How Do We Measure Market Effects? Counting the Ways, and Why It Matters

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ABSTRACT

Recent work in energy efficiency evaluation shows that market transformation programs are best documented by measuring market effects, and that non-energy effects are also important. Thus far there is no consensus in the energy efficiency community on how market and non-energy effects should be included in the cost-effectiveness evaluation of market transformation programs. This lack of consensus could jeopardize policymakers' abilities to document the full impact of market transformation programs as well as compare results across states and regions.

This paper provides an overview of current approaches to measuring market effects, non-energy effects, and cost-effectiveness by energy efficiency organizations in the U.S. It summarizes primary and secondary research on how market transformation program results are captured in cost-effectiveness analysis. The results show that organizations in approximately one fourth of 19 states with active efficiency efforts are estimating long-term market effects. Versions of the TRC or Societal cost-effectiveness tests are most widely used, but approximately one-third of the states use multiple tests. In roughly one fifth of the states, the Utility or RIM tests are used. There are many challenges to reaching consensus on the measurement of market and non-energy effects and their inclusion in cost-effectiveness analysis. The paper identifies some positive trends toward consensus on approaches and coordination of measurement among utilities and program administrators within states and at the regional level, and offers some suggestions for accelerating these trends.

Introduction

While recent work in energy efficiency evaluation makes it clear that the impacts from market transformation programs are best documented by measuring market effects (TecMarket Works Framework Team 2004), some state regulatory commissions have not fully incorporated their measurement into state requirements. To date there is no consensus on the use of market effects in cost-effectiveness evaluation of market transformation programs. This poses a significant threat to future market transformation programs, because without market effects, policymakers cannot document the full impact of programs. The purpose of this paper is to provide an overview of current approaches to measuring market effects, non-energy effects, and cost-effectiveness by energy efficiency organizations in the U.S. The paper summarizes results of primary and secondary research into how market transformation program results are captured in cost-effectiveness analysis.

The underlying premise motivating this research is that there is substantial benefit from coordination and consistency in measurement of results of market transformation activities. Furthermore, there is benefit from capturing all costs and benefits, including externalities. However, as our research illustrates, these are not current practice. We hope this research helps

stimulate discussion that will contribute to continued improvement of market transformation measurement.

Background and Methodology

Market transformation and resource acquisition programs are frequently characterized as two distinct and complementary strategies for achieving energy efficiency; they have slightly different, but not mutually inconsistent, foci. The focus of market transformation is to overcome market barriers to what would otherwise be cost-effective efficiency.[1] Typically, the time horizon required for market transformation programs to achieve planned results is longer than for resource acquisition programs (Sebold et al. 2001).

Transforming markets is one of several goals of most, if not all, energy efficiency programs. The emergence of this goal coincided with the utility restructuring era of the 1990s. It is helpful to remember that energy efficiency programs first evolved in the 1980s as demand side resource investments. In the traditional structure of the time, regulators set policy parameters for efficiency investments, designated how cost effectiveness would be measured, verified cost-effectiveness results, and, in many jurisdictions, provided regulatory incentives designed to align utility financial motives with ratepayer interest in achieving cost-effective efficiency (Harrington & Murray 2003).

The utility restructuring debate in the 1990s threw into question both the traditional regulated monopoly utility structure and the premise that utilities needed to be further involved in energy efficiency markets. While many states ultimately decided to retain the traditional structure, the post-debate level of commitment to energy efficiency ranged from greater (as in Maine, New Jersey, and New York), the same (Florida), to less (Colorado) than before. For states that opted for restructuring, commitments to energy efficiency changed in various ways. Ratepayer funding for energy efficiency was maintained in many of these states. However, funding levels were lower in general. Some efficiency program investments included specific market transformation goals, and efficiency program development was not necessarily integrated into a resource portfolio. Furthermore, the strategies for administration of efficiency programs diversified (Harrington & Murray 2003). Currently, energy efficiency duties remain with distribution companies in some states (e.g. Massachusetts and Connecticut). In other states, they are administered by the state (e.g. Maine, Illinois, Ohio, Wisconsin, and New York[2]), a non-profit entity (e.g. Oregon), a private entity (e.g. Vermont), or some combination (as in the Pacific Northwest). Table 1 illustrates the range of funding available for energy efficiency programs and program evaluation for the states discussed in this paper.

