems Corporation

Boston Edison Company

Boston Edison DSM Settlement Board

Carolina Power & Light Company

Clean Air Task Force

Connecticut Non-Utility Parties

Conservation Law Foundation

Conserve Nova Scotia

Commonwealth Edison Company

Consortium for Energy Efficiency

Dalhousie University

Efficiency New Brunswick

Energoprekt, Republic of Bulgaria

Energy Foundation

Hungarian Electrotechnical Association,  
Republic of Hungary

Jacksonville Electric Authority

Kendall Foundation

Long Island Power Authority

Maine Office of the Public Advocate

Maine Public Utilities Commission

Maine School Management Association

Maine State Planning Office

Massachusetts Division of Energy  
Resources

Massachusetts Electric Company

Massachusetts Energy Efficiency Council

National Grid USA

Natural Resources Council of Maine

Natural Resources Defense Council

New Hampshire Governor's Office of Energy

New Jersey Institute of Technology

New Jersey Electric and Gas Utility

Collaborative

NY State Energy Research & Development  
Authority

Niagara Mohawk Power

Northeast Energy Efficiency Partnerships

Northeast Utilities

Northern Indiana Public Service Corporation

Nova Scotia Department of Energy

Nova Scotia Power

Pacific Northwest National Laboratory

Penobscot Indian Nation

PEPCO

Rhode Island Energy Efficiency Board

Southern California Edison

Vermont Department of Public Service

World Bank/People's Republic of Vietnam

U.S. Department of Energy

- Federal Energy Management Program

- Rebuild America Program

- U.S. Country Studies Program

- New England Support Office, Boston

- Mid-Atlantic Support Office, Philadelphia

- Mid-West Support Office, Chicago

- Northwest Support Office, Seattle

Union of Concerned Scientists

### ***PRIOR PROFESSIONAL EXPERIENCE***

#### **Central Maine Power, Augusta, Maine (1992)**

**Legislative Representative:** Developed Company positions with regard to state and federal energy policy. Drafted proposed legislation as well as legislative and regulatory testimony.

**Central Maine Power (1988-1992)**

**Director, Energy Management Program Design:** Managed development of CMP's Demand Side Management programs from design through filing with the Maine Public Utilities Commission.

**Central Maine Power, Lewiston, Maine (1986-1988)**

**Supervisor, Commercial and Residential Services:** Directed staff delivering all energy management and customer service programs in the Company's Western Division.

**Bonneville Power Administration, Portland, Oregon (1985-1986)**

**Manager, Commercial Audit Program:** Managed \$12.5 million program which provided audits to 4,000 businesses in Oregon, Washington, Idaho, and Montana.

**Bonneville Power Administration, Lower Columbia Area Office (1984-1985)**

**Assistant to Area Manager:** Agent for the Manager in resolving contractual disputes between BPA and the State of Oregon and several customer utilities.

**Bonneville Power Administration, Portland, Oregon (1982-1984)**

**Conservation Finance Specialist:** Analyzed options to finance conservation programs; designed and implemented mechanisms to do so.

**Cape & Islands Self-Reliance Corporation, Hyannis, Massachusetts (1980-1982)**

**Executive Director:** Established a not-for-profit corporation providing energy conservation services to businesses and individuals in a three-county area. Managed a staff of fourteen.

**National Center for Appropriate Technology (1979-1980)**

**Director, Rocky Mountain Field Office** Managed NCAT services in the Rocky Mountains & High Plains.

**EDUCATION**

**University of Maine School of Law (1991) Doctor of Law**

**Portland (Oregon) State University, Lewis and Clark College (1983-1985)**

*Advanced studies in Public Administration and Economics of Regulated Industries*

