Debating Net Versus Gross Impacts in the Northeast: Policy and Program Perspectives

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ABSTRACT

Energy efficiency programs in New England typically measure gross and net energy and demand savings. The fact that not all states have common practice for defining, measuring, and reporting net savings presents challenges for the development of regionally consistent reporting. When faced with what to deliver in the New England Forward Capacity Market, regulators decided that the efficiency program administrators should bid in gross savings.

This paper discusses the definitions of net and gross savings in New England, and various considerations related to how they are measured. For example, should measurement include partial or full free-ridership, participant and non-participant spillover, or a net-to-gross ratio? These decisions affect the value of the net savings result. Similarly, how baselines are defined and approached can affect the gross savings measurement.

The authors of this paper conducted an informal survey of energy efficiency stakeholders with regulatory, evaluation, and program implementation expertise throughout the United States to help inform the decision about what to bid in to the Forward Capacity Market. This paper reviews the factors that were considered, the positions that were put forth by stakeholders and the Independent System Operator of New England and how they contributed to the decision that was ultimately made. It further considers what can be learned from the experience that can inform other regional policy initiatives.

Introduction

The purpose of this paper is to chronicle an effort to develop consistent measurement practice. The context is the Independent System Operator in New England's (ISO-NE) recent effort to establish measurement and verification guidelines for the Forward Capacity Market (FCM), and whether providers of demand resources should bid net or gross savings into the FCM. While the issue was decided for the FCM, similar debate may arise in other policy contexts. We hope that a review of this debate will help illustrate both the process and issues that may be involved in future policy discussion, as well as informing future efforts to increase consistency in measurement of energy efficiency results.

Background

Recent policy changes have the potential to increase the funding, visibility, and importance of energy efficiency programs as a regional energy and demand resource in the Northeast. These include the FCM, the Regional Greenhouse Gas Initiative (RGGI), efficiency portfolio standards, least cost procurement requirements, potential increases in state system benefits charge, and regulatory directives for energy efficiency organizations to pursue all cost-effective efficiency. (Sedano and Murray 2007).

These policy developments grow out of a history of energy efficiency successes. Yet they are an acknowledgment in New England that there is potential to increase the delivery of energy efficiency. The complexity of the regional environment is one of the challenges to increasing use of energy efficiency as a reliability, energy and environmental resource. Many states and even more utilities and non-utility efficiency administrators create a situation with diverse policy interests, potential inefficiencies and missed opportunities to achieve comprehensive energy efficiency. Inconsistencies in assumptions and methodologies for measurement of energy efficiency impacts are a key challenge that needs to be addressed, since it is likely that energy efficiency program impacts will receive greater scrutiny by more stakeholders than in the past.

New England Energy Efficiency Programs Lack Consistent Protocols

Energy efficiency programs do not measure impacts consistently from state to state, or from program to program within an organization (Titus, Nevius and Michals, 2004; Michals and Titus, 2006). The differences are most evident in the measurement of net impacts – applications of free-ridership, spillover rates, and net-to-gross ratios vary across the New England states. However, differences in approaches to baseline measurements also exist.

Forward Capacity Market as a Driver of Consistent Regional M&V Protocols

The FCM was designed through a settlement process to provide economic incentives to attract investment in new and existing capacity in New England. It is the first instance in the United States where demand-side resources can compete on a comparable basis with supply resources in a wholesale regional market. The FCM market rules were approved on April 16, 2007 by the Federal Energy Regulatory Commission in FERC Docket No. ER07-546-000. Through an auction process, owners of capacity resources bid to be paid market-based prices in return for the commitment to provide capacity to meet the region's reliability needs.

Resources must qualify to participate in the auction by proving they can meet their commitment. For the first auction, new resources had to submit a "Show of Interest" application in February 2007 as a first step in the qualification process. The qualification package includes submittal of the "DRV" – demand resource value – along with a Monitoring and Verification (M&V) plan that complies with the ISO-NE's manual of measurement and verification protocols, the ISO-NE Manual for Measurement and Verification of Demand Reduction Value from Demand Resources (M-MVDR). The manual was developed by ISO-NE explicitly to help meet its goal of keeping demand and generation resources on a level playing field.