In summary, many factors in addition to market transformation goals influence states' energy efficiency programs, the impacts that are measured, and their approach to cost-effectiveness. The factors include overall downward pressure on funding levels and multiple program goals, as well as diversity of program administration structure and target audiences.

[1] In practice, many resource acquisition programs also attempt to overcome market barriers, and thus are better described as falling on a continuum from resource acquisition to market transformation. For the sake of simplicity, we maintain the distinction in this paper.

[2] In New York, multiple entities provide energy efficiency services, including NYSERDA and LIPA.

Table 1. Descriptive Statistics: Energy Efficiency Budgets, 2004[3]

N=18	2004 Efficiency Budget (in Millions)*		Efficiency $ Budgeted Per Capita**		Evaluation as Percent of Efficiency Budget	
Min	$3	(OH)	$0.30	(OH)	0	(IL)
Max	$540	(CA)	$26.00	(MA)	5	(NH, NV, IA)
Median	$39	(WI)	$12.00	(NH)	2	(ME, NY, RI)

*Exception: Budget figures for Minnesota and Texas are for 2003.
** Population figures used are from July 2003 U.S. Census estimates.

Methodology. This paper is based on research conducted by staff of the Consortium for Energy Efficiency (CEE) and Northeast Energy Efficiency Partnerships (NEEP) as part of a coordinated study of energy efficiency regulation among organizations in the U.S. Virtually every state with systems benefit charge (SBC) funding for energy efficiency was examined. Secondary research involved reviews of the energy efficiency legislation of each of the states, of recent publications addressing energy efficiency regulation at the state level, and of selected utility filings. Where necessary, this was supplemented by telephone conversations. In addition, NEEP conducted formal interviews with its sponsors[4] and selected regulators from Northeast states. A total of 37 organizations in 22 states were contacted for this project. Information obtained from multiple organizations in each individual state has been aggregated.

Results

Definition of Cost-Effectiveness Tests

In reviewing the approaches to measuring cost-effectiveness taken by our members and sponsors, we found that different permutations on each test are applied across the states. Test nomenclature varies among states as well. Table 2 identifies and defines the types of cost-effectiveness tests currently in use in the U.S., and attempts to categorize these in a logical and useful way.[5] As this table shows, the tests range from narrowly focused to widely inclusive with respect to the number and type of benefits and costs included.

Measurement of Cost-Effectiveness

Where do states stand on cost-effectiveness analysis? There is no "one size fits all" approach. Table 3 lays out approaches taken to measuring cost-effectiveness by state. As this table shows, Florida uses the RIM test, while Connecticut, Illinois and Texas use the Utility test. Market transformation is not an explicit program goal in most of these states. The prevailing practice among states that offer market transformation programs is the Societal Test, or some

[3] This analysis does not include the individual states that are part of the Northwest Energy Efficiency Alliance.
[4] NEEP sponsors include utility companies, municipal aggregators, public authorities and efficiency organizations that deliver energy efficiency programs in the Northeast. Many are also members of CEE, a national organization.
[5] Since all the organizations included in our research with service territory in California relied on the tests laid out in the California Standard Practices Manual (California State Governor's Office 2001), and several outside of the state did as well, we based a number of our test descriptions on this document. However, we found the 2001 California Evaluation Framework (Sebold et al. 2001) helpful in understanding and categorizing alternative approaches taken by a number of parties outside the state. The categorization presented in Table 2 is based on a synthesis of these two documents.