**University of Maine (1969) B.A. in Political Science**

**HONORS, MEMBERSHIPS & PRESENTATIONS**

**Honors:** BPA Middle Management Program, Massachusetts Energy Citizen of the Year

**Memberships and Civic Positions:** Secretary of the Board of Directors, New Buildings Institute; Board of Directors, Wiscasset Area Development Corporation; Vice President, Small Woodland Owners Association of Maine; Board of Directors, Environment Northeast; Board of Directors, Wiscasset Area Development Corporation; Clerk, Wiscasset & Quebec Railroad Company; Board of Directors, Maine School of Science and Mathematics Foundation; Board of Directors, Maine Association of building Energy Professionals; Chairman, Planning Board, and Fence Viewer, Town of Alna, Maine

**Presentations & Papers:** At conferences or seminars in Long Beach and Santa Clara, California; Halifax, Nova Scotia; Winnipeg, Manitoba; Indianapolis, Indiana; Houston, Texas; Chicago, Illinois; Orlando, Florida; Boston, Massachusetts; Los Vegas, Nevada; Atlanta, Georgia; Washington, DC

**Recent Publications:** "Just a Little Money – Financing Modest Investments in Energy Efficiency and Renewable Energy for Residential and Small Business Customers in a New Energy Marketplace" and "Prospects for a Green Financing Program For Massachusetts" (with Fred Gordon)

## **Prahl Consulting**

### **Massachusetts Non-Utility Parties (NUPs) and Energy Efficiency Advisory Council (EEAC)**

**1998-Present**

*Evaluation planning, review and oversight consultant.* Over the past twelve years I have assumed a steadily increasing range of evaluation oversight responsibilities on behalf of Massachusetts regulators and NUPs. In 1998, I began as evaluation advisor to the NSTAR Collaborative. In the mid-2000s, most residential evaluations in Massachusetts went statewide, and I was assigned the responsibility for critiquing and providing oversight to these studies. In 2009, following an agreement among major stakeholders and an accompanying resolution by the EEAC, a decision was reached to fundamentally restructure the evaluation framework in Massachusetts. Under the new framework, all evaluations are statewide although administered by individual utilities, and the EEAC's consultants have the ability to directly override evaluation planning and implementation decisions made by the utilities.<sup>1</sup> As leader of the EEAC Consultants' EM&V team, I therefore have substantial decision-making authority over all EM&V activities in Massachusetts, currently totaling some \$9 million annually. I believe this is the second or third largest EM&V operation in the U.S., following California and possibly New York. I also represent Massachusetts on the Northeast EM&V Forum, a regional body charged with performing collaborative studies and developing regional protocols.

### **Wisconsin Statewide Public Benefits Programs**

**1999-Present**

*Independent reviewer and planner.* For eleven years I have been responsible for reviewing and critiquing all deliverables for the evaluation of the statewide Focus on Energy program. I also play a key role in evaluation planning for Focus on Energy, and serve on the management team with the team of contractors performing the evaluations.

### **California Public Utilities Commission**

**2007-Present**

Since 2007, as a subcontractor to CIEE, I have helped the CPUC to oversee exploratory market effects studies of the CFL, High-Bay Lighting, and Residential New Construction markets. I have been the lead representative for the CFL study and technical advisor for the remaining studies.<sup>2</sup>

### **New York Department of Public Service**

**2008-Present**

*Evaluation advisor.* I am currently serving on a team of five individual consultants advising the NYDPS on its evaluation policy-making, review and oversight efforts.

### **Rhode Island Energy Efficiency and Resources Management Council (EERMC) 2008-Present**

*Evaluation advisor.* In this ongoing assignment I advise the Council on evaluation policy issues and on the review and oversight of all EM&V studies in Rhode Island.

### **California Utilities on behalf of the CPUC**

**1995-2000**

*Independent reviewer.* In this assignment I represented the CPUC Energy Division on CADMAC, and helped to adjudicate and litigate disputes regarding savings claims in the AEAP. While California's evaluation program was smaller in the mid-90s than it is today, it was nonetheless the largest in the country at the time.

---

<sup>1</sup> Subject to a system of appeals.