ISO-NE was tasked with creating the M-MVDR in the fall of 2007. Recognizing that M&V for demand resources from energy efficiency programs differed in some ways from M&V for traditional demand response initiatives, NEEP convened and facilitated a working group to advise and provide input to the ISO-NE as it prepared the M&V manual. The working group included program administrators and regulators from Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. The working group established a smaller steering committee that oversaw many tasks, including communications with ISO-NE during the project period. It contracted with a small group of consultants with evaluation expertise who assisted the working group in a two-pronged effort. One of the consultants' tasks was to develop regionally consistent inputs for measure lives and peak coincidence factors, for lighting and

HVAC energy efficiency measures. The other was to prepare draft language for the M&V manual, which the working group would then recommend to ISO-NE. The manual was modeled after other ISO-NE manuals, in particular the ISO New England Load Response Program Manual, Revision 8[1]. Both tasks were conducted in a very compressed time period, from October 2007 through January 2008. While the large working group was convened for a few meetings, and presentations of interim deliverables, most of the details were addressed in communications between consultants and the steering committee. This working group process demonstrated the capability for cooperation among six New England states' regulators and efficiency program administrators.

Issues That Generated Debate

At several points in this process, differences surfaced. In particular, the drafts of M-MVDR Section 6: Establishing Baseline Conditions and Section 8: Demand Reduction Value Calculation generated discussion that drove the working group to examine the heart of what constitutes energy efficiency program demand side resources[2].

The Baseline Issue

The baseline issue of concern to the working group was how to address situations when the true baseline for energy efficiency projects is below building energy code. This surfaced as an issue, because there was inconsistency in how baselines were defined relative to building code in the region, and defining baseline conditions is a key component of gross impacts. Using the ISO Load Response Manual as a guide, baseline calculation methods are specified for any likely types of assets. The following draft language was developed:

> e. For projects in which operating equipment is replaced with a more efficient equivalent, the Baseline Condition is the kW load of that operating equipment across the Performance Hours. The [M & V Plan], where appropriate, should include methods to adjust the baseline, or in the absence of measured baseline adjustment factors, to adjust the baseline values based on the applicable code efficiency standard, or standard practice, and the remaining life of the existing equipment…
>
> g. For new construction or major renovation projects, the Baseline Conditions shall be equal to the kW load during the applicable Performance Hours of equipment meeting the level of efficiency required by state codes, federal product efficiency standards, or standard practice, whichever is most applicable and verifiable, or standard practice if there is no applicable code or standard (Horowitz, 2007).

[1] The most current version is obtainable at: www.iso-ne/com/rules_proceds/iso-nemnl/m_lrp_load_response_program_revision_12_10_01_07.doc.

[2] Two other issues, Statistical Significance (Section 7) and Measurement Equipment Specifications (Section 10), also generated significant discussion. They both address accuracy and precision of the DRV and colored the baseline and net versus gross debate.

The issues were: 1) can or should the Manual specify common practice as a baseline option that is different from applicable code or standard; and 2) how have other institutions approached this decision, if at all? To inform this decision, the Steering Committee sought feedback from nationally recognized evaluation experts.

The feedback revealed many perspectives. One is that the code serves as a "reasonable average baseline." Often, many buildings are below code, but others are above code. In the Pacific Northwest code is set at or near average standard practice. Another perspective is "it depends." In many situations code as baseline would greatly understate true program effects. California Title 24 is one example; studies have documented standard practice to be significantly less than code. The New York State Energy and Development Authority (NYSERDA) uses different deemed savings for the same appliance depending on its vintage, because baselines change. NYSERDA also updates its residential new construction baseline six months after a code change to allow time for customer response. One respondent noted "Instant compliance at the point of code change is unrealistic. What is fair for one region may not be fair for another." Another asked, "Is there any single set of hard numbers that a decision-maker can repair to and feel confident of? If not, how does one systematically integrate the various types of information (including qualitative judgments) that should be considered? And should we trust any one decision-maker to do that integration?"

One policy concern raised about projects that are designed to encourage retrofits to come up to code is that society is providing incentives for noncompliance. This would argue against allowing a baseline below code.

Ultimately, the steering committee decided the most compelling argument was "it depends." "..[T]he more code pulls standard practice to a new performance level, the more likely there may be a period of time (lag) before the standard practice catches up with code" (Schlegel 2007). It was important to preserve flexibility in the M&V manual. This approach met with the approval of ISO-NE because the onus was on the bidders to provide documentation in cases where they choose a baseline below code.

The Net versus Gross Issue

The initial draft of the M&V manual prepared by the steering committee of the working group included a description of the terms and approaches to the measurement of *net* savings, assuming net savings would be the basis of the DRV and that net would account for free-ridership and spillover or market effects. The biggest concerns among the steering committee were: 1) how would net savings be defined, given inconsistency within the region, and 2) what measurement approaches might meet acceptance by both the working group and ISO-NE.

