A Modified Delphi Approach to Predict Market Transformation Program Effects

Philip Mosenthal, Optimal Energy, Inc.
Ralph Prahl, Prahl & Associates
Chris Neme, Vermont Energy Investment Corp.
Robert Cuomo, NSTAR

ABSTRACT

In planning market transformation programs it is essential to develop theories of how markets will be effected, and to explicitly predict the level of these effects. This task requires skills and information not traditionally considered by program planners. For NSTAR's 2000-2002 efficiency filing, we employed a modified Delphi process to predict market effects.

For each market transformation program we identified each significant market to be addressed and defined an appropriate measure of performance. We then assembled teams of experts for each set of markets. Each expert independently estimated the likely annual market effects, both with and without the program. All team members then reviewed and discussed the estimates, including everyone's rationale. Through this discussion, we reached an initial consensus. We then presented the consensus estimates, and the rationale behind them, to a wider audience of stakeholders (utilities, non-utility parties and consultants) for comment. Each team then reassembled to reconsider estimates in light of the stakeholder comments and developed final estimates for each market.

The paper describes the process used, lessons learned in developing and implementing the process, the use and usefulness of the results in program planning, and recommendations for improvements to the approach. It also compares the approach to traditional Delphi technique, and to a similar process recently employed for two regional market transformation programs. Finally, it identifies ancillary benefits, including informing program design implementation and evaluation decisions by articulating the market transformation theory and the expectations and timing of specific market events.

Introduction and Summary

As part of its energy efficiency efforts, NSTAR will file a three year plan with the Massachusetts Department of Telecommunications and Energy (DTE).[1] It describes NSTAR's plans for delivery of a set of market transformation and resource acquisition initiatives from 2000 to 2002. As part of an Energy Efficiency Collaborative, NSTAR and consultants for the Collaborative non-utility parties (NUP Consultants) jointly developed the plan. In the past, energy efficiency planning has focused on predicting levels of direct resource acquisition, often driven by budget constraints, and with fairly explicit and predictable links between program activity and results. Market transformation program

[1] NSTAR was created from the recent merger of Boston Edison, Cambridge Electric and Commonwealth Electric Companies. The DTE was formerly called the Massachusetts Department of Public Utilities.

planning differs significantly. Effective planning and cost-effectiveness analysis requires explicit assumptions about effects that may occur far past the end of the program. Compounding this is that market transformation programs tend to have much softer causal and temporal links between program activity and results. Predicting and quantifying these effects requires a new set of tools than those traditionally used by DSM planners.

NSTAR and the NUP Consultants developed an innovative method to estimate likely market effects from NSTAR's market transformation programs. Using a Modified Delphi Approach (MDA), we relied on the opinions of experts in each market.[2] Through a series of refinements and discussions each expert's opinions were considered, thought processes were explored, and results modified until a single consensus set of effects were developed for each market.

This process resulted in a surprising level of agreement among participants. In addition, the development of a clear rationale for how and why market effects would occur resulted in stronger and more refined program designs. Program implementation should also be improved because the logic of the causal links between program activities and resulting effects was clearly defined and articulated. Because MDA relies on a wide variety of perspectives and expertise, rather than a single planner's predictions, it should result in more consistent, balanced and reasoned forecasts. At the same time, the modified approach used is far easier and cheaper than either traditional Delphi technique, or complex statistical or other quantitative models might be. Future research may identify improvements to the MDA process, or perhaps borrow from it to improve on other planning approaches.

Planning Framework

NSTAR's 3 year plan proposes a portfolio of 8 programs. Three of these programs are primarily designed to capture discretionary retrofit energy savings, and do not have significant features intended to transform markets. The remaining 5 are designed to capture opportunities at the time of natural market events (e.g., new construction, equipment replacement, etc.), and specifically incorporate features intended to create sustainable changes in certain markets. These programs include:

- C&I Construction. This program promotes efficiency at the time of new construction, renovation, remodeling or replacement in all primary energy using equipment markets. NSTAR also participates in separate, technology-specific market transformation initiatives sponsored by the Northeast Energy Efficiency Partnership (NEEP). Because these technologies are also promoted by, and tracked as part of, the CIC program, we estimated market effects collectively for both the NSTAR CIC and NEEP programs.
- LED Traffic Signals. This program promotes a specific technology to selected market segments.