<sup>2</sup> This contract expires on June 30, 2010.

**State of California on behalf of the California Board for Energy Efficiency and the CPUC** **1997-2000**

*Primary overseer of energy efficiency evaluation efforts.* Evaluation lead for the team of consultants working for the CBEE, I was responsible for recommending evaluation policies and overseeing the planning and implementation of all evaluations, as well as for directing the work of other team members on evaluation issues.

**Co-author of the California Evaluation Framework** **2003-2004**

I was one of the authors of this groundbreaking California document.

**Long Island Power Authority** **1999-2009**

*Evaluation Advisor.* For ten years, I advised LIPA on its evaluation and market assessment activities, including reviewing and commenting on RFP's, reports, and interim work products.

**Efficiency Vermont** **2000-Present**

*Evaluation Advisor.* For ten years, I have advised EVT on a range of evaluation and market assessment issues.

**Illinois Stakeholder Advisory Group** **2008-2009**

*Independent Reviewer.* The SAG is responsible for helping regulators to oversee the programming efforts of Com Ed and Ameren Illinois. For two years I advised the SAG on the development and implementation of the Illinois evaluation framework governing the evaluation efforts of the two program administrators.

**New England State Program Working Group** **2006-2007**

*Evaluation Advisor.* I advised the SPWG and the New England Independent System Operator (ISO) in the development of protocols governing the country's first forward capacity market for energy efficiency.

**U.S. Environmental Protection Agency** **2009-2010**

*Independent Reviewer.* I recently served as an invited member of a team of five experts charged with reviewing and critiquing the savings estimation methods of the Energy Star program.

**New York Power Authority** **2009-Present**

*Evaluation Advisor.* I am currently advising NYPA on the development and implementation of its evaluation framework.

Other clients over the years have included BC Hydro, NARUC, and the Connecticut Department of Public Utilities Control.

**Ralph Prah**  
**Independent Consultant**  
7613 Whitebridge Glen  
University Park, FL 34201  
Phone: (608) 238-9942  
E-mail: PrahR@msn.com

## **EXPERIENCE**

### **1990-Present: Independent Consultant**

Advised governmental and non-profit organizations on the planning, review and oversight of energy efficiency program evaluation and market assessment activities. Clients included the California, Connecticut, Massachusetts, New York, Wisconsin, and Vermont PUCs; the National Association of Regulatory Utility Commissions; the Wisconsin Department of Administration; the Massachusetts Department of Energy Resources; the Long Island Power Authority; the Massachusetts Non-Utility Parties; and the Northwest Energy Efficiency Alliance. Selected recent assignments include:

- Lead evaluation planner and reviewer for the Wisconsin statewide public benefits evaluation team, 1999-present.
- Evaluation planning, review and oversight consultant to the Massachusetts Non-Utility Parties and Energy Efficiency Advisory Council, 1998-present.
- Evaluation advisor to the New York Department of Public Service, 2008-present
- Evaluation advisor to the Rhode Island Energy Efficiency and Resources Management Council, 2008-present.
- Evaluation advisor to the New York Power Authority, 2009-present
- Assisting the California PUC in overseeing a series of market effects studies, 2007-Present (subcontractor to the California Institute for Energy Efficiency)
- Evaluation planning and review consultant to Efficiency Vermont, 2000-present.
- Evaluation planning and review advisor for the Long Island Power Authority, 1999-2009.
- Evaluation advisor to the Illinois Stakeholder Advisory Group, 2008-2009
- Assisting the New England states and ISO in developing regional Measurement and Verification protocols for use in the Forward Capacity Market, 2006-2007
- Primary overseer of energy efficiency evaluation efforts in California on behalf of the California Board for Energy Efficiency and the California PUC, 1997-2000.
- Independent reviewer of the evaluation activities of the California utilities on behalf of the California PUC, 1995-2000.