The following excerpts of a background paper prepared for the working group outline the options that were being considered for recommendation to ISO-NE.

Definitions of Terms

- Free Riding: Fraction of gross savings associated with measures that participants would have adopted even in the absence of the program. The two types of free riding are:
  - Pure Free-Rider: In the absence of the program, would have paid full price for exactly the same thing (measure) at exactly the same time
  - Partial Free-Rider: In the absence of the program, the participant would have

    - Installed the same measure, but later (accelerated free-rider);
    - Installed the same measure, but in smaller quantities (incremental free rider)
    - Installed a measure more efficient than standard, but less efficient than program (incremental free-rider)
- Participant Spillover: Savings associated with additional actions taken by participants outside of program, but caused by the program
- Non-Participant Spillover: Savings associated with actions taken by as a result of program
- Market Effects: Changes in energy use as a result of program-induced changes in energy efficiency markets. Overlaps with both non-participant and participant spillover, but differs in that only relatively lasting market changes are counted.

Types of Net Impact Adjustments Measured by Northeast States as of 2007

Categories include free riding (FR), participant spillover (PSO), and non-participant spillover (NPSO).[3]

- Connecticut: FR, PSO, NPSO
- Maine: None
- Massachusetts: FR, PSCO, NPSO
- New Hampshire: PSO, NPSO
- Rhode Island: PSO, NPSO
- Vermont: FR, NPSO

Methods for Measurement of Net Impact Adjustments[4]

1. Stipulated or deemed values
2. Participant Self-Reports
3. Enhanced participant self-reports (including some field verification)
4. Interviews with upstream market actors
5. Comparison of participants with non-participants
6. Comparison of test area with control area
7. Econometric methods (including discrete choice analysis)
8. Triangulation among multiple methods

[3] This information was drawn from NEEP protocols report. The NEEP report did not distinguish between spillover and market effects, so market effects were not included in this listing. Market effects raise unique policy issues, and may require different measurement approaches from free ridership and spillover.

[4] The choice of which savings adjustments to include can influence the choice of methods.

Strategy and Process Developed in Attempt to Achieve Consensus on Definition of Net Savings

The steering committee identified eight threshold issues requiring working group decisions, shown below, as a way of outlining a process they recommended for achieving consensus within the working group on consistent treatment of net impact for the FCM:

1. Is it acceptable to assume that free-ridership and spillover net to zero, as some New England states apparently do currently?
   Tentative Recommendation: Do not allow this assumption for the FCM.
2. Are any stipulated or deemed values to be allowed?
   Tentative Recommendation: Because net savings adjustments tend to be relatively unstable over time and can be significantly influenced by program design, we would recommend minimizing the use of deemed values for net impact adjustments. However, to allow for the participation of projects that are too small for net savings adjustments to be made cost-effectively, [deemed values] might make sense … if they are likely to yield a smaller net demand reduction than if primary research had been conducted.
3. Which of the categories of net impact adjustments should be: (a) mandatory, (b) optional, or (c) barred?
   Tentative Recommendation: Make inclusion of free- riding mandatory, and make inclusion of participant and non-participant spillover optional[5].
4. Which of the types of free riding must be accounted for?
   Tentative Recommendation: Make it mandatory to include both pure and partial free riding to the extent that this is feasible. Because there are well-established methods for estimating partial free riding in the context of self-reports, a major implication is that partial free riding would need to be addressed when self-reports are used. We believe self-reports are by far the most common method being used to estimate free riding for state-level non-residential energy efficiency programs in New England…[and] most impact evaluations are probably already meeting this requirement.
5. Which methods for the estimation of net impact adjustments are acceptable?
   Tentative Recommendation: Do not bar any methods, but focus on enhancing level of rigor for whichever method(s) are used.
6. How frequently must net impact adjustments be updated?
   Tentative Recommendation: Two to five years. Given the tendency of net-to-gross adjustments to be relatively unstable over time, they need periodic updating[6].
7. What steps, if any, should the Manual specify must be taken to enhance the level of rigor for net impact adjustments in particular, above and beyond the global requirements regarding level of rigor?
   Tentative Recommendation: Provide some tailored guidelines on steps to minimize bias and maximize validity.
8. Should *methods* for the estimation of net savings adjustments be standardized across states?