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[2] Experts included John Brown, NSTAR; John DaSilva, NSTAR; Anne Emidy, ETW; Kate Gillooly, NSTAR; Fred Gordon, Pacific Energy Associates; Kevin Grabner; Mike Guerard, Conservation Services Group; Jon Linn, NEEP; Dick Mora, NSTAR; Philip Mosenthal (C&I Sector Leader), Optimal Energy; Steve Nadel, ACEEE; Chris Neme (Residential Sector Leader), Vermont Energy Investment Corp; Chuck Partridge, NSTAR; Ralph Prahl, Prahl and Associates; Jeff Pratt, Pacific Energy Associates; Margaret Suozzo, ACEEE; and Bruce Wall, NEEP.

- Residential New Construction.
- Residential Lighting. This regional market transformation program promotes compact fluorescent fixtures to residential customers.
- Residential Appliances. This regional market transformation program promotes horizontal axis clothes washers and room air conditioners.

In order to analyze program cost-effectiveness and predict long term benefits, we estimated long term penetrations of efficiency in each relevant market, both with and without a 3-year program. We chose a planning period of 13 years (three program years plus 10 post-program). Total energy savings in each year attributed to each program would then be calculated as the product of: 1) penetration of efficient equipment or practice (expressed as a percent of the total eligible); 2) the eligible population in the market; and 3) the savings per unit.[3] Figures 1 & 2 show our final predicted penetration forecasts for the C&I unitary HVAC new construction market as an example of one market.

Modified Delphi Approach

A modified Delphi approach (MDA) was used, that differed in some significant ways from traditional Delphi technique.

Traditional Delphi Technique

The Delphi technique, named after the Greek oracle, was developed by social science researchers at the RAND corporation in the 1950's as a way to develop consensus forecasts based on expert opinion (Farmer, 1998). Since then it has been used widely, both to forecast numerical parameters and to develop and analyze policies or non-quantitative goals. "The Delphi technique is the best known, qualitative, structured and indirect interaction futures method in use today" (Lang). The technique relies on a systematic approach to collect opinions of experts and to either reach consensus or expose divergent views on issues. Often it is iterative, allowing participants to review the opinions and reasoning of others, and subsequently revise their initial thoughts based on peer feedback. This iterative process will tend to cause diverse viewpoints to converge toward a common understanding. (Gordon, 1971; Strauss & Zeigler 1975). Delphi approaches are particularly useful in fields like market transformation, where adequate historical data does not exist to support other, more quantitative methods (Lang, 1999 citing Ono & Wedemeyer, 1994).

Under a traditional approach, Delphi participants remain anonymous, and all communication is done in writing (Strauss & Zeigler 1975). The intent is to ensure that dominant personalities or the professional stature of individuals do not disproportionately influence the outcome (Farmer, 1998). The modified delphi approach used here diverged in some important ways from the traditional technique. All experts knew who the other participants were, and most — but not all — communication was by teleconference. In

[3] In addition to both with- and without-program penetration, we also forecast "in-program" penetration for years 2000 to 2002. These data represented the portion of the total with-program penetration that would actively participate in the program (e.g., obtain a cash incentive, services, etc.), and were used strictly to set program tracking system goals and budgets.

addition, most participants knew each other beforehand, thereby perhaps further influencing personal dynamics in the teleconferences.

Enzer (1971) and Sackman (1974) have noted some important problems or limitations to traditional Delphi Technique. While the MDA described below potentially introduces some biases, it also overcomes some significant drawbacks:

"Delphis are usually slow and time-consuming…each round could take several months." (Strauss & Zeigler, 1975)

Preventing verbal interaction can stifle creativity. Verbal contact often results in a more stimulating and dynamic environment than might not occur through impersonal written communications.

Allowing each participant to explain his or her own reasoning verbally and respond to questions and requests for clarification can ensure a better collective understanding, and provides for a greater level of efficiency.

The traditional Delphi "systematically discourages adversary process and inhibits exploratory thinking." (Strauss & Zeigler, 1975) Allowing participants to "cross examine" each other until some level of consensus or clear divergence is reached may sharpen thinking and encourage creativity and new ideas.

Defining Markets

The first step in MDA was to define markets. For some programs this was fairly straightforward. For example, in the NEEP Lighting and Appliance Programs, the markets — compact fluorescent lamps and torchieres, horizontal axis washers and room air conditioners — are defined by the program design. For others, markets may not be as clear. For example, the CIC Program can potentially promote any number of custom measures. In addition to a prescriptive focus on some specific technologies, it also includes a general focus on improved design and building practices. As a result, CIC was divided into 17 separate markets, based on end-use and market event (e.g., new construction lighting design).

