

The Intersection of Policy and Methodology in Net Savings Estimation: Recommendations from a Regional Scoping Study

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ABSTRACT

Energy efficiency community members are far from unanimous in their understanding and use of the concept of net savings. To work toward consistency and develop a research agenda, the Regional Evaluation, Measurement, and Verification Forum (Forum) facilitated by Northeast Energy Efficiency Partnerships (NEEP) commissioned a scoping study consisting of a literature review, interviews with 12 energy efficiency and air regulation experts, and feedback from Forum members.

The study confirmed that the challenges surrounding the definition and measurement of net savings persist more than 20 years after they were first enumerated. Such challenges include defining net savings, accessing reliable data, and measuring the counterfactual, or what would have happened in the absence of the program.

The study also identified new challenges, such as the issue of attribution, in the sense of separating the effects of a given program from the effects of all other programs or pro-efficiency messages to which participants have been exposed, at a time of rapid increase in the number, scope, and diversity of energy efficiency programs. Another new challenge is the added expectation by energy and air regulators in some parts of the country that energy efficiency programs help meet ambitious targets for reducing greenhouse gas emissions; the study shows that the air regulation and energy efficiency communities do not share a common understanding of how to translate energy savings into emissions reductions.

The paper provides a summary of these issues and presents policy and research recommendations to address the challenges laid out in the scoping study.

Introduction

The energy efficiency community pursues the estimation of net savings in order to separate the energy savings directly caused by a ratepayer or publicly funded program from those savings that would have happened anyway, and thereby determine whether the program has used the funds wisely. Estimating net savings, however, necessitates estimating a counterfactual. This charge is extremely difficult—some would say impossible—to fulfill, and the results always embody a degree of uncertainty because one can never know for certain what would have happened without the program. Despite the challenges of measurement, estimating net savings is critical to energy efficiency program assessment; without such estimation one cannot be sure that a program or portfolio has an effect on energy savings. The current and evolving contexts in which programs operate, however, may mean that the time is ripe for changing the common approaches to estimating net savings. This paper summarizes the debates surrounding the importance of measuring net savings, the challenges inherent in such measurement, and

possible directions for the near and more distant future. It is drawn from a larger scoping study completed by the NMR Group, Inc. (NMR) and Research Into Action, Inc. (RIA) (2010) for the Regional Evaluation, Measurement, and Verification Forum (Forum), which is a stakeholder group that includes energy and environmental regulators and energy efficiency providers in New England, New York and the mid-Atlantic, and is facilitated by Northeast Energy Efficiency Partnerships (NEEP).¹ The Forum designated a project subcommittee consisting of Forum members to assist NEEP and the evaluators. The subcommittee and evaluators worked together to identify potential interviewees and provide input into the project scope, direction, and conclusions. Although the Forum commissioned the study, members of the energy efficiency community throughout North America wrestle daily with these issues, and it is the authors' belief that the findings and recommendations apply beyond the Northeast.

Background

The Forum had three motivations for pursuing this study. The first motivation was to explore the possibility of consistent definitions of and approaches for measuring net savings in the Northeast. Across the region, jurisdictions conceptualize “net energy savings” differently, particularly with respect to free ridership and spillover. Likewise, program administrators and evaluators rely on numerous methodologies to estimate net savings, but each methodology suffers from some reliability, validity, and bias concerns. The lack of consistency in definitions and methodologies presents challenges for inter-jurisdictional efforts to meet energy and greenhouse gas emission reduction goals, for program administrators operating in multiple jurisdictions, and for market-level programs expected to have effects beyond the jurisdiction in which they operate. The Forum sought to assess the possibility of developing a consistent regional approach to net savings, and to develop an understanding of what this approach might look like if it were to be developed and adopted across the Northeast.