[5] Note that this recommendation falls short of instruction on what to do about market effects, in recognition that market effects in savings estimates may be difficult to justify in the M&V manual.
[6] There was internal disagreement based on concerns that two years updates would be cost-prohibitive.

Tentative Recommendation: New England should begin efforts to move toward standardized methods for certain key types of programs on its own, but not attempt to reflect or anticipate these in the ISO-NE M&V Manual.[7]

The Net Savings Debate: To Report or Not to Report Net Savings

In the working group came to stalemate; the notion that net savings should be the basis for the DRV was challenged by representatives from New Hampshire. To move forward, the working group decided to take three steps: 1) solicit opinions from national evaluation and air emission policy experts to inform the issue, 2) bring the issue to the attention of the New England Conference of Public Utility Commissioners (NECPUC), and 3) raise the issue with ISO-NE.

Arguments in Favor of Net Savings

Why buy something free? Because utilities receive proceeds from ratepayer funded social benefits charges to finance energy efficiency programs, states want to direct such funds in ways that minimize free-ridership (Yoshimura 2007). I suspect the ISO and other bidders might get a bit irritated if they are buying things in a market that they get for free. Personally, I would include free-rider considerations and other major net to gross issues that can be quantified (Schiller 2007).

Maintain a level playing field. I acknowledge that a net savings approach will make energy efficiency "less competitive" than a gross savings approach. It's critical to be consistent by doing net accounting on the supply side. T&D losses should be calculated in net accounting for generation (Manion 2007).

Establish increased cost efficiency and economies in administration. The Northeast states all have somewhat different definitions of net savings. The region should settle on a single definition across states and with the FCM and RGGI. For program administrators operating in multiple jurisdictions, having to track these results in different ways adds to cost. If administrators need to layer on different definitions for the FCM and RGGI, we'll be keeping multiple sets of books for different purposes but for the same resource (White 2007).

Ensure just compensation for sbc-funded benefits. Entities implementing SBC-funded programs ought to be able to be paid for savings that would not otherwise occur if the programs weren't run. That means that they would discount for free-ridership and claim savings from spillover. Note that merchant providers of DSM would not necessarily be held to this standard; SBC-funded programs should not be put at a financial disadvantage when dealing with the Forward Capacity Market (White 2007).

[7] This is another complex issue. There is a great deal of variation in the range of methods currently being used across New England; there is some risk that ISO may question the comparability of results. Any move toward standardization is likely to be time-consuming and tricky because different kinds of programs tend to demand different methods.

Encourage prudent bidding strategy; net savings are more credible. States should bid whatever they think they can document; bidding less than they are sure of providing introduces a safety factor. The issue is not what to bid, but whether ISO will calculate savings only if netted out for free-riders (Schiller 2007). "I would favor a net approach for credibility's sake. If states cannot agree on a net method, I'd suggest a default method based on typical New England state experience" (Prindle 2007).

There is value in consistency among regional policies. RGGI M&V requirements are being created on a parallel path. If DSM efforts are part of the strategy for dealing with climate change, should allowances/credits be given for gross savings or net savings? Net savings is where we want to go if we don't want to overstate the environmental benefits of program efforts (White 2007).

Arguments in Favor of Gross Savings

The market does not recognize net adjustments. Free -ship and spillover adjustments are not required in a market environment. The intent of the resource supplier and the resource's incremental cost (even if the cost to the supplier is zero) does not diminish the value of the savings created by that resource. Adjustment for "free-riders" and "spillover" is not required in a market environment. If such adjustments were claimed by a demand resource supplier, I suppose ISO could accept them to the extent that the adjustments were measured and verified, but I do not think that such adjustments are necessary. The only thing ISO needs to guard against is different suppliers (e.g., the utility and the end-use customer) claiming the same MW savings (Yoshimura 2007).

From an efficiency evaluator: "If the implementers can deliver and verify the reduction in gross loads, they have delivered assured value. Compare that to the world in which they only deliver "net" participant effects. You may or may not have them; they may or may not have been able to measure them... It is the gross savings above the baseline that avoid a need for power -- the baseline doesn't involve measuring efficiency improvements. In my experience, the best the baseline forecasts can do is account for price elasticity, partially implemented codes, and standards. Price elasticity doesn't translate to concrete measures on a controlled timeline. A successful bidder…is providing a measured, clear benefit ..[when] you requested it. What do you care about the motivations of the people who took real action? They did it; it has an impact; the lights stay on" (Ken Keating 2007).