For each of these markets, we then defined specific baseline and efficiency criteria. For example, for the replacement motor market the standard (baseline) efficiency level is that required by EPACT (NEMA 12-6c) and the high efficiency level is CEE qualifying.[4] All markets were initially developed by the residential and C&I sector leaders. Other team members provided review and comment on the market definitions. In some cases, definitions were modified during the MDA process to better facilitate a common understanding of the market, and remedy unforeseen problems such as double counting benefits (e.g., some participants initially interpreted "comprehensive new construction design" to be inclusive of "high efficiency lighting design" and others did not). Traditional Delphis determine all questions up front, thereby eliminating the opportunity for mid-course corrections. This can substantially weaken study results when the initially established criteria are off the mark (Lang, 1999 citing Simmonds, 1977).

[4] EPACT refers to the minimum efficiencies manufactured in the U.S. per the 1992 Energy Policy Act. CEE refers to efficiency criteria established by the Consortium for Energy Efficiency, and promoted by numerous North American utilities.

Estimating Effects

Once markets were at least tentatively defined, we assembled teams to participate in the MDA for each market. Each team was comprised of at least 1 NSTAR representative, at least 1 NUP Consultant, and at least 1 outside expert. For regional programs, or where a market included a regional effort, the Northeast Energy Efficiency Partnership (NEEP) program manager was also included. Most teams had additional participants with particular expertise in the market or the specific program, and ranged in size from 3 to 8. This is smaller than most traditional Delphis (Ludwig, 1997), with a likely concomitant reduction in accuracy, based on research indicating a positive correlation between accuracy and team size (Dalkey, Rourke, Lewis & Snyder, 1972).

Our approach also differed significantly from that used by GDS & Feldman (1999) in that all participants were in the energy efficiency field, as opposed to direct market actors.[5] In addition, many of the participants knew each other prior to participating. Traditional Delphis include people from divers disciplines and backgrounds. The possibility exists that the homogeneity of our teams might skew the data (Enzer et al 1971). It is likely that the variation of estimates was lower because of the homogeneity of team members. On the other hand, because the panel of experts included both utility staff and NUP Consultants with often divergent goals and opinions, any potential bias may have been mitigated. In addition, it is also possible that individuals directly associated with the markets — but not with energy efficiency initiatives — might have less intuitive sense about the likely impacts of utility-sponsored intervention strategies, being unfamiliar with the body of DSM literature and general accomplishments of past DSM activity.

Brief program descriptions were provided to each team member in advance to ensure everyone had an understanding of the program design. Electronic templates were developed for each program and distributed to each team. These templates provided a consistent spreadsheet format to insert penetration estimates, defined markets, and provided notes and instructions. All templates were then emailed back to sector leaders filled in with each team member's market predictions.

Once initial forecasts were submitted, the sector leaders distributed them to all team members, with the author of each data set identified. Teams then discussed the results by teleconference. This allowed each participant to explain their rationale for selected penetration estimates, and to hear rebuttal from other team members. This discourse, while not permitted in traditional Delphis, provided significant benefits, as described below.

- **Best available data.** Often a particular participant had valuable objective information that others were not aware of. For example, one participant might have reviewed a baseline study, and therefore based starting "without-program" penetration levels on actual data. In cases such as these, the team generally deferred to the individual with the most current and robust data.
- **A common understanding of rationale.** Often penetration curves were not smooth lines (see Figures 1 & 2). In some cases, forecasts were similar to step functions, or

[5] A Delphi process to estimate market effects for NEEP regional motors and clothes washer initiatives was led by GDS Associates and Shel Feldman Management Consulting in 1999. It drew participants from directly within the markets (e.g., product manufacturers and distributors), as well as energy efficiency professionals.

had major bends and changes of slope. At first glance these might seem illogical. However, often the author had relevant information about the broader market, or the program plans, that would corroborate such thinking. Examples included specific schedules for codes and standards rulemaking at the state or federal level and specific manufacturer plans.

- **A consistent view of the assignment.** In some cases, it was revealed through discussion that a participant had misunderstood a market definition, or some other critical piece of information. These understandings are much less likely to surface under a traditional technique, and could result in fatally flawed estimates.
- **Program design, implementation and evaluation planning improvements.** Collectively thinking through the likely market reactions to, and timing of, specific program and external events enabled teams to identify potential program improvements. For example, a critical issue to the effective transformation of the unitary HVAC market is the level of efficiency codified in the pending update to the 1987 Federal National Appliance Energy Conservation Act (NAECA) standards. By explicitly considering the timing of the NAECA update process, and the simultaneous likely penetrations of different efficiency equipment, strategies to directly support and influence the standards-setting process were identified. In addition, the process of identifying the causal links between program features and market effects set the stage for effective evaluation planning.
- **Creativity and flexibility.** Traditional