The second motivation for this study stems from the recent expansion and diversification of the audiences for net energy savings. More jurisdictions now have efficiency programs, the savings targets of existing programs have recently been expanded, and energy efficiency programs are expected to provide substantial reductions in greenhouse gas emissions. The Forum was interested in understanding the extent to which current ways of defining and measuring net savings meet the needs of these diversifying audiences.

The third motivation for this study relates to the concept of “attribution.” Attribution refers to the practice of determining what impacts are *caused* by a specific program during a specific time period. Increasingly, however, when the energy efficiency community mentions “sorting out attribution,” it refers to the fact that reductions in end users' energy consumption can be affected by myriad efficiency programs offered by a broad range of sponsors as well as by the economic, social, and technological context in which programs operate. This situation has significantly exacerbated the difficulty of establishing causation and estimating net savings. The Forum wanted to explore how the increasing challenges associated with attribution may affect net savings definitions and methodologies.

Scope

The scoping study drew distinctions between “adjusted gross savings,” which include directly observable adjustments to gross impacts such as measure persistence and in-service rates, and “net savings,” which include adjustments to gross impacts due to program attribution or customer behavior

¹ The Forum was established in 2009. See www.neep.org/emv-forum for a list of Forum members and a full description of Forum goals and products.

such as free-ridership and spillover. This paper limits its scope to discussions of net energy savings only. The authors acknowledge that program impacts go far beyond energy savings to include a wide range of non-energy impacts. In fact, the potential impacts are so numerous that the Forum directed the authors to focus only on net savings and non-energy impacts that may be calculated directly from net savings, such as reductions in greenhouse gas emissions,. It is important to note that many of the experts interviewed for this paper singled out the *regulatory* emphasis on net savings over other program impacts as a factor that exacerbates the challenges associated with net savings.

Methodology

The authors gathered information for this scoping paper using two separate methodologies. The first involved a literature review of approximately 100 articles, papers, presentations, and book chapters from within the field of energy efficiency as well as other evaluation fields. The literature review provides a context—over time, across locations, and beyond energy efficiency—for issues related to program impacts generally and net savings in particular. In conducting the review, the authors documented the various themes and perspectives on net energy savings represented in the readings, paying particular attention to questions related to energy and climate change policy.

The authors also interviewed 12 experts on the administration, implementation, and evaluation of energy efficiency programs for energy regulation and air regulation in order to gain insight into issues related to energy savings in general and net savings in particular.² While the literature review provided the authors with an understanding of the dominant concerns, issues, and viewpoints related to net savings, the in-depth interviews allowed them to focus more specifically on the issues of greatest concern to the Forum that had not been adequately addressed in the existing literature. The results also incorporate comments made by Forum members and other individuals whom NEEP asked to review the paper. The authors treat such comments in the same manner as information gathered from the in-depth interviews. Throughout the discussion the authors use “commentators” to mean authors of the literature, interviewees, or reviewers of the scoping paper.

The authors analyzed the information gathered from the literature review and interviews using standard qualitative analysis techniques. Specifically, they organized the material according to the various themes of most concern to the Forum, such as definitions of net savings, estimation methodologies, intended use of the results, and strengths and weaknesses of approaches, among others. Based on this organization, they identified patterns and connections among ideas, which served as the basis for the qualitative discussion presented in the scoping paper and summarized here.

Results

This paper focuses on the recommendations and conclusions from the scoping paper completed for the Forum (NMR & RIA 2010). However, the authors find it important to summarize the key findings in order to provide the background necessary to understand the recommendations and conclusions.³

² The independent system operators (ISOs) in the Northeast have decided to accept estimates of adjusted gross savings for the Forward Capacity Markets. For this reason, the authors did not include system planners among the interviewees. The authors recognize that their perspectives and needs may be relevant to consider in the future—for example, in the context of incorporating energy efficiency into system planning forecasts.