Table 2. General Description of Types of Cost-Effectiveness Tests

Test Name(s)	Measurement Approach	General Costs Included	General Benefits Included
Utility Test[1,2]	Measures net costs taking perspective of utility. Excludes participant costs.	Utility costs	Avoided supply, T&D, generation & capacity costs during load reduction periods
Program Administrator Cost Test[2]	Measures net costs based on administrative costs only.	Program administrative costs; incentives; increased supply costs during periods of increased load	Net avoided supply costs; marginal cost of reduction in T&D, generation, and capacity during load reduction periods
Participant Test[1, 2]	Measures quantifiable costs and benefits taking customer perspective.	Expenses incurred by customers, increases in customer utility bills, value of customer time spent arranging program participation	Reduction in customer utility bills, incentives paid, tax credits, gross energy savings
Ratepayer Impact Measure (RIM), a.k.a. Non-Participant Test[1,2]	Measures program impacts on customer bills or rates.	Initial & annual program costs incurred by administrator and any other parties, incentives paid, decreased revenue from load reduction periods, increased supply costs from load increase periods	Savings from avoided supply costs, including T&D and generation; capacity cost reductions during load reduction periods; increased revenue during load increase periods
Total Resource Cost Test (TRC)[1,2]	Measures net costs taking perspective of utility, but includes participant and non-participant costs. Applied at program and/or measure level. Usually focuses on measures or activities for a single year.	Program costs paid by utility and participants; increase in supply costs during load increase periods; spillover	Avoided supply costs; reduction in T&D, generation, and capacity costs; tax credits
Societal Test[1,2,3]	Based on TRC, but takes perspective of society. Applied at program and/or measure level. May use higher marginal costs than TRC; should use societal discount rate; excludes tax credits & interest.	All costs included in TRC, plus: externalities, some non-energy costs (including costs to particpants and society)	All benefits included in TRC, plus: externalities (avoided environmental damage, increased system reliability, fuel diversity); some non-energy benefits (including benefits to participants and society)
Public Purpose Test (PPT)[1,3]	Based on Societal Test; takes societal perspective; takes long-term view. Applied at portfolio level.	Same as Societal, but takes into account market effects & broader array of externalities and non-energy costs	Same as Societal, but takes into account market effects & broader array of externalities, non-energy benefits; spillover savings

[1] Sebold (2001).
[2] California State Governor's Office (2001).
[3] TecMarket Works Framework Team (2004).

variation on that theme, either self-described by administrators as modified Societal or modified TRC.[6] In six states (about one third of those surveyed) multiple tests are used. Wisconsin and Connecticut represent two examples of the multiple-test approach. Wisconsin supplements its

[6] For example, in Massachusetts, the modified TRC includes participant non-resource benefits, avoided environmental compliance costs, and low-income benefits along with more traditional TRC benefits and costs.

Societal Test with a Public Purpose test to document the results of market transformation programs. Connecticut applies a TRC test in cases where program benefits and costs include externalities. Multiple tests allow administrators and policymakers to examine program results from different perspectives and to rely on those most relevant for a particular program type.

Table 3. Approaches to Measuring Cost-Effectiveness, by State

	Northeast								California
Region/State	ME[1]	NH[2]	VT[3]	MA[4]	RI[5]	CT	NY[6]	NJ[7]	CA
Is MT an Explicit Program Goal?	y Mod.	y Mod.	y	y Mod.	n Mod.	n	y	y	y
Test	Soc	TRC	Soc.	TRC	Util.	Util.		Soc.	Soc.
Uses Multiple Tests						y	y		y
Market Effects									
Spillover		y	y	y	y	y	y		
Market Penetration									
Forecasts			y	y			y		
Non-energy Effects									
Water		y	y	y	y		y		
Customer benefits		y	y	y			y		
Quantified		y	y	y			y		
Non-quantified adder		15%	y						

	Midwest					Pacific Northwest		South and Southwest		
Region/State	WI	OH[8]	IA	MN	IL	NEEA[9]	OR[10]	TX	CO	FL
Is MT an Explicit Program Goal?	y Mod.	n	y	n Mod.	n	y	y	y	n	n
Test	Soc		Soc.	Soc	Util.	TRC	Soc.	Util.	TRC	RIM
Uses Multiple Tests	y		y			y	y			
Market Effects										
Spillover	y			y		y				
Market Penetration										
Forecasts	y					y				
Non-energy Effects										
Water	y					y	y			
Customer benefits	y	y				y	y			
Quantified	y	y				y	y			
Non-quantified adder								20%		

[1] Maine's cost-effectiveness test is under development.

[2] New Hampshire market effects include participant and nonparticipant spillover. An adder is used for non-resource effects. Resource effects are quantified.

[3] Vermont adds .07 cts/kwh for environmental externalities and an 11 percent adder for risk mitigation. Market transformation is a minor goal which is not explicitly rewarded in Efficiency Vermont's contract.

