Examining the Net Savings Issue: A National Survey of State Policies and Practices in the Evaluation of Ratepayer-Funded Energy Efficiency Programs

Martin Kushler, Seth Nowak, and Patti Witte
January 2014
Report Number U1401

529 14th Street NW, Suite 600, Washington, DC 20045
Phone: (202) 507-4000 • Twitter: @ACEEEDC
Facebook.com/myACEEE • www.aceee.org

Contents

Acknowledgments

The authors would like to thank the following organizations for providing funding for this work: the New York State Energy Research and Development Authority, Pacific Gas & Electric Company, Southern California Edison, and the Energy Foundation. Their generous support made this project possible.

The authors would also like to thank the individuals who assisted us by agreeing to be interviewed as national evaluation experts (Nick Hall, Ken Keating, Sami Khawaja, Ralph Prahl, Jeff Schlegel, Ed Vine, and Bob Wirtshafter) and who provided external review and comment on the document (Steven Nadel, Bill Saxonis, and Ed Vine). While the various reviewers were very generous with their time and advice, the authors alone are responsible for the content of this report.

We would also like to thank Fred Grossberg, Renee Nida, Patrick Kiker, and Eric Schwass for their assistance in the editing and publication process.

Finally, we would like to thank the many staff members in the state utility regulatory commissions around the nation who cooperated with us on this project and provided the necessary data and answers to our many questions.

Executive Summary

One of the most prominent and longstanding challenges in the utility energy efficiency field is the issue of determining the net savings impacts of a program. This is not only a technical methodological challenge, it also has conceptual and policy implications.

In order to help policymakers, regulators, utilities, and other interested parties better understand this issue and how their peers are addressing it, the American Council for an Energy-Efficient Economy (ACEEE) conducted a national review of state approaches to the net savings issue. ACEEE surveyed all 50 states and the District of Columbia, reviewed a large amount of recent industry literature, and conducted interviews with national energy efficiency program evaluation experts.

The reader should note that this is not a methodological report. The purpose of this study was not to assess or resolve evaluation methodology issues relating to estimating net savings. Other entities have addressed and are addressing that task, e.g., the Department of Energy/National Renewable Energy Laboratory (DOE/NREL) Uniform Methods Project. Rather, the purpose of this project is to examine and document what states are doing in actual practice, in terms of their decision making regarding the issue of net savings.

Briefly stated, the results of this project indicate a great deal of diversity in how states are approaching this issue. At one end, nearly a quarter of states simply report gross savings. Another large segment, probably a majority, nominally report net savings, but with a fairly simplistic approach (often just using deemed net to gross ratios). Finally, a small number of states (many profiled in this report) are pursuing more complex approaches to measurement of net savings, including spillover and in some cases, broader market effects.

Even among evaluation professionals, while the majority support the use of net savings for program reporting and calculating lost revenues, there is not a consensus on whether net savings is the metric that should be used, much less on what specific methodologies should be utilized to determine net savings.

In the context of this diversity, this project seeks to present a snapshot of the current situation in the industry and provide some thoughts on key issues and concerns that are at play. This report provides a summary of our national survey results (as well as state-by-state results on key variables, in Appendix B), the key takeaways from our interviews with national energy efficiency evaluation experts, brief profiles of some states that are noteworthy on this issue (in Appendix A), a summary of our conclusions, and a few practical recommendations for how states should address various aspects related to the subject of net savings.

The net savings issue is one where methodologies and policy approaches continue to evolve. We hope that this assessment of the current status across the nation will contribute to the discussion.

Introduction

This project examines the approaches that states are taking regarding the use of net vs. gross savings in the evaluation of their ratepayer-funded energy efficiency programs. In some respects, this is a long-standing issue. In essence, the determination of net savings (i.e., the net impact attributable to a program) has been the central challenge facing energy program evaluators since the first utility energy conservation programs were launched in the 1970s. The core obstacle, of course, is that evaluators must estimate savings relative to something that can never actually be measured: what would have happened in the absence of the program? But a number of developments over the years have raised the challenges associated with estimating net savings well beyond anything anticipated in that earlier era.

In those earlier years, evaluation practice was relatively simple, generally featuring some type of quasi-experimental design focused on a discrete program. In recent years, the issue has become much more complex. Among other things, programs are now often designed to have broader market effects, and messaging on energy efficiency is coming to the public from many different sources and programs. Separating out the net effects of energy efficiency programs has become a much more complicated challenge.

In response, many different methodological approaches are being utilized, ranging from true experimental and quasi-experimental designs to non-experimental methods such as self-report surveys, discrete choice modeling, and Delphi panels. Indeed, there is a robust discussion in evaluation circles about whether and when to use net savings, and what factors to include and what methodologies to use to estimate net savings (e.g., Skumatz & Vine 2010, Vine et al. 2010, Haeri & Khawaja 2012, Prahl et al. 2013). A recent ACEEE project (Kushler et al. 2012) documented that the approach to evaluation of ratepayer-funded energy efficiency programs varied considerably across states, including basic choices to use net or gross savings. In short, there is a great deal of uncertainty, and even dispute, within the industry.

Purpose

The purpose of this report is not to resolve the methodological issues relating to estimating net savings. We will not attempt to assess and make recommendations regarding specific evaluation methods. There are other entities that have addressed and are addressing that task, e.g., the Department of Energy/National Renewable Energy Laboratory (DOE/NREL) Uniform Methods Project.

Rather, the purpose of this project is to examine and document what states are doing in actual practice regarding the issue of net savings. What is in fact being done by states in terms of the use of net savings in making regulatory decisions? What issues are being discussed? What precedents are being set and what lessons are being learned that can help inform decisions by other states?

To accomplish this purpose, the project conducted a national survey of regulatory staff in all 50 states plus extensive review of additional material for states with significant activity relating to defining and measuring net savings. We also interviewed a number of nationally known energy efficiency evaluation experts and reviewed much of the recent literature in this field. This report will summarize the results of this study and provide some practical recommendations on how states might best approach this issue.

Definitions

In understanding the net savings issue, it is useful to have as a frame of reference a set of definitions of some of the key factors involved. For this purpose, we present below the definitions provided by four prominent sources in the industry: the California Evaluation Protocols prepared for the California Public Utilities Commission (CPUC), the Northeast Energy Efficiency Partnerships (NEEP) EM&V Forum, the New York Evaluation Plan Guidance prepared for the New York State Department of Public Service (NYSDPS), and the Energy Efficiency Program Impact Evaluation Guide prepared by the State and Local Energy Efficiency Action Network (SEE Action).

Over time, through efforts at both the regional (e.g., the NEEP EM&V Forum) and federal (SEE Action) level, the definitions commonly used in the field have converged to a great extent. However, as seen below, there are still some detectable differences, and these can affect evaluation approaches in a particular state or region. For the definitions presented below, we have asterisked the ones we feel are most useful among the group.[1] We will comment on some of these definitional issues later in the report.

Gross Savings

* CALIFORNIA PROTOCOLS (CPUC 2006) (P. 227): the change in energy consumption and/or demand that results directly from program-related actions taken by participants in a DSM program, regardless of why they participated.

* NEEP EMV FORUM 2012 (NMR 2012) (P. 6): the change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated.

NEW YORK EVALUATION PLAN GUIDANCE (NYSDPS 2008) (P. 26): the change in energy consumption and/or demand that results directly from program-related actions taken by participants in the DSM program. The gross savings reported by the program administrators are referred to as *ex ante* values since they have not been adjusted by *ex post (after measure installation)* evaluation efforts.

* SEE ACTION (SEE ACTION 2012) (P. A-7): the change in energy consumption and/or demand that results directly from program-related actions taken by participants in an energy efficiency program, regardless of why they participated.

Net Savings

CALIFORNIA PROTOCOLS (P. 233-234): the total change in load that is attributable to the utility DSM program. This change in load may include, implicitly or explicitly, the effects of free drivers, free riders, state or federal energy efficiency standards, changes in the level of energy service, and natural change effects.

* NEEP EMV FORUM 2012 (P. 6): the change in energy consumption and/or demand that is attributable to a particular energy-efficiency program. This change in energy use and/or demand may include, implicitly or explicitly, consideration of factors such as Free Ridership, Participant and Non-

[1] This is admittedly a subjective judgment on our part, where we most value clarity and succinctness. We recognize that others may have different preferences among these definitions.

Participant Spillover, and induced market effects. These factors may be considered in how a Baseline is defined and/or in adjustments to Gross Savings values.

NEW YORK EVALUATION PLAN GUIDANCE (P. 27): the total change in load that is attributable to the utility DSM program. This change in load may include, implicitly or explicitly, the effects of spillover, free riders, state or federal energy efficiency standards, changes in the level of energy service, and natural change effects.

* SEE ACTION (P. A-11): the change in energy consumption and/or demand that is attributable to a particular energy efficiency program. This change in energy use and/or demand may include, implicitly or explicitly, consideration of factors such as free ridership, participant and non-participant spillover, and induced market effects. These factors may be considered in how a baseline is defined (e.g., common practice) and/or in adjustments to gross savings values.

Free Rider

CALIFORNIA PROTOCOLS (P. 226): a program participant who would have implemented the program measure or practice in the absence of the program.

* NEEP EMV FORUM (HOROWITZ 2011) (P. 17): a program participant who would have implemented the program measure or practice in the absence of the program. Free riders can be: 1) total, in which the participant's activity would have completely replicated the program measure; 2) partial, in which the participant's activity would have partially replicated the program measure; or 3) deferred, in which the participant's activity would have completely replicated the program measure, but at a future time than the program's timeframe.

NEW YORK EVALUATION PLAN GUIDANCE (P. 6): a customer who participates in an energy efficiency program but would have, at least to some degree, installed the same measure(s) on their own if the program had not been available.

* SEE ACTION (P. A-7): a program participant who would have implemented the program's measure(s) or practice(s) in the absence of the program. Free riders can be (1) total, in which the participant's activity would have completely replicated the program measure; (2) partial, in which the participant's activity would have partially replicated the program measure; or (3) deferred, in which the participant's activity would have partially or completely replicated the program measure, but at a future time beyond the program's time frame.

Free Driver

CALIFORNIA PROTOCOLS (P. 226): a non-participant who adopted a particular efficiency measure or practice as a result of a utility program.

NEEP EMV FORUM (P. 17): A program non-participant who has adopted a particular efficiency measure or practice as a result of the evaluated program. Also see Spillover.

NEW YORK EVALUATION PLAN GUIDANCE (P. 5): See Spillover.

* SEE ACTION (P. A-7): a program non-participant who has adopted particular energy efficiency measure(s) or practice(s) as a result of the evaluated program. See Spillover.

* SEE ACTION (P. A-7): a program participant who has adopted additional or incremental energy efficiency measure(s) or practice(s) as a result of the evaluated program, but which were not directly induced by the program. See Spillover.

Spillover

CALIFORNIA PROTOCOLS (P. 241): Reductions in energy consumption and/or demand in a utility's service area caused by the presence of the DSM program, beyond program-related gross or net savings of participants. These effects could result from: (a) additional energy efficiency actions that program participants take outside the program as a result of having participated; (b) changes in the array of energy-using equipment that manufacturers, dealers and contractors offer all customers as a result of program availability; and (c) changes in the energy use of nonparticipants as a result of utility programs, whether direct (e.g., utility program advertising) or indirect (e.g., stocking practices such as (b) above or changes in consumer buying habits).

* NEEP EMV FORUM (P. 29): Reductions in energy consumption and/or demand caused by the presence of an energy efficiency program, beyond the program-related gross savings of the participants and without financial or technical assistance from the program. There can be participant and/or non-participant spillover. Participant spillover is the additional energy savings that occur when a program participant independently installs energy efficiency measures or applies energy saving practices after having participated in the efficiency program as a result of the program's influence. Non-participant spillover refers to energy savings that occur when a program non-participant installs energy efficiency measures or applies energy savings practices as a result of a program's influence.

NEW YORK EVALUATION PLAN GUIDANCE (P. 5): refers to the energy savings associated with energy efficient equipment installed by consumers who were influenced by an energy efficiency program, but without direct financial or technical assistance from the program. Spillover includes additional actions taken by a program participant as well as actions undertaken by non-participants who have been influenced by the program. Sometimes spillover is referred to as "free drivership" or as "market effects." These market effects may be current or may occur after a program ends. When market effects occur after a program ends, they are referred to as "momentum" effects or as "postprogram market effects."

* SEE ACTION (P. A-15): reductions in energy consumption and/or demand caused by the presence of an energy efficiency program, beyond the program-related gross savings of the participants and without direct financial or technical assistance from the program. There can be participant and/or non-participant spillover. *Participant spillover* is the additional energy savings that occur as a result of the program's influence when a program participant independently installs incremental energy efficiency measures or applies energy-saving practices after having participated in the energy efficiency program. *Non-participant spillover* refers to energy savings that occur when a program non-participant installs energy efficiency measures or applies energy savings practices as a result of a program's influence.

Net-to-Gross Ratio

CALIFORNIA PROTOCOLS (P. 234): a factor representing net program load impacts divided by gross program load impacts that is applied to gross program load impacts to convert them into net program load impacts. This factor is also sometimes used to convert gross measure costs to net measure costs.

NEEP EMV FORUM (P. 2): a factor representing net program savings divided by gross program savings that is applied to gross program impacts to convert them into net program load impacts. The factor itself may be made up of a variety of factors that create differences between gross and net savings, commonly including free riders and spillover. Other adjustments may include a correction factor to account for errors within the project tracking data, breakage, and other factors that may be estimated which relate the gross savings to the net effect of the program. Can be applied separately to either energy or demand savings.

NEW YORK EVALUATION PLAN GUIDANCE (P. 6): a ratio that compares the gross savings of a program to the energy savings actually attributable to the program. Energy savings are estimated after adjusting for factors such as measurement error, measure installation quality, user behavior, and the actions program participants and non-participants would have taken absent the program (e.g., free ridership and spillover).

* SEE ACTION (P. A-11): a factor representing net program savings divided by gross program savings that is applied to gross program impacts to convert them into net program load impacts. The factor itself may be made up of a variety of factors that create differences between gross and net savings, commonly including free riders and spillover. Can be applied separately to either energy or demand savings.

Market Effects

CALIFORNIA PROTOCOLS (P. 231): a change in the structure or functioning of a market or the behavior of participants in a market that result from one or more program efforts. Typically these efforts are designed to increase the adoption of energy-efficient products, services or practices and are causally related to market interventions.

NEEP EMV FORUM (P. 22): the change in the structure or functioning of a market, or the behavior of participants in a market, that results from one or more program efforts. Typically the resultant market or behavior change leads to an increase in the adoption of energy-efficient products, services, or practices.

NEW YORK EVALUATION PLAN GUIDANCE (P. 5): See Spillover.

* SEE ACTION (P. A-10): a change in the structure of a market or the behavior of participants in a market that is reflective of an increase (or decrease) in the adoption of energy efficient products, services, or practices and is causally related to market interventions (e.g., programs). Examples of market effects include increased levels of awareness of energy efficient technologies among customers and suppliers, increased availability of energy efficient technologies through retail channels, reduced prices for energy efficient models, build out of energy efficient model lines, and—the end goal—increased market share for energy efficient goods, services, and design practices.

Market Transformation

* CALIFORNIA PROTOCOLS (P. 232): a reduction in market barriers resulting from a market intervention, as evidenced by a set of market effects, that lasts after the intervention has been withdrawn, reduced or changed.

*** NEEP EMV FORUM (P. 22):** a reduction in market barriers resulting from a market intervention, as evidenced by market effects that last after the intervention has been withdrawn, reduced, or changed.

SEE ACTION (P. A-10): a reduction in market barriers resulting from a market intervention, as evidenced by a set of market effects that is likely to last after the intervention has been withdrawn, reduced, or changed.

With this common frame of reference established, we can now proceed to present and discuss the methodology and results of this study.

Methodology

ACEEE used multiple methodologies in gathering information for this project. To begin, we conducted a national (50 states + D.C.) telephone survey to see how the individual jurisdictions were handling the issue of net vs. gross savings in the evaluation of ratepayer-funded energy efficiency programs. Questions included:

- Is net or gross savings (or both) required, and for what purposes?
- Does the state use evaluated energy savings to determine the eligibility for and/or amount of incentives for the utility/program administrator?
- Does the state use evaluated energy savings to determine the amount of lost revenues that a utility will be able to recover?
- How are net savings defined?
- What adjustments are made to estimate net savings (e.g., free riders, free drivers, spillover, market effects)?
- Are rules for defining and/or calculating net savings specified in legislative or regulatory documents?

In addition to being used to characterize the overall national picture regarding state approaches to the net savings issue, the survey results also were used to identify states where the issue of net savings had received more extensive attention, so the profiles of leading states could be developed. For those selected states, various key documents (e.g., regulatory orders, legislation) were obtained and reviewed, and additional inquiries were made with regulatory staff and other parties involved in the state.

As a further source, we also reviewed a number of recent reports and professional papers on the net savings issue to examine current trends in the industry.

Finally, to gain additional perspective and insight, extensive telephone interviews were conducted with seven leading national energy efficiency program evaluation experts.[2] These individuals were chosen because of their expertise in this field and in order to include experts with a diversity of perspectives and experience in all the key geographic areas in the nation.

[2] These individuals were Nick Hall, Ken Keating, Sami Khawaja, Ralph Prahl, Jeff Schlegel, Ed Vine, and Bob Wirtshafter.

Results

National Survey Results

This section of the report presents the basic numerical results of our national survey of state approaches to the net vs. gross issue in the evaluation of ratepayer-funded energy efficiency programs. In the subsequent sections, we will provide additional information and discuss some of the practical implications of what we have observed.

Identifying States with Ratepayer-Funded Energy Efficiency Programs

As a threshold consideration, in order for our survey on energy savings energy efficiency program evaluation to be relevant, it is necessary that there actually be utility ratepayer-funded energy efficiency programs in that state. In what might be considered the first result of the study, we found that a total of 44 states (plus the District of Columbia) had some level of formally approved ratepayer-funded energy efficiency programs in operation. Thus the population for this census survey is those 45 jurisdictions.[3] The results presented in this report are drawn from those 45 jurisdictions.

Evaluation Purposes and Structures

The initial survey question asked if program savings from ratepayer-funded energy efficiency programs are quantified and reported in their state (see Table 1).

Table 1. Energy Savings Rates Quantified and Reported

Are energy savings results from ratepayer-funded energy efficiency programs quantified and reported in your state? (n = 45)	
Yes	42 (93%)
No	3 (7%)

As expected, nearly all states have some process for quantifying and reporting the energy savings results of their ratepayer-funded energy efficiency programs. A few states do not yet have such a process in place or do not have any state regulatory role.

The next question was, *Who is responsible for calculating and reporting the quantified energy savings results from ratepayer-funded energy efficiency programs?* Respondents were asked to briefly explain who does that and when. The 43 responses[4] were coded into major categories as follows:

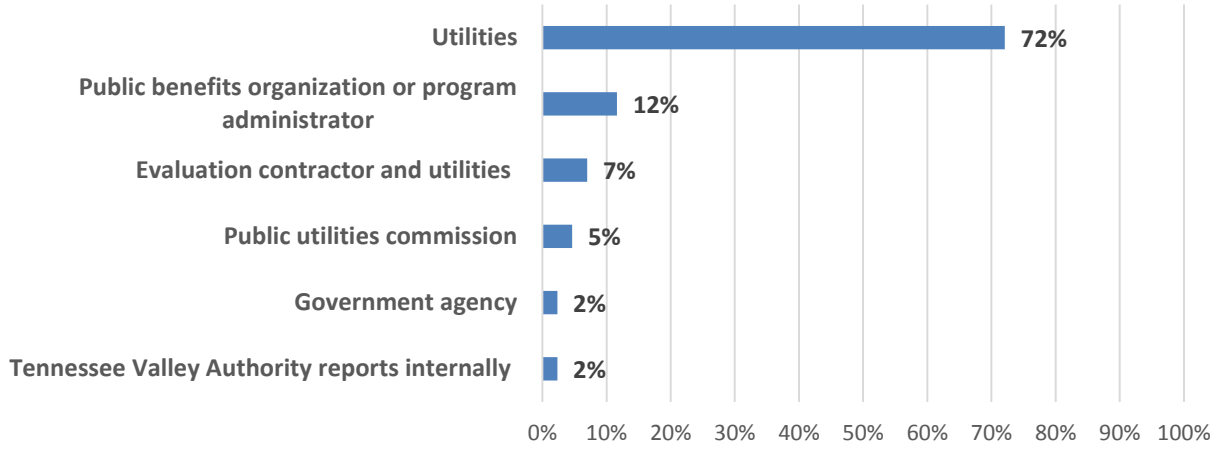
[3] The excluded states did not have substantive formally approved utility ratepayer-funded energy efficiency programs in place at the time of the survey and/or do not have any formal evaluation process or protocols. They are Alabama, Alaska, Louisiana, Mississippi, North Dakota, and West Virginia. One state, Tennessee, has no substantive investor-owned utility ratepayer-funded energy efficiency programs, as the federal Tennessee Valley Authority administers most of the energy efficiency activity in the state. Hence, much of this segment regarding use of savings estimates for shareholder incentives and lost revenue recovery does not apply. While there are currently no utility-administered/ratepayer-funded efficiency programs in Delaware, we have included Delaware survey responses in the data set. Currently, Regional Greenhouse Gas Initiative (RGGI) funding (for Delaware Sustainable Energy Utility—SEU—programs) and a Public Utility Tax (for the Energy Efficiency Investment Fund—EEIF) are used for efficiency programs in Delaware.

[4] One of the states not yet reporting results indicated their planned approach.

- Utilities (31 states)
- Public benefits organization or program administrator (5 states)
- Evaluation contractor and utilities (3 states)
- Public utilities commission (2 states)
- Tennessee Valley Authority reports internally (1 state)
- Government agency (1 state)

The results are shown in Figure 1.

Figure 1. Entity Reporting Energy Savings Results (n=43)



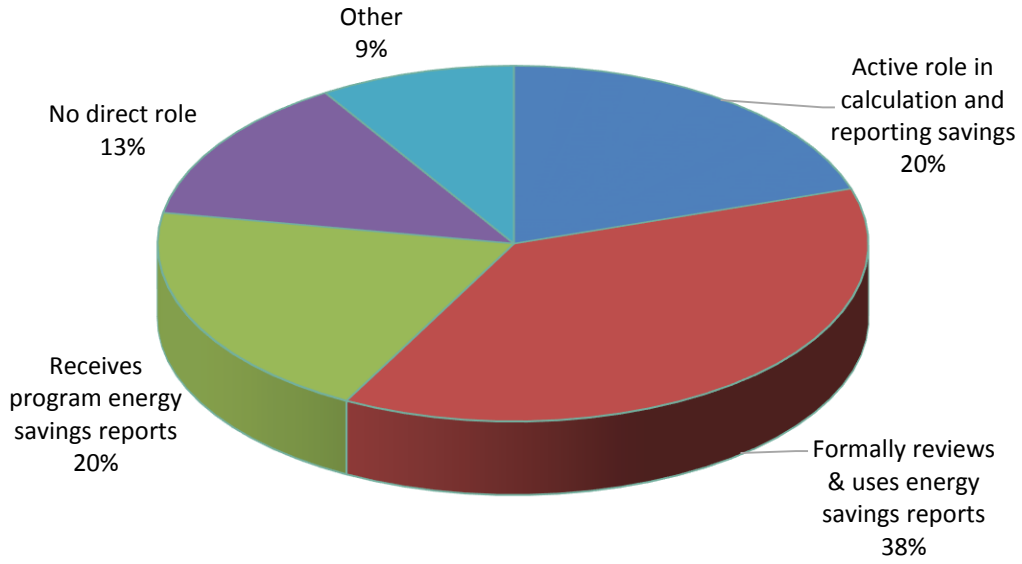
As the data indicate, in a large majority of states the utilities have the primary role in quantifying and reporting the energy savings results. However, over a quarter of the states have other entities either having or sharing that responsibility.

Next we asked: *What is the role of the public utilities commission in calculating and reporting energy efficiency program savings?* The 45 respondents answered as follows:

- Formally reviews and uses energy savings reports (17 states)
- Receives program energy savings reports (9 states)
- Active role in calculation and reporting savings (9 states)
- No direct role (6 states)
- Other (See Appendix B for listing) (4 states)

Figure 2 shows these results.