³ Note that the full scoping paper specifically addresses arguments for and against measuring net savings and the advantages and disadvantages of current methods of measuring net savings. The authors have decided not to address these topics in the

Context Surrounding Net Savings Estimation

The authors identified three contextual issues that greatly influenced the results, conclusions, and recommendations of the scoping paper: 1) key audiences for net savings, 2) different conceptualizations of net savings, 3) estimation of what would have happened in the absence of the program, which is a counterfactual.

Key Audiences for Net Savings. Historically, program administrators, energy regulators, and program planners have been the main audiences for net savings estimates. These groups have used net savings estimates to assess how well programs were performing, to guide program revisions and discontinuation, and to decide on rewards or penalties for program administrators (Friedmann 2007; Messenger *et al.* 2010; Saxonis 2007, 2010). More recently, the audiences for energy savings estimates have expanded to include stakeholders and regulators with expectations that energy efficiency efforts will realize substantial reductions in greenhouse gas emissions, while long-standing audiences have increased their scrutiny of the estimates in response to increased funding and expanded regional goals for energy savings and reduced emissions. **Table 1** on the next page lists the audiences for net savings estimates identified through the research, specifies whether the audience is well established or emerging, and lists the audience's chief uses of net savings estimates. As the table shows, the established audiences for net savings tend to use the estimates for similar purposes: assessing if the program has achieved its goals and determining if the program has used funds wisely. In contrast, the primary emerging audience—the air regulation community—has conflicting views about how they will determine the impact of efficiency programs on the reduction of greenhouse gas emissions. It remains unclear whether the air regulation community will prefer to use energy savings in the form of gross savings, adjusted gross savings, or net savings, but their decision could have substantial effects on the estimation of net savings in the near future.

Conceptualizations of Net Savings. The second contextual issue involves how *net savings* is conceptualized. Sources from within the energy efficiency community unanimously agree that net savings are those that would not have occurred without the program. Yet the operational definition of net savings differs among programs and jurisdictions.

The literature and interviewees focused on two components of net savings: free ridership and spillover. Jurisdictions differ in their approaches to these two components of net savings. Some allow for the inclusion of both in net savings, while others allow only free ridership to be counted. Also, some jurisdictions expect free ridership and spillover to be isolated and measured, but others allow free ridership and spillover to be embedded in the estimate (such as for market-level estimates).

A related issue involved whether to consider adjustments such as installation rates, realization rates, leakage, rebound, and hours of use as part of net savings or as adjusted gross savings to which a net-to-gross ratio would still be applied to yield net savings. For the purposes of this paper, the authors treat net savings as referring to the adjustments associated with free ridership and spillover only, while the other adjustments are treated as components of adjusted gross savings. The recommendations section touches on this issue.

conference paper, but refer interested readers to the full paper (NMR & RIA 2010) as well as to Friedmann 2007; Hoefgen 2010; Messenger *et al.* 2010; Peters & McRae 2008; Saxonis 2007; Skumatz, Khawaja, & Colby 2009; and TecMarket Works 2004, among many other thoughtful articles and books that have been written on the subject of net savings and free ridership.

Table 1. Audiences for Net Savings Estimates

Audience	Established or Emerging	Use of Net Savings Estimates
Energy efficiency program administrators and planners; energy regulators; legislators; advocacy groups	Established (in some areas legislators and advocacy groups are emerging audiences)	<ul style="list-style-type: none">• Assess if program achieved savings goals• Identify strong and weak areas of program design and redesign program accordingly• Apply strong program designs for other products, in other jurisdictions• Adjust payments to / funding of programs based on goal achievement• Determine if the ratepayer / taxpayer funds are being spent cost effectively and wisely
Air regulators	Emerging	<ul style="list-style-type: none">• Will apply emissions factors to energy savings to estimate greenhouse gas reductions• Assess degree to which efficiency programs have achieved greenhouse gas reduction targets• Disagreement over whether will require adjusted gross or net savings

Estimation of the Counterfactual: The estimation of net savings typically relies on quantifying what would have happened in the absence of the program, which is the third contextual issue. However, because the program did happen, evaluators must estimate this counterfactual. Because we can never actually measure what did not happen, we will never be sure that our methods have accurately captured what a participant would have done absent the program. Evaluators have attempted to overcome this challenge by continuously modifying methods of measuring net savings, but most improvements end up being only incremental in nature because we can never rid ourselves of the counterfactual.