### **1985-1997: Coordinator of Energy Efficiency Evaluation and Research, Public Service Commission of Wisconsin**

Provided regulatory oversight for the program evaluation, market assessment and R&D efforts of the Wisconsin utilities in support of their energy efficiency programs. Played a leading role in conceiving, developing, and overseeing the Energy Center of Wisconsin, a unique state-level research consortium. Served as an in-house consultant on a wide range of regulatory issues involving statistical analysis and applied social research.

## EDUCATION

- 1985. M.A., Sociology, University of Wisconsin-Madison.
- 1982. B.S., History, University of Wisconsin-Madison.
- 1982. B.A., Journalism, University of Wisconsin - Madison.

## REFERRED PUBLICATIONS

### 1. Conference Papers

1. Vine, Edward, Nick Hall, Kenneth M. Keating, Martin Kushler, and Ralph Prael, 2010. "Emerging Evaluation Issues: The U.S. Experience." In *Proceedings of the International Energy Program Evaluation Conference*. Paris, France.
2. Vine, Edward, Ralph Prael, Steve Meyers and Isaac Turiel, 2009. "A Framework for Evaluating Market Effects of Energy Efficiency Programs: Guidance for Evaluators." In *Proceedings of the 2009 International Energy Program Evaluation Conference*.
3. Ledyard, Thomas, Dimple Gandhi and Ralph Prael, 2009. "In it for the Long Haul: The Challenges of a Seven-Year Effort to Assess the Market Effects of a Non-Residential New Construction Program." In *Proceedings of the 2009 International Energy Program Evaluation Conference*.
4. Tolkin, Betty M., William Blake, Elizabeth Titus, Ralph Prael, Dorothy Conant, and Lynn Hoefgen, 2009. "What Else Does an ENERGY STAR Home provide? Quantifying Non-Energy Impacts in Residential New Construction. In *Proceedings of the 2009 International Energy Program Evaluation Conference*.
5. Wilson-Wright, Lisa, Tom Ledyard, Ralph Prael, Kim Oswald and Angela Li, 2009. "They're Out There – Somewhere: Locating and Evaluating CFLs Distributed Through Markdown Programs." In *Proceedings of the 2009 International Energy Program Evaluation Conference*.
6. Barry, J. Ryan, Oscar Bloch, Miriam Goldberg, Ralph Prael and Mitch Rosenberg, 2009. "State-to-State Baseline Comparison to Establish Existence of Market Effects in the Non-Residential Sector." Forthcoming in *Proceedings of the 2009 International Energy Program Evaluation Conference*.
7. Lynn Hoefgen, Angela Li, Gail Azulay, Ralph Prael, and Susan Oman, 2008. "Market Effects: Claim Them Now or Forever Hold Your Peace." In *Proceedings of the 2008 ACEEE Summer Study on Energy Efficiency in Buildings*.
8. Glenn C. Haynes, Thomas Ledyard, Gail Azulay, and Ralph Prael, 2007. "Building a Better Mousetrap: A Unique Approach to Determining Reliable Savings Potential." In *Proceedings of the 2007 International Energy Program Evaluation Conference*.
9. Susan Oman, Lynn Hoefgen, Angela Li, and Ralph Prael, 2007. "Blinded by the Light: Why Are We in the Dark about How Many CFLs are Out There?" In *Proceedings of the 2007 International Energy Program Evaluation Conference*.