Figure 2. Role of Commission in Reporting Savings (n=45)



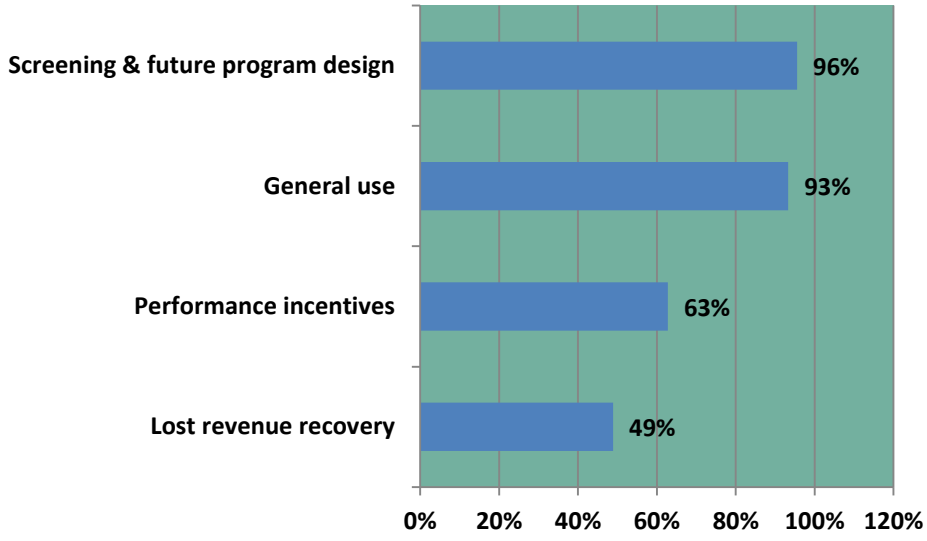
As with our earlier study conducted in late 2011 (Kushler et al. 2012), the results of this survey indicate that there is quite a bit of variability in the framework for evaluation across the states.

The next series of questions addressed the allowed uses of program savings estimates and then followed up addressing which are actually done in practice in the respondent's state. First we asked: *For which of the following purposes are energy efficiency program energy savings results used in your state?* States could respond "yes" to each of four possible purposes:

- Screening and making decisions on future programs (43 states)
- General reporting on program accomplishments (42 states)
- Determining eligibility for and/or amount of utility performance incentives (28 states)
- Determining eligibility for and/or amount of utility lost revenue recovery (22 states)

Figure 3 shows these results.

Figure 3. Uses of Energy Savings Estimates (n=45)



The second survey question asked how utility performance incentives had actually been awarded. Table 2 shows the results.

Table 2. Utility Performance Incentives Actually Awarded

If yes for performance incentives, have utility performance incentives actually been awarded in your state on the basis of quantified energy efficiency program savings? (n = 28)	
Yes	23 (82%)
No	5 (19%)

Five of the 28 states that have the authority or a plan to use energy savings results to determine performance incentives have not yet actually done so. Of the 23 states that report that evaluation results have actually been used to award utility/program administrator performance incentives, 16 of those states use net savings and 7 use gross savings. Of the 16 that use net savings, 3 adjust for free ridership only.

The third survey question asked how lost revenue recovery had actually been awarded. Table 3 shows the results.

Table 3. Lost Revenue Recovery Actually Awarded

If yes for lost revenue recovery, has it actually been awarded in your state on the basis of quantified energy efficiency program savings? (n = 22)	
Yes	20 (91%)
No	2 (9%)

Two of the 22 states that have the authority or a plan to use energy savings results to determine lost revenue recovery have not yet actually done so. An additional 3 states (not included in the 22) used to provide lost revenue recovery but no longer do so. Of the 20 states that report that evaluation results have been used to determine lost revenue recovery, 15 of those states use net savings and 5 use gross savings. Of the 15 that use net savings, 1 adjusts for free ridership only.

Formal Evaluation Rules and Protocols for Energy Savings

The fourth survey question asked if evaluation rules or protocols had been established. Table 4 shows the results.

Table 4. Evaluation Rules or Protocols Established

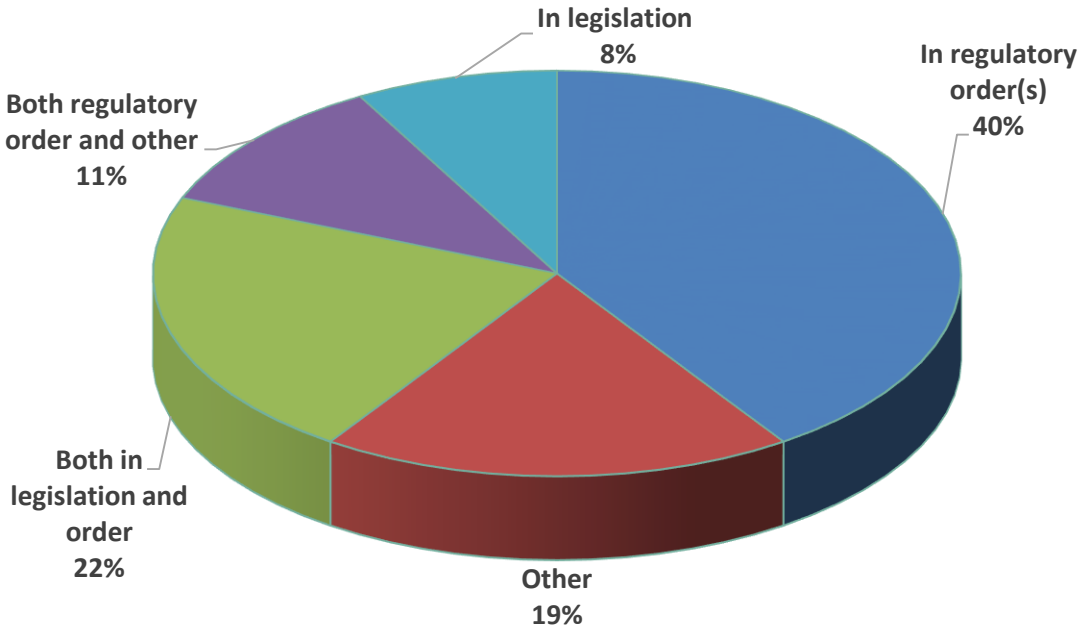
Have any evaluation rules or protocols been established for quantifying and reporting energy efficiency programs savings in your state? (n = 45)	
Yes	37 (82%)
No	8 (18%)

Next we asked: *If yes regarding the existence of established rules and protocols for energy savings, how were these rules/protocols established?* States responded "yes" to five possibilities:

- In regulatory order(s)/rules (15 states)
- In legislation (3 states)
- Both in legislation and regulatory order(s)/rules (8 states)
- Other (e.g., technical advisory group, other agency) (7 states)
- Both in regulatory order(s)/rules and other (4 states)

Figure 4 shows the results.

Figure 4. Basis for Establishing Rules or Protocols (n=37)



The citations for the evaluation rules/protocols for each state where such information is available are provided in Appendix B of this report.

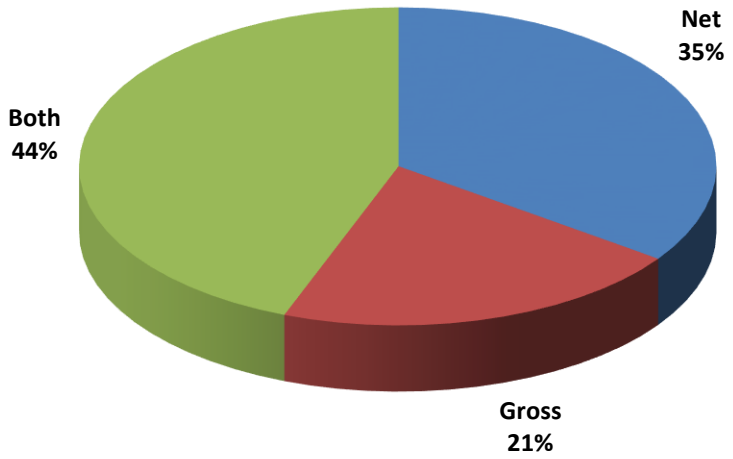
Results Related to Net Savings Issues

Next we asked: *Does your state use gross or net savings when quantifying and reporting energy efficiency program savings?* Here are the original responses by 43 states to the survey question as provided, without further analysis:

- Net: 15 states
- Gross: 9 states
- Both: 19 states

Figure 5 shows the results.

Figure 5. State Self-Categorization on the Use of Net vs. Gross Savings



Later we will present results using a more refined categorization of state approaches, based on further information we were able to obtain from the states.

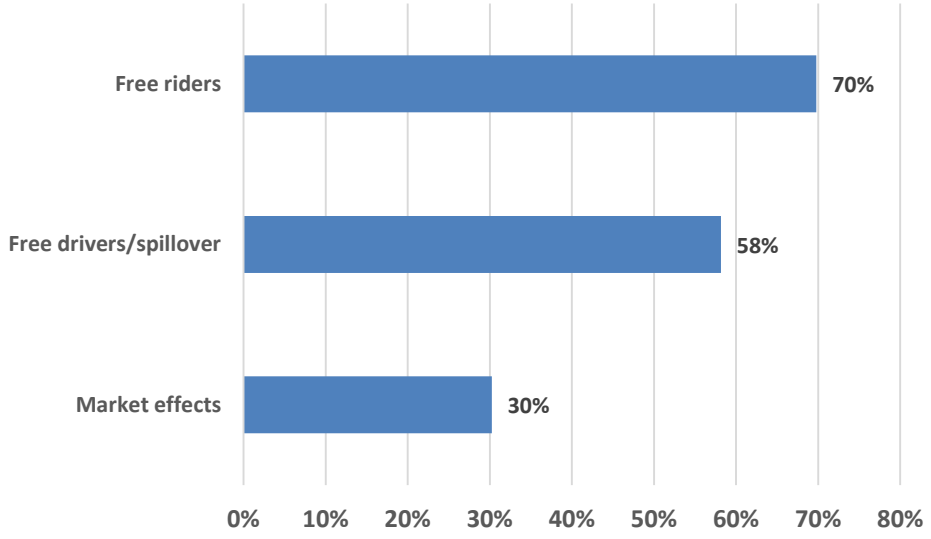
Next we asked: *Are adjustments made for any of the following factors when energy savings results are quantified and reported in your state?* Forty-three states indicated "yes" or "plan to" for each of the following factors:

- Free riders (30 states yes, 3 states plan to)
- Free drivers/spillover (25 states yes, 5 states plan to)
- Market effects[5] (13 states yes, 2 states plan to)

See Figure 6 for the results. The percentages shown are of all states responding to this question.

[5] See the analysis later in this paper that takes a closer look at this reported use of market effects.

Figure 6. Percent of States Using Each Type of Adjustment to Energy Savings Estimates (n=43)



Core Survey Data Adjusted for Additional Information

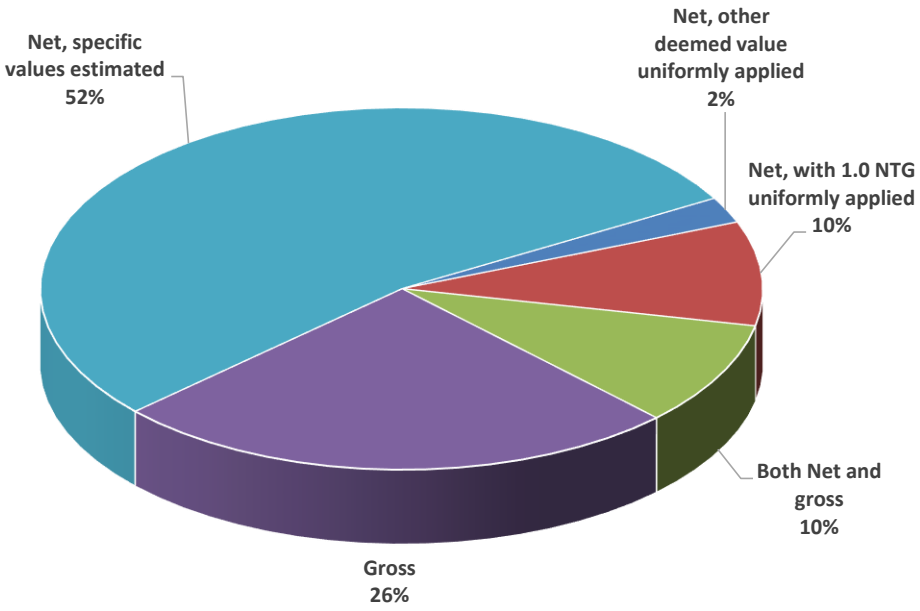
As we examined the state survey responses in more detail, along with other available documentation from the states, it became clear that there were some inconsistencies in the self-reported data. For example, not every state that indicated they used net savings or both actually indicated that they adjusted for any of the major factors (free riders, free drivers/spillover, market effects). Some states that apply a deemed 1.0 net-to-gross ratio consider themselves to be using net savings, while some consider that to be using gross savings. Because of these inconsistencies, we pursued follow-up questions and/or review of additional documents and developed our own best assessment categorization of state approaches to the net vs. gross issue.

Based on our additional questions and review, we refined the answers to the question, *Does your state use gross or net savings when quantifying and reporting energy efficiency program savings?* We tallied the states who effectively responded "yes" to each of the following categories (n=42):

- Net with specific values estimated (22 states)
- Net with 1.0 NTG ratio uniformly applied (4 states)
- Net with other deemed NTG value uniformly applied (1 state)
- Both net and gross (4 states)
- Gross only (11 states)

See Figure 7 for the results. The percentages shown are of all states responding to this question.

Figure 7. "Best Assessment" Categorization, Net vs. Gross



We concede that this analysis may not reflect an exact categorization for every state, but we feel that this revised table presents a more accurate summary of what states are actually doing regarding the net vs. gross issue. Moreover, the information does serve to illustrate that there is a tremendous diversity in how states are approaching this subject.

The Special Case of Market Effects

In reviewing the core survey results, we were somewhat surprised to see that a total of 13 states reported that they included market effects in their assessment of net savings. Since this seemed incongruous with the fact that market effects evaluation is thus far fairly rare, we decided to follow up with respondents and seek clarification.

Here is our preferred definition of "market effects" from the earlier definitions section:

> a change in the structure of a market or the behavior of participants in a market that is reflective of an increase (or decrease) in the adoption of energy efficient products, services, or practices and is causally related to market interventions (e.g., programs). Examples of market effects include increased levels of awareness of energy efficient technologies among customers and suppliers, increased availability of energy efficient technologies through retail channels, reduced prices for energy efficient models, build out of energy efficient model lines, and—the end goal—increased market share for energy efficient goods, services, and design practices. (SEE Action 2012, p. A-10),

In the light of this definition, it appears that only 2 of those 13 states (Massachusetts and Vermont) are in fact actively pursuing the estimation of actual market effects.[6] One additional state specifically acknowledges the presence of market effects and incorporates a specific "adder" in part to reflect that factor. Three states clarified that they really just consider spillover. The remaining six states acknowledged that they really do not include market effects in their evaluation of energy efficiency program impacts. Generally, their initial response was due to a misunderstanding of what was meant by market effects—some thought it just meant adjusting savings for changes in baseline standards—or in some cases it was just an error in the initial response.

These further results confirm that thus far, the actual estimation of market effects in the official quantification of energy efficiency program impacts by states is extremely rare.[7] While market effects is a hot topic in the professional evaluation community, it has thus far had a very limited practical impact in actual state regulation of ratepayer-funded energy efficiency programs. Some additional observations on this subject will be provided in the next section, where the results of our interviews with national evaluation experts are presented.

Identifying States to Profile

In addition to the objective of characterizing the national landscape regarding state approaches to the use of net or gross savings, the other use of the initial national survey was to identify a subset of particular states to profile in this report. This subset includes:

- States that have given the most extensive thought to the net vs. gross issue
- States that have actually used net savings to make regulatory decisions with specific monetary consequences (e.g., to award shareholder incentives or to quantify lost revenues for recovery).

States identified as interesting on this net savings issue include California, Connecticut, Hawaii, Iowa, Indiana, Massachusetts, New York, and Wisconsin. These state profiles are provided in Appendix A.

Results of Interviews with National Evaluation Experts

As one further method of data collection for this project, we conducted interviews with seven highly regarded national experts in the evaluation of ratepayer-funded energy efficiency programs.[8] They were asked for their opinions on recommended approaches to the net vs. gross issue and for their suggestions on leading state examples to examine in this project. These might include states that are applying quantified net savings to key regulatory decisions and states that have done a noteworthy job at examining and discussing the issues related to net savings. We had the opportunity for extended conversations with each of these experts, and their responses were very intriguing.

---

[6] In fairness, we should note that we did not provide a definition of market effects in the survey. Instead, we allowed respondents to self-categorize their approach according to their own interpretations of the terms given in the survey categories.

[7] In addition to the two states actively pursuing the quantification of market effects mentioned above, we were able to identify a few states (e.g., California, Connecticut, Indiana, New York, and Wisconsin) that are not yet quantifying market effects in formal decisions but that have taken steps to explore the ability to do so.

[8] See the Methods section for a description of who they were and how they were selected.

Opinions of the Experts

It was striking, and a little surprising, to see how much diversity of opinion there was amongst the evaluation experts. While there was agreement on a couple of factors, there was a wide range of opinion on many of the elements relating to issue of net savings.

One question on which there was complete agreement was which components should be included in the quantification of net savings. Among the choices of free riders, free drivers/spillover, and market effects, all of the experts agreed that, conceptually, all of those components should be included in any optimal assessment of net savings. From there, however, the opinions began to diverge.

When asked whether states should use net or gross savings when reporting the impacts of their ratepayer-funded energy efficiency programs, one expert replied "net" and was largely dismissive of the use of "gross"; one replied "gross" and was largely dismissive of "net"; one replied "net," but said that states should just default to a 1.0 net to gross (NTG) ratio; and the other 4 said "both," but with varying opinions on which should be used for what purposes.

In terms of specific purposes, all seven experts did agree that a consideration of free riders and net savings could be useful for things like program improvement. Generally, program administrators should attempt to design and deliver programs that minimize free riders and result in savings that would not otherwise occur. Similarly, if a program is intended to produce spillover and broader market effects (e.g., market transformation type programs), then the evaluation should examine those issues and attempt to improve performance.

For reporting overall program impacts, the majority, but not all, favored net savings. For things like calculating utility or program administrator (PA) incentives, several commented that it was all right to use whatever works in terms of providing proper motivation. However, for calculating lost revenues for recovery by a utility, several of the experts volunteered that a more stringent test (i.e., net savings) was justified, to protect ratepayer interests. The burden of proof should be more clearly on the utility to document that revenue loss occurred as a result of the energy efficiency program.

Interestingly, there was some disagreement as to whether net savings results should be applied retroactively in calculating utility/PA incentives, or just prospectively.[9] Five of the experts said prospective only, but two leaned toward retroactive, albeit acknowledging that it could depend upon particular circumstances.[10]

We also asked the experts for their thoughts on what methodologies were acceptable, preferable, and not acceptable for estimating net savings. Most of the respondents placed nearly all of the common methodologies (e.g., market studies, Delphi techniques, discrete-choice modeling, surveys) in the acceptable category and were reluctant to single anything out as a

---

[9] As NMR & Research Into Action (2012) describe, retrospective use of net savings refers to the process of estimating net savings and NTG ratios from data from past programs and applying them to past PA programs. In contrast, prospective use refers to estimating net savings and NTG ratios from data from past programs and applying them to future programs.

[10] In our previous national study (Kushler et al. 2012), we found that 80% of states that awarded shareholder/program administrator incentives applied net savings results only prospectively.

clearly superior method.[11] A couple did comment that simple self-report surveys alone were probably not sufficient. Ultimately, most volunteered that best practice would be to use multiple methods and triangulation to develop defensible estimates.[12] One expert summed up the prevailing opinion about current methodologies (among those who favored the use of net savings) when he said: "They are all by nature inaccurate. But just because you can't do it accurately, doesn't mean you shouldn't do it. Lots of things in the utility world are inaccurate."

Finally, we asked the experts which states they thought were leading on the important emerging issue of market effects. Here we did find some commonality. Several mentioned Massachusetts as a leading state. Several also mentioned New York as noteworthy for its work on developing spillover guidelines (NYSDPS 2012). Several complimented California for its work in conducting research studies on market effects, albeit not necessarily for how it has operationally handled the issue thus far. Similarly, Wisconsin was noted for having done some good research, but not for any actual regulatory decisions using market effects. Finally, two additional states (Indiana and Hawaii) were praised for their conceptual approach to examining the issue.

Overall, however, the experts could not point to any state as having an ideal approach at this point. The issue of quantifying and crediting market effects is simply too new to the field.

[11] It was also noted that the cost and time requirements for pursuing various methodologies should be considered when thinking about how much and what type of effort to devote to estimating net savings.

[12] Of course triangulation is not a panacea. It is primarily helpful if the cluster of estimates tend to converge. If the estimates are widely divergent, one still faces the need to choose among methods. Clearly, additional research on preferred methods is still needed.

Discussion

The results of our national survey clearly demonstrate that there is a wide disparity in how states are approaching the issue of net vs. gross savings. At one end, nearly a quarter of states simply report gross savings. Another large segment, probably a majority, nominally report net savings, but with a fairly simplistic approach (often just using deemed NTG ratios). Finally, a small number of states (many profiled in this report) are pursuing more sophisticated measurement of net savings, including spillover and in some cases, broader market effects.

Even among evaluation professionals, there is no consensus on whether net savings is the metric that should be used, much less on what specific methodologies should be utilized to determine net savings. (A majority of our experts did support the use of net savings for program reporting and calculation of lost revenues.) As a humorous illustration of the variability of approaches in the industry in general, no consensus exists within the industry on how to spell "free riders" (freeriders, free-riders).[13]

Within the evaluation community, there is much discussion of the issue of net savings, including many thoughtful and interesting treatments of both theory and methodology (Vine et al. 2010, NMR 2011, Prahl et al. 2013). But in nearly every case, actual evaluation application in the states is falling far short of the theoretically preferred approaches. Clearly this is an area of evaluation practice that is still under development.

In the interest of highlighting some of the more advanced approaches in this subject area, the next section briefly reviews the progress in a few leading states.

Highlights from Some Leading States

Within the industry, California would be easily acknowledged as the state that over the decades has made the largest investment and done the most work on the evaluation of ratepayer-funded energy efficiency programs. Not surprisingly, it has also arguably done the most research on the issue of market effects.

A seminal piece of work in this field was a scoping study on market transformation done for California which defined market effects as "a change in the structure of a market or the behavior of participants in a market that is reflective of an increase in the adoption of energy-efficiency products, services, or practices and is causally related to market interventions" (Eto et al. 1996). California was a pioneer in its focus on market transformation, which was a policy approach largely adopted as a defensive mechanism to continue ratepayer-funded energy efficiency after the onset of electric industry restructuring in the mid-1990s.

While California shifted from its preoccupation with market transformation toward a more resource-acquisition approach after the California electricity crisis of 2000-2001, the notion of market effects has remained an intriguing issue. Its importance was highlighted when disputes arose over the fact that California was making downward adjustments to energy savings impacts to account for free ridership, but was not considering potential upward impacts from spillover and market effects.

[13] The fixation on the subject of free riders in the energy efficiency evaluation community is literally decades old (e.g., see Saxonis 1995).

In response, in 2007 the CPUC directed its staff to explore the ability to credibly quantify and credit nonparticipant spillover market effects. The CPUC also directed staff to report on the ability of current protocols to measure nonparticipant spillover savings, and potentially to propose revisions to market effects protocols and performance incentive mechanisms (D. 07-10-032).

Subsequently, the CPUC funded and co-managed with the California Institute for Energy and Environment (CIEE) three landmark studies examining the issue of market effects. These studies focused on CFLs, residential new construction, and high-bay lighting. They represent some of the earliest and most extensive empirical examinations of market effects.

Briefly stated, all three studies found that energy savings from market effects could be calculated, and two of them—on CFLs and high-bay lighting—concluded that savings could be quantified with sufficient reliability to be claimed as a resource. The three studies and their results are described in detail in a CIEE paper by Ed Vine (Vine 2011). An interesting additional element of that paper is that it also describes the results of a survey of professionals in the field that examined how the results of these three market effects studies were being used in the industry. In essence, this was an examination of the spillover or market effects of the research California had conducted. The researchers received a very positive response, with the most prevalent benefits cited by respondents being (a) documentation that market effects exist and (b) the transparent testing of methods to evaluate market effects.

While California is noteworthy for the research work they have done on this issue, their operational response thus far has been rather cursory. The CPUC did officially conclude that spillover is a valid concept ("as a policy matter, the Commission endorses the concept that spillover is real, just as free ridership is real") and they ordered that a portfolio-level market effects adjustment of 5% be applied across the board to the entire 2013-2014 portfolio cost-effectiveness calculation. They also directed staff to conduct additional spillover studies during the 2013-2014 period (D. 12-11-015, November 8, 2012).

One interesting example of a spillover effect of California's research on this issue is Hawaii. The evaluators working for the Hawaii Public Utilities Commission carefully reviewed the research and regulatory decisions coming out of California and a few other states, and concluded that spillover studies have tended to be costly and of questionable value in producing definitive estimates. As a result, they recommended a pragmatic approach of applying a spillover adjustment of not more than 10% to the previously established NTG ratios. The Hawaii Commission subsequently proceeded with a 5% spillover credit, similar to California's pragmatic approach (Dickerson 2013). Finally, the evaluators also recommended focusing attention on designing programs to maximize spillover and minimize free ridership rather than trying to precisely measure those variables (Evergreen Economics 2013).