Some methods, however, likely produce more valid estimates of the counterfactual, and, therefore, net savings than others do. For example, analysis of longitudinal sales data in areas with and without programs offers a promising approach for isolating net savings for programs expected to have market-level effects (*e.g.* ENERGY STAR[®] appliances and lighting programs). Unfortunately, manufacturers and retailers—including program partners and recipients of the ENERGY STAR Partner of the Year award—often refuse to provide sales data that allows for a careful assessment of how program activity has influenced sales of the technology. Without such data, evaluators regularly fall back on self-report based approaches, which many commentators believe are more susceptible to measurement error, thereby producing potentially biased results that suffer from a lack of validity. While data and methodological limitations pose problems for all programs, the nature and severity of the problems differ with the type of program. Measurement of spillover, for example, may be more challenging for mass market measures.

Net Savings in Relation to Current and Evolving Policy Needs

Recent legislation and policies targeting climate change, national energy independence, and economic stimulus have combined with traditional energy efficiency program drivers to bring about expanded goals for both energy savings and non-energy benefits, such as greenhouse gas reductions and job creation. Moreover, individuals are being exposed to an increasing number of programs and

messages encouraging efficiency, while national economic trends also have an effect on actions related to efficiency. This situation increases the challenges of attribution. This section discusses commentators' views on current and evolving policy needs as well as the implications for determining attribution.

Meeting Current Policy Needs. Commentators had mixed opinions about the extent to which existing net savings approaches meet current policy needs, with energy regulators being more likely to say that existing approaches meet current policy needs, and program administrators and net savings experts voicing greater skepticism. Those who thought that current approaches are sufficient to meet current policy needs tended to focus on the importance of measuring net savings estimates. They argued that net savings estimates and insights gained from process evaluations and free-ridership and spillover studies allow program administrators, planners, and regulators to understand the strengths and weaknesses of a program design and decide whether and when to revise or discontinue a program. Further, these commentators said that net savings estimates ensure that ratepayer and taxpayer funds are spent wisely so as to achieve the greatest return on investment in terms of energy savings. Commentators who were skeptical about the ability of current net savings approaches to meet current policy needs had two primary concerns. One was the contention that most of the measurement approaches currently in use could not estimate net savings at the level of accuracy and precision needed to meet current policy needs. The second concern was that net savings is too narrow a focus and fails to capture important aspects of programs, such as behavioral change, market transformation, and how well they engage the customer. A related concern was that the current focus on net savings—particularly free ridership—could inhibit innovation in program design that will allow programs to meet evolving policy needs.

Meeting Evolving Policy Needs. The authors also asked interviewees to discuss the evolving policy needs regarding net savings, particularly those focused on expanded energy savings goals, reduced greenhouse gas emissions, and jobs creation. Their responses can be summarized as follows: 1) Things are changing fast, 2) Programs will need to adopt new design and implementation approaches to achieve the ambitious goals that have been set, and 3) Program evaluation will need to make significant adjustments in response to these changes, but 4) No one is sure what these changes will entail or what will be needed, so the direction to take remains uncertain.

This uncertainty is perhaps most notable regarding air regulation. There is the potential for—and some commentators said a high likelihood of—a federal greenhouse gas regulatory program to exist in the future. Multiple commentators argued that the energy efficiency community should plan for this eventuality by working with the air regulation community to develop evaluation and reporting approaches that support both communities. Air regulators and many commentators in the efficiency community noted that savings estimates would require new metrics that tie energy efficiency impacts to emissions reductions at the power plant level, most likely by time of day and time of year.