10. Robert M Wirtshafter, Greg Thomas, Gail Azulay, William Blake, and Ralph Prah, 2007. "Do Quality Installation Verification Programs for Residential Air Conditioners Make Sense in New England?" In *Proceedings of the 2007 International Energy Program Evaluation Conference*.
11. Ann Clarke, Robb Aldrich, Robert Allgor, David Hill and Ralph Prah, 2007. "A Performance Evaluation Study of Photovoltaic Systems Installed through the Long Island Power Authority's Clean Energy Initiative Solar Pioneer Program." In *Proceedings of the 2007 International Energy Program Evaluation Conference*.
12. Ann Clarke, Timothy Pettit, Robert Allgor, David Hill and Ralph Prah, 2005. "A Theory-Based Evaluation of LIPA's Solar Pioneer Program: Measuring Early Progress in the Transformation of the PV Market on Long Island." In *Proceedings of the 2005 International Energy Program Evaluation Conference*.
13. Thomas A. Ledyard, Ann Clarke, Ralph Prah, Todd Romano, and Eric Belliveau, 2005. "LIPA's Commercial Construction Program: Demonstrating Initiative Influence along the Road to Transformation." Forthcoming in *Proceedings of the 2005 International Energy Program Evaluation Conference*.
14. Timothy Pettit, Ann Clarke, David Hill, Ralph Prah, and Marjorie McCrae, 2004. "Using Theory-Based Evaluation To Help Plan Improvements for LIPA's Solar Pioneer Program." In *Proceedings of the 2004 American Solar Energy Society Conference*.
15. Michael W. Rufo, Ralph Prah and David Sumi, 2002. "Nonresidential Performance Contracting Programs: Assessing the Market Transformation Dimension." In *Proceedings of the 2002 ACEEE Summer Study on Energy Efficiency in Buildings*, pp. 6.267-6.282.
16. Sumi, David, and Ralph Prah, 2001. "A Comprehensive Examination of the Market Effects of a Public Benefits-Sponsored Pilot Program: Lessons Learned from Wisconsin's Focus on Energy." In *Proceedings of the 2001 International Energy Program Evaluation Conference*, pp. 237-248.
17. Sumi, David, and Ralph Prah, 2000. "Market Transformation Assessment: Early Results to Inform Program, Policy And Administrative Decisions in Wisconsin." Presented at the 11<sup>th</sup> National Energy Services Conference and Exposition, December 4-6, 2000.
18. Mosenthal, Philip, Ralph Prah, Chris Neme and Robert Cuomo, 2000. "A Modified Delphi Approach to Predict Market Transformation Program Effects." In *Proceedings of the 2000 ACEEE Summer Study on Energy Efficiency in Buildings*.
19. Hastie, Steve, Ralph Prah, Phil Mosenthal, Dimple Gandhi and Barbara Klein, 2000. "A Systematic Application of Theory-Based Implementation and Evaluation of Market Transformation Programs." In *Proceedings of the 2000 ACEEE Summer Study on Energy Efficiency in Buildings*.
20. Rufo, Michael, Ralph Prah and Pierre Landry, 1999. "A Comprehensive Baseline Assessment of the Non-Residential Energy-Efficiency Services Market." In *Proceedings of the 1999 Energy Services Conference*.