Another state that has demonstrated leadership on this issue is New York. It has had some experience conducting its own market effects evaluations. However, New York may be most notable for its work on the issue of spillover.

The NYSDPS found itself confronting substantial claims of spillover savings in certain evaluations of energy efficiency programs in New York and, as a result, pursued the

development of specific guidelines for quantifying spillover effects. It subsequently produced what is widely regarded as a landmark initial effort by a state to establish guidelines for the evaluation of spillover (NYSDPS 2012).[14] These guidelines may go farther than any other jurisdiction in terms of requirements related to verifying spillover. New York is attempting to comply with the guidelines in evaluations that are currently underway. It will be interesting to see whether the state is able to fully meet the requirements and to assess the relative costs and benefits of this approach.

Building on this work is a very interesting current initiative in New York to deliberately produce a significant market transformation in the multifamily building market by creating a new type of energy efficiency service provider in that market. This should provide an interesting opportunity to test out the spillover guidelines by assessing not only spillover at the individual level but also broader market effects (Wirtshafter et al. 2013).

Indiana is an interesting example of a state that is currently using a fairly basic approach to quantifying energy efficiency program savings, but is laying the groundwork for one of the most sophisticated examinations of market effects in the nation. Indiana has developed the Indiana Evaluation Framework (Indiana Statewide Core Evaluation Team 2012), which defines net savings as:

> savings directly attributable to a program and . . . . savings that are directly attributable to the program's efforts. Net savings are determined by adjusting the evaluated gross savings estimates to account for a variety of circumstances, including savings weighted freerider effects, spillover effects and market effects. (p. 12)

The framework also defines market effects evaluation as "assessing the ways in which energy efficiency programs impact the operations of energy service markets such that additional savings above and beyond those achieved through direct program services to participants are documented" (p. 3). Consistent with the framework, Indiana is engaging in market baseline research, which will establish the baseline from which to measure market effects impacts in future years.

Finally, besides California and New York, perhaps the other state that has been most active in examining and researching the net savings issue is Massachusetts. The program administrators (the utilities) in Massachusetts had been independently quantifying the net savings of programs, including free ridership and spillover for over a decade. Then in 2011, a pair of detailed studies were undertaken to develop suggestions for more standardized guidelines for quantifying net savings for commercial and industrial programs (Tetra Tech et al. 2011) and for residential programs (NMR 2011).

These reports represent two of the most comprehensive examinations of net savings methodologies undertaken by any state and provide the foundation and rationale for

[14] See also the subsequent paper by a team of evaluators working in New York (Prahl et al. 2013) for further discussion of the New York spillover guidelines. Together the documents offer an excellent discussion of the challenges associated with estimating spillover and some practical recommendations. These include a thoughtful discussion of the subject of methodological rigor, including confidence levels and precision, which are especially thorny issues for the evaluation of spillover and market effects.

Massachusetts' continued emphasis on quantifying net savings for their ratepayer-funded energy efficiency programs. The Massachusetts Department of Public Utilities (MDPU) has been a national leader among regulatory commissions in the examination of the net savings issue. For example, see their "Order on Program Net Savings…," DPU 11-120-A, August 10, 2012.

Whereas some states have backed away from major efforts to quantify net savings and are pursuing a more simplified approach, Massachusetts has remained a supporter of strong efforts to accurately quantify net savings, including market effects that occur over multi-year periods and across programs.

Is It Necessary to Quantify Net Savings?

As reflected in our expert interviews summarized earlier, the industry continues to hold a diversity of opinion on whether it is necessary (or possible) to accurately quantify net savings impacts. Proponents argue that it is of course desirable to be able to identify what impacts a program is having beyond what would have happened if there had been no program. That is simply a part of sound public policy to assure that ratepayer dollars are well spent.[15]

Skeptics tend to make three key points:

1. The methods used to measure net savings are flawed and inaccurate, and risk producing unreliable or invalid conclusions.
2. The overall objectives for energy efficiency programs are broader now, including things like overall market energy price suppression effects and, in particular, climate objectives.[16] And Mother Nature does not care who savings are attributed to—just that overall carbon emissions are reduced.
3. Public policies and market interventions influencing energy efficiency are now so numerous and complex that it may be impossible to sort out the net effects of a particular program.

With respect to that third issue, Vine et al. (2010) describe the situation as follows:

> Consider a typical situation in the USA today. It is not uncommon to simultaneously have: public energy efficiency messaging by the state government; state and/or federal tax credits for energy efficiency measures; private-sector advertising and promotions for energy efficiency products; utility audit and informational programs; utility rebate and incentive programs; and general media coverage of energy efficiency related issues. In addition, the market actors who are exposed to these efforts may also be exposed to private, public and/or ratepayer-funded energy efficiency educational efforts in their universities, trade schools, or public schools. In this context, some are beginning to believe that it is a "fool's errand" to try to isolate out the effects of any one policy or program on an individual's behavior. (p.4).

[15] For an interesting description of the historical origins of the concepts of free ridership and net impacts in social services and public policy, see Haeri & Khawaja (2012).

[16] See Friedmann (2007) for an articulation of the argument that we need to re-examine traditional thinking regarding net savings in view of the climate crisis.

There are also practical concerns, in terms of the purposes for which net savings might be used. A good example of these concerns, and of a state using different approaches to the net vs. gross issue for different purposes, is provided by the following statement from the Public Service Commission of Wisconsin:

> Because net savings reflect the true impact of the programs, it is important to use them to determine cost-effectiveness, to inform continual program improvement, and for public policy decision making. However, contract goals should be on a gross basis. Net savings are inherently difficult to measure. Measuring net savings to determine if the program administrator is meeting contract goals would involve too many variables that are outside the Program Administrator's control and could create considerable risk to the Program Administrator if payment is tied to achievement of net goals. Also, establishing net contract goals can lead to unintended results. For example, the Program Administrator could walk away from a viable project because of concern that the program will get little or no credit for the savings from the project. (PSCW 2010, p.4)

On the other hand, one of our expert interviewees (who coincidentally was a long-time resident of Wisconsin) expressed a contrary opinion:

> In the absence of being held accountable in some manner for net savings, program administrators would be likely to face perverse incentives to pursue savings that would have occurred anyway. Therefore, resources would be misallocated to programs that are having relatively little effect on the world, and savings that could have been achieved would be missed. (Prahl 2013)

It would seem fair to say that the issue of net savings is a subject of great discussion and debate within the industry, with evaluators developing ever-more-sophisticated methods to examine this issue, and regulators generally looking for responsible yet practical solutions.[17]

What About Simplified Approaches?

When substantial financial ramifications are attached to the results of a net savings analysis (e.g., utility performance incentives and/or lost revenue recovery), arguments about net savings methodologies and results can become quite spirited. California's experience with shareholder incentives between 2006 and 2012 is a classic example.

Exacerbated by a policy of retroactively applying *ex post* estimates of free ridership, California degenerated into years of argument and litigation regarding the calculation and award of utility shareholder incentives. A CPUC analysis demonstrated that depending on which assumptions and methodologies were used, financial implications for the utilities ranged from nearly $400 million in earnings to a penalty of over $100 million (CPUC 2010). Ultimately, the CPUC changed its approach for incentives not only to move away from a retroactive adjustment to net savings, but to also shift to a greatly simplified incentive structure based in large part on

[17] An interesting illustration of this tendency toward differing perspectives on the methodological quest for net savings measurement is provided by the CIEE study mentioned earlier (Vine 2011), where a survey was done of industry professionals to assess the use of CIEE's excellent set of sophisticated evaluations of energy efficiency program market effects. Two-thirds of those who responded were either consultants or from academia. Less than 8% were from utilities, and none was from a utility regulatory commission.

milestone accomplishments rather than quantified program impacts. (See Zuckerman et al. 2013 for a detailed description of the California experience with shareholder incentives.)

While the California experience is an extreme example, it is certainly the case that the difficulty and expense of measuring things like free ridership and spillover—and the prospect of argumentation and litigation—have tended to push states toward simplified solutions.[18] Indeed, some states reached that conclusion early on. A good example is New Hampshire, where the Public Utilities Commission decided in 2000 that the methodological challenges and associated costs of accurately assessing free riders and spillover no longer justified the effort needed to net those out of the cost-effectiveness analysis (Order No. 23,574, November 1, 2000).

This allure of a simplified solution helps explain the great proliferation of deemed net-to-gross values, often in the context of technical reference manuals establishing key evaluation and cost-effectiveness assumptions and parameters. In that regard, our previous research (Kushler et. al. 2012) found that at least 20 states use some level of deemed NTG values in their calculation of net savings.

Critics of the simplified approach might raise several key questions, including:

- How reliable and valid are those deemed values?
- Are they regularly updated with new information from actual research?
- Are they flexible enough to adequately differentiate programs with higher vs. lower free rider risks and spillover effects?

These are legitimate and important questions confronting the industry.

One special category of a simplified approach is the practice, adopted in a number of states, of simply assuming a 1.0 NTG ratio for the portfolio of programs. Advocates of this approach (e.g., Khawaja et. al. 2012) make quite a good case that many studies have in fact found that estimates of free ridership and spillover often do roughly cancel out, and that not trying to measure these factors saves time and money (and reduces argument).

However, there are two reasons to be cautious about this approach. First, not all programs are equal. Some programs do legitimately have NTG ratios that are greater than 1.0; other programs are legitimately less than 1.0. The particulars of the design of a program can have a substantial influence on the level of free ridership that will be encountered, as well as on the amount of spillover/market effects that one might expect. Shouldn't we give some differential credit to programs that are well designed on those factors?

Second, the quality of implementation can also have a major effect on the extent of free ridership, as well as the presence and amount of spillover/market effects actually achieved. Simply assuming a 1.0 NTG ratio for everything can remove the incentive to make the extra effort to minimize free riders and/or maximize spillover and market effects. This would seem to be an issue with important policy and program ramifications, and an area where practical solutions are needed.

[18] See Haeri & Khawaja (2012) and Khawaja et al. (2012) for some arguments in favor of a simplified approach to the net savings issue.

Prospective vs. Retroactive Application of Net Savings Results

Another issue receiving active attention in the industry, and on which our interviewed evaluation experts had some disagreement, is whether *ex post* evaluation results regarding net savings should be applied retroactively to adjust claimed savings, or just prospectively to establish new NTG ratios for the next phase of the program.

The primary argument for retroactive application is that one should use the best available estimate of the actual effects of an energy efficiency program, and theoretically, that would be the net savings. Arguments against retroactive application focus on pragmatic concerns. For example, concern over the inability of available methods to reliably and accurately measure net savings creates a context for increased argumentation, particularly when there are financial implications (e.g., the award of performance incentives).[19] As another example, the perceived risk by program administrators of being retroactively "dinged" by a net savings adjustment may limit their willingness to pursue innovative or untested programs.

The Massachusetts DPU explicitly cited that latter concern as the rationale for changing its longstanding practice of retroactively applying net savings calculations in 2012:

> To avoid the risk that performance in administering the plans could be negatively affected by post-implementation adjustments to program savings that are difficult to project beforehand, Program Administrators may seek to adopt an overly cautious approach to program design and implementation. Revising our current practice so that Program Administrators no longer adjust net savings calculations post-implementation should remove a disincentive for Program Administrators to adopt innovative approaches to program design and implementation. (MDPU, 11-120-A, p.15.)

While there was not total unanimity amongst our experts on this issue, most of the group agreed with the prospective-only application of new net savings factors for the purposes of judging whether program administrators have met their program targets.

Claimed vs. Verified Gross Savings

Many states report gross energy savings results for their programs, either as the primary metric or along with net savings estimates. An important distinction to make is between raw or claimed gross savings and verified, adjusted, or evaluated gross savings.

The SEE Action collaborative group (SEE Action 2012) provides the following useful distinction between claimed and evaluated savings:

> *Claimed savings.* Values reported by an implementer or administrator, using their own staff and/or an evaluation consulting firm, after the subject energy efficiency activities have been completed; also called tracking estimates, reported savings, or in some cases,

[19] For some background on concerns about available methods, see Saxonis (2007) for a thoughtful discussion of the difficulty of estimating free ridership and spillover with any certainty, including a review of the disparate estimates of these values that have been reported in different studies; and see Peters & McRae (2008) for an excellent discussion about concerns regarding the estimation of free ridership via survey methods that have been commonly applied.

> ex post savings (although ex post usually applies to evaluated savings [see evaluated savings]). (p. A-3)
>
> *Evaluated savings.* Savings estimates reported by an independent, third-party evaluator after the subject energy efficiency activities have been implemented and an impact evaluation has been completed; also called ex post, or more appropriately, ex post evaluated savings. The designation of "independent" and "third party" is determined by those entities involved in the use of the evaluations and may include evaluators retained, for example, by the administrator or a regulator. These values may rely on claimed savings for factors such as installation rates and a technical reference manual for values such as per-unit savings values and operating hours. These saving estimates may also include adjustments to claimed savings or projected savings for data errors, per-unit savings values, hours, installation rates, savings persistence rates, or other considerations. (p. A-6)

Similarly, NEEP provides a succinct definition of "adjusted gross savings" that helps differentiate that variable from the result of a net savings evaluation.

> *Adjusted gross savings.* The change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated. It adjusts for such factors as data errors, installation and persistence rates, and hours of use, but does not adjust for free ridership or spillover. (Horowitz 2011, p. 7)

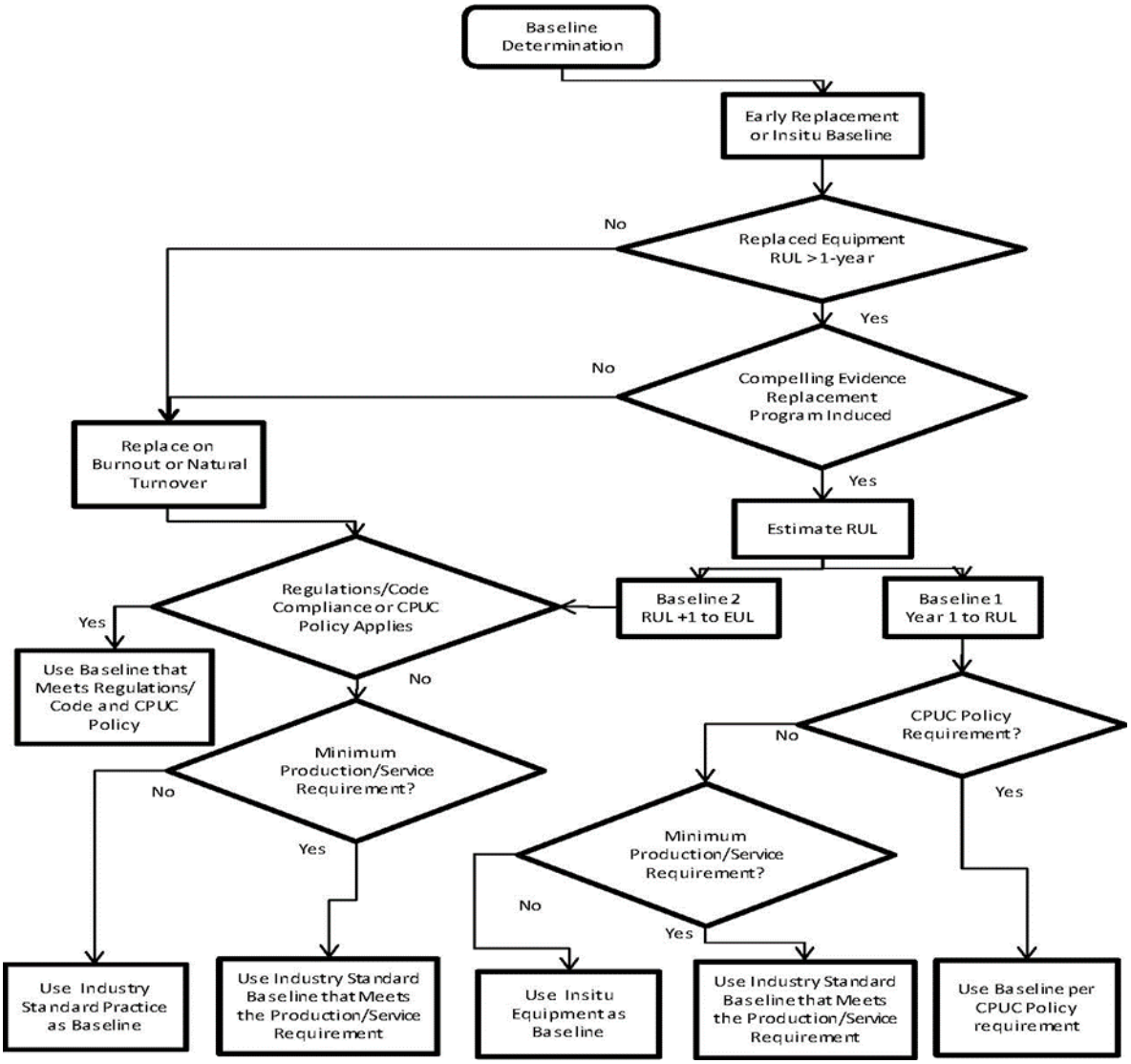
This distinction from net savings evaluation is important, because the consensus among the evaluation experts we interviewed was that, unlike the net savings adjustment factors discussed above, these types of adjusted gross (or verified gross) correction factors should be applied retroactively to initial claimed gross savings figures.

Other Gross Savings Issues

While not the primary focus of this report, the estimation of gross savings is obviously a critical component in any ultimate estimate of net savings. Various jurisdictions use different approaches to estimating gross savings, and even subtle discrepancies can produce important differences in results.

For example, one concern regarding gross savings that has been noted is in connection with the increasingly complex adjustments used to define baseline conditions. To illustrate, Figure 8 shows a flowchart of the decision-making process used in California for industrial program evaluations.

Figure 8. Decision-Making Process for Evaluating California Industrial Programs



Source: Maxwell et al. 2011

When adjustments are made for things like industry standard practice, the estimated gross savings of a particular customer action can depart considerably from the actual immediate grid impact of that action.[20] In addition to being a complicating factor that must be carefully considered in estimating the energy efficiency resource impact, this deviation can also create administrative challenges for the program administrator. The most obvious is simply trying to accurately classify any particular project, given the risk that improper classification could result in disallowed savings. But there are also customer relations issues. For example, when a program can pay incentives to a customer based only on the theoretical adjusted gross savings rather than on what the customer actually sees in terms of a change in consumption, this can create some customer confusion.

[20] There is some debate in the field about whether adjustments for standard industry practice should more appropriately be considered a net savings adjustment (e.g., Hall et al. 2013, Ridge et al. 2013).

In terms of the broader implications for the use of evaluation results, the key takeaway from Figure 8 is that the choice of different baselines can result in several different gross savings estimates.[21]

This analysis suggests that there is still an important need for transparency in reporting gross savings results, and ideally, a continued evaluation industry focus on developing practical and consistent protocols for estimating gross savings.

Other Purposes for Net Savings Evaluation

Finally, one area where there does seem to be a fairly good consensus in the industry, even among the evaluation experts who do not support requiring energy efficiency program results to be reported in net savings terms, is the use of methodologies to examine free ridership and spillover to help in program design and ongoing program improvement. The available methodologies can help provide qualitative information for improving the incremental effectiveness of programs, despite a lack of confidence that they provide a sufficient basis to make accurate conclusions about net savings (particularly conclusions with large financial implications).

That type of pragmatic use of evaluation information can be applied just about anywhere. Even states that have not focused on using evaluation studies to adjust net savings results have embraced this use of free rider and spillover information to improve program designs (e.g., MPSC 2008, Texas Public Utilities Commission 2013).

[21] Almost none of these estimates equate to what the customer actually experiences at the meter, by the way. This suggests some continued usefulness for things like pre- and post-metering or billing analysis.

Conclusions

Based on the results of our national survey of states, interviews with evaluation experts, and review of pertinent literature, we are able to arrive at a few over-arching conclusions on the net savings subject. We briefly discuss each of these below.

There is a great diversity of approaches to the issue of net savings. In this project, our national survey of the 45 states with active ratepayer-funded energy efficiency programs found a tremendous variation in the manner in which states address the net savings issue. A substantial minority of those states (nearly a quarter) simply rely on gross savings. Among those that nominally use net savings, there are major discrepancies in how they operationalize the issue, ranging from simply deeming a 1.0 NTG ratio to valiantly attempting to measure free riders, spillover, and market effects.

This diversity across states should not be a surprise, given the results of our earlier study (Kushler et al. 2012), which was more broadly focused on how states were handling the issue of evaluating ratepayer-funded energy efficiency programs. As that study noted:

> One distinguishing characteristic of the electricity system in the United States is that regulation of retail utilities has been a responsibility of the individual states. With few exceptions, federal policymakers have tended to defer to that separation of powers. In many respects, each state is its own little kingdom when it comes to designing the details of how the retail utilities within its borders are to be regulated. . . . State approaches to the issue of whether and how to provide ratepayer-funded energy efficiency programs are a classic example of this independence. (p. 2)

What was perhaps more surprising in this project was the diversity of opinion we found among the seven national energy efficiency program evaluation experts that we interviewed. Even on the core issue of whether states should make their primary reporting metric gross or net savings, we found a wide range of opinions (albeit a clear majority did favor net savings as the primary metric).

Opinion on some key issues is increasingly converging. Among the evaluation experts we interviewed, there was consensus on at least three important subjects. The first was that **it is desirable to have some evaluation focus on the issues of free ridership and spillover/market effects when designing and improving programs**. Even those who did not think it was possible or desirable to try to reliably estimate those factors when quantifying program impacts felt that it was desirable to study those factors and use the information to produce better programs.

A second area of consensus was that if one was going to attempt to evaluate the net savings impact of a program**, it would be desirable to incorporate multiple methods and attempt to triangulate a reasonable savings estimate**. There was general agreement that no single method of estimating net savings has yet emerged as the preferred approach.

Finally, a third area of consensus was that if someone is going to try to quantify net savings, **it is important to incorporate all three basic components (free riders, spillover and market effects) and not acceptable to quantify only free ridership.** By only adjusting savings to account for free riders, one is biasing and unbalancing the final results.

It is encouraging to see that the industry seems to have made some progress on that latter issue. As recently as 2005, a national review found that use of free ridership values in establishing NTG ratios was widespread while very few estimates actually included any spillover, but that situation has changed (Khawaja et al. 2012). Indeed, in our earlier study (based on a survey conducted in late 2011), we found that nearly a third of states that reported using net savings were quantifying only free riders and not free drivers/spillover or market effects (Kushler et al. 2012). In our new survey for this project, that number had been reduced to just 14% of states that quantify net savings (and half of those now plan to include spillover in the future).

There has been a strong trend toward simplified approaches to the net savings issue. It is interesting to observe that there is a growing gap between the advances that the evaluation industry has been making toward more sophisticated methods for estimating factors such as spillover and market effects, and the actual approaches that state regulators are taking on this issue. Very likely in response to the higher costs, lengthy time delays, and risk of protracted arguments, there has been a strong trend toward simplified approaches to the net savings issue, such as deemed NTG values and round-number "adders" to reflect factors like spillover and market effects. California and Hawaii are examples. It is encouraging to see a growing number of states explicitly recognize the reality of those important factors. But thus far, with limited exceptions (e.g., California, Massachusetts, and New York), states do not seem committed to investing the time and resources necessary to rigorously measure those factors.

While one can understand the advantages to a particular state in taking a simplified approach, we should recognize and appreciate the contribution made by those who do invest in more intensive evaluation on this issue. This activity is important both to document the reality of concepts such as spillover and market effects and to provide empirical data that states can use in their simplified approaches.

Recommendations

As stated at the outset of this report, the purpose of this project was not to critique or make recommendations regarding particular methodologies for estimating net savings. We leave that important work to others. For example, see the forthcoming report from the U.S. DOE/NREL Uniform Methods Project. In that spirit, we focus our recommendations on a number of pragmatic conceptual and operational issues.

To begin, we offer a few recommendations on which there was relatively good consensus amongst the national evaluation experts we interviewed.

States should be transparent in disclosing the methodologies and assumptions used in estimating the energy savings results that they report, whether gross or net.

Regardless of which metric a state chooses, it should clearly and simply disclose the methodologies and key input assumptions used to develop the savings estimates it reports. This disclosure is important both internally in interpreting reported results as well as externally in facilitating comparisons between states.

If net savings are used, those estimates should include consideration of all the basic factors: free riders, free drivers/spillover, and market effects. It is not acceptable to consider only free ridership effects.

We are pleased to see substantial progress in the industry on this issue in the last couple of years. Just a small percentage of states now employ an unbalanced approach to net savings that only adjusts for free ridership, and the trend away from that practice continues.

Issues of free ridership and spillover/market effects should be examined for program design and program improvement purposes, even if they are not used to adjust official reported energy savings.

We are also pleased to see the widespread acceptance of this basic principle, although there is considerable work to be done to encourage states to actually undertake the evaluation effort to provide those benefits in program improvement.

In addition to these consensus areas, we offer a few other recommendations that we think merit consideration.