Yet disagreement remains within and between the air regulation and energy efficiency communities about the degree to which current energy efficiency evaluation practices do or can meet air regulatory needs. A pivotal issue is whether the air regulation community will be required to base savings on adjusted gross or net savings; if net savings are required, the air regulation community will also have to address the challenge of attribution of savings and of emissions reductions. A related concern is which methods of estimating energy savings will be acceptable for “proving” that emissions reductions actually occurred. Another issue is how to define the baseline in projections of emissions, particularly whether those baseline projections start out by assuming the emissions reductions resulting from energy efficiency programs or if such reductions will be credited to the programs as achievements beyond the baseline.

Attribution in the Face of Multiple Programs and Policies. Increasingly, the energy efficiency community is focusing a great deal of attention on attribution: how to attribute program impacts to particular programs when there are multiple additional factors influencing the behaviors targeted by the program. This focus reflects the perception of some commentators that the complex web of programs, messages, and influences that encourage individuals to adopt energy efficiency measures makes the task of estimating net savings more difficult than before.

One of the primary challenges of attribution is that people are not necessarily aware of the causes of their own behavior and their explanations can therefore be inaccurate. For example, after taking an action, individuals tend to see themselves as the “sort of person” who takes that sort of action, minimizing the influence of external factors, such as a program’s incentive, that in fact might have influenced the action in the first place. Or they might have intended to take the energy-saving action promoted by a program before hearing about the program, but might not have been motivated actually to take the action until exposed to the program or its incentive. The question in this example becomes how much credit to give to the program versus the other influences that had existed but had not motivated them to action.

Some commentators stressed that, although it is important to disentangle the effects of a particular program from other influences, it is also important not to lose sight of the overall goal of reducing energy use by focusing too narrowly on which program or source of funds gets the credit, because there could be synergistic effects among programs; the whole may be greater than the sum of the parts. These sources also warned that the effectiveness of programs could be reduced if the energy efficiency community focuses program efforts only on what is most provable, not what is most effective.

Consistency in Net Savings Definitions and Methods

When sponsoring this effort, the Forum was particularly interested in the question of whether or not promoting consistency in net savings definitions and methods across the Northeast was a task it should take on, and, if so, how the Forum might go about pursuing consistency. The project team explored opinions about the possibility of adopting consistent definitions of and methods for measuring net savings throughout the Northeast.

Most commentators supported the idea of having a consistent definition of net savings in the Northeast (*i.e.*, which components are included). The main reason the region currently does not have a consistent definition is that there has been no explicit public policy driver, such as legislation, to stimulate its development. Instead, jurisdictions have simply developed their own definitions, and may be reluctant to let go of them without some compelling reason to do so.

Opinions diverged, however, on whether methods for measuring net savings should be consistent, given a particular definition of net savings. Most respondents recognized some benefits of adopting consistent methods, particularly in light of increased regional cooperation on greenhouse gas emissions, and in order to facilitate evaluation and reporting for programs and program administrators operating across jurisdictions. However, individuals voiced concern about overly prescriptive approaches that could stifle creativity and may not reflect the diverse range of programs and varying resources. Others, while advocating consistency, also argued that a consistent approach should not include current methods because they are too fraught with reliability, validity, and bias concerns.

In general, air regulators were the strongest advocates for consistency in estimation methods. Net savings experts and program administrators generally supported consistent methods for net savings, but raised concerns about the reliability and validity of current methods and their ability to meet current or evolving policy needs. Energy regulators and their representatives voiced the greatest skepticism

regarding the promotion and adoption of consistent methods, pointing out that methods should keep evolving and improving before any particular methods are prescribed.

Conclusions and Recommendations to the Forum

The research presented in this paper demonstrates that the expanding audiences for net savings estimates and the evolving policies that may influence the measurement and use of net savings will present new challenges to the already confounding problem of net savings estimation in the energy efficiency community. The research presented here and elaborated on in the full scoping paper supports the continued use of net savings estimates for four specific purposes.