21. Rufo, Michael, Ralph Prah and Pierre Landry, 1999. "Evaluation of the 1998 California Non-Residential Standard Performance Contracting Program: A Theory-Driven Approach." In *Proceedings of the 1999 International Energy Program Evaluation Conference*, pp. 867-880.
22. Goldman, Charles, Joseph Eto, Ralph Prah and Jeff Schlegel, 1998. "California's Non-Residential Standard Performance Contract Program." In *Proceedings of the 1998 ACEEE Summer Study on Energy Efficiency in Buildings*.
23. Prah, Ralph, Jeff Schlegel and Charles Goldman, 1998. "Organizing for Market Transformation: Institutional Issues in the Creation of a New Energy Efficiency Policy Environment in California." In *Proceedings of the 1998 ACEEE Summer Study on Energy Efficiency in Buildings*.
24. Prah, Ralph, and Scott Pigg, 1997. "Do the Market Effects of Utility Energy Efficiency Programs Last? Evidence From Wisconsin." In *Proceedings of the 1997 International Energy Program Evaluation Conference*, August.
25. Pigg, Scott, Ralph Prah and Mark Wegener, 1997. "Motors Market Transformation in a Time of Utility Restructuring -- The Wisconsin Story." In *Proceedings of the 1997 International Energy Program Evaluation Conference*, August.
26. Kushler, Martin, Jeff Schlegel and Ralph Prah, 1996. "A Tale of Two States: A Case Study Analysis of the Effects of Market Transformation." In *Proceedings of the 1996 ACEEE Summer Study on Energy Efficiency in Buildings*, Volume 3, pp. 59-68. American Conference for an Energy Efficient Economy, Washington, D.C., August.
27. Prah, Ralph and Jeff Schlegel, 1994. "DSM Resource Acquisition and Market Transformation: Two Inconsistent Policy Objectives?" In *Proceedings of the 1994 ACEEE Summer Study on Energy Efficiency in Buildings*. American Council for an Energy Efficient Economy, Washington, D.C.
28. Prah, Ralph, 1994. "When Worlds Collide: The Role of Verification in DSM Bidding." In *Proceedings of NARUC's Fifth National Conference on Integrated Resource Planning*. National Association of Regulatory Utility Commissioners, Washington D.C., May.
29. Schlegel, Jeff, and Ralph Prah, 1994. "Market Transformation: Getting More Conservation and Energy Efficiency for Less Money." In *Proceedings of the 1994 Affordable Comfort Conference*.
30. Schlegel, Jeff, George Edgar, Martin Kushler, Ralph Prah and Angie Minkin, 1993. "Do Shareholder Incentives Work? Results of an Evaluation of DSM Shareholder Incentives in California." In *Proceedings of the 1993 International Energy Program Evaluation Conference*. Argonne National Laboratory, Argonne, IL, August.
31. Prah, Ralph, and Jeff Schlegel, 1993. "Evaluating Market Transformation." In *Proceedings of the 1993 International Energy Program Evaluation Conference*. Argonne National Laboratory, Argonne, IL, August.
32. Peach, Gil, Ralph Prah, Jeff Schlegel and Rick Fleming, 1993. "Moving Towards Market Transformation." In *Proceedings of The ECEEE 1993 Summer Study: The Energy*

- Efficiency Challenge for Europe*. European Council for An Energy Efficient Economy, Oslo, Norway, August.
33. Schlegel, Jeff, and Ralph Prael, 1993. "Money Talks: The Changing Role of Measurement and Evaluation in the Age of DSM Regulatory Incentives." In *Proceedings of the Sixth National Conference on Utility Demand-Side Management Programs*. Electric Power Research Institute, Palo Alto, CA, March.
  34. Schlegel, Jeff, Ralph Prael, Wayne DeForest and Martin Kushler, 1992. "Are Markets Being Transformed by DSM Programs?" Presented at NARUC's Fourth National Conference on Integrated Resource Planning, September 16, 1992.
  35. Prael, Ralph, Jeff Schlegel and Scott Pigg, 1992. "Evaluation and Utility Performance Incentives: Not (Just) A Scorecard." In *Proceedings of NARUC's Fourth National Conference on Integrated Resource Planning*. National Association of Regulatory Utility Commissions, Washington D.C., September.
  36. Vine, Edward, Odon de Buen, Charles Goldman, and Ralph Prael, 1991. "Stimulating Utilities to Promote Energy Efficiency: Process Evaluation of the Madison Gas and Electric Competition." In *Proceedings of the 1991 International Energy Program Evaluation Conference*. Argonne National Laboratory, Argonne, IL, August. Pp. 234-248.
  37. Schlegel, Jeff, Ralph Prael and Martin J. Kushler, 1991. "Measurement in the Age of Incentives." In *Proceedings of the 1991 International Energy Program Evaluation Conference*. Argonne National Laboratory, Argonne, IL, August. Pp. 182-190.
  38. Prael, Ralph, 1991. "Evaluation of Utility Performance Incentives in Wisconsin." In *Proceedings of the 1991 International Energy Program Evaluation Conference*. Argonne National Laboratory, Argonne, IL, August. Pp. 244-250.
  39. Vine, Edward, Odon de Buen, Charles Goldman and Ralph Prael, 1991. "Stimulating Utilities to Promote Energy Efficiency: The Madison Gas and Electric Competition." In *Proceedings of the Fifth National Conference on Utility Demand-Side Management Programs*. Electric Power Research Institute, Palo Alto, CA, July. Pp. 346-351.
  40. Prael, Ralph, 1990. "Development of a State-Level Collaborative DSM Research Center." In *Proceedings of the 1990 ACEEE Summer Study on Energy Efficiency in Buildings, Volume 5*. American Council for an Energy Efficient Economy, Washington, D.C., August. Pp. 149-156.
  41. Prael, Ralph, Virginia L. Kreitler and Julie Worel, 1989. "Market Research in a Regulatory Setting: the Wisconsin Commercial Market Segmentation Study." In *Proceedings of the Fourth National Conference on Utility Demand-Side Management Programs*. Electric Power Research Institute, Palo Alto, CA, May. Pp. 63.1-63.10.
  42. Kreitler, Virginia L., and Ralph Prael, 1989. "Variability in Commercial Markets and Implications for Program Transferability." In *Proceedings of the Fourth International Conference on Energy Program Evaluation*. Argonne National Laboratory, Argonne, IL, August. Pp. 349-354.