Simplified approaches to quantifying net savings (e.g., deemed NTG values) are acceptable in most situations, assuming they are carefully established and subject to periodic updating.

Given the costs and time requirements of conducting a specific evaluation of the net savings impacts of a program (e.g., estimating factors such as free ridership, spillover, and market effects), one can certainly understand the attractiveness of establishing deemed NTG ratios. Incorporating at least some simplified approaches into the assessment of a portfolio of energy efficiency programs is probably unavoidable. However a simplified approach should incorporate some key elements, including the following:

- Establish the deemed values using the best available evidence for similar programs and measures, and for similar target population and climate zones.

- Where possible, the deemed values should be appropriate to the particular program design that will be used. Some program designs are more vulnerable to free riders than others, and some are more likely to produce spillover and market effects.
- If possible, to avoid challenges and litigation later, establish the deemed values in a collaborative process where stakeholders sign off on the values chosen.
- Have a process for periodic review and updating of deemed net savings assumptions as better information becomes available.
- If possible, in order to provide information to update net savings factors, conduct targeted net savings evaluations on programs and measures where there is greater uncertainty and/or savings impacts.

For purposes of judging program administrator performance, when a priori net savings assumptions (e.g., NTG ratios) have been agreed to, evaluation results should generally only be applied prospectively, to adjust future energy savings calculations.[22]

That approach should hopefully reduce the likelihood of protracted argument and litigation—recall California's unpleasant experience—reduce the program administrator's perception of risk, and thus encourage more innovative programs. It is also consistent with basic fairness. If all parties have agreed to accepted NTG values based on a given program design and that design is faithfully executed, it is reasonable not to retroactively change the playing field used for crediting energy savings accomplishments.[23]

One exception to this prospective-only approach to applying changes to net savings inputs could be in cases of a priori agreement that the effects of a particular program are so uncertain that producing savings numbers must await the results of an *ex post* evaluation. Examples include programs with very uncertain free ridership potential, or programs designed to achieve large but unproven spillover or market effects. In such cases, there may be good agreement that final savings claims cannot be determined until the net savings evaluation is completed.

Savings results reported in gross savings terms should be verified gross.[24]

Some states have a preference for reporting energy efficiency program accomplishments in terms of gross rather than net savings. This preference should not exempt such states from performing good program evaluation work. A critically important role for evaluation is to verify the key elements that go into calculating gross savings (e.g., what specific equipment was installed, what was replaced, what is the appropriate baseline, hours of operation). It is important to distinguish this verification from the evaluation effort that goes into estimating net savings. Even if a state chooses to focus on gross savings, it should still perform the evaluation work needed to produce verified gross savings estimates. One should not simply rely on unverified tracking system estimates.

---

[22] In contrast, a retroactive adjustment is appropriate for other purposes. For example, for system planning purposes it would be important to use the best available estimate of how much incremental resource was actually acquired.

[23] In contrast, other key factors more under the control of the utility/program administrator, such as the actual number of units installed, the size of the measures replaced, and so on, should indeed be based on actual *ex post* data observed in the evaluation. This is the essence of the concept of verified gross savings.

[24] This variable is sometimes referred to by other terms such as "adjusted gross savings" (NEEP 2012) or "*ex post* evaluated gross savings" (SEE Action 2012). Essentially, it is the raw gross savings (e.g., from the program tracking system), adjusted by evaluation methods to verify key factors (such as verifying the actual installation and operation of the measure, the size, efficiency level, hours of operation, and so on) used to calculate savings.

One other point on this subject of verified gross savings relates to the issue of retroactive vs prospective application of results. In contrast to our previous recommendation that net savings adjustments should generally be applied only prospectively for purposes such as calculating program administrator incentives, the adjustments to raw tracking data to determine verified gross savings should be applied retroactively. Program administrators logically consider these factors (e.g., the actual number, efficiency, size, etc. of measures installed, the existing conditions, the proper baseline) as they deliver the program; thus it is appropriate to base estimates of savings credit, program administrator incentives, and so forth on actual verified gross data rather than on simple *ex ante* estimates or unverified raw tracking data.

We note that the Massachusetts DPU emphasized a similar point in their 2012 order on the net savings issue:

> To ensure that the value of the resources procured through the energy efficiency programs is represented in an accurate and reliable manner, it is imperative that the adjusted gross savings associated with each program year be determined using the most up-to-date information available. Accordingly, the Department finds that it is appropriate for Program Administrators to continue to apply the results of recently completed gross savings evaluation studies retrospectively to the applicable program year (i.e., to calculate program savings on a post-implementation basis using updated gross savings impact factors). (MDPU, 11-120-A, p. 14)

Savings estimates used for utility claims of lost revenues should be held to a higher standard.

While ACEEE recommends the use of true symmetrical revenue decoupling to address utility concerns about revenue loss resulting from customer energy efficiency programs (Hayes et al. 2011), it is true that a number of states directly grant lost revenue recovery based on savings impacts reported for their energy efficiency programs. We believe that energy savings estimates used for that purpose need to be held to the highest feasible standard, even if more simplified approaches are used for other purposes, such as basic program reporting (or even the determination of shareholder incentives).

The issue of lost revenue recovery is fundamentally different for two reasons. First, the amounts of money at stake can be very large, even exceeding the total cost of operating the energy efficiency program. Second, the whole concept of lost revenue recovery is based on the premise that the utility suffered actual harm by the loss of revenues they would have otherwise received— harm for which ratepayers are being asked to directly compensate the utility. For those reasons, a more stringent approach to quantifying actual savings is justified for the purposes of calculating lost revenue compensation.

Concluding Thoughts

The reader will note that this report does not express a firm conclusion or recommendation on the core questions of whether states should require that net savings evaluations be conducted, and whether energy efficiency program results must always be reported in net savings terms. Key decisions to be addressed include how many resources (dollars and time) should be devoted to the pursuit of net savings estimates, and in what circumstances. This is a complex issue, encompassing multifaceted and sometime conflicting concerns and objectives.

We certainly support the conceptual objective of knowing what impacts an energy efficiency program has produced that would not have happened absent the program. That objective would clearly tend to call for net savings evaluation. However, we are sympathetic to the concerns expressed by many that (a) the available methodologies are not sufficient to produce accurate estimates of true net impacts in an increasingly complex market, and (b) considerable time, expense, and argument can be avoided by using a more simplified approach.

Moreover, we would note that in the earlier years of ratepayer-funded energy efficiency programs, there was a threshold question of whether energy efficiency programs were in fact a valid utility system resource. That question, combined with opposition from some key vested interests, tended to produce a high burden-of-proof evaluation expectation for energy efficiency programs that was disproportionate to the level of scrutiny applied to many other utility expenditures.

We would submit that the threshold question of energy efficiency as a legitimate resource has been robustly answered over the years, and now we should take care that the operationalization of an evaluation requirement does not impede the many benefits (both utility-system and societal) of energy efficiency programs.

However, one other factor that pushes again toward net savings evaluation (comprehensive) is the fact that energy efficiency programs are increasingly being designed to produce spillover and market effects that go well beyond direct program participants. It is essential that we develop ways to reasonably estimate those impacts.

Finally, our examination of this complex issue leads us to two hopefully compatible conclusions. We definitely support continued research into methods of examining factors such as free ridership, spillover, and market effects. Exploring and hopefully reliably quantifying these effects will be increasingly important as more sophisticated upstream and market-focused energy efficiency programs and policies are developed.

At the same time, where necessary, we support states taking a pragmatic approach that facilitates the advancement of their policy objectives while reasonably protecting the interests of their ratepayers and citizens.

We look forward to following the further developments in the field.

References

[CPUC] California Public Utilities Commission. 2006. *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals.* Prepared for the California Public Utilities Commission by TecMarket Works. http://www.cpuc.ca.gov/NR/rdonlyres/27629E7A-F01A-48CA-8B2C-B07ECEE7DD5A/0/CAEnergyEfficiencyEvaluationProtocols.doc

———. 2010. *2006-2008 Energy Division Scenario Analysis Report.*

Dickerson, Chris Ann. 2013. Personal communication, August 2013.

Eto, Joseph, Ralph Prahl and Jeff Schlegel. 1996. *A Scoping Study on Energy Efficiency Market Transformation by California Utility DSM Programs.* Prepared for the California Demand-Side Measurement Advisory Committee: Project 2091T.

Evergreen Economics. 2013. *Evaluation of the Hawaii Energy Conservation and Efficiency Programs, Program Year 2011, Volume 1*, June 20, 2013.

Friedmann, Raphael. 2007. "Maximizing Societal Uptake of Energy Efficiency in the New Millennium: Time for Net-to-Gross to Get Out of the Way?" In *Proceedings of the 2013 International Energy Program Evaluation Conference.* Chicago, IL.

Haeri, Hossein, and M. Sami Khawaja. 2012. "The Trouble with Freeriders." *Public Utilities Fortnightly, March 2012.*

Hall, Nick, David Ladd and M. Sami Khawaja. 2013. "Setting Net Energy Impact Baselines: Building Reliable Evaluation Approaches." In *Proceedings of the 2013 International Energy Program Evaluation Conference.* Chicago, IL.

Hayes, Sara, Steve Nadel, Martin Kushler, and Dan York. 2011. *Balancing Interests: A Review of Lost-Revenue Adjustment Mechanisms for Utility Energy Efficiency Programs.* Washington, DC: American Council for an Energy-Efficient Economy.

Horowitz, Paul. 2011. *Glossary of Terms, Version 2.1. Facilitated by Northeast Energy Efficiency Partnerships*. A project of the NEEP Regional Evaluation, Measurement and Verification Forum. PAH Associates. http://www.neep.org/Assets/uploads/files/emv/emv-products/EMV_Glossary_Version_2.1.pdf

Indiana Statewide Core Program Evaluation Team. 2012. *Indiana Evaluation Framework.* Prepared for The Indiana Demand Side Management Coordination Committee.

Khawaja, M. Sami, Hossein Haeri, Anne West and Seth Kadish. 2012. *Net-To-Gross Study.* Prepared for SRP by the Cadmus Group, April, 2012.

Kushler, Martin, Seth Nowak, and Patti Witte. 2012. *A National Survey of State Policies and Practices for the Evaluation of Ratepayer-Funded Energy Efficiency Programs.* Washington, DC: American Council for an Energy-Efficient Economy.

[MDPU] Massachusetts Department of Public Utilities. 2012. *Order on Program Net Savings and Environmental Compliance Costs.* D.P.U. 11-120-A. http://www.env.state.ma.us/dpu/docs/electric/11-120/81012dpuord.pdf

Maxwell, Jonathan, Nikhil Gandhi and Fred Coito. 2011. "Establishing Baselines for Industrial Energy Efficiency Projects." In *Proceedings of the 2011 ACEEE Summer Study on Energy Efficiency in Industry Conference.*

[MPSC] Michigan Public Service Commission. 2008. *In the Matter, on the Commission's own motion to implement 2008 PA 295 through issuance of a temporary order as required by MCL 460.1191.* Temporary Order. Case No. U-15800.

[NMR] NMR Group, Inc. and Research Into Action, Inc. 2012. *Regional Net Savings Research, Phase 2: Definitions and Treatment of Net and Gross Savings in Energy and Environmental Policy.* Submitted to Northeast Energy Efficiency Partnerships: Evaluation, Measurement and Verification Forum. https://www.neep.org/Assets/uploads/files/emv/NEEP%20-%20Regional%20Net%20Savings%20Report%2012-05-12.pdf

[NMR] NMR Group, Inc., Tetra Tech and KEMA. 2011. *Cross-Cutting Net to Gross Methodology Study for Residential Programs – Suggested Approaches (Final).* Prepared for: Massachusetts Program Administrators. http://www.ma-eeac.org/Docs/8.1_EMV%20Page/2011/2011%20Residential%20Studies/Residential%20MA%20NTG%20Methods%20Final%20072011.pdf

[NYSDPS] New York State Department of Public Service and the Evaluation Advisory Group. August 2008. Updated November 2012. *New York Evaluation Plan Guidance for EEPS Program Administrators.* http://www.dps.ny.gov/Evaluation_Guidance.pdf

Peters, Jane and Marjorie McRae. 2008. "Freeridership Measurement Is Out of Sync with Program Logic….or We've Got the Structure Built, but What's Its Foundation?" In *Proceedings of the 2008 ACEEE Summer Study on Energy Efficiency in Buildings.* Washington, DC: American Council for an Energy-Efficient Economy.

Prahl, Ralph. 2013. Personal communication, August 2013.

Prahl, Ralph, Richard Ridge, Nick Hall and William Saxonis. 2013. "The Estimation of Spillover: EM&V's Orphan Gets a Home." In *Proceedings of the 2013 International Energy Program Evaluation Conference.* Chicago, IL.

[PSCW] Public Service Commission of Wisconsin. 2010. *Memorandum Regarding Quadrennial Planning Process Phase Two – Evaluation Issues.* Docket No. 5-GF-191.

Ridge, Richard, Michael Baker, Nick Hall, Ralph Prahl and William Saxonis. 2013. "Gross is Gross and Net is Net: Simple, Right?" In *Proceedings of the 2013 International Energy Program Evaluation Conference.* Chicago, IL.

Saxonis, William, P. 1995. "After Ten Years of Measuring Free Riders: What Have We Learned? What Challenges Remain?" *Proceedings of the 1995 International Energy Program Evaluation Conference*.

———. 2007. "Free Ridership and Spillover: A Regulatory Dilemma." In *Proceedings of the 2013 International Energy Program Evaluation Conference.* Chicago, IL.

[SEE Action] State and Local Energy Efficiency Action Network. December 2012. *Energy Efficiency Program Impact Evaluation Guide, Evaluation, Measurement, and Verification Working Group.* DOE/EE-0829.
http://www1.eere.energy.gov/seeaction/pdfs/emv_ee_program_impact_guide.pdf

Skumatz, Lisa and Edward Vine. 2010. "A National Review of Best Practices and Issues in Attribution and Net-to-Gross: Results of the SERA/CIEE White Paper." In *Proceedings of the 2010 ACEEE Summer Study on Energy Efficiency in Buildings.*

Tetra Tech, KEMA and NMR Group, Inc. 2011. *Cross-Cutting C&I Free-Ridership and Spillover Methodology Study Final Report.* Prepared for Massachusetts Program Administrators.
http://www.ma-eeac.org/Docs/8.1_EMV%20Page/2011/2011%20Commercial%20&%20Industrial%20Studies/MA%20FR_SO%20CI%20%20Study%20w%20Exec%20Summary%205-26-2011%20v11.pdf

Texas Public Utility Commission. Substantive Rules. R. 25.181. Project No. 39674.

Vine, Ed. 2011. *California's Market Effect Studies: Key Findings, Lessons Learned, and Future Directions*. California Institute for Energy and Environment (CIEE) White Paper. Prepared for: California Public Utilities Commission.

Vine, Ed, Nick Hall, Kenneth Keating, Martin Kushler and Ralph Prahl. 2010. Emerging *Issues in the Evaluation of Energy-Efficiency Programs: The US Experience.* Published online November 26, 2010 at Springerlink.com.

Wirtshafter, Robert, Jennifer Fagan and Bobbi Tannenbaum. 2013. "A Case Study of How a Market Transforming Program Claims Spillover and Market Effects." In *Proceedings of the 2013 International Energy Program Evaluation Conference.* Chicago, IL.

Zuckerman, J., Jeff Deason and Sangeetha Chandrashekeran. 2013. "Rewarding Efficiency: Lessons from California's Shareholder Incentive." In *Proceedings of the 2013 International Energy Program Evaluation Conference.* Chicago, IL.

Appendix A: Profiles of Selected States of Interest

California

Background

Description of Utility Energy Efficiency Programs in the State

California is a long-time leading state for its utility-sector customer energy efficiency programs, which date back to the 1970s and have grown and evolved substantially over three decades. Investor-owned utilities administer energy efficiency programs with oversight by the California Public Utilities Commission (CPUC), which establishes key policies and guidelines, sets program goals, and approves spending levels. California's publicly owned utilities (POUs), such as large municipal utilities serving Los Angeles and Sacramento, also administer customer programs.

California's utilities fund some of their programs and initiatives through resource procurement budgets and recover their costs through rate cases brought before the CPUC. California's utilities also used to collect a Public Goods Charge (PGC) on customer utility bills to fund utility energy efficiency programs. Public Goods Charge is California's name for a public benefits fund established in Assembly Bill 1890 in 1996. The PGC (see R.09-09-047, section 11) was not reauthorized by the California Legislature in 2011, and Governor Brown directed the CPUC to pursue continuation of funding for these programs before the PGC expires. About one-quarter of the utility energy efficiency portfolio budgets came through the PGC; the remaining majority of the energy efficiency portfolios is funded through utility procurement funds and is unaffected by the expiration of the PGC.

Following California's 2001 electricity crisis, the main state resource agencies worked with the state's utilities and other key stakeholders to develop the California Integrated Energy Policy Report that included energy savings goals for the state's investor-owned utilities (IOUs). The CPUC formalized the goals in Decision 04-09-060 in September 2004. The goals called for electricity use reductions in 2013 of 23 billion kWh and peak demand reductions of 4.9 million kW from programs operated over the 2004–2013 period. The natural gas goals were set at 67 MMTh per year by 2013.

The California legislature emphasized the importance of energy efficiency and established broad goals with the enactment of Assembly Bill 2021 of 2006. The bill requires the California Energy Commission (CEC), the CPUC, and other interested parties to develop efficiency savings and demand reduction targets for the next ten years. Having already developed interim efficiency goals for each of the IOUs from 2004 through 2013, the CPUC developed new electric and natural gas goals in 2008 for years 2012 through 2020, which call for 16,300 GWh of gross electric savings over the nine-year period (see CPUC Decision 08-07-047). California's current targets are embedded in the approved 2013-2014 program portfolios and budgets for the state's IOUs, which call for gross electricity savings of almost 4,000 GWh and natural gas savings of approximately 94 MMTh (see CPUC Decision 12-11-015).

Under Assembly Bill 1890 (1996) and Assembly Bill 995 (2000), California established a loading order that calls for first pursuing all cost-effective efficiency resources, then using cost-effective renewable resources, and only after that using conventional energy sources to meet new load.

All of the investor-owned electric and gas utilities in California have decoupling, which is an integral part of California's "big, bold" energy efficiency initiative. Utilities may also earn

performance incentives for energy efficiency efforts. The budgets for California's 2011 electric and natural gas utility-sector energy efficiency programs were $1.16 billion and $268 million respectively. The state's 2010 electric energy efficiency programs resulted in new savings of 4,617,000 MWh (adjusted for free riders and spillover).

California is a national leader in energy efficiency program measurement and evaluation. The evaluation of ratepayer-funded energy efficiency programs relies on regulatory orders (CPUC Decision 09-09-047). Evaluations are administered by both utilities and the CPUC. California has established formal rules and procedures for evaluation which are stated in Decision 09-09-047. Evaluations are conducted statewide and for each of the utilities.

Evaluation of Utility Energy Efficiency Program Impacts

EVALUATOR: The California Public Utilities Commission and the utilities.

USE: General reporting on program accomplishments, screening, and making decisions on future programs and, in some years, determining eligibility for and/or amount of utility performance incentives.

PROTOCOLS: California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals, April 2006.

Net vs. Gross Energy Savings

Net and/or gross energy savings

Net

Primary metric (net or gross) to report energy efficiency program savings results

Net

Definitions

NET SAVINGS: The total change in load that is attributable to the utility DSM program. This change in load may include, implicitly or explicitly, the effects of free drivers, free riders, state or federal energy efficiency standards, changes in the level of energy service, and natural change effects (California Energy Efficiency Evaluation Protocols).

FREE RIDER: A program participant who would have implemented the program measure or practice in the absence of the program (California Energy Efficiency Evaluation Protocols).

FREE DRIVER: A non-participant who adopted a particular efficiency measure or practice as a result of a utility program (California Energy Efficiency Evaluation Protocols).

SPILLOVER: Reductions in energy consumption and/or demand in a utility's service area caused by the presence of the DSM program, beyond program-related gross or net savings of participants. These effects could result from: (a) additional energy efficiency actions that program participants take outside the program as a result of having participated; (b) changes in the array of energy-using equipment that manufacturers, dealers, and contractors offer all customers as a result of program availability; and (c) changes in the energy use of nonparticipants as a result of utility programs, whether direct (e.g., utility program advertising) or indirect (e.g., stocking practices such as (b) above or changes in consumer buying habits) (California Energy Efficiency Evaluation Protocols).

MARKET EFFECTS: A change in the structure or functioning of a market or the behavior of participants in a market that result from one or more program efforts. Typically these efforts are designed to increase the adoption of energy-efficient products, services, or practices and are causally related to market interventions.

Net Savings Discussion

California has long focused on net savings as their metric of interest in energy efficiency evaluation, albeit until recently this only included free ridership. Awarding incentives based on *ex post* evaluation of net savings has been a goal of CPUC's for many years. In an earlier wave of shareholder incentives in the 1990s, CPUC implemented an incentive with payments based on *ex post* EM&V results, but that incentive was interrupted by industry restructuring and never fully implemented (CPUC 2003). More recent experience in California has been noteworthy for conflict on this issue, as described more fully below.

Application of Net Savings for Decision Making

Shareholder incentives

In a paper presented at the 2013 International Energy Program Evaluation Conference (IEPEC) in Chicago, Zuckerman et al. (2013) describe the history and controversy of the energy efficiency shareholder incentive mechanism in California. The authors describe the Risk/Reward Incentive Mechanism (RRIM), implemented in 2007 for the state's investor-owned utilities:

> Under the RRIM, incentive earnings were calculated based on *ex post* (post-implementation) estimates of energy savings. Utilities would receive interim payments during the first two years of the three-year program cycle based on *ex ante* (pre-implementation) estimates of energy savings parameters. At the end of the program cycle, CPUC would update both installation numbers and estimates of energy savings parameters, including free ridership rates, based on final evaluation findings. CPUC would adjust the final payment to the utilities so that the total award paid over the three-year cycle corresponded to the amount calculated based on ex post evaluation; this process was referred to as a true-up. If the final earnings calculation showed that the interim payments were not justified by program performance, the utilities would be obligated to return the interim payments.

As Zuckerman et al. explain, the CPUC viewed this process as a way to ensure that ratepayers were paying for actual performance, not just for implementation of programs with uncertain outcomes. However, conflict regarding evaluation methods and processes prevented full implementation of the RRIM. One of the major conflicts ensued due to issues regarding a compact fluorescent lamp (CFL) upstream buy-down program, which made up the largest component of the utilities' 2006-2008 energy efficiency program portfolios. The CPUC expressed concerns early in the 2006-2008 program cycle that the *ex ante* estimates of free ridership were too low for the CFL program. The CFL program was so large that changes to the free ridership rate could make the difference between incentive earnings and penalties for the utilities, and the utilities objected to the possibility of the CPUC forcing them to return interim payments based on the results of the ex post true-up.

As anticipated, as Zuckerman et al. depict, conflict arose when the CPUC's Energy Division released its final evaluation report in 2012, the results that would be used to calculate the true-up incentive payment for the 2006-2008 program cycle. Based on the final evaluation report, the

utilities would receive a penalty of $45 million as opposed to a $400 million incentive based on ex ante estimates. One of main issues in dispute was the free ridership rates for the CFL program.

The Zuckerman et al. paper describes that, in December 2010, the CPUC decided to abandon the true-up and essentially changed the RRIM from a risk/reward proposition to a bonus payment for successful implementation of energy efficiency programs. After continued dispute, the RRIM incentive was extended (without the ex post true-up) to 2009 programs. The CPUC approved an incentive for the 2010-2012 programs based on a percentage of approved program spending (not energy savings) and on utility compliance with CPUC's process for reviewing ex ante energy savings estimates.

On September 5, 2013, in Decision 13-09-023, the CPUC adopted a new Efficiency Savings and Performance Incentive (ESPI) mechanism that supersedes the RRIM.

In its decision, the CPUC expressed its perspective on the shareholder incentive:

> Incentive earnings potential should be sufficient to motivate IOU investors and managers to view EE as a core part of regulated operations, and to foster creativity within IOU engineering and management. EE should be viewed through the same financial lens as supply-side investments. At the same time, incentive earnings potential must remain limited as necessary to protect ratepayers' interests and guard against excessive and/or unreasonable costs, and to ensure that ratepayers realize commensurate benefits as a result of any incentive earnings paid.

In Decision 13-09-023, the CPUC expressed its intention to award incentives based on net savings goals, adjusted for the effects of free riders and spillover. The CPUC directed a shareholder incentive, relating to the resource savings component of the ESPI mechanism, that includes both ex ante and ex post approaches.

> For custom projects and for specific deemed measures with ex ante parameters that we identify as highly uncertain, we shall require ex post evaluations as the basis for calculating savings incentive payments. The savings award for the remaining deemed measures will be calculated based on the locked down ex ante parameter values, and only the claimed measure count will be subject to ex post adjustment for these measures. The specific processes for determining the ex ante and ex post portions of the savings incentive are described next.