The first is *assessing the degree to which programs cause a reduction in energy usage and demand*. The research supports the continued use of net savings as one of numerous measures that should be given serious consideration in the assessment of program success, at least until a suitable alternative is developed beyond gross savings or adjusted gross savings that recognizes that some energy and demand savings would have happened without the program.

The second use is to *uncover fraudulent program implementation practices*. Cases have been documented in which program implementers have claimed savings from activities that they clearly did not influence, including installations that occurred prior to any interaction with the program and random downward fluctuations in energy use in excess of what accrued to any program activity.

The third involves *gaining insight into how the market is changing and transforming over time* by tracking net savings across program years and determining the extent to which free ridership and spillover rates and net-to-gross ratios have changed over the period.

The final continued use supported by this research is to *understand better how the market responds to the program* and to use the information to inform modifications to program design, including measure eligibility and targeted marketing. Later, these program modifications would again be subject to net savings evaluation, in an adaptive management process.

Recommendations and Research Needs

In addition to these four uses, the research also points to a series of recommendations and research needs related to pursuing consistent approaches to defining and measuring energy savings—net and gross—throughout the Northeast. The authors believe that these recommendations, while made to the Forum, have broader application in the energy efficiency and air regulation communities.

Recommendation 1: Lead the process of developing consistent definitions of and approaches for measuring adjusted gross savings and net savings in the Northeast Region. The research uncovered a wide variety of both definitions and conceptualizations of net savings and its components as well as approaches to estimating net savings. The majority of sources considered this lack of consistency to be problematic and supported the long-term goal of achieving more consistency across the Northeast in how net savings is defined and measured. Because of the consensus that consistency is unlikely to be achieved without a policy driver, the authors recommended that the Forum lead the way toward greater consistency. The first step in achieving the goal of more consistent definitions of net savings is to define the elements of adjusted gross savings, to which net savings are applied. The next step is to define the elements and concepts of net savings, allowing everyone to “speak the same language,” but not necessarily requiring that everyone measure every element. Research to support this recommendation would focus on understanding current reporting needs and practices for ISOs and forward capacity

markets, regulators, and program administrators. The next step would be to enumerate similarities and differences in definitions and requirements across the region and to develop consistent definitions that would meet the needs of the diverse energy efficiency community in the region.

Recommendation 2: The Forum and its allies should consider taking action to improve the quality of data used to estimate net savings. This may involve advocating for legal requirements for manufacturers, retailers, and distributors to provide national sales and shipment data for key equipment and products, reported by size and efficiency at the county or state level. It may also involve encouraging program administrators to keep records of program activity by year, including in any possible comparison areas. The research revealed a great deal of dissatisfaction with net savings methods relying on self-reported free ridership and spillover or surveys of comparison areas. Several sources noted that market-based approaches using sales data avoid these problems by embedding free ridership and spillover into the estimates. However, due in part to confidentiality concerns, inconsistent access to the types of sales data needed for accurate estimation of net savings severely limits the use of such methods. Legally requiring reporting of these sales data may provide the only avenue for accurate estimation of net savings from upstream market transformation programs—including capturing the savings resulting from cumulative program activity from prior years. Higher-quality data will not only improve estimation from quantitative approaches, but they could also provide more dependable information for use in qualitative approaches.⁴ Note that this recommendation does not require further research, but, instead would focus on advocacy and working to overcome the barriers to data access caused by confidentiality concerns.

Commentators also mentioned the challenges of gaining access to longitudinal data, including program data (*e.g.*, budgets, measure covered, participants served, and previous estimates of net savings, among others) that could assist in the estimation of net savings and cumulative program. More careful record keeping of such data will assist in the development of net savings estimates by allowing for the estimation of cumulative and spillover effects over time, thereby providing a more complete assessment of program impacts. Although this recommendation must largely be implemented by program administrators, the Forum could assist program administrators in the development of data collection and storage tools, perhaps even developing a database that contains such information for easy reference and comparison across areas and years.