43. Prael, Ralph, 1988. "Evaluation for PUCs." In *Proceedings of the 1988 ACEEE Summer Study on Energy Efficiency in Buildings, Volume 9*. American Council for an Energy Efficient Economy, Washington, D.C., August. Pp. 126-138.
44. Oliver, Pamela E., Gerald Marwell and Ralph Prael, 1985. "Organizer and Network Characteristics as Predictors of Collective Action Through All-or-None Agreements." Presented at the annual meetings of the American Sociological Association, Washington, D.C.

## **2. Journal Articles**

45. Vine, Edward, Odon De Buen, Charles Goldman and Ralph Prael, 1992. "Mandating Utility Competition: One Option for Promoting Energy Efficiency." *Utilities Policy*, January, 1992:51-61.
46. Prael, Ralph, Gerald Marwell and Pamela E. Oliver, 1991. "Reach and Selectivity as Strategies of Recruitment for Collective Action: A Theory of the Critical Mass, V." *Journal of Mathematical Sociology* 16(2):137-164.
47. Oliver, Pamela E., Gerald Marwell and Ralph Prael, 1988. "Social Networks and Collective Action: A Theory of the Critical Mass, III." *American Journal of Sociology* 94:502-534.

## **3. Journal Issues**

48. Prael, Ralph, and Jeff Schlegel, 1995, Guest Editors. *Energy Services Journal: Special Issue on Market Transformation*, Volume 1, No. 2. Lawrence Erlbaum Associates, Mahwah, New Jersey.

## **4. Book Chapters**

49. Prael, Ralph, and Jeff Schlegel, 1994. "Evaluating Market Transformation." In *Energizing the Energy Policy Process: The Impact of Evaluation*, Roberta W. Walsh and John G. Heilman, editors, pp. 181-197. Quorum Books, Westport, Connecticut.

## **SELECTED NON-REFERRED PUBLICATIONS**

50. Eto, Joseph, Ralph Prael and Jeff Schlegel, 1996. *A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs*. Ernest Orlando Lawrence Berkeley National Laboratory, Berkeley, CA.
51. Schlegel, Jeff, Miriam Goldberg, Jonathan Raab, Ralph Prael, Marshall Kneipp, and Dan Violette, 1997. *Evaluating Energy Efficiency Programs in a Re-Structured Industry Environment: A Handbook for PUC Staff*. Washington, D.C.: National Association of Regulatory Utility Commissioners.

## **MISCELLANEOUS ACTIVITIES**

Member of the planning committee for the International Energy Program Evaluation Conference, 1999-Present.