[4] Massachusetts market effects include participant and nonparticipant spillover, and in some cases, market penetration.

[2] New Hampshire market effects include participant and nonparticipant spillover. An adder is used for non-resource effects. Resource effects are quantified.

[5] Rhode Island market effects include participant spillover.

[6] Information for LIPA is not included in this analysis.

[7] New Jersey program administration is in transition, with test approach under development.

[8] Ohio uses retail electricity prices and assesses programs from the customer perspective.

[9] NEEA uses the TRC for long-term impacts and the Utility test for short-term impacts.

[10] Oregon utilities rely on the Northwest Alliance for market transformation program cost-effectiveness measurement. The Energy Trust of Oregon includes $15/ton for carbon in cost-effectiveness analysis.

Source: Based in part on Maine PUC (2002).

Measurement of Market Effects

Changes in markets due to market transformation programs are referred to as market effects. Successful market transformation programs are dynamic. Thus the nature of market effects can be expected to vary over time. The 2001 California Evaluation Framework (Sebold et al. 2001) offers a useful typology for understanding market effects, categorizing them as Near-Term, Interim, and Ultimate[7] market effects.

Near-Term and Interim market effects include changes in knowledge, attitudes, and behaviors by consumers and suppliers in the initial stages of program interventions. They can be described and quantified with program tracking and survey techniques. They are useful in program implementation, because they provide important, timely feedback, often before Ultimate effects are detectable. All of the market effects provide important feedback about programs, but only some lend themselves to inclusion in estimates of energy savings in cost-effectiveness models. Participant spillover can be considered a Near-Term market effect and can be quantified and incorporated into estimates of program energy savings and cost-effectiveness.[8]

Examples of measurements of Interim effects include changes in the number of models on the market, in the number of manufacturers producing efficient products, and continuing changes in Near-term effects (Sebold et al. 2001). Non-participant spillover can also be considered an Interim market effect. While it is more challenging and costly to measure than participant spillover, non-participant spillover can also be incorporated in estimates of energy savings and cost-effectiveness.

Examples of Ultimate market effects include trends such as changes in product shipments, sales, and market share that are detectable at the market level during and after program implementation. To be meaningful in estimates of program energy savings, Ultimate market effects must be directly attributable to programs. Measurement of Ultimate effects typically requires time series data and forecasts.[9] Thus Ultimate effects are more challenging and less certain but often more costly to measure, and slower to deliver than other kinds of market effects.

States' approaches to market effects measurement. For most programs in most states, program-year direct participation and spillover are the basis for estimating market transformation program benefits, rather than projections of baselines and market penetration. Anecdotal evidence suggests that measurement of participant spillover is relatively common, while measurement of non-participant spillover is inconsistent across program administrators. Not surprisingly, market effects are not measured in many states where market transformation is not an explicit goal, such as Illinois and Ohio. Approximately one fourth of the states studied estimate Ultimate effects by projecting change in market penetration relative to a projected baseline for at least some of their market transformation programs.

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[7] Ideally, market effects are measured with respect to a baseline.

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[8] Similarly, free-ridership can be viewed as a representation of participant baseline conditions; free-ridership is only defined if the program has identifiable participants.

[9] Dynamic modeling has been recommended as one approach that would allow Ultimate effects to be incorporated into cost-effectiveness analysis (Sebold et al. 2001).

The most comprehensive approaches to the measurement of market effects are found among utilities in California, Massachusetts,[10] at the Energy Trust of Oregon,[11] and at the Wisconsin Department of Administration. These places measure the full range from Near-Term to Ultimate effects. With the exception of the Energy Trust of Oregon, these organizations also have explicit regulatory directives to quantify Ultimate market effects as part of their program evaluation efforts. They use a variety of measurement approaches, including Delphi techniques, discrete choice market share models, and dynamic modeling. Several other organizations—such as the New Jersey utilities, the New York State Energy Development and Research Authority (NYSERDA), the Northwest Alliance (NEEA),[12] and Efficiency Vermont—have conducted baseline studies to lay the groundwork for future measurement of Near-term and Interim market effects. These organizations have addressed Ultimate market effects in a more limited fashion. For example, the New Jersey utilities and Efficiency Vermont include Ultimate market effects in analyses of economic potential of energy efficiency.[13] NEEA estimates market size and current market penetration for relevant programs. It develops a growth curve for each baseline, assumes that its program will augment that growth, and projects savings based on its assumptions.