Recommendation 3: The Forum should clarify the definition of *attribution* and the degree to which programs must differentiate the impact of their activities from the impacts of other factors that may lead to the same or similar actions or outcomes. While it may be important to assess the impacts brought about by the program, the energy efficiency community should be careful not to lose sight of the goal of reducing energy use by focusing too narrowly on which program gets the credit, particularly as various programs and influences may have synergistic effects such that the whole of their combined impact is more than the sum of their individual impacts. Deciding the degree to which programs must (or can) disentangle their impacts from those of other programs and external influences will involve identifying the variety of potential influences outside of program activity that may affect program participation and assessing whether direct causal links can be established between those other potential influences and energy saving actions. Related research would include understanding the impact of participants who take part in multiple programs, including any possible synergies from participation in multiple programs, as well as identifying the variety of potential influences outside of program activity that may affect program participation with an eye toward establishing whether causal links can be drawn

⁴ Examples include structured expert judgment (Delphi panels), weight-of-evidence, and historical tracing approaches.

between these influences and participation.

Recommendation 4: The Forum should encourage the energy efficiency community—particularly energy regulators—to expand its assessment of program success from a focus on net savings to the inclusion of additional factors that may more accurately capture the full range of program impacts, including non-energy impacts such as jobs, improved health, and increased productivity.

Net savings is a valuable measure of the amount of savings the program has achieved that would not have happened otherwise. But, as the full scoping paper documented, net savings measures are not infallible, nor do they fully capture the wide range of impacts that may result from energy efficiency program activity. Therefore, while the authors recommended the continued consideration of net savings estimates, they also suggested that additional impacts be taken into account when assessing programs and determining any reward or penalties to be paid. Research involved in expanding the focus of evaluation beyond net savings would include identifying the impacts other than energy savings that are most crucial to determining program performance and ensuring that ratepayer and taxpayer funds are being used responsibly, and developing a prioritization scheme of these impacts.

Recommendation 5: The Forum should decide if it supports the development of consistent methodological approaches to estimating net savings for the Northeast, and, if so, take the actions necessary to develop regional guidelines for consistent methods.

This recommendation involves three different steps. First, the Forum should discuss the reasons for and against developing consistent approaches to net savings estimation and decide whether consistency should be pursued in the Northeast. Second, should the Forum recommend in favor of consistency in methods for estimating net savings, it should begin by developing a framework for how to achieve it. This framework would serve as an interim step toward consistency while the Forum waits for the results of research projects that would be needed before embarking on the third and final step: the development of guidelines for consistent methodological approaches to net savings. The guidelines would provide more explicit recommendations concerning which methodological approaches to use in specific situations. The guidelines should also allow for the introduction of new methods, with a process or criteria for establishing their reliability, validity, and rigor. Although flexible, the guidelines should avoid the trap of “anything goes” by specifically identifying the best approaches to be pursued given varying levels of resources and by identifying the approaches that should be avoided except in limited circumstances.

This recommendation involves three different research needs. The first is to develop an understanding of the range of methods available for estimating net savings, their strengths and weaknesses, and their ability to provide the types of estimates needed by the energy efficiency community (and perhaps the air regulation community) to ensure that any guidelines for consistent methodological approaches to net savings rely on the best net impact evaluation practices available. The second involves exploring the existing academic and energy efficiency research on the psychological and sociological processes that influence estimates of net energy savings in an effort to understand more fully the ways in which these processes may affect how participants respond to self-report questions about their past actions and likely behavior in the absence of the program. The third is an examination of the potential of macroeconomic approaches for estimating the impact of program activity on net energy savings. Such approaches are new, and it remains to be seen if they will prove to be among the new “best practices” in net savings evaluation.