Lost revenue recovery

N/A. All of the investor-owned electric and gas utilities in California have decoupling.

References

ACEEE State Energy Efficiency Policy Database. http://www.aceee.org/sector/state-policy/california

California Public Utilities Commission. November 8, 2012. Decision 12-11-015.

Application of Pacific Gas and Electric Company for Approval of 2013-2014 Energy Efficiency Programs and Budget (U39M). Application 12-07-001. And Related Matters.

Application 12-07-002, Application 12-07-003, Application 12-07-004. Decision Approving 2013-2014 Energy Efficiency Programs and Budgets.
http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M034/K299/34299795.PDF

California Public Utilities Commission. September 5, 2013. Decision 13-09-023. Decision Adopting Efficiency Savings and Performance Incentive Mechanism.

Order Instituting Rulemaking to Reform the Commission's Energy Efficiency Risk/Reward Incentive Mechanism. Rulemaking 12-01-005 (Filed January 12, 2012).
http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M076/K775/76775903.PDF

California Public Utilities Commission. September 23, 2004. Order Instituting Rulemaking to Examine the Commission's Future Energy Efficiency Policies, Administration and Programs, Rulemaking 01-08-028. Interim Opinion: Energy Savings Goals for Program Year 2006 and Beyond. http://docs.cpuc.ca.gov/published/Final_decision/40212.htm

State of California. September 29, 2006. Assembly Bill No. 2021. Chapter 734.
http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab_2001-2050/ab_2021_bill_20060929_chaptered.pdf

California Public Utilities Commission. July 31, 2008. Decision 08-07-047. Order Instituting Rulemaking to Examine the Commission's Post-2005 Energy Efficiency Policies, Programs, Evaluation, Measurement, and Verification, and Related Issues. Rulemaking 06-04-010.

Decision Adopting Interim Energy Efficiency Savings Goals for 2012 through 2020, and Defining Energy Efficiency Savings Goals for 2009 through 2011.
http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/85995.pdf

California Public Utilities Commission. November 8, 2012. Decision 12-11-015. Application of Pacific Gas and Electric Company for Approval of 2013-2014 Energy Efficiency Programs and Budget (U39M). Application 12-07-001. Decision Approving 2013-2014 Energy Efficiency Programs and Budgets.
http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M034/K299/34299795.PDF

State of California. September 23, 1996. Assembly Bill No. 1890. Chapter 854.http://www.leginfo.ca.gov/pub/95-96/bill/asm/ab_1851-1900/ab_1890_bill_960924_chaptered.html

State of California. September 30, 2000. Assembly Bill No. 995. Chapter 1051.
http://www.energy.ca.gov/renewables/documents/ab995_bill_20000930_chap.html

California Public Utilities Commission. Decision 09-09-047. September 24, 2009. Application of Southern California Edison Company (U338E) for Approval of its 2009-2011Energy Efficiency Program Plans and Associated Public Goods Charge (PGC) and Procurement Funding Requests. Application 08-07-021. Decision Approving 2010 to 2012 Energy Efficiency Portfolios and Budgets. http://www.cpuc.ca.gov/NR/rdonlyres/A08D84B0-ECE4-463E-85F5-8C9E289340A7/0/D0909047.pdf

TecMarket Works. 2006. California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. Prepared for the California Public Utilities Commission under contract with and directed by the CPUC's Energy Division, and with guidance from Joint Staff.
http://www.cpuc.ca.gov/NR/rdonlyres/27629E7A-F01A-48CA-8B2C-B07ECEE7DD5A/0/CAEnergyEfficiencyEvaluationProtocols.doc

Zuckerman, J., Jeff Deason and Sangeetha Chandrashekeran. "Rewarding Efficiency: Lessons from California's Shareholder Incentive." Paper presented at the 2013 International Energy Program Evaluation Conference, Chicago, IL. August 13-15, 2013.

Connecticut

BACKGROUND

Description of Utility Energy Efficiency Programs in the State

Connecticut's electric distribution companies [(Connecticut Light & Power (CL&P), a Northeast Utilities company and United Illuminating Company (UI)], natural gas investor-owned utilities [Yankee Gas (YGS), Southern Connecticut Gas (SCG), and Connecticut Natural Gas (CNG)], and municipal electric companies are required by Connecticut statute to provide conservation and load management (C&LM) programs for their customers. The Energy Efficiency Board (EEB) advises and assists the electric and natural gas utilities in the development of energy efficiency programs included in their CL&M plan. The integrated plan is subject to review and approval by the Public Utilities Regulatory Authority (PURA), which is part of the energy branch of Connecticut's Department of Energy and Environmental Protection (DEEP). The DEEP and PURA oversee the fully integrated electric distribution utility and natural gas utility programs. The EEB administers the Connecticut Energy Efficiency Fund (CEEF), which is primarily supported by monthly charges on customers' bills. The utilities administer the energy efficiency programs. The utilities and the contractors they hire implement the programs.

In 2007, the Connecticut legislature enacted Public Act 07-242, An Act Concerning Electricity and Energy Efficiency, which required the electric distribution utilities to meet their resource needs through "all available energy efficiency resources that are cost-effective, reliable and feasible." Additionally, the Energy Future Act of 2011 (PA 11-80) required that Connecticut's energy needs "shall be met first through all available energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible."

Public Act 07-242 also required the Department of Public Utility Control (now PURA) to order the state's electric and natural gas distribution companies to decouple distribution revenues from the volume of natural gas or electricity sales. In 2013, Public Act 13-298 again required decoupling for all electric distribution companies. Currently, United Illuminating uses a full decoupling mechanism, adjusted annually (see Docket No. 08-07-04RE03).

Although the mechanism has changed over time, Connecticut has had some type of utility performance incentives for DSM since 1988. During annual hearings, the EEB reviews the past year's results relative to the established goals and determines a performance incentive for the distribution utilities for achieving or exceeding the goals. The incentive, referred to as a management fee, can be from 2 to 8% of the program costs before taxes. The Connecticut Local Distribution Companies have proposed new performance incentives for natural energy efficiency programs in the recently filed 3-year 2013-2015 C&LM Plan.

Connecticut has established formal rules and procedures for evaluation, which are stated in Public Act 11-80. Evaluations are administered by the EEB. Statewide evaluations are conducted. Connecticut uses the Total Resource Cost (TRC) and Utility/Programs Administrator (UCT) test. These benefit-cost tests are required for overall portfolio and total program level screening. Connecticut specifies the UCT to be its primary cost-effectiveness test.

Evaluation of Utility Energy Efficiency Program Impacts

EVALUATOR: The utilities, specifically CL&P and UI for the electric companies and YGS, SCG, and CNG for the gas companies, annually report the energy savings results and the performance incentive calculations to DEEP and PURA, usually in February of the subsequent year.

USE: Connecticut uses energy efficiency savings results for general reporting on program accomplishments, screening and making decisions on future programs, determining eligibility for and/or amount of utility performance incentives, and determining eligibility and/or amount of utility lost revenue recovery.

PROTOCOLS: Connecticut has established formal rules and procedures for evaluation, which are stated in Public Act 11-80.

NET VS. GROSS ENERGY SAVINGS

Net and/or gross energy savings

Net

Primary metric (net or gross) to report energy efficiency program savings results

Net

Definitions

NET SAVINGS: The final value of savings that is attributable to a program or measure. Net savings differs from gross savings because it includes adjustments from impact factors such as free ridership or spillover. Net savings is sometimes referred to as verified savings or final savings (Connecticut Program Savings Documentation for 2012 Program Year).

FREE RIDER: A program participant who would have installed or implemented an energy efficiency measure even in the absence of program marketing or incentives (Connecticut Program Savings Documentation for 2012 Program Year).

SPILLOVER: Savings attributable to a program, but additional to the gross (tracked) savings of a program. Spillover includes the effects of: (a) participants who install additional energy-efficient measures as a result of what they learned in the program; or (b) non-participants who install or influence the installation of energy efficient measures as a result of being aware of the program (Connecticut Program Savings Documentation for 2012 Program Year).

Net Savings Discussion

Each year, the utility companies jointly file a Program Savings Document that defines net savings. This document is filed along with the Conservation and Load Management Plan and reviewed and approved by DEEP and PURA. The currently approved document—the 2012

Program Savings Document—was filed in Docket Number 12-02-01. The 2013 Program Savings Document was filed with Docket Number 13-03-02 (formerly 12-11-04) and is pending approval. The Savings Document specifies on page 8 that:

> When calculating the total impact of energy saving measures, there are also some other factors beyond the engineering parameters that need to be considered, such as the market effects of free ridership, spillover or installation rate. The equation for net savings is as follows: Net Savings = Gross Savings x (1 + spillover – free ridership) x Installation Rate

In October 2012, Connecticut took an in-depth look at the net energy savings of CL&P's and UI's 2011 commercial and industrial electric and natural gas energy efficiency programs in a free ridership and spillover study conducted by Tetra Tech.

The EEB's primary objective of the study was to assist in quantifying the net impacts of the utilities' commercial and industrial electric and natural gas energy efficiency programs by estimating the extent of:

- Program free ridership
- Early participant like and unlike spillover
- Nonparticipant like spillover

This study used a tested, standardized net-to-gross self-report approach developed and implemented by the evaluation team for the Massachusetts Program Administrators (Tetra Tech 2011). End users were interviewed about their motivations for installing the program-eligible equipment, and about what they would have done in the absence of the program incentive and other services, as well as questions that attempted to rule out rival explanations for the installation. Vendors who were influential in the decision to participate in the program were also interviewed.

Through the interview process, the evaluation team developed rates for 1) free ridership (to estimate the extent of free ridership for each customer), 2) like spillover (based on how much more of the same energy-efficient equipment the participant installed outside of the program and did so because of their positive experience with the program), 3) unlike spillover (based on the amount of energy-efficient equipment installed by a participant due to program influence that is not identical to the equipment they received through the program), and 4) nonparticipant spillover (based on responses by design professionals and equipment vendors regarding the percent of their sales that were program-eligible, the percent of these sales that did not receive an incentive through the program, and the program's impact on their decision to recommend/install this efficient equipment outside the program).

The 2012 report includes free ridership estimates, participant spillover estimates, and nonparticipant spillover estimates at a statewide level by program and measure type. Detailed results by company by program, detailed results at the measure level by program, and early indicators of participant unlike spillover are included the full report.

APPLICATION OF NET SAVINGS FOR DECISION-MAKING

Shareholder incentives

The Conservation and Load Management Plan filed by the utilities and reviewed and approved by DEEP and PURA includes performance incentives based on net savings. The 2013-2015 CL&P has been filed under Docket No. 13-03-02 and is pending approval. The approved 2012 Plan was filed under Docket No. 12-02-01.

CL&P and UI have received shareholder incentives for meeting or exceeding net energy savings goals in numerous dockets. YGS, SCG, and CNG have proposed performance incentives for the first time in 2013, which if approved will be awarded based on quantified energy efficiency program savings.

Lost revenue recovery

The three gas companies, YGS, SCG, and CNG, have received lost revenue recovery based on quantified energy program savings, through the gas Conservation Adjustment Mechanism (CAM).

REFERENCES

ACEEE State Energy Efficiency Policy Database
http://www.aceee.org/sector/state-policy/connecticut

State of Connecticut, Public Act No. 07-242, House Bill 7432, An Act Concerning Electricity and Energy Efficiency.
http://www.cga.ct.gov/2007/act/pa/2007pa-00242-r00hb-07432-pa.htm

State of Connecticut, Public Act No. 11-80, Senate Bill 1243, An Act Concerning the Establishment of the Department of Energy and Environmental Protection and Planning for Connecticut's Energy Future.
http://www.cga.ct.gov/2011/ACT/PA/2011PA-00080-R00SB-01243-PA.htm

Tetra Tech, KEMA, and NMR. 2011, Cross-Cutting C&I Free-Ridership and Spillover Methodology Study Final Report, prepared for the Massachusetts Program Administrators.

Tetra Tech. October 5, 2012. Connecticut Energy Efficiency Fund, 2011 Commercial and Industrial Electric and Natural Gas Programs Free-ridership and Spillover Study.
http://energizect.com/sites/default/files/2011%20CI%20FR-SO%20Report%20Final_0.pdf

The United Illuminating Company and Connecticut Light & Power Company. September 26, 2011. Connecticut Program Savings Documentation for 2012 Program Year.
http://www.ctenergyinfo.com/sites/default/files/2012%20CT%20Program%20Savings%20Documentation%20FINAL.pdf

Hawaii

BACKGROUND

Description of Utility Energy Efficiency Programs in the State

Hawaii has increased its utility-sector energy efficiency program offerings in recent years. The Hawaiian Electric Company (HECO), the largest investor-owned utility in the state, has offered

energy efficiency programs since the mid-1990s. In July 2009, Hawaii consolidated the energy efficiency programs of most of its electric utilities into a single program operated by a third-party contractor, Science Applications International Corporation (SAIC). The program is now called Hawaii Energy.

Hawaii has two major electric utility companies: HECO and the Kauai Island Utility Cooperative (KIUC). HECO's customers support the energy efficiency programs through a public benefits charge. KIUC operates its customer energy efficiency programs independently, recovering costs for the programs through utility rates set by the Cooperative's directors. Hawaii uses very little natural gas, and does not have any natural gas energy efficiency programs.

Hawaii is collaborating with the U.S. Department of Energy. Hawaii signed a memorandum of understanding (MOU) with the U.S. Department of Energy in 2008. This MOU established the Hawaii Clean Energy Initiative, a long-term partnership between Hawaii and the DOE to achieve the goal of supplying 70% of the state's energy needs through renewable energy and energy efficiency programs by 2030. Hawaii's Public Utilities Commission (HPUC) has also adopted an energy efficiency portfolio standard (EEPS) (Docket No. 2010-0037) with a goal of achieving 4,300 GWh of energy savings by 2030. In addition, Hawaii has a renewable portfolio standard (RPS), which was codified in HRS §269-91, et seq. and amended in 2006, 2008, and 2009. Currently, savings from energy efficiency programs and combined heat and power systems (among other measures) may count towards meeting up to 50% of the RPS through 2014. Beginning in 2015, electrical energy savings will no longer be able to count toward Hawaii's RPS and will instead count towards Hawaii's EEPS.

Hawaii has decoupling in place and offers energy efficiency shareholder incentives for electric utilities.

Hawaii's reported budget for electric energy efficiency programs was $35.6 million for 2011. The state's utility electric energy efficiency programs saved 114,974 MWh or 1.15% of statewide retail sales.

Evaluation of Utility Energy Efficiency Program Impacts

EVALUATOR: Evaluation contractors (also called the Evaluation, Measurement & Verification team) work for the HPUC and review the reports from the program administrator. The EM&V team independently checks the inputs and calculations (including fieldwork, where necessary) and develops the final savings estimates.

USE: Hawaii uses energy efficiency savings results for reporting on program accomplishments, screening and making decisions on future programs, and determining eligibility for and/or amount of performance incentives for the third-party administrator.

PROTOCOLS: The evaluation rules and protocols have been developed through HPUC procedures and are not officially recorded in one document.

NET VS. GROSS ENERGY SAVINGS

Net and/or gross energy savings

Both. Both net and gross energy savings are reported but net energy savings are a key indicator for program goals.

Primary metric (net or gross) to report energy efficiency program savings results

Net.

Definitions

NET SAVINGS: According to the Technical Reference Manual, the formulae for converting gross customer-level savings to net generation-level savings are as follows:

Net Program kWh = Gross Customer Level ΔkWh x (1 + SLF) x RR
Net Program kW = Gross Customer Level ΔkW x (1 + SLF) x RR

Where:
Net kWh = kWh energy savings at generation level, net of free riders and system losses
Net kW = kW energy savings at generation level, net of free riders and system losses
Gross Customer ΔkWh = Gross customer level annual kWh savings for the measure
Gross Customer ΔkW = Gross customer level connected load kW savings for the measure
SLF = System Loss Factor
RR = Realization Rate that includes free riders and engineering verification
Note: A five percent adder for spillover was introduced in program year 2012. The five percent is added to the portfolio NTG energy savings.

FREE RIDER: A customer who received an incentive through an energy efficiency program who would have installed the same or a smaller quantity of the same high efficiency measure on their own within one year if the program had not been offered (Technical Reference Manual).

SPILLOVER: Energy-efficient equipment installed in any facility in the program service area due to program influences, but without any financial or technical assistance from the program. It is expressed as a percent or fraction of the gross savings attributable to program participation (Technical Reference Manual).

Net Savings Discussion

Annually, proposals for changes to the ex ante deemed savings in the Technical Reference Manual (which in practice stays somewhat similar each year) are recommended based on the evaluations conducted in the previous year. An EM&V team retained by HPUC reviews and, with consent of HPUC, approves deemed savings values and calculation methodologies for custom measures. The program implementer reports accomplishments. The EM&V team conducts verification (database, desk review, telephone surveys, onsite visits) to verify savings claimed by the program implementer. On an as-needed basis the EM&V team conducts independent impact evaluation for key measures or programs (billing, engineering, etc. analysis).

The EM&V team develops a NTG ratio for each program by applying free rider estimates to calculated gross impacts. The EM&V team determines a portfolio NTG ratio based on the individual program NTG ratios. A 5% credit is then added to the portfolio NTG ratio to account

for spillover. For example, if a portfolio resulted in approximately a .73 NTG, with the 5% adder for spillover/market effects, the portfolio NTG would become .78.

The 5% spillover credit was introduced in program year 2012 based on an evaluation of program year 2011 (Evergreen Economics 2013, page 71). The decision was a component of an overall review of program and portfolio NTG methodologies in several states. The 5% adder follows California's lead wherein the CPUC, having reviewed the available literature, determined that the results on 1) amount of spillover/market effects for certain programs and b) availability of methodologies to reliably quantify spillover/market effects were inconclusive (CPUC 2012).

APPLICATION OF NET SAVINGS FOR DECISION MAKING

Shareholder incentives

Hawaii has awarded performance incentives to its third-party energy efficiency program administrator based on, among other things, net energy savings. The program year 2011 (July 1, 2011 – June 30, 2012) contract for the third-party public benefits fund administrator (page C1-3) specified that the third-party administrator's electric energy savings target to earn the performance incentive in program year 2011 was "the sum of annualized first-year savings (at generation and net of free riders) achieved by implementation of all program strategies and initiatives during each program year." (Note: the spillover adder had not yet been incorporated into the electric savings calculation.) The contract indicated that the program year 2011 electric energy savings target was 108,500,425 kWh (Appendix B-15) with a maximum performance award for electric energy savings of $303,188.

On January 29, 2013, in Order No. 30967, Docket No. 2007—0323, the HPUC approved a performance award payment of $303,188 to SAIC Energy, Environment & Infrastructure, LLC for the electric energy savings portion of the incentive.

Lost revenue recovery

Not applicable. Decoupling was implemented for the investor-owned utilities in Hawaii: HECO, MECO, and HELCO.

REFERENCES

California Public Utilities Commission. November 8, 2012. Issued November 15, 2012. Decision 12-11-015. Decision Approving 2013-2014 Energy Efficiency Programs and Budgets. Application of Pacific Gas and Electric Company for Approval of 2013-2014 Energy Efficiency Programs and Budget (U39M). Application 12-07-001 (Filed July 2, 2012). And Related Matters. Application 12-07-002, Application 12-07-003 Application 12-07-004.
http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M034/K299/34299795.PDF

Evergreen Economics. June 20, 2013. Evaluation of the Hawaii Energy Conservation and Efficiency Programs, Program Year 2011, Volume 1 of 2: Main Report.
http://www.hawaiienergy.com/media/W1siZiIsIjIwMTMvMDcvMTEvMjBfMzNfNTFfMzk3X0hhd2FpaV9QWTIwMTFfRXZhbHVhdGlvbl9SZXBvcnRfRmluYWxfMDYyMDEzLnBkZiJdXQ/Hawaii%20PY2011%20Evaluation%20Report%20-%20Final%20-%20062013.pdf?sha=219766b6

Hawaii Energy Public Benefits Fund Administrator Contract July 1, 2011 – June 30, 2012. Go to: http://www.hawaiienergy.com/information-reports and look under "Public Benefit Fund Administrator Contracts."

Hawaii Energy Public Benefits Fund Administrator Contract July 1, 2012 – June 30, 2014. Go to: http://www.hawaiienergy.com/information-reports and look under "Public Benefit Fund Administrator Contracts."

Hawaii Public Utilities Commission. March 9, 1992, Revised: March 14, 2011. A Framework for Integrated Resource Planning. http://www.hawaiianelectric.com/vcmcontent/IntegratedResource/IRP/PDF/IRP_Framework_March_2011.pdf

———. January 3, 2012. Order No. 30089 in Docket No. 2010—0037, Approving A Framework for Energy Efficiency Portfolio Standards. http://dms.puc.hawaii.gov/dms/OpenDocServlet?RT=&document_id=91+3+ICM4+LSDB15+PC_DocketReport59+26+A1001001A13A30A92652H4283818+A13A30A92652H428381+14+1960

———. January 29, 2013. Order No. 30967 in Docket No. 2007—0323, Instituting a Proceeding to Investigate the Issues and Requirements Raised by, and Contained in, Hawaii's Public Benefits Fund, Part VII of Chapter 269, Hawaii Revised Statutes. http://dms.puc.hawaii.gov/dms/OpenDocServlet?RT=&document_id=91+3+ICM4+LSDB15+PC_DocketReport59+26+A1001001A13A30A92652H4283818+A13A30A92652H428381+14+1960

Hawaii Energy—Technical Reference Manual No. 2011 Program Year 3 July 2011 to June 2012. http://www.hawaiienergy.com/media/W1siZiIsIjIwMTMvMDUvMTcvMTlfNTNfMTZfOTk1X1BZMTFfSGF3YWlpRW5lcmd5VFJNLnBkZiJdXQ/PY11-HawaiiEnergyTRM.pdf?sha=c230e920

Memorandum of Understanding between the State of Hawaii and the United States Department of Energy, 2008. http://apps1.eere.energy.gov/news/pdfs/hawaii_mou.pdf

Indiana

BACKGROUND

Description of Utility Energy Efficiency Programs in the State

Indiana has two types of energy efficiency programs: Core and Core Plus. Core programs are offered by a third-party administrator (TPA) across the state on behalf of the participating utilities. The commission created a committee called the DSM Coordination Committee (DSMCC) to oversee the Core programs. This committee consists of the participating utilities, the Indiana Utility Consumer Counselor, Indiana Industrial Group, and the Citizens Action Coalition. Core Plus programs are utility-specific programs offered by the individual utilities in their service territory.

Both natural gas and electric utilities in Indiana operate energy efficiency programs. While some of these programs have existed for over a decade, they have been relatively small. In 2007, the state's regulators, utilities, and stakeholders began efforts to expand customer energy efficiency programs and to establish targets for energy savings through such programs.

This led to a series of dockets at the Indiana Utility Regulatory Commission (IURC). A Commission order (in Case 42693) called on all electric utilities to provide a core set of statewide programs. It was implemented starting January 2, 2012. Phase II of the order requires regulated utilities to achieve energy savings targets. Utilities must contract with a single independent third-party administrator for the purpose of jointly administering and implementing the Core programs, which are collectively called Energizing Indiana.

Energizing Indiana provides a statewide approach offered by all regulated electric utilities. It gives consumers a uniform set of energy efficiency programs, using coordinated marketing, outreach, and consumer education strategies. Programs include residential lighting, home energy audits, low-income weatherization, energy-efficient schools, and commercial and industrial. Energizing Indiana is administered by a single independent, third-party entity, which is contracted individually with each of the participants. Utilities are able to offer or contract for additional programs (Core Plus programs) in order to reach their energy saving targets. Core programs are evaluated through a consistent evaluation framework developed by the DSMCC's Evaluation Measurement and Verification Subcommittee (EM&V-SC) working with a third-party evaluation contactor who also serves as the statewide evaluation contractor for the Core programs. Core Plus program evaluations are contracted separately by each of the participating utilities.

The Indiana energy efficiency resource standard began at 0.3% annual electricity savings in 2010, increasing to 1.1% in 2014, and leveling at 2% in 2019. Indiana's Commission ordered all jurisdictional electric utilities to begin submitting three-year DSM plans in July 2010 indicating their proposals and projected progress in meeting annual savings goals outlined by the Commission. Utilities that do not meet the goals must demonstrate to the Commission how they plan to alter or add programs to increase savings.

Indiana Administrative Code provides guidelines for demand-side recovery electric utilities, as well as lost-revenue recovery and demand-side management incentives.

Evaluation of Utility Energy Efficiency Programs

EVALUATOR: Each utility is responsible for providing energy savings results from ratepayer-funded energy efficiency programs for both Core and Core Plus programs. Projected *ex ante* impacts are provided from the third-party administrator for Core programs. There is a third-party EM&V Evaluation Administrator responsible for conducting evaluations of Core programs and reports are provided to the commission via the DSMCC, once the reports are accepted by the EM&V-SC. Utilities have to hire an independent entity to perform EM&V on the Core Plus programs.