Measurement of Non-Energy Effects

To further illustrate the range of variation in approaches to measuring cost-effectiveness among the states, our research briefly explored if and how states approach the measurement of non-energy effects. Whether they are intended program results or fortunate by-products, non-energy effects are important to include because they add value to programs. As with some market effects, non-energy effects can be hard—if not impossible—to observe, measure, and attribute to specific programs. Moreover, differences in how program administrators measure the effects and how they incorporate them in cost-effectiveness analyses add challenge to comparing program results across organizations.[14]

Our research indicates that program administrators tend to adopt an "all or nothing" approach to including non-energy effects in cost-effectiveness analysis. At one extreme ("all"), non-energy effects include avoided resource use, such as gas, oil, and water, as well as other effects such as changes to customer operations and maintenance, avoided air emissions, etc. Several administrators acknowledge that they only include a subset of effects that can be "reasonably" quantified in their analysis (e.g. Maine, NYSERDA, NEEA). There appears to be little consensus on what and how to measure, but this may be changing. For example, in 2003 the Massachusetts utilities jointly developed common assumptions concerning residential non-electric benefits from market transformation programs (Massachusetts Electric et al. 2003).

[10] Massachusetts utilities are required to estimate and forecast program-related market penetration, including post-program market effects; these are filed separately from the cost-effectiveness analyses. Near-term and Interim market effects are included in cost-effectiveness analyses.

[11] The Energy Trust of Oregon administers and evaluates statewide market transformation programs in Oregon.

[12] In the Pacific Northwest, market transformation programs are offered and evaluated by the Northwest Alliance. Utilities in Washington, Idaho, Montana, and Oregon do not administer market transformation programs.

[13] Efficiency Vermont does not include post-program effects in program cost-effectiveness analysis because they assume the programs operate continuously throughout the multi-year planning horizon.

[14] Anecdotally, we know that some regulators establish guidelines that specify monetized values to assume for air emissions, and that the utilities in Massachusetts have been working jointly to establish common assumptions or estimation methods for non-energy effects in order to increase consistency and transparency of program results.

Florida, Minnesota, Illinois, Iowa, Texas, and Colorado are among states where program administrators do not measure non-energy effects. Perhaps the biggest distinction in the measurement of non-energy effects is between administrators that quantify effects and those that employ an "adder." Administrators in five states (Vermont, New Hampshire, Texas, Oregon, and Montana) use adders for non-energy effects.[15] Per Table 3, there is no commonality among adders. For example, Vermont's adder is applied statewide and includes risk mitigation quantified separately from environmental externalities, while Texas only applies the adder to containment areas (specific air quality zones). The adder strategy allows program administrators to incorporate externalities in impact analysis while avoiding the possibility of incurring large evaluation expenses for results with a potentially unacceptable level of uncertainty.

Discussion

While not all states with market transformation programs assess market effects or non-energy effects, there is evidence that some states are moving in this direction. In certain states, such as New York, benefit-cost analysis is viewed as an ongoing effort that will improve as new data and information are made available (NYSERDA 2004). Guidelines can assist in the development of a consistent framework for evaluation (Eto 1998), and there has been significant activity in the development and refinement of energy efficiency evaluation guidelines in recent years. California utilities produced important evaluation guidelines for publicly funded energy efficiency in 2001 (Sebold et al.) and refined and elaborated on these in 2004 (TecMarket Works Framework Team). The 2001 guidelines are complex. They have been widely reviewed and distributed, but as our research illustrates, they have not been applied across the country. Around the states, program administrators conduct evaluations that estimate market baselines and track market progress based on market indicators and logic models, even if they do not incorporate Interim or Ultimate market effects in cost-effectiveness models. To allow the value of market and other indirect program effects to be captured where appropriate, regulators and administrators have built flexibility into their requirements. In Maine, for example, the Commission requested "as much flexibility as possible while retaining a consistent, economically rational approach to program design" (Maine PUC 2002:9-10). It further chose not to specify a rate impact level that would trigger program rejection, and it allowed programs with non-quantifiable benefits to be implemented when the entire portfolio is cost-effective.