A level playing field between energy efficiency and other market participants is needed to send the correct market signals. Requiring free-ridership adjustments for energy efficiency would be discriminatory, since this concept is never applied to other resource options (e.g., demand response programs, customer sited generation) (Kushler 2007). When generation bids, they get paid for what they provide - no discussion of whether they would have provided more or less (DeCotis 2007). ..[O]ne factor that is usually not accounted for is T&D losses. This could add 5-10% to reduced generation requirements – maybe more; it is not clear how ISO addresses this issue when comparing demand side and supply issues (Schiller 2007). "Would the generators have built a facility anyway, or as we found in one of our demand response pilots, wouldn't they have been taking load off with self-generation on peak anyway to save the demand charge? That is not a level playing field" (Kushler 2007).

Measurement of net adjustments introduces cost inefficiencies. "Sticking with gross impacts reduces M&V costs and avoids extra hassle and potentially contentious argument over factors that affect net savings. … if the ISO pays for it, the cost is passed on to ratepayers. If it's my money, I don't want to see it wasted on any resource" (Kushler 2007). Can we accurately estimate net effects? I concur that we cannot. As the public begins to feel they need to make efficiency investments to counteract … oil price increases, our methods will be viewed as even less reliable. When they find a way to [make efficiency investments using programs to counteract global warming] only the most expensive methods will get us good answers for net savings adjustments (Peters 2007).

Use of gross impacts avoids risk associated with claiming spillover benefits. Some of the players calling for the use of net impacts are hoping to be compensated for net-to-gross ratios greater than 1.0…however, it is unlikely that the ISO will wish to pay for "more speculative" [less accurately documented] impacts, so my counsel is …to be compensated for gross impacts (Kushler 2007).

Use of gross impacts avoids sending perverse market signals associated with free-ridership in market transformation programs. Requiring an "adjustment" for free-riders would send a perverse signal against program-related efforts to encourage market transformation, as one person's market transformation-influenced consumer is another person's free-rider (Kushler 2007). This is especially true in areas like New England where programs have a long history of implementation (White 2007).

Decision

The response from ISO was ultimately that states should bid gross savings: "After thinking about the issue a little more over the weekend, I believe that the appropriate standard is that the claimed DRV of a Demand Resource be measurable and verifiable using acceptable methodologies outlined in the M&V Manual" (Yoshimura 2007).[8]

The working group also brought this issue to NECPUC, which decided states should use gross savings in their FCM bids.[9] Denis Bergeron, Maine Public Utility Commission and manager of Efficiency Maine, noted that from a system benefit program perspective, "consistency in measurement was more important for policies that crossed state lines" (Bergeron 2007).

Summary and Conclusion

In summary, it was unanimous that "This is a complicated issue" (DeCotis 2007). Some of the feedback reflects lingering concerns. "I completely agree (that gross impacts are the proper measurement for the FCM). This makes me very worried. Should I be?" (Messenger 2007) "While, from a theoretical perspective I think that accounting for net adjustments is the right thing to do, I recognize the uncertainty associated with their inclusion. Regional

[8] The Manual does not address whether the DRV shall be net or gross.

[9] Anecdotal information suggests that states may not have been consistent in using gross savings in their bids in the first Forward Capacity auction, and some may have elected to bid net savings.

consistency and the ability to keep a single set of books for efforts are more important to me than being theoretically pure" (White 2007). "Perhaps if everyone can live with allocating squishy dollars to match squishy research results we could agree that incentives can be applied at the net level?" (Hall 2007)

Some of the key lessons learned identified in the net to gross debate may inform the process of developing common protocols in other situations. These include:

It is important to strive for fairness across different locations. Flexible language defining baselines that allow states with different stages of building energy codes is an example of how fairness and recognition of geographic differences were addressed in the ISO-MMVDR.

It is important to avoid sending mixed policy signals. The ISO-NE criterion of achieving a level playing field for demand and supply resources is an example of providing clear direction. Some of the concerns expressed by evaluation experts about free-ridership and spillover in mature efficiency markets are an example of risks of mixed policy signals that would have been associated with a decision to bid net impacts.

It is important to balance flexibility and explicit specifications. The decision about gross impacts is a matter of interpretation, but flexibility is preserved in that ISO-NE does not exclude net impacts explicitly[10].

The interrelationship of issues increases the challenge of achieving consistency. The steering committee's thoughtful development of a strategy to achieve consistency for a definition of net impacts is an example of how to identify and disentangle interrelated issues.

The ability to measure something (with desired precision) can influence decisions about protocols. Several evaluators recommended gross impacts because of concerns about the adequacy of current evaluation techniques for measuring net impacts.