USE: Evaluations are used to confirm or verify *ex ante* gross savings projections and to quantify *ex post* gross and net savings. Energy savings results are used for general reporting on program accomplishments, screening and making decisions on future programs, determining eligibility for and/or amount of utility performance incentives, and determining eligibility and/or amount of utility lost revenue recovery.

PROTOCOLS: The DSM Coordination Committee oversees the Core programs. This committee consists of the participating utilities, the Indiana Utility Consumer Counselor, Indiana Industrial Group, and the Citizens Action Coalition. DSMCC developed a document titled "Evaluation Work Plan for Evaluation, Measurement, and Verification Services," which was filed with the commission in Cause No. 42693 S1 on November 14, 2012. The information can be

found on the commission's electronic document system at the following link: https://myweb.in.gov/IURC/eds/. There is also an Evaluation Framework developed from Indiana Utility Regulatory Commission Order 42693.

NET VS. GROSS ENERGY SAVINGS

Net and/or gross energy savings

Both. Historically Indiana has used gross energy savings goals. Targets in the 2009 commission order http://www.in.gov/iurc/files/Cause_No._42693.pdf are stated in verified gross terms, with a footnote that "calculations of net savings should be done periodically to inform program design so that the proportion of free riders is minimized." Net savings are used for program design improvements, planning future programs, cost-effectiveness analysis, and calculations of lost revenues.

Primary metric (net or gross) to report energy efficiency program savings results

Since the energy efficiency goals are based on gross savings, the level of savings reported by the utilities is also based on gross impacts for both Core and Core Plus programs. The benefit/cost analysis is done using net savings, which reflect the free riders and short-term participant spillover derived from EM&V analysis. Market effects savings are to be evaluated periodically to document the savings achieved beyond the direct energy savings of the participants.

Definitions

NET SAVINGS: Net savings refers to savings directly attributable to a program and represent the participant savings that are directly attributable to the program's efforts. Net savings are determined by adjusting the evaluated gross savings estimates to account for a variety of circumstances, including savings weighted free rider effects and spillover effects. Net savings include market effects that will also be reported when market effects studies are conducted. NTG Ratio = (1 – free rider adjustment + participant spillover adjustment + market effects adjustment) (TecMarket Works 2013).

FREE RIDER: "Freeriders are those who would have taken exactly the same action (or made the same behavior change), installing a measure (or changing a behavior) at exactly the same energy efficiency result, at the same time as they took the program-incented action. Partial freeriders are those who would have taken exactly the same action, but the program expedited that change, or they would have taken a similar action, but not at the same level of efficiency as the program-incented action, or they would have taken the same behavior change but at a later time than the program-encouraged behavior change." (TecMarket Works 2013).

FREE DRIVER: Estimated free driver percentages (used to calculate net savings along with estimated free rider percentages) are required to be reported in evaluation reports, but are not defined distinct from spillover in the evaluation framework (TecMarket Works 2013).

SPILLOVER: Spillover is described as: "Savings produced as a result of the program's influence on the way participants use energy through technology purchase and use changes or through behavior changes induced or significantly influenced by the program or the portfolio." It is alternately explained as follows:

> The concept of spillover refers to additional savings generated by program participants due to their program participation, but not captured by program participation records. Spillover occurs when participants choose to purchase energy-efficient measures or adopt energy-efficient practices because of the influence of a program, but they choose not to participate or are otherwise unable to participate in that program. As these customers are not "participants" for these additional actions, they do not typically appear in program records of the savings generated by the program (TecMarket Works 2013).

MARKET EFFECTS: "Savings produced as a result of the program's or portfolio's influence on the operations of the energy technology markets or changes to energy-related behaviors by customers" (TecMarket Works 2013).

Net Savings Discussion

Verified gross energy savings are used for reporting by utilities for purposes corresponding to state goals in the energy efficiency resource standard. The final statewide Evaluation Framework, from which the definitions above are cited, goes into depth specifying the estimation and uses of net energy savings. Uses enumerated are:

1. To help determine which programs to offer in the future
2. For use in utility-specific calculations of lost revenues
3. For improving program performance by better design and implementation

The calculation of net energy savings is detailed in the *2012 Energizing Indiana Programs EM&V Final Report* (TecMarket Works et al. 2013). The report describes the various methodologies Indiana employed in the evaluation of its 2012 programs to estimate free ridership and short-term spillover. In addition, the report describes Indiana's intention to include an estimation of market effects in the net energy savings calculation in the future.

Indiana's proposed assessment of market effects is particularly noteworthy. The general approach, as described on pages 43-44 of the TecMarket Works 2013 evaluation of the 2012 Energizing Indiana programs, is summarized below.

A market effects study was included in the evaluation of Indiana's statewide Core programs to assess how the programs influenced the operations of the market. The intention was to capture savings above and beyond those achieved by the program's direct influence on participants. To assess the changes caused by the Energizing Indiana portfolio, the Evaluation Team conducted a market baseline assessment in 2011 and early 2012 before the portfolio had a chance to impact the markets. This study assessed the degree to which key residential and commercial industrial program measures were sold in the market area and the degree to which customers were adopting the energy-efficient models of those technologies prior to the program.

In early 2015, a similar study will be conducted to assess those same markets after the end of the first three-year statewide program cycle. The difference between the baseline assessment and the 2015 reassessment will document the changes that have occurred relative to a set of technologies covered by the programs in the portfolio. Once the changes in the market have been documented, the assessment will look at the various reasons that drove those changes.

To assess the various reasons for the changes in the market, the evaluation will use expert judgment and reason-for-change opinions from the key market actors that are responsible for making changes to the products that they order, stock, sell, install, and purchase. The assessment will include metrics associated with Energizing Indiana, the efforts associated with those programs, and key stakeholder reactions to why they made the stocking and sales changes that are documented in the 2015 study. The Evaluation Team will examine a wide range of change drivers and allocate energy savings to the parts of the change that can be attributed to Energizing Indiana's efforts. The evaluation will then allocate energy savings to the measures covered by the program to reflect their proportional value to the market-induced changes. The results of this effort will be a market effect multiplier to the gross per-measure energy savings that are then applied to the measures moved via the program's direct effects and counted toward the program-induced net effects estimate. This allocation will be made after the completion of the 2015 market effects study.

APPLICATION OF NET SAVINGS FOR DECISION MAKING

Shareholder incentives

Gross savings are used for determining performance incentives. Performance incentive mechanisms currently in place are based on awarding a percent of eligible program expenditures, with the percent based on the gross savings achieved relative to gross savings targets.

Lost revenue recovery

The commission has administrative rules, 170 IAC 4-8-6, that address lost revenues. IOUs are permitted to project a level of lost revenues based on an approved assumed level of savings, and this is included in the DSM program costs recovered through a tracker. Lost revenue calculations are adjusted for free riders. Lost revenues are expected to be reconciled to actual at a later date. The IOUs are Duke Energy Indiana (Cause No. 43955), Indiana Michigan Power Company (Cause No. 43827, lost revenues extended in Cause No. 43959), NIPSCO (Cause No. 44154), and SIGECO (Cause No. 43938 for large commercial and industrial customers and Cause No. 43405 DSMA-9S1 for small commercial and industrial customers).

REFERENCES

ACEEE State Energy Efficiency Policy Database
http://www.aceee.org/sector/state-policy/indiana#Summary

Indiana Utility Regulatory Commission (IURC) Order 42693. 2009. Phase II Order.
https://myweb.in.gov/IURC/eds/Modules/IURC/CategorySearch/viewfile.aspx?contentid=0900b63180123011

TecMarket Works, The Cadmus Group, Opinion Dynamics Corporation, Integral Analytics, Building Metrics and Energy Efficient Homes Midwest with Vickie Benson and Maria Larson. 2013. *Indiana Evaluation Framework September 25, 2012, with Updated Measure Life Tables of February 2013*.

TecMarket Works, Opinion Dynamics Corporation, The Cadmus Group, Integral Analytics, Building Metrics and Energy Efficient Homes Midwest with Maria Larson. 2013. *2012 Energizing Indiana Programs EM&V Report. Final Report.* Prepared for The Indiana Demand Side

Management Coordination Committee. Contained in June 26, 2013 IURC Cause No. 42693-S1. https://myweb.in.gov/IURC/eds/Modules/Ecms/Cases/Docketed_Cases/ViewDocument.aspx?DocID=0900b631801a1cc0

TecMarket Works and Indiana Statewide Evaluation Team. 2012. *Indiana Technical Resource Manual Version 1.0*. Prepared for the Indiana Demand Side Management Coordination Committee EM&V Subcommittee. Contained in January 17, 2013 IURC Cause No. 42693-S1.

Iowa

BACKGROUND

Description of Utility Energy Efficiency Programs in the State

Iowa's energy utilities administer energy efficiency programs for their customers. State law requires regulated IOUs to provide such programs. Most publicly owned utilities in Iowa (municipal utilities), as well as rural electric cooperatives, provide energy efficiency programs, ensuring nearly statewide coverage.

Regulated IOUs recover costs of programs approved by the Iowa Utilities Board (IUB) by adding tariff riders to customer bills. This is an automatic rate pass-through, reconciled annually to prevent over-recovery or under-recovery. Recently filed utility plans indicate an increasing level of funding for, and commitment to, energy efficiency. The IUB is authorized to conduct prudence reviews of IOU energy efficiency programs and may disallow imprudent costs.

Energy efficiency resource standard targets vary by utility: average targets are annual electricity savings of 1.4% and natural gas savings of 1.2% of retail sales by 2013.

Senate Bill 2386, passed in 2008, required the IUB to develop energy savings performance standards for each regulated electric and natural gas utility, which must file plans to meet those goals cost effectively. Utilities that are not regulated (i.e., municipal utilities and rural cooperatives) are also required to set energy efficiency savings goals, but their plans are not reviewed or approved by the IUB.

In compliance with this law, the IUB issued an order for IOUs to submit energy efficiency plans with an annual savings goal for both electricity and natural gas of 1.5% of average retail sales over the previous three years, to be met by December 31, 2011 (Docket No. 199 IAC 35.4(1)). Iowa's two investor-owned electric utilities, Interstate Power and Light Company (IPL) and MidAmerican Energy Company, complied with this request by filing Energy Efficiency Plans for 2009-2013 that outlined how the utilities could meet the 1.5% electric target (Docket No. EEP-2008-0001 and Docket No. EEP-2008-0002). Both utilities determined the 1.5% natural gas target would be unattainable.

Municipal and cooperative utilities also are required to implement energy efficiency programs, set energy savings goals, create plans to achieve those goals, and report to the IUB on progress. Municipal and co-operative utilities filed goals on December 31, 2009.

Iowa's natural gas utilities also set annual energy efficiency savings targets for the period between 2009 and 2013. Annual goals vary. Municipal utilities plan to save 0.74% by 2012.

Evaluation of Utility Energy Efficiency Programs

The utilities each calculate their own results for the year and submit a report annually (by May 1) that shows the savings and spending results. These annual reports were the result of orders issued in dockets EEP-2002-0038 (June 3, 2003), EEP-2003-0011 (July 18, 2003), and EEP-2003-0004 (July 21, 2003). Similar requirements were included in EEP-2008-0003 (March 3, 2009), EEP-2008-0002 (March 9, 2009), and EEP-2008-0001 (June 24, 2009).

EVALUATOR: Evaluations are administered by the utilities. There are no specific legal requirements for these evaluations in Iowa.

USE: From the annual report data filed by the IOUs, the IUB compiles aggregate state data that is used for various reports including reports to the legislature. Energy savings results may be used as one of the factors utilities use for general reporting on program accomplishments, screening, and making decisions on future programs.

PROTOCOLS: There are rules set up in 199 IAC 35.8(2)"f" that may be found in Iowa Administrative Code, Rule.199.35.8. part "f."

NET VS. GROSS ENERGY SAVINGS

Net and/or gross energy savings

Through regulatory order, the utilities are responsible for developing forward-looking energy savings estimates that include both net and gross savings. From Iowa Administrative Code, Rule.199.35.8. part "f":

> For the plan as a whole and for each program, the utility shall provide: The estimated annual energy and demand savings for the plan and each program for each year the measures promoted by the plan and program will produce benefits. The utility shall estimate gross and net capacity and energy savings, accounting for free riders, take-back effects, and measure degradation.

Primary metric (net or gross) to report energy efficiency program savings results

Gross savings are used. This approach was arrived at based on research by the National Energy Efficiency Best Practices Study, an ongoing project sponsored by the California Public Utilities Commission, which concluded that the NTG ratio is close to 1.0 in the majority of cases studied (Cadmus 2012).

Definitions

NET SAVINGS: NTG assessments primarily seek to determine energy savings attributable to energy efficiency programs by explicitly accounting for ***free ridership*** (energy savings likely to have occurred in the program's absence) and ***spillover*** (energy savings induced but not subsidized by the program). Savings resulting from this calculation are the net program savings, and the ratio of net program savings to gross savings is the NTG ratio (Cadmus 2012).

FREE RIDER: "Free riders" means those program participants who would have done what an energy efficiency program intends to promote even without the program (Iowa Administrative Code, Rule.199.35.2). Free ridership subtracts from gross energy savings likely to have occurred through adoption of energy efficiency measures by participants, independent of the program.

That is, participants are considered free riders if they would have adopted the same energy-saving measures at the same time, in the same quantity, and at the same efficiency level had the program not existed (Cadmus 2012).

SPILLOVER: Spillover adjustment adds energy savings from adoption of high-efficiency measures outside the program, but likely induced by the program. These additional energy savings are assumed to derive from greater knowledge and awareness of energy-efficient options resulting directly from the program's availability and influence. Spillover can occur within participant and nonparticipant populations. For example, participants in a program may be motivated to adopt high-efficiency measures beyond those subsidized by a program. Simultaneously, the knowledge, awareness, and availability of measures caused by a program may induce nonparticipants to adopt the same energy-efficient measures. For most programs, the number of eligible nonparticipants far outnumbers participants; thus, potential exists for large spillover impacts within this population (Cadmus 2012).

MARKET EFFECTS: A third possible adjustment is program-induced market effects, that is, any change the program causes to operations of supply chains in energy efficiency markets. For example, the programs may result in:

- Manufacturers changing the efficiency of their products
- Wholesalers and retailers changing their stocking decisions, reacting to shifts in demand for more efficient goods caused by IOU programs
- Architects and builders adopting energy-efficient practices (Cadmus 2012)

Net Savings Discussion

Both the 2008 and 2012 assessment studies led by Cadmus investigated the use of NTG adjustments, including free ridership and spillover effects. The first study recommendation was that Iowa's investor-owned utilities use a NTG ratio of 1.0 across all programs for the energy efficiency plans in the 2009–2013 program cycle. The more recent 2012 report updated that research, reviewing free ridership and spillover practices in 32 jurisdictions in regulatory filings, technical planning materials, and evaluation reports. The report found:

- Measuring NTG elements is inexact and concerns persist about bias in the methods.
- NTG estimates in general have small impacts on the societal cost test results, which are used in Iowa for economic analysis of energy efficiency programs, and so are not that relevant to measuring energy efficiency measures or programs' cost effectiveness.
- Numerous areas use a NTG ratio of 1.0 for the portfolio as a whole.

Most important, the authors concluded:

> The incidence of cases where only freeridership is assessed suggests an asymmetrical treatment of spillover and freeridership effects. Should spillover be included, it is likely many NTG ratios will be near or greater than 1.0. More than two-thirds of all evaluation studies reviewed in a recent best-practices study[25] had a NTG value of approximately 1.0.
>
> Given these findings, it appears reasonable that gross savings be used as the basis for reporting and target compliance. However, utilities should design effective programs that minimize freeridership. This entails: (1) regularly monitoring the saturation of measures within their own service areas and in other jurisdiction; and (2) using this information to revise their programs and their incentive structures periodically.

APPLICATION OF NET SAVINGS FOR DECISION MAKING

Shareholder incentives

N/A

Lost revenue recovery

N/A

REFERENCES

ACEEE State Energy Efficiency Policy Database
http://www.aceee.org/sector/state-policy/iowa

Interstate Power and Light Company. Energy Efficiency Plan Annual Report for 2012. April 30, 2013.
http://alliantenergy.com/wcm/groups/wcm_internet/@int/documents/document/mdaw/mdey/~edisp/012897.pdf

Interstate Power and Light Company. Energy Efficiency Plans. Docket No. EEP-2008-0001.
http://www.state.ia.us/government/com/util/energy/energy_efficiency/ee_plans_reports.html

Iowa Administrative Code, Rule.199.35.2
https://www.legis.iowa.gov/DOCS/ACO/IAC/LINC/Rule.199.35.2.pdf

———, Rule.199.35.8. part "f"
https://www.legis.iowa.gov/DOCS/ACO/IAC/LINC/Rule.199.35.8.pdf

Iowa Utilities Board. Interstate Power and Light Company, MidAmerican Energy Company, and Aquila, Inc., d/b/a Aquila Networks. Docket No. 199 IAC 35.4(1), EEP-02-38, EEP-03-1, EEP-03-4. Issued January 14, 2008. Order Requiring Filing of New Energy Efficiency Plans and Additional Information.

[25] Study managed by Pacific Gas and Electric Company under the auspices of the California Public Utility Commission in association with the California Energy Commission, San Diego Gas and Electric, Southern California Edison, and Southern California Gas Company. http://www.eebestpractices.com/index.asp

http://www.state.ia.us/iub/docs/orders/2008/0114_iac354.pdf

MidAmerican Energy Company. Energy Efficiency Plans. Docket No. EEP-2008-0002 http://www.state.ia.us/government/com/util/energy/energy_efficiency/ee_plans_reports.html

Quantec, LLC, Summit Blue Consulting, Nexant, Inc., A-TEC Energy Corporation and Britt/Makela Group, February, 2008. *Assessment of Energy and Capacity Savings Potential in Iowa – Appendix G,* prepared for the Iowa Utility Association, Volume 1, Assessment of Energy and Capacity Savings Potential in Iowa February 28, 2012

Quantum Consulting, Inc. San Francisco, 2004. *National Energy Efficiency Best Practices Study: Volume S – Crosscutting Best Practices and Project Summary,* submitted to the California Best Practices Advisory Committee, Pacific Gas & Electric Company. http://www.eebestpractices.com/index.asp

The Cadmus Group, Inc. Energy Services Division, with Nexant, Inc. and First Tracks Consulting. February 28, 2012. *Final Report: Assessment of Energy and Capacity Savings Potential in Iowa.*

Massachusetts

BACKGROUND

Description of Utility Energy Efficiency Programs in the State

Massachusetts is a leading state with a long, successful record of implementing energy efficiency programs for all customer sectors. The state created an aggressive funding mechanism and required electric utilities to provide energy efficiency programs during its restructuring of the industry in 1997. Electric and natural gas utilities in the state have offered energy efficiency programs to customers since the 1980s.

In 2008, the governor signed Chapter 169 of the Acts of 2008, An Act Relative to Green Communities (the Green Communities Act). The new law altered the approval process and timeline for electric and natural gas utility energy efficiency plans and required the utilities to file the plans every three years. The law required the state's regulatory authority, the Department of Public Utilities (Department), to ensure that energy efficiency programs "are delivered in a cost-effective manner capturing all available efficiency opportunities, minimizing administrative costs to the fullest extent practicable, and utilizing competitive procurement processes to the fullest extent practicable." In addition, the law directed the Department to appoint and convene an Energy Efficiency Advisory Council (EEAC), whose members play a key role in designing, approving, and monitoring the energy efficiency programs of Massachusetts' IOUs.

Large IOUs in Massachusetts have partnered together to sponsor the Mass Save initiative. These utilities work with the Massachusetts Division of Energy Resources (DOER) to provide a wide range of services, incentives, trainings, and information promoting energy efficiency. A variety of electric and gas efficiency programs are also offered directly through IOUs and municipal utilities.

Annual electric savings targets in Massachusetts ramp up from 2.5% to 2.6% from 2013 to 2015. The state's three-year plan also includes gas savings of about 1.1% of retail sales annually. Utility companies in the state manage and implement the energy efficiency programs with collaborative input and oversight from the Department, the EEAC, and DOER.

Massachusetts has decoupling in place for all of its gas and electric utilities. Utility companies can earn a shareholder incentive of approximately 5% of energy efficiency program costs for meeting energy saving, benefit-cost, and market transformation goals.

The reported budgets for Massachusetts's 2011 electric and gas energy efficiency programs for 2011 were $453 million and $118 million respectively. The 2010 net incremental electricity savings due to the programs were 628,709 MWh.

Evaluation of Utility Energy Efficiency Program Impacts

EVALUATOR: Evaluations are mainly administered by the Energy Efficiency Program Administrators (electric and gas IOUs and municipal aggregators); however, the Massachusetts's Energy Efficiency Advisory Council oversees the evaluations. There are no specific legal requirements for these evaluations.

USE: Massachusetts uses energy efficiency savings results for reporting on program accomplishments, screening and making decisions on future programs, determining eligibility for and/or amount of performance incentives for the third-party administrator, and determining eligibility and/or amount of utility lost revenue recovery.

PROTOCOLS: The Green Communities Act required that energy efficiency programs "are delivered in a cost-effective manner capturing all available efficiency opportunities, minimizing administrative costs to the fullest extent practicable, and utilizing competitive procurement processes to the fullest extent practicable. " The rules for benefit-cost tests are stated in the Act and DPU 8-50-A. Benefit-cost tests are required at the overall portfolio and total program levels screening. DPU 8-50-A provides general energy efficiency evaluation guidelines, the Massachusetts Technical Reference Manual (TRM) describes impact energy savings, and the August 10, 2012 order in D.P.U. 11-120-A provides guidance regarding the evaluation of net energy savings.

NET VS. GROSS ENERGY SAVINGS

Net and/or gross energy savings

Net

Primary metric (net or gross) to report energy efficiency program savings results

Net

Definitions

NET SAVINGS: The net savings value is the final value of savings that is attributable to a measure or program. Net savings differs from gross savings because it includes the effects of the free ridership and/or spillover rates (Massachusetts Technical Reference Manual).

FREE RIDER: A free rider is a customer who participates in an energy efficiency program (and gets an incentive) but who would have installed some or all of the same measure(s) on their own,

with no change in timing of the installation, if the program had not been available. The free ridership rate is the percentage of savings attributable to participants who would have installed the measures in the absence of program intervention (Massachusetts Technical Reference Manual).

SPILLOVER: Spillover includes the effects of (1) participants in the program who install additional energy-efficient measures outside of the program as a result of participating in the program, and (2) non-participants who install or influence the installation of energy-efficient measures as a result of being aware of the program. These two components are the participant spillover and non-participant spillover. The spillover rate is the percentage of savings attributable to a measure or program, but additional to the gross (tracked) savings of a program (Massachusetts Technical Reference Manual).

MARKET EFFECTS: The effects on the market due to nonparticipant spillover (Massachusetts Technical Reference Manual).

Net Savings Discussion

Due to efforts of both the Department and the energy efficiency program administrators (the state's utilities), Massachusetts stands out as a leader in net energy savings evaluation of utility sector energy efficiency programs.

The Department periodically reviews its evaluation guidelines and, in response to the Green Communities Act, opened an investigation in August 2008 that focused on reviewing the existing standards for energy efficiency cost effectiveness, shareholder performance incentives, Department review of energy efficiency plans, and Department review of energy efficiency annual reports (in D.P.U. 08-50). On October 26, 2009, the Department issued three orders in 08-50. One of the orders, D.P.U. 08-50A, required program administrators to continue using the Total Resource Cost test as the single cost-effectiveness test of the energy efficiency plans. The order specified that the TRC test includes all costs and benefits of energy efficiency programs that can be attributed to either the energy system or the program participants.

In 2011, the Department, on its own motion, opened another investigation to update its energy efficiency guidelines (D.P.U. 11-120). In the first phase of this investigation, the Department examined issues associated with energy efficiency program benefits that are included in the cost-effectiveness determination: (1) the method used to calculate program net savings and (2) the method used to calculate reasonably anticipated environmental compliance costs. In August 2012, the Department issued an Order on Program Net Savings and Environmental Compliance Costs (D.P.U. 11-120) in which, in part, it concluded:

> Net savings have a more limited role than adjusted gross savings in determining the value of the resources acquired through the energy efficiency programs. Net savings values, which indicate the level of adjusted gross savings that can be attributed only to the energy efficiency programs, are used primarily to inform and guide future program design decisions. This forward-looking function is not enhanced by a retrospective application of updated evaluation study results.
>
> The retrospective application of updated net savings impact factors has produced sufficiently reliable and accurate results, to date, for determining the performance of traditional energy efficiency programs. Continuing this practice, however, could provide a

> disincentive for Program Administrators to adopt the innovative approaches to energy efficiency that likely will be needed going forward to meet the requirements of the Green Communities Act and the GWSA. To avoid the risk that performance in administering the plans could be negatively affected by post-implementation adjustments to program savings that are difficult to project beforehand, Program Administrators may seek to adopt an overly cautious approach to program design and implementation. Revising our current practice so that Program Administrators no longer adjust net savings calculation post-implementation should remove a disincentive for Program Administrators to adopt innovative approaches to program design and implementation. Accordingly, the Department finds that it is appropriate for Program Administrators, when calculating post-implementation program savings (gross and net), to use: (1) the most recently updated gross savings impact factors (as discussed above); and (2) the net savings impact factors that were used when the programs were designed and developed.