There are pros and cons to flexibility in cost-effectiveness approaches. Flexibility is particularly useful in the context of market transformation, to allow market and non-energy effects to be included in program evaluation. But it has also prevented faster adoption of more market-oriented approaches in some cases. If an administrator can demonstrate program-level cost-effectiveness under more traditional approaches, then there is little or no incentive to undertake more complicated—and expensive—evaluation or cost-effectiveness modeling, especially when the results only increase uncertainty along with savings. In New Hampshire, for example, program administrators have the software capability to include information from market penetration curves in their analysis of the cost-effectiveness of market transformation programs, but regulators have not asked for this and thus it is not a priority for administrators. To date, Vermont has fit market transformation programs into its overall portfolio but has not estimated Ultimate market effects in its analyses of program performance. The contract under

[15] Adders are also used in some cases to estimate externalities in low-income programs. This was not explored in our research.

which Efficiency Vermont operates emphasizes resource acquisition goals and favors results that are "not controversial" or uncertain. Efficiency Vermont staff note that market transformation programs have public policy benefits and are "good customer service," but their impacts are unlikely to be comprehensively evaluated or quantified in the state soon. Vermont administrators recognize their state cannot transform a market on its own (Hamilton 2003).

At the same time that flexibility and the diversity of tests has increased, there is also movement in the direction toward standardization of measurements and cost-effectiveness modeling between organizations within states. For example, as part of implementing the 1999 EDECA Act (New Jersey BPU 2001) establishing requirements to advance energy efficiency and renewable energy in New Jersey, utilities established mutually agreed-upon protocols for measuring program impacts.[16]

Several states and organizations responsible for large service territories in the Northeast have recently made significant moves toward standardization of measurements of market effects, non-energy benefits, or cost-effectiveness. For example, NYSERDA is refining their cost-effectiveness approach for 2004 and beyond to include more internal consistency, incorporate more tests, and allow for inclusion of more benefits in its analysis. Previously, benefits were not uniform across all programs, but costs were. Starting in 2004, program-level cost-effectiveness test benefits will be uniform across all programs, and costs included in program-level analysis will be restricted to evaluation and marketing costs. This will allow NYSERDA to compare cost-benefit ratios over time. In addition, NYSERDA will examine measure-level cost-effectiveness for program design, as well as an Energy $mart Portfolio-level test which will incorporate a "wide range of benefits into the B-C analysis, including system reliability, CO_2, NO_x and SO_2 reduction benefits and the hedge value of efficiency" (NYSERDA 2003, 3). Sensitivity analyses will be performed to take uncertainty into account. Programs with non-monetized benefits will be assessed separately using a version of cost-value analysis that develops a metric based on ratings of multiple attributes of a program.

New Hampshire and Connecticut have each moved towards increased standardization of evaluation and reporting of program results. New Hampshire utilities implemented common Core efficiency programs in 2003. In 2002 these utilities filed a study with the Public Service Commission that provided common input assumptions for cost-effectiveness modeling. They also conducted a benchmarking exercise to establish that the cost-effectiveness models used by the various utilities provide similar results (CVEC et al. 2002). The Connecticut utilities have developed and filed joint program plans for 2004 (CLMP & UIC 2003).

The four Massachusetts electric utilities provide a successful case study of significant progress in standardization and market transformation program measurement. Since 1998, when cost-effectiveness guidelines for Massachusetts were first issued, the utilities have increased coordination and standardization of their evaluations. Order DTE 98-100 (Mass. DTE 1998) addressed some of the unique qualities of market transformation programs. For example, it allows market effects attributable to a program to be counted as benefits where appropriate. It requires that utilities report savings associated with post-program market effects.[17] It addresses concerns about uncertainty in market transformation program benefits by allowing sensitivity analyses on some market effects, and by calling for a target level of precision for post-program

[16] The New Jersey Board of Public Utilities has since ruled that it will administer energy efficiency and renewable programs and is in the process of developing the state's cost-effectiveness approach.