The FCM manual provides a successful example of a process for addressing future protocols for RGGI's offset market or NOx emissions policy. "In my view, the importance of these M&V protocols will resonate beyond the FCM "(Manion 2007).

It is likely the net to gross debate will continue. "From the air regulator perspective, what is needed to develop a multi-state GHG registry that will eventually include project-based GHG reductions is to net out quantifiable free-rider impacts." If a large proportion of "free-rider" resources were to be bid into the market, it could certainly create enough of a distortion to undercut the competitiveness of truly additional, new resources, much like the introduction of "non-additional" renewable resource categories has undermined the market for additional renewable energy resources in state regional portfolio systems. The result is an unacceptable level of market volatility and uncertainty for developers, and a freeze on new project development (Manion 2007).

[10] "Formulas used by the Project Sponsor to determine Demand Reduction Values shall include any modifying factors, including, but not limited to, coincidence…and the relevant Performance Hours, realization rate, measure life, and equipment failure rate." (ISO-NE, 2007, p8-2)

"One of the great things about …resource planning in the Northwest is that the [net-to-gross issue] is not that important. It is good input into deciding where to spend scarce ratepayer funds or not. All savings – gross acquisitions, market effects, codes and standards – replace the need for generation. It has worked for 26 years of consistent planning. Of course, shareholder incentives don't play a part in the overall picture" (Hall 2007).

"At NARUC and in talking to various Commissioners in Kansas, Illinois, South Carolina, Wisconsin and California, they are beginning to understand that the ... [net-to-gross approach], avoided cost, and the total resource cost test are all working against energy efficiency's growth, right when energy efficiency growth is being seen as essential... " (Hall 2007).

In conclusion, the regional policies can serve as a catalyst to resolve differences among state policymakers about measuring energy efficiency resources. Without the impetus of the FCM, the New England states lacked a clear incentive, accepted process, and commitment of funds that were needed to develop consistent measurement and verification of demand resources. Since the FCM is still in infancy, experience with delivering the resources in 2010 will be a good test of the protocols that have been established. It will be instructive to follow whether the protocols are revised and whether the issues that have been resolved are revisited.

References

Bergeron, Denis (Maine Public Utilities Commission). 2007. Personal communication. January.

DeCotis, Paul (NYSERDA). 2007. Personal communication. January.

Feldman, Shel. 2007. Personal communication. January.

Hall, Nick (Tekmarket Works). 2007. Personal communication. January.

Hicks, Liz (KEMA). 2007. Personal communication. January.

Horowitz, Paul. 2007. Personal communication. January.

Keating, Ken. 2007. Personal communication. January.

Kushler, Marty (ACEEE). 2007. Personal communication. January.

Manion, Michelle ([NESCAUM] Northeast States for Coordinated Air Use Management). 2007. Personal communication. January.

Messenger, Mike (California Energy Commission). 2007. Personal communication. January.

Michals, J. and E. Titus. 2006. "The Need for and Approach to Common Protocols to Measure, Track, and Report Energy Efficiency Savings in the Northeast." In Proceedings of the ACEEE 2006 Summer Study on Energy Efficiency in Buildings, 8:179-190. Washington, D.C.: American Council for an Energy-Efficient Economy.

Peters, Jane (Research Into Action). 2007. Personal communication. January.

Prahl, Ralph. 2007. Personal communication. January.

Prindle, William (ACEEE). 2007. Personal communication. January.

Schiller, Steve. 2007. Personal communication. January.

Sedano, Richard and Cathie Murray. 2007. "Energy Efficiency in New England: Resource Opportunities." For: The Future of Energy Efficiency: A Strategic Planning Retreat of the Regulatory Assistance Project, April 27.

Schlegel, Jeff. 2007. Personal communication. January.

Titus, E., M. Nevius, and J. Michals. 2004. "How Do We Measure Market Effects: Counting the Ways and Why It Matters." In Proceedings of the ACEEE 2004 Summer Study on Energy Efficiency in Buildings, 6:117-128. Washington, D.C.: American Council for an Energy-Efficient Economy.

White, Carol (National Grid US). 2007. Personal communication. January.

Yoshimura, Henry (ISO-NE). 2007. Personal communication. January.

ISO-New England Inc. 2006. ISO New England Load Response Program Manual.

ISO- New England Inc. 2007. ISO New England Measurement and Verification of Demand Reduction Value from Demand Resources Manual M-MVDR.