The program administrators (Pas) in Massachusetts have also actively pursued clarity on the net energy savings issues. The PAs have evaluated utility-sector energy efficiency programs for many years, including assessments of free riders and spillover. As a group, the PAs have commissioned several studies to standardize the methodology to quantify free ridership and spillover (National Grid et al. 2003, Tetra Tech 2011, NMR 2011). The Tetra Tech (2011) and NMR (2011) studies are among the most detailed and comprehensive reports in any state on net savings methodologies.

APPLICATION OF NET SAVINGS FOR DECISION MAKING

Shareholder incentives

The Green Communities Act explicitly allows distribution companies to include a proposed incentive mechanism in the three-year energy efficiency plans, subject to Council approval and comment, but provides no guidance as to how an incentive mechanism should be structured.

In 2012, the Department issued an order initiating the second phase of its investigation to update the energy efficiency guidelines in D.P.U. 11-120. In this order, the Department presented a straw proposal for a new way to address the recurring filings made each year during the first term of the three-year plans: (1) performance reports submitted by each Program Administrator annually, which include a determination of the performance incentive payment, (2) annual calculation and reconciliation of each Program Administrator's energy efficiency surcharge (EES), and (3) mid-term modification filings.

In the January 31, 2013 order, Approving Revised Energy Efficiency Guidelines in D.P.U. 11-120 Phase II, the Department required that a performance incentive mechanism be, among other things, designed to encourage Distribution Companies to pursue all available cost-effective energy efficiency. The Department determined that performance incentive payments would be calculated based on performance over the term of its energy efficiency plan, rather than performance in each year of the plan. The order allowed PAs to collect design performance incentive payments during the term of their plans, based on projected performance during the term, as approved by the Department, and to reconcile actual and design performance incentive payments at the end of each term on a schedule established by the Department.

With certain exceptions, the performance incentives, based on net savings, proposed by the PAs in the utilities' 2013-2015 Energy Efficiency Plans were approved by the Department in the

January 31, 2013 order in D.P.U. 12-100 through D.P.U. 12-111. In earlier cases, the Department awarded performance incentives to the IOUs in the state: NGRID Electric & Gas, NU Electric & Gas, FG&E Electric & Gas, Columbia Gas, Berkshire Gas, and New England Gas (DOER 2013).

Lost revenue recovery

D.P.U. 07-50-A gives distribution companies the ability to pursue revenue recovery through decoupling or lost base revenues. For the companies choosing to pursue lost base revenues (LBR), D.P.U. 07-50-A explained:

> Beginning in 2009 and extending through the term of their initial three-year energy efficiency plans (i.e., through 2012), electric distribution companies will be allowed to recover LBR resulting from their incremental efficiency savings. For this purpose, incremental efficiency savings are defined as those efficiency savings that exceed the efficiency savings from their 2007 energy efficiency activities, as documented in their 2007 annual reports on energy efficiency. An electric distribution company that seeks to recover LBR must petition the Department to do so in conjunction with the filing of its 2009 energy efficiency plan. Such filing must include full documentation and explanation of (1) how the incremental energy efficiency savings will be achieved and accounted for, and (2) the proposed LBR calculation. Gas distribution companies, which currently are allowed recovery of LBR, may continue do so through the term of their initial three-year energy efficiency plans (i.e., through 2012) consistent with existing LBR recovery methods.

Although the Department approved decoupling plans for National Grid Electric Company (DPU 09-39), National Grid Gas Company (DPU 10-55), Bay State Gas Company (DPU 09-30), and Western Massachusetts Electric Company (DPU 10-70), decoupling has not been adopted by all of the utilities. Lost-base revenue recovery was included in and approved in the 2013-2015 energy efficiency plans for NSTAR Electric (D.P.U. 12-110), NSTAR Gas (D.P.U. 12-105), and Berkshire Gas (D.P.U. 12-101).

REFERENCES

ACEEE State Energy Efficiency Policy Database
http://www.aceee.org/sector/state-policy/massachusetts

Commonwealth of Massachusetts. 1997. An Act Relative to Restructuring the Electric Utility Industry in the Commonwealth, Regulating the Provision of Electricity and Other Services, and Promoting Enhanced Consumer Protections Therein ("the Electric Restructuring Act").
https://malegislature.gov/Laws/SessionLaws/Acts/1997/Chapter164

———. 2008. Act Relative to Green Communities, Acts of 2008, chapter 169, section 11 ("the Green Communities Act").
https://malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter169

Massachusetts Department of Public Utilities. 2000. Investigation to Establish Methods and Procedures to Evaluate and Approve Energy Efficiency Programs, D.T.E. 98-100.
http://www.env.state.ma.us/dpu/docs/electric/98-100/finalguidelinesorder.pdf

———. 2008. Investigation by the Department of Public Utilities on its own Motion into Updating its Energy Efficiency Guidelines Consistent with An Act Relative to Green Communities, D.P.U. 08-50, 2008. http://www.env.state.ma.us/dpu/docs/electric/08-50/82208dpunoi.pdf

———. 2009. Investigation by the Department of Public Utilities on its own motion into Updating its Energy Efficiency Guidelines Consistent with An Act Relative to Green Communities, D.P.U. 08-50-A (2009) http://www.env.state.ma.us/dpu/docs/electric/08-50/31609dpuord.pdf

———. 2011. Investigation by the Department of Public Utilities on its own Motion into Updating its Energy Efficiency Guidelines, D.P.U. 11-120, 2011. http://www.mass.gov/eea/docs/dpu/energy-efficiency/energy-efficiency-legislation-and-regulations/ee-noi-dpu-11-120.pdf

———. 2012. Order on Program Net Savings and Environmental Compliance Costs, D.P.U. 11-120-A, August 10, 2012. http://www.env.state.ma.us/dpu/docs/electric/11-120/81012dpuord.pdf

———. 2013. Order Approving Revised Energy Efficiency Guidelines. Investigation by the Department of Public Utilities on its own Motion into Updating its Energy Efficiency Guidelines. D.P.U. 11-120-A, Phase II January 31, 2013. http://www.ma-eeac.org/Docs/6_DPU%20Proceedings%20Page/Other%20Related%20DPU%20Orders/DPU%2011-120-A%20Phase%20II%20Order%20Approving%20Revised%20Energy%20Efficiency%20Guidelines.pdf

———. 2013. Order Approving the Three-Year Energy Efficiency Plans of the Commonwealth's electric and gas distribution companies and the Cape Light Compact ("Program Administrators") for 2013-2015. January 31, 2013. D.P.U. 12-100 through D.P.U. 12-111. http://www.mass.gov/eea/docs/dpu/electric/2013-2015-3-yr-plan-order.pdf

Massachusetts Division of Energy Resources (DOER), 2013. Staff response to ACEEE survey.

Massachusetts Technical Reference Manual for Estimating Savings from Energy Efficiency Measures 2013-2015 Program Years—Plan Version. October 2012. http://www.ma-eeac.org/Docs/8.3_TRMs/1MATRM_2013-15%20PLAN_FINAL.pdf

National Grid, NSTAR Electric, Northeast Utilities, Unitil, Cape Light Compact Standardized Methods for Free-Ridership and Spillover Evaluation—Task 5 Final Report (Revised). June 16, 2003.

(NMR) NMR Group, Inc., Tetra Tech, and KEMA. 2011. *Cross-Cutting Net to Gross Methodology Study for Residential Programs – Suggested Approaches (Final).* Prepared for Massachusetts Program Administrators. http://www.ma-eeac.org/Docs/8.1_EMV%20Page/2011/2011%20Residential%20Studies/Residential%20MA%20NTG%20Methods%20Final%20072011.pdf

Tetra Tech, KEMA and NMR Group, Inc. April 18, 2011. *Cross-Cutting C&I Free-Ridership and Spillover Methodology Study Final Report.* Prepared for Massachusetts Program Administrators. http://www.ma-eeac.org/Docs/8.1_EMV%20Page/2011/2011%20Commercial%20&%20Industrial%20Studies/MA%20FR_SO%20CI%20%20Study%20w%20Exec%20Summary%205-26-2011%20v11.pdf

New York

BACKGROUND

Description of Utility Energy Efficiency Programs in the State

New York is a leading state on utility-sector energy efficiency programs. New York's energy efficiency programs result from New York Public Service Commission (NYPSC) regulatory orders. Customers pay a non-bypassable system benefits charge (SBC) on their utility bills. The charge supports energy efficiency programs for residential, multifamily, low-income, and commercial/ industrial customers, as well as research and development efforts in the NYPSC Technology & Market Development (T&MD) program and their Energy Efficiency Portfolio Standard (EEPS) program. A state government authority, the New York State Energy Research and Development Authority (NYSERDA), administers the T&MD portfolio and several EEPS programs. In addition to the programs authorized by the Commission, two public power authorities, the New York Power Authority and the Long Island Power Authority, also offer energy efficiency programs to their customers.

The NYPSC established funding for the systems benefits programs in 1996. The NYPSC's December 14, 2005 order in Case 05-M-0090 approved a five-year extension of the SBC program from 2006-2011. This was originally named the New York Energy $mart™ Program and was administered by NYSERDA. The energy efficiency, renewable energy, low-income, and other programs were funded at approximately $175 million annually.

Additional program funding for energy efficiency in New York was approved in June 2008 when the NYPSC issued an Order Establishing Energy Efficiency Portfolio Standard (EEPS) and Approving Programs (Case 07-M-0548). This order adopted a goal of a 15% reduction in electricity usage in the state by 2015. The order increased the annual level of electric system benefits charges from $175 million to $334 million as of October 1, 2008. During this time frame, the utilities were authorized to operate their own energy efficiency programs as well.

In October 2011, the Commission reauthorized a majority of the EEPS programs for the four-year period ending December 31, 2015, with revised targets and budgets where appropriate. The percentage of funding allocated to low-income programs was also increased. This Order increased the total EEPS electric and gas efficiency program budget by $2.1 billion, while increasing energy savings targets by 8,310 GWh and 15.9 million dekatherms.

In 2008, the Commission established incentives for electric utility energy efficiency programs under the EEPS proceeding. In the 2012 through 2015 incentive period, the Commission established incentive pools totaling $36 million for electric utilities and $14 million for gas utilities, totaled over a four-year incentive period. The incentive program provides a two-tier incentive. Utilities are eligible for incentives not only for achievement of their own targets but also for the achievement of statewide goals.

The evaluation of utility-sector energy efficiency programs in New York relies on regulatory orders in Cases 07-M-0458 and 07-G-0141, as well as guidance from the Evaluation Advisory Group. The utilities and NYSERDA administer program evaluation.

Evaluation of Utility Energy Efficiency Program Impacts

EVALUATOR: Utilities and NYSERDA. NYSERDA is required to use third-party evaluation contractors. The utilities employ third-party contractors as well.

USE: New York uses energy efficiency savings results for reporting on program accomplishments, screening and making decisions on future programs, and for determining eligibility for and/or amount of performance incentives for the utilities.

PROTOCOLS: New York State Department of Public Service and the Evaluation Advisory Group, New York Evaluation Plan Guidance for EEPS Program Administrators. August 2008. Updated November 2012 and August 2013.

NET VS. GROSS ENERGY SAVINGS

Net and/or gross energy savings

Net.

Primary metric (net or gross) to report energy efficiency program savings results

Net.

Definitions

NET SAVINGS: The total change in load that is attributable to the utility DSM program. This change in load may include, implicitly or explicitly, the effects of spillover, free riders, state or federal energy efficiency standards, changes in the level of energy service, and natural change effects. The net savings reported by the program administrators are referred to as ex ante values since they have not been adjusted by ex post (after measure installation) evaluation efforts (New York Evaluation Plan Guidance for EEPS Program Administrators).

FREE RIDER: A customer who participates in an energy efficiency program but would have, at least to some degree, installed the same measure(s) on their own if the program had not been available (New York Evaluation Plan Guidance for EEPS Program Administrators).

SPILLOVER: Refers to the energy savings associated with energy-efficient equipment installed by consumers who were influenced by an energy efficiency program, but without direct financial or technical assistance from the program. Spillover includes additional actions taken by a program participant as well as actions undertaken by non-participants who have been influenced by the program. Sometimes spillover is referred to as a free driver effect or as market effects. These market effects may be current or may occur after a program ends. When market effects occur after a program ends, they are referred to as momentum effects or as postprogram market effects (New York Evaluation Plan Guidance for EEPS Program Administrators).

FREE DRIVER: Sometimes referred to as spillover (New York Evaluation Plan Guidance for EEPS Program Administrators).

MARKET EFFECTS: Sometimes referred to as spillover (New York Evaluation Plan Guidance for EEPS Program Administrators).

Net Savings Discussion

In the NYPSC's May 16, 2007 order in Case 07-M-0548 instituting the Energy Efficiency Portfolio Standard proceeding, the Commission made it clear that rigorous program evaluation must be a central focus and specifically required "transparent and technically sound methods for measurement and verification of net energy savings, benefits and costs, as well as assessment of customer satisfaction and program efficacy."

An October 18, 2010 order issued by the NYSPSC in Case 07-M-0548 approved the "New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs, Residential, Multi-Family, and Commercial/Industrial Measures." This manual specifies that:

> the savings approaches presented in this Tech Manual provide gross energy savings estimates and specify the approaches for obtaining those estimates. The New York Department of Public Service policy specifies that savings projections used for predicting energy savings will be net savings. To arrive at net savings the gross estimates presented in this Tech Manual must be adjusted to account for free riders and spillover.
>
> Free rider adjustments erode the gross savings estimate by subtracting out the savings that would have occurred without the program's incentive or influence. Spillover adjustments increase savings by counting the additional savings that occur as a result of two possible conditions. First, participants can replicate that same action (participant spillover) outside of the program participation process, providing additional savings. Second, the program can influence the way non-participants make energy saving decisions that result in additional savings not associated with a specific participation event. Together, the subtraction of savings for free riders, plus the addition of savings for spillover tend to offset each other to a significant degree. As a result, for the purposes of estimating program impacts, the savings estimates presented in this Tech Manual, or the savings produced using the calculation approaches described in this Tech Manual, must be multiplied by 0.90 to arrive at an estimated net energy savings for each measure.
>
> As program evaluations are completed, this factor will be adjusted up or down as appropriate by program and for each measure included in this Tech Manual. Over time, the adjustment factor will evolve to be more accurate and will be focused on specific types of programs and delivery approaches. To standardize the net impact estimation approach now, a net to gross conversion factor of 0.90 will be applied to the gross saving estimates.

As a leading state in utility-sector energy efficiency program implementation and evaluation, the NYSPSC/NYSDPS has tackled a number of complex program evaluation issues. In the November 2012 update of the New York Evaluation Plan Guidance for EEPS Program Administrators, the NYSDPS established specific guidelines for quantifying spillover effects. The guidelines, among other things, include a list of questions evaluators need to answer before making critical decisions about spillover, a system to determine the amount of rigor to use to assess the amount of spillover, and several methods to calculate spillover.

The August 2013 update of the York Evaluation Plan Guidance for EEPS Program Administrators includes appendices with guidelines for estimating net-to-gross ratios using the

self-report approach, and guidelines for calculating the relative precision of program net savings.

APPLICATION OF NET SAVINGS FOR DECISION MAKING

Shareholder incentives

Although New York has a shareholder incentive mechanism in place that is based on net energy savings (Case 07-M-0548), to date none of the utilities has been awarded an incentive.

Lost revenue recovery

N/A (All 6 major electric and all 10 major gas companies have revenue decoupling mechanisms in place.)

REFERENCES

ACEEE State Energy Efficiency Policy Database
http://aceee.org/energy-efficiency-sector/state-policy/newyork

New York Evaluation Advisory Contractor Team and TecMarket Works. October 15, 2010. New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs, Residential, Multi-Family, and Commercial/Industrial Measures. Prepared for New York DPS.
http://www3.dps.ny.gov/W/PSCWeb.nsf/0/06f2fee55575bd8a852576e4006f9af7/$FILE/TechManualNYRevised10-15-10.pdf

New York Public Service Commission. May 16, 2007. Order Instituting Proceeding. Case 07-M-0548—Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard.
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={625676B8-D6A2-4AB9-8D53-5426AB4BDD6D}

———. October 18, 2010. Case 07-M-0548—Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard. Order Approving Consolidation and Revision of Technical Manuals.
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={90EF3CB5-16EC-4141-B25F-C19937351402}

———. March 22, 2012. Order Establishing Utility Financial Incentives. Case 07-M-0548—Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard.
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={93BC3B51-B317-461C-876E-0ED5962DBBA9}

(NYSDPS) New York State Department of Public Service and the Evaluation Advisory Group. August 2008. Updated November 2012. New York Evaluation Plan Guidance for EEPS Program Administrators.
http://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/766a83dce56eca35852576da006d79a7/$FILE/EVALGUIDE.11.12.pdf

———. August 2008. Updated August 2013. New York Evaluation Plan Guidance for EEPS Program Administrators.

http://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/766a83dce56eca35852576da006d79a7/$FILE/NY_Eval_Guidance_Aug_2013.pdf

Wisconsin

BACKGROUND

Description of Utility Energy Efficiency Programs in the State

Wisconsin has a statewide energy efficiency and renewable resources program called Focus on Energy, which is funded through a non-bypassable charge on customer bills. There has been no market restructuring or deregulation, so vertically integrated, investor-owned utilities are still regulated providers. In addition to Focus on Energy, utilities provide voluntary energy efficiency programs. Act 141 allows IOUs to operate voluntary programs with funding in addition to the 1.2 percent of gross operating revenues they contribute to Focus on Energy. These voluntary programs need to be approved by the Public Service Commission and currently three IOUs operate some level of voluntary programs.

Under 2005 Wisconsin Act 141, oversight of Focus on Energy was transferred to the Public Service Commission of Wisconsin. Act 141 also requires municipal and retail electric cooperative utilities to collect an average of $8 per meter to fund energy efficiency programs. Municipal and retail electric cooperative utilities can collect the dollars and participate in the Focus on Energy program or can elect to operate their own Commitment to Community programs.

Program cost recovery is handled via individual rate cases. A conservation escrow account is used for voluntary energy efficiency and programs. Program costs are recovered through rates, the money goes into an escrow account, and then the costs are adjusted, or "trued up," in the next rate case. If utilities spend more than the approved budget, they generally receive cost recovery through the true up. If actual spending is less than the escrow amount, the PSCW trues it up through a reduction in revenue requirement for the next rate period.

The Public Service Commission of Wisconsin oversees the statewide programs. The investor-owned utilities formed the non-profit Statewide Energy Efficiency and Renewables Administration (SEERA) to fulfill their obligations under Act 141. SEERA is required to fund Focus on Energy and to contract on the basis of competitive bids, with one or more persons to administer the programs. Focus on Energy has energy efficiency programs in two areas: (1) residential energy efficiency and renewable energy and (2) non-residential energy efficiency and renewable energy (including the business, governmental, institutional, industrial, and agricultural sectors). Focus on Energy also has a Research Portfolio Program that funds research projects to obtain new knowledge in the areas of energy efficiency and renewable energy program design and delivery in Wisconsin.

Act 141 allows for self-directed programs for the largest energy customers. Customers must submit a program plan for approval to the Public Service Commission of Wisconsin that meets cost-effectiveness standards and includes detailed measurement and verification plans. Approved customers implement their plans and submit quarterly reports. The amount of funding available is based on a variable formula; funding is received on project completion. To date, no customers have chosen this option.

Evaluation of Utility Energy Efficiency Programs

EVALUATOR: Focus on Energy savings are tracked in a statewide database. The Public Service Commission of Wisconsin contracts with a third party to evaluate the programs. Savings are quantified and reported on an annual basis. Results can be found at www.focusonenergy.com. A few utility-specific programs achieve savings that are not part of the statewide achievement. The utility contracts with a third party to evaluate the program, and these savings are also provided on an annual basis.

The Commission oversees the Focus on Energy evaluation. The Commission formed an Evaluation Work Group (EWG) to assist. The EWG consists of members representing the program evaluator, the program administrator, the utilities, the Commission, and one member of the public named by the Commission. The EWG has assisted the Commission in addressing such issues as the appropriate methods to use to determine attribution. Commission staff have day-to-day oversight of evaluation activities.

USE: Energy savings results are used for reporting on program accomplishments, screening and making decisions on future programs, and for determining eligibility for and/or amount of Focus on Energy program administrator performance incentives.

PROTOCOLS: Rules for evaluation of energy efficiency and renewable resource programs are found in the Quadrennial Review Process: http://www.aceee.org/files/state/WI_5-GF-191_Order.pdf, Docket 5-GF-191.

NET VS. GROSS ENERGY SAVINGS

Net and/or gross energy savings

Both. Net savings are used to determine measure and program cost effectiveness, to inform continuous improvement of program design, and for public policy decision making. Gross metrics are used to determine contract goals and incentives for the program administrator.

Primary metric (net or gross) to report energy efficiency program savings results

Net.

Definitions

NET SAVINGS: Savings "net" of what would have occurred in the program's absence. (These are the observed impacts attributable to the program.) Evaluators typically calculate the savings by applying the net-to-gross ratio to the gross verified savings. The net-to-gross ratio is the ratio of the verified net savings attributed to the program after evaluation to the verified gross savings. Verified net savings are energy savings that evaluators can confidently attribute to program efforts. For verified net savings, the evaluation team makes adjustments for outside influences, such as free ridership and spillover. Verified gross savings are energy savings verified by an independent evaluation team based on inspections and reviews of the number and types of implemented energy efficiency measures and the engineering calculations used to estimate the energy saved. Verified gross savings reflect the total calculated savings without considering the influence of free riders or spillover (Cadmus 2013).

FREE RIDER: Participants who would have adopted the energy-efficient measure without the program (Cadmus 2013).

SPILLOVER (PARTICIPANT): Participants who, after an initial program experience, go on to adopt more energy-saving products or practices without program assistance (Cadmus 2013).

MARKET EFFECTS: Changes in marketplace practices, services, and promotional efforts that induce businesses and consumers to buy energy-saving products and services without direct program assistance. Evaluators generally considered these effects a result of program impacts on the market (Cadmus 2013).

Net Savings Discussion

In the PSCW's November 15, 2010 order in Docket 5-GF-191 (Quadrennial Planning Process Order), the Commission determined that net savings are the best method of quantifying energy savings and represent the true impact of energy efficiency programs. The order stated that net savings can be used to determine measure and program cost effectiveness, to inform continual improvement of program design, and to inform public policy decision making. The Commission advised that gross savings also have value and are the best metric for evaluating whether a Program Administrator is achieving contract goals because "net savings are difficult to measure and involve variables that are outside the Program Administrator's control." The Commission decided that the Evaluation Work Group (also created in this order) could propose guidelines for net energy savings measurement methods.

Appendix J.1 in Cadmus' August 28, 2013 evaluation of Wisconsin's 2012 calendar year Focus on Energy programs provides a detailed description of the methodology used to estimate free riders and spillover and calculate net energy savings.

APPLICATION OF NET SAVINGS FOR DECISION MAKING

Shareholder incentives

Program administrator performance incentives have, in the past, been awarded in Wisconsin on the basis of quantified net energy efficiency program savings to the Focus on Energy administrator. See PSCW Docket 9501-FE-106. In 2010, the Commission, during its quadrennial planning process, made decisions that apply to the current quadrennial (2011-2014). The change was made from net annual to gross lifecycle for this quadrennial. CB&I, the current program administrator, has a contract that includes a performance incentive based on gross lifecycle savings.