[17] These are reported separately from cost-effectiveness results and from market effects realized while the program is implemented.

effects that reflects a "reasonable assessment of their importance" in determining whether a program is cost-effective (Mass. DTE 1998, 4.22[b]). In 2000, utilities began an effort to conduct statewide cost-effectiveness analyses for some market transformation programs. Joint utility multi-year evaluation plans were completed in 2002 for residential market transformation programs, and statewide market penetration forecasts were also developed. The utilities have cooperated on studies to develop common impact parameters, such as spillover, in some commercial energy efficiency programs. In 2003, the utilities completed a study to develop common methods and assumptions regarding non-energy effects. The regulators' emphasis on state-level results for market transformation programs in Massachusetts provided the impetus for standardization of the utilities' evaluation efforts. The Massachusetts' utilities' collaborative process, involvement in jointly-delivered regional programs, and the utility staff have also significantly contributed to this trend. As a result, state-level market transformation program results can be provided to Massachusetts regulators, and the utilities are better able to compare results across a variety of energy efficiency programs.

The Massachusetts experience also reveals several remaining challenges to coordination. One is that market effects of commercial sector market transformation programs have not been measured as comprehensively as those of residential programs. Another is that market transformation program evaluations stop at state borders, because regulatory requirements differ even when similar—or identical—market transformation programs are delivered in neighboring states. A third challenge is that while market transformation is a long-term process, it is often analyzed annually in cost-effectiveness tests. Because regulatory staff turn over frequently and state priorities change, it can be helpful to have multi-year evaluation plans in place to ensure that appropriate data can continue to be collected to measure market transformation program effects.

On the other side of the country, NEEA recently completed a study that included multi-state cost-effectiveness analysis of market transformation programs. The study found many opportunities within NEEA to increase consistency in its approach to cost-effectiveness. For example, while NEEA uses one cost-effectiveness model for all programs, the model is used inconsistently (Violette & Cooney 2003). NEEA has not connected market results reported in market progress reports (MPERS) to savings from programs. If NEEA can implement the recommendations from this study, it will provide a good example of how to effectively present consistent, regional, long-term cost-effectiveness results of market transformation programs.

Conclusions and Recommendations

As our research shows, including all market and non-energy effects from market transformation programs in program evaluation is not a common practice among program administrators. Coordination of measurements between states is rare, and coordination within states is a recent trend. There are many benefits to be gained by program administrators and regulators from increased consistency in the measurement of outcomes of market transformation activities and from documenting program results in a way that captures all net benefits. Increased consistency would help document market transformation progress more accurately, and allow for the comparison of results over time and across states and regions. Cost-effectiveness tests, market effects, and non-energy benefits that have been vetted and widely accepted could help to

[18] Originally the MPERs were designed to look at entire markets, not just at project indicators and effects. Over time, they have changed to focus on project effects and delivery processes and less on the overall market.

increase regulators' confidence in program results. Another benefit is more efficient use of evaluation funds. When parties from across a state agree on how to measure particular effects, it streamlines the job of measuring those effects. This practice could also help evaluators from other states to avoid "re-inventing the wheel" in implementing more robust measurement of market and non-energy effects.

Several states provide encouraging examples about increasing consistency in measurement approaches. However, there are also substantial barriers to increasing consistency and to capturing the full value of market and non-energy effects. One of the biggest barriers concerns the challenges faced by regulators. Turnover of regulatory staff, limited time, the complexity of these issues and how to address them, and competing energy priorities are among the obstacles. There are also few opportunities for regulators to increase their understanding of the issues. Another substantial barrier is cost. Smaller states and those with weaker commitments to evaluating efficiency program impacts are at a considerable disadvantage in measuring market transformation program results comprehensively.

How can the energy efficiency community help overcome these barriers? Some key recommendations that could help insure the future of market transformations include:

- Identify commonly accepted approaches to measuring market and non-energy effects for use in cost-effectiveness analysis of market transformation programs.
- Identify forums for performing outreach to regulators, such as regulatory training programs and nationally recognized guidelines.
- Increase communication to regulators concerning recommendations for measurement of market and non-energy effects in cost-effectiveness analysis.
- Develop a common base of assumptions and input data for market transformation programs.
- Increase opportunities for discussion and brainstorming within the energy efficiency community on creative solutions to barriers to improved measurements, such as high evaluation costs, data availability, and state-specific attribution of market transformation program impacts.

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