Recommendation 6: The Forum should facilitate the development of a working group comprising members of the energy efficiency community, the system planning community, and the air regulation community with the ultimate goal of developing approaches to measuring energy

savings and resultant reductions in greenhouse gas emissions in a manner that is mutually acceptable to and feasible for all three communities. Some of the sources consulted in this research predicted that the near future will bring policies requiring the development of energy savings estimation methods that meet the needs of the air regulation community. They also said that the needs of the energy efficiency, air regulation, and system planning communities would best be met if these methods were developed in partnership. The tasks for this partnership would include examining possible approaches for translating energy efficiency impacts into measurable pollution reductions by time of day and year and exploring ways of measuring net energy savings that would meet the requirements for reliability and precision to which both communities must abide. The first research needed to support this recommendation is to examine the possible methods or approaches for translating energy efficiency impacts into measurable pollution reductions from power plants by time of day and time of year. The second type of research would involve exploring possible approaches to measuring *net energy savings* that would meet any requirements for reliability and precision.

The project team believes that the energy efficiency community—and probably the air regulation community as well—should acknowledge the fact that energy efficiency and emissions reductions programs are not wholly responsible for all the savings and emissions reductions that may be achieved through the adoption of the devices or behaviors promoted by the programs. The estimation of net impacts—be they savings, emissions reductions, jobs created, water saved, and so on—is a way of making this acknowledgement. Currently, the measurement of net impacts occurs at the measure or program level, with the results sometimes being aggregated to a group of programs or to the entire portfolio offered by a program administrator. However, the authors recognize that demonstrating attribution has become increasingly challenging in light of numerous programs and factors that may influence the targeted behaviors. Moreover, jurisdictions at the municipal to state levels—and perhaps one day at the federal level—have set ambitious goals to reduce energy use and greenhouse gas emissions. Given the uncertainty inherent in measuring the counterfactual of net savings, some members of the energy efficiency community are beginning to ask if the energy efficiency community needs a radical rethinking of how it goes about estimating net impacts in general and net savings in particular. It is beyond the scope of this paper to describe what such a radical rethinking of impact evaluation methods might entail, but in the full scoping paper, the authors briefly discuss alternatives to measuring net savings that recognize that program activity does not necessarily yield all the measured gross savings⁵. This leads to the final recommendation.

Recommendation 7: The Forum should consider the potential of using a deemed or negotiated net savings approach for crediting energy savings—or emissions reductions—to a program or portfolio. In such an approach, program administrators and regulators would draw on available evidence and additional indicators of program impacts to help decide on the percentage of gross savings that can be claimed by a program or portfolio after it has carefully demonstrated that the program activities have strongly contributed to the desired outcomes. The credibility of the negotiated net savings figure would depend on the type, amount, and quality of the information informing it; such information could include program tracking data, adjusted gross savings estimates, net savings estimates derived from periodic research (possibly multiple approaches), the sales/shipment data mentioned in Recommendation 2, market research to assess the state of the market, energy intensity by sector over time, and more. The percentage could be developed through a Delphi panel or other structured expert judgment approaches. Importantly, the approach itself, and not just the net-to-gross number, should be negotiated and agreed

⁵ In addition, one outcome from the release of the Scoping Study was formation of a Policy Subcommittee, in which Forum members will explore policy issues, including implications of current or new approaches to net savings.

on beforehand; it is even possible—as with the recent decision in Arizona to credit up to one-third of the savings from utility codes and standards efforts toward its 2020 Energy Efficiency Standards (EES) target, provided they make a credible effort—to decide on the number beforehand. The conclusion would still be subjective, and its precision—how close it is to the real value of net savings—would be uncertain because achievement of the goal could be questioned on the basis of the counterfactual, influenced by other factors such as economic recessions, reduction in certain types of manufacturing, changes in energy prices, and so forth. Even so, the negotiated agreement approach avoids depending entirely on controversial measurements of the counterfactual of net savings.

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