Lost revenue recovery

N/A

REFERENCES

ACEEE State Energy Efficiency Policy Database
http://www.aceee.org/sector/state-policy

Cadmus, August 28, 2013. *Focus on Energy Calendar Year 2012 Evaluation Report Appendix*.
http://www.focusonenergy.com/sites/default/files/FOC_XC_CY%2012%20Report%20Appendices%20A-O%20Final_%2008-28-2013_1.pdf

Public Service Commission of Wisconsin. November 15, 2010. Docket 5-GF-191. Quadrennial Planning Process. Order.

http://www.aceee.org/files/state/WI_5-GF-191_Order.pdf

———. January 6, 2009. Contract for Services Between the Statewide Energy Efficiency and Renewables Administration and Wisconsin Energy Conservation Corporation, Contract #9501-FE-106. WPSC Docket 9501-FE-106 (see Attachment E).
http://psc.wi.gov/apps35/ERF_view/viewdoc.aspx?docid=106388

Appendix B: State-By-State Data from the National Survey

Who is responsible for calculating and reporting energy savings results from ratepayer-funded energy efficiency programs? [1]

Arizona	utilities
Arkansas	utilities
California	CPUC and utilities
Colorado	utilities
Connecticut	utilities
Delaware	NA[2]
District of Columbia	District Department of the Environment (DDOE)
Florida	utilities (and Commission reports to legislature, governor)
Georgia	utilities
Hawaii	HPUC (EM&V firm retained by HPUC conducts verification of savings claims made by program implementer)
Idaho	utilities
Illinois	utilities and Illinois Energy Office
Indiana	utilities for utility administered Core Plus Programs, and Third Party Administrator for statewide Core Programs
Iowa	utilities
Kansas	utilities
Kentucky	utilities
Maine	Efficiency Maine Trust
Maryland	utilities
Massachusetts	utilities
Michigan	utilities (MPSC administers workgroups that address issues related to calculating program savings)
Minnesota	utilities
Missouri	utilities and commission (has retained EM&V auditor)
Montana	utilities
Nebraska	utilities
Nevada	utilities
New Hampshire	utilities and commission
New Jersey	New Jersey Clean Energy Program managers
New Mexico	utilities
New York	program administrators (utilities, NYSERDA) report to DPS
North Carolina	utilities
Ohio	utilities
Oklahoma	utilities
Oregon	Energy Trust of Oregon
Pennsylvania	utilities
Rhode Island	utilities
South Carolina	utilities
South Dakota	utilities
Tennessee & parts of AL, GA, KY, MS, NC, VA	TVA quantifies and calculates internally
Texas	utilities
Utah	utilities
Vermont	Vermont Energy Investment Corporation and VT DPS

[1] All states were given the opportunity to review the material in this appendix and make any necessary corrections.

[2] There are currently no utility-administered/ratepayer-funded efficiency programs in Delaware. Currently RGGI funding (for DE SEU Programs) and a Public Utility Tax (for the Energy Efficiency Investment Fund—EEIF) are used for efficiency programs in Delaware.

Who is responsible for calculating and reporting energy savings results from ratepayer-funded energy efficiency programs? (cont.)

Virginia	Utilities
Washington	Utilities
Wisconsin	Focus on Energy and PSC (hires evaluator), some utilities (with evaluators)
Wyoming	utilities

What is the role of the public utilities commission in calculating and reporting energy efficiency program savings?

Active role in calculation and reporting savings	Formal review and use of energy savings reports
California	Arkansas
Florida	Colorado
Hawaii	Georgia
Kansas	Idaho
Michigan	Illinois
Missouri	Iowa
New Hampshire	Maryland
Vermont	Montana
Wisconsin	Nevada
	New York
	North Carolina
	Ohio
	Pennsylvania
	Texas
	Virginia
	Washington
	Wyoming

Receives program energy savings reports	No direct role
Connecticut	Arizona
Indiana	Delaware
Maine	District of Columbia
Oklahoma	Nebraska
Oregon	New Mexico
Rhode Island	Minnesota (Dept. of Commerce regulates)
South Carolina	
South Dakota	
Utah	

Other Commission Roles

New Jersey	Approves protocols for calculating savings.
Tennessee Valley Authority	Federal
Massachusetts	Receives program energy savings reports. The Energy Efficiency Advisory Council, chaired by DOER, does most of the oversight
Kentucky	Does not report, but does EM&V for some utilities.

Uses of Energy Savings Data

	General Monitoring	Screening and decisions regarding future programs	Eligibility or amount of performance incentives	Have actually used for performance incentives awards
Arizona	yes	yes	yes	yes
Arkansas	yes	yes	yes	yes
California	yes	yes	yes	yes[1]
Colorado	yes	yes	yes	yes
Connecticut	yes	yes	yes	yes
Delaware	plan to	plan to	no	
District of Columbia	yes	yes	yes	no
Florida	yes	yes	yes	no
Georgia	yes	yes	yes	yes
Hawaii	yes	yes	yes	yes
Idaho	yes	yes	no	
Illinois	yes	yes	yes	no
Indiana	yes	yes	yes	yes
Iowa	yes	yes	no	
Kansas	no	no	yes	yes
Kentucky	yes	yes	no	
Maine	yes	yes	no	
Maryland	yes	yes	no	
Massachusetts	yes	yes	yes	yes
Michigan	yes	yes	yes	yes
Minnesota	yes	yes	yes	yes
Missouri	yes	yes	yes	no
Montana	yes	yes	no	
Nebraska	yes	yes	no	
Nevada	yes	yes	no	
New Hampshire	yes	yes	yes	yes
New Jersey	yes	yes	no	
New Mexico	yes	yes	yes	yes
New York	yes	yes	yes	no
North Carolina	yes	yes	yes	yes
Ohio	yes	yes	yes	yes
Oklahoma	yes	yes	yes	yes
Oregon	yes	yes	no	
Pennsylvania	yes	yes	no	
Rhode Island	yes	yes	yes	yes
South Carolina	yes	yes	yes	yes
South Dakota	yes	yes	no	

	General Monitoring	Screening and decisions regarding future programs	Eligibility or amount of performance incentives	Have actually used for performance incentives awards
Tennessee and portions of AL, GA, KY, MS, NC, and VA	yes	yes	no	
Texas	yes	yes	yes	yes
Utah	yes	yes	no	
Vermont	yes	yes	yes	yes
Virginia	no	yes	no	
Washington	yes	yes	yes	yes
Wisconsin	yes	yes	yes	yes
Wyoming	yes	yes	no	

Use of energy savings results concerning lost revenue recovery

	Savings results used for lost revenue recovery?	Utilities actually received lost revenue recovery?	Utilities	Case numbers
Arizona	yes[1]	yes	APS	Decision No. 73732
Arkansas	yes	yes	Entergy Arkansas Southwestern Electric Power Company Oklahoma Gas and Electric Company Centerpoint Energy Arkansas Gas SourceGas Arkansas, Inc. Arkansas Oklahoma Gas Corporation	07-082-TF 07-082-TF 07-075-TF 07-081-TF 07-078-TF 07-077-TF
California	no			
Colorado	no			
Connecticut	yes	yes	The three gas companies, YGS, SCG, and CNG, have received lost revenue recovery based on quantified energy program savings, through the gas Conservation Adjustment Mechanism (CAM).	Many dockets for YGS, SCG, and CNG [if you really need the docket numbers I can provide some of the recent docket numbers in a follow up]
Delaware	plan to			
District of Columbia	no			
Florida	yes	yes	All utilities subject to FEECA.	Docket No. xx0002, where "xx" are the last two digits of the year.
Georgia	no			
Hawaii	no		Decoupling was implemented for the IOUs in Hawaii: HECO, MECO, HELCO.	2008-0274
Idaho	no			
Illinois	no			
Indiana	yes	yes	Duke Energy Indiana, Indiana Michigan Power Company, NIPSCO, and SIGECO	Cause No. 43955 Cause No. 43827, lost revenues extended in Cause No. 43959 Cause No. 44154 Cause No. 43938 for large commercial and industrial customers and Cause No. 43405 DSMA-9S1 for small commercial and industrial customers
Iowa	no			

Kansas	no			
Kentucky	yes	yes	Louisville Gas & Electric ("LG&E"), Kentucky Utilities ("KU"), Duke Energy Kentucky ("Duke KY"), and Kentucky Power Company ("KPCo")	Case no2011-00134 (LG&E/KU), Case no2012-00495 (Duke KY), and Case no2012-00367 (KPCo)
Maine	no			
Maryland	yes	yes	BGE, Pepco, DPL, and SMECO (not PE)	Done in the annual surcharges, Case Nos. 9153-57
Massachusetts	yes	yes	In the 2013-2015 plans only NSTAR Electric, NSTAR Gas and Berkshire Gas have LBR.	
Michigan	yes	yes	Indiana Michigan Power Company	Tracker approved in general rate case U-16180, Reconciliation U-16739, U-17283
Minnesota	no	used to		
Missouri	yes	yes	Ameren Missouri and KCPL Greater Missouri Operations Company recovery lost revenue through Commission-approved through-put disincentive net shared benefit share (TD-NSB Share) component of performance incentive.	Case No. EO-2012-0142 and Case No. EO-2012-0009
Montana	yes	yes	NorthWestern Energy and Montana-Dakota Utilities.	NorthWestern Energy: D2003.6.77/D2004.6.90, D2006.5.66/D2007.5.46, and D2012.5.49 (on-going).
Nebraska	no			
Nevada	yes	yes	Sierra Pacific Power Company d.b.a. NV Energy and Nevada Power Company d.b.a. NV Energy.	CLOSED: 10-10024 & 10-10025, 11-03003 & 11-03004, 12-03004 & 12-03005 OPEN: 13-03003 & 13-03004
New Hampshire	no	used to	electric utilities	Note: The electric utilities received lost revenues during the 1990; but, the Commission ended that practice in Docket No. 96-150, Order No. 23,574, dated November 1, 2000.
New Jersey	no			

New Mexico	yes	no		
New York	no			
North Carolina	yes	yes	Duke-Progress Energy Carolinas, Duke Energy Carolinas, and Dominion North Carolina Power.	Dominion – Docket E-22, Subs 486, 477, and 464 Duke Energy – Docket E-7, Subs 1001, 979, 941, and 831 (Sub 1031 is pending) Duke Progress – Docket E-2, Subs 1019, 1002, 977, 951, and 931
Ohio	yes	yes	all	11-5596,11-5568,12-2190,11-2191,-112192,13-0431,13-0833
Oklahoma	yes	yes	Public Service Company of Oklahoma, Oklahoma Gas & Electric Company, Empire Electric Company.	PSO – Cause No. PUD 201200128, Order No. 604214; OGE Cause No. PUD 201200134, Order No. 605737
Oregon	yes	no		
Pennsylvania	no			
Rhode Island	yes	yes	National Grid	RI PUC Docket 4327
South Carolina	yes	yes	SCE&G, Duke, Duke Energy Progress	SCPSC Docket No. 2013-76-E, SCPSC Docket No. 2013-50-E, SCPSC Docket No. 2012-302-E (and Docket No. 2012-303-E which is related.)
South Dakota	no	used to	Montana-Dakota Utilities was originally calculating their actual lost margins for recovery.	Docket NG05-016
Tennessee and portions of AL, GA, KY, MS, NC, and VA	no			
Texas	no			
Utah	yes	no		
Vermont	no			
Virginia	no			
Washington	no			
Wisconsin	no			
Wyoming	yes	yes	Questar Gas Company Cheyenne Light, Fuel & Power	Questar Gas 30010-122-GT-12 30010-119-GT-12 30010-107-GT-11 30010-106-GT-10 30010-101-GT-10 Cheyenne Light, Fuel & Power 20003-124-ET-12 / 30005-170-GT-12

[1] For lost fixed cost recovery

Have evaluation rules or protocols been established for quantifying and reporting savings?

	Evaluation rules for savings?	Order, law or other?	If other, explain	Where are the policies?
Arizona	yes	other	Commission rulemaking	For electric energy efficiency rules, see Article 24, and for gas energy efficiency rules, see Article 25 at the following web address: http://www.azsos.gov/public_services/Title_14/14-02.pdf
Arkansas	yes	order		Docket No. 10-100-R Evaluation, Measurement & Verification Protocol Rules for EM&V, currently using TRM Version 2.0. Order No. 17 approved the current TRM on 9/18/2012. http://www.apscservices.info/EEInfo/TRM.pdf Docket No. 10-010-U Notice of Inquiry into Energy Efficiency This docket established annual reporting requirements. Order No. 14 approved current Standardized Annual Reporting Packet. This includes an Excel workbook and instructions. http://www.apscservices.info/pdf/10/10-010-u_150_1.pdf Docket No. 06-004-R Rules for Conservation and EE Programs Order http://www.apscservices.info/Rules/energy_conservation_rules_06-004-R.pdf
California	yes	order and other	The California Evaluation Framework and Protocols were initiated by Commission order, and more rules guiding evaluation standards were provided in D.05-04-051.	http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/ CA Energy Efficiency Evaluation Protocols, providing guidance to policy makers on evaluation efforts. CA Evaluation Framework, provides approach for planning and conducting evaluations of California's energy efficiency programs. CPUC Energy Efficiency Policy Manual, describes policy rules and related reference documents for development and evaluation of rate-payer-funded energy efficiency programs in California. D1004029 Determining Evaluation, Measurement and Verification Processes for 2010 through 2012 Energy Efficiency Portfolios. http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/116710.PDF
Colorado	yes	order	The gas programs have reporting rules outlined in Commission Rules	
Connecticut	yes	law and order		Recently the evaluation protocols have been inserted in statute. CGS Public Act (PA) 13-298

	Evaluation rules for savings?	Order, law or other?	If other, explain	Where are the policies?
Delaware	yes	other	An EM&V Framework has been developed in Delaware. Formal regulations are going to be developed for the Framework.	Email Jessica.Quinn@state.de.us for a copy of the Framework document.
District of Columbia	yes	other	DDOE, in consultation with the DC SEU and an independent EM&V consultant, developed EM&V protocols and a Technical Reference Manual for the DC SEU portfolio of energy efficiency and renewable programs that are based on regional and national efforts to standardize EM&V protocols, methods, and assumptions.	An electronic copy of the EM&V Framework for the DC SEU portfolio of programs can be obtained by contacting Lance Loncke at lancelot.loncke@dc.gov
Florida	yes	order		Commission Rule 25-17.0021, Goals for Electric Utilities, Florida Administrative Code.
Georgia	yes	order and other	Evaluation rules and protocols can be found in the Georgia Public Service Commission rules and in the Resolution of Outstanding Issues filed as part of the 2010 IRP	Rule Section 515-3-4.09: http://rules.sos.state.ga.us/docs/515/3/4/09.pdf Evaluation Protocol: Resolution of Outstanding Issues in Document #129403 in Docket # 31082.
Hawaii	yes	other	By HPUC procedure	
Idaho	no			
Illinois	yes	order and other	IL Commerce Commission ordered utilities and Stakeholder Advisory Group (SAG) to hire contractor to develop Technical Reference Manual (TRM) to standardize assumptions and methods for calculating energy savings. TRM was developed and a process set up for updates through SAG. TRM was approved by Commission. Stakeholder Advisory Group created a "Net to Gross Framework" .	ICC dockets 12-0528, 13-0077

	Evaluation rules for savings?	Order, law or other?	If other, explain	Where are the policies?
Indiana	yes	other	The DSMCC developed a document titled "Evaluation Work Plan for Evaluation, Measurement, and Verification Services," which was filed with the commission in Cause No. 42693 S1, on November 14, 2012.	On the commission's electronic document system at the following link: https://myweb.in.gov/IURC/eds/
Iowa	yes	other	199 IAC 35.8(2)"f"	(https://www.legis.iowa.gov/DOCS/ACO/IAC/LINC/Chapter.199.35.pdf)
Kansas	yes	order		KCC Order in Docket No. 12-GIMX-337-GIV (http://estar.kcc.ks.gov/estar/ViewFile.aspx/20130306153852.pdf?Id=da7931e5-7840-4a58-8e7b-9217dfaf608a)
Kentucky	no			
Maine	yes	other	Agency rules (links provided below):	http://www.efficiencymaine.com/docs/AgencyRules/Chapter%20380.pdf http://www.efficiencymaine.com/docs/AgencyRules/Chapter%20480.pdf
Maryland	yes	order		Case Jackets: 9153-9157
Massachusetts	yes	other		The TRM describes the various impacts.
Michigan	yes	law and other	Rules promulgated under PA 295 that are still in process of being approved. The program is being run under the draft rules.	PA 295 of 2008: http://www.legislature.mi.gov/documents/2007-2008/publicact/pdf/2008-PA-0295.pdf
Minnesota	yes	law and order		Docket No. E,G999/CIP-06-1591, Minnesota Rules Ch. 7690, Minn. Stat. §216B.241
Missouri	yes	law and order		Missouri Energy Efficiency Investment Act of 2009 (MEEIA) contained in Section 393.1075, RSMo, Supp. 2012. Commission's MEEIA rules (4 CSR 240-3.163, 4 CSR 240-3.164, 4 CSR 240-20.093 and 4 CSR 240-20.094) are the result of Commission rulemaking in File No. EX-2010-0368.
Montana	no			
Nebraska	no			

	Evaluation rules for savings?	Order, law or other?	If other, explain	Where are the policies?
Nevada	yes	law and order		NAC 704.934 Preparation, contents and submission of demand side plan; annual analyses regarding programs for energy efficiency and conservation. http://www.leg.state.nv.us/NAC/NAC-704.html NRS 704.785 Adoption of regulations authorizing electric utility to recover amount based on effects of implementing energy efficiency and conservation programs; limitations. http://www.leg.state.nv.us/NRS/NRS-704.html 06-03038 & 06-04018: Order to use net savings when evaluating programs. 10-10024 & 10-10025: Order to use net savings when calculating lost revenues.
New Hampshire	yes	order		A recent illustration is provided in Docket DE 10-188, Order No. 25,189. The Commission approved a settlement agreement that established refined protocols for quantifying and reporting planned savings. The Electric and Gas Utilities agreed to provide additional information when submitting calculation of program savings. The additional information linked (or reconciled) actual savings for the most recent historical year compared to plan, and for the planned savings for the proposed years. The additional information provided data for each program, including data by measure, annual savings per measure, measure life, and total lifetime savings.
New Jersey	yes	order		http://www.njcleanenergy.com/main/public-reports-and-library/market-analysis-protocols/energy-savings-protocols/energy-savings-pr
New Mexico	yes	law		62-17-8 NMSA; Efficient Use of Energy Act (EUEA), Measurement and Verification
New York	yes	order		See "Evaluation Guidelines" http://www3.dps.ny.gov/W/PSCWeb.nsf/All/766A83DCE56ECA35852576DA006D79A7?OpenDocument
North Carolina	yes	order		Commission Rules R8-68 and R8-69 are the EE program approval and cost recovery rules, respectively. See Docket No. E-100, Sub 113 for details of the rulemaking case , especially Commission order issued February 29, 2008, which promulgated rules R8-68 and 69.
Ohio	yes	law and order		SB 221, PUCO website
Oklahoma	yes	law and order		OAC 165:35 Subchapter 41 Demand Programs; OAC 165:45 Subchapter 23 Demand Programs
Oregon	no			

	Evaluation rules for savings?	Order, law or other?	If other, explain	Where are the policies?
Pennsylvania	Yes	order and other	The Commission has provided general outlines for the reporting of savings in various Orders. Additionally, the Commission's Statewide Evaluator has provided guidance via memos to the utilities regarding the calculation and reporting of savings. However, neither the utilities nor the Commission are bound to the guidance provided in the Statewide Evaluator's memos.	Act 129 Phase I (6/1/09-5/31/13) Implementation Order: http://www.puc.pa.gov/electric/pdf/Act129/EEC_Implementation_Order.pdf Act 129 Phase II (6/1/13-5/31/16) Implementation Order: http://www.puc.state.pa.us/pcdocs/1186974.doc Act 129 Phase I and II Technical Reference Manuals: http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/technical_reference_manual.aspx Act 129 Phase I and II Total Resource Cost Test Orders: http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/total_resource_cost_test.aspx Act 129 Phase I Statewide Evaluator's Audit Plan: http://www.puc.pa.gov/electric/pdf/Act129/SWE-Audit_Plan_Update_Nov11.pdf
Rhode Island	Yes	order		See revisions to standards in Three Year Procurement Plan, Docket 4202 and standards in Docket 3931 http://www.ripuc.org/eventsactions/docket/4202-EERMC-Amendment(2-24-11).pdf http://www.ripuc.org/eventsactions/docket/3931-EERMC-Standards(2-29-08).pdf
South Carolina	Yes	order		SCPSC Order No. 2010-472, SCPSC Order No. 2009-373, SCPSC Order No. 2009-336
South Dakota	No			
Tennessee and portions of AL, GA, KY, MS, NC, and VA	Yes	other		Not certain the TRM has been "publicly" released, though it has been made available internally and to program implementers.
Texas	Yes	law and order		As mentioned above, the legislative authority is in SB 1125 enacted in 2011 by the Texas Legislature. The EM&V framework is embodied in P.U.C. SUBST. R. 25.181, relating to Energy Efficiency Goal (Project No. 39674). This can be found on the PUCT website at: http://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/25.181/25.181.pdf
Utah	Yes	order		For Rocky Mountain Power, refer to Docket No. 09-035-27 http://www.psc.utah.gov/utilities/electric/elecindx/2006-2009/0903527indx.html For Questar Gas, refer to Docket No. 05-057-T01 http://www.psc.utah.gov/utilities/gas/gasindx/05057T01indx.html

	Evaluation rules for savings?	Order, law or other?	If other, explain	Where are the policies?
Vermont	Yes	law and order		30V.S.A 209(e)(12)—requires ind. audit of savings verification Docket 7466 VEIC and BED Orders of Appointment and "Process and Administration" documents. Found here at the Public Service Boards website: http://psb.vermont.gov/docketsandprojects/eeu/7466/orders Technical Reference Manual VEIC Contact: Nikola Janjic Njanjic@veic.org PUC Contact: Barry Murphy barry.murphy@state.vt.us
Virginia	no			
Washington	yes	other	The Commission relies on the work of the Northwest Power and Conservation Council's Regional Technical Forum.	http://rtf.nwcouncil.org//
Wisconsin	yes	order		Docket 5-GF-191
Wyoming	no			

		ACEEE "Best Assessment" Categorization, Net vs. Gross					
	Net, gross, or both? **Original state response**	**Net, specific values estimated**	**Net, 1.0 NTG uniformly applied**	**Net, other deemed value uniformly applied**	**Gross**	**Both**	**Secondary or other savings use or "Other"**
Arizona	gross		Yes				
Arkansas	net	Yes					
California	both	Yes					
Colorado	net	Yes					
Connecticut	net	Yes					
Delaware	both				Yes		Net for B/C, planning, future goals
District of Columbia	net	Yes					
Florida	net	Yes					
Georgia	gross					Yes	net for shareholder incentives
Hawaii	both	Yes					Gross
Idaho	net	Yes					
Illinois	net	Yes					
Indiana	gross					Yes	Net used for lost revenues purposes
Iowa	gross				Yes		
Kansas	gross				Yes		
Kentucky	net	Yes					
Maine	both				Yes		Net
Maryland	both				Yes		BC & program design
Massachusetts	net	Yes					
Michigan	both			Yes			
Minnesota	gross		Yes				
Missouri	both					Yes	
Montana	both	Yes	Yes				
Nebraska	both				Yes		
Nevada	both	Yes					Gross also reported
New Hampshire	gross		Yes				
New Jersey	both		Yes				
	Net, gross,	**Net,**	**Net, 1.0**	**Net, other**	**Gross**	**Both**	**Secondary or**

	or both? Original State Response	specific values estimated	NTG uniformly applied	deemed value uniformly applied		other savings use or "Other"
New Mexico	net	Yes				
New York	net	Yes				
North Carolina	net	Yes				
Ohio	gross			Yes		
Oklahoma	both				Yes	
Oregon	net	Yes				
Pennsylvania	gross			Yes		
Rhode Island	net	Yes				
South Carolina	gross			Yes		
South Dakota	net	Yes				
Tennessee / TVA areas	both			Yes		Net used in system planning; NTG factors from TVA's EM&V contractor.
Texas	both			Yes		Net for program design
Utah	both	Yes				
Vermont	both				Yes	
Virginia	NA					
Washington	Gross, both or "other"					Net used for program design
Wisconsin	both	Yes				Gross for PA goals, net for everything else
Wyoming	both	Yes				

State reported adjustments made when energy savings results are quantified and reported

	Free riders	Spillover/ free drivers	Market effects
Arizona	no	no	no
Arkansas	yes	yes	no
California	yes	yes	no
Colorado	yes	no	no
Connecticut	yes	yes	plan to
Delaware	plan to	plan to	plan to
District of Columbia	yes	yes	no
Florida	yes	yes	no
Georgia	yes	yes	no
Hawaii	yes	yes	yes
Idaho	yes	yes	yes
Illinois	yes	plan to	
Indiana	yes	plan to	plan to
Iowa	no	no	no
Kansas	no	no	no
Kentucky	yes	yes	no
Maine	yes	yes	No
Maryland	Yes	Yes	No
Massachusetts	yes	yes	yes
Michigan	yes	yes	
Minnesota	no	no	No
Missouri	yes	yes	No
Montana	yes	yes	no
Nebraska	plan to	plan to	plan to
Nevada	yes	yes	no
New Hampshire	no	no	no
New Jersey	no	no	no
New Mexico	yes	no	no
New York	yes	yes	no
North Carolina	yes	yes	no
Ohio	no	no	no
Oklahoma	yes	yes	no
Oregon	yes	yes	yes
Pennsylvania	no	no	no
Rhode Island	yes	yes	no
South Carolina	no	no	no
South Dakota	yes	yes	

	Free riders	Spillover/ free drivers	Market effects
Tennessee and portions of AL, GA, KY, MS, NC, and VA	yes	yes	no
Texas	plan to	plan to	no
Utah	yes	yes	no
Vermont	yes	yes	yes
Virginia			
Washington			
Wisconsin	yes	yes	plan to
Wyoming	yes	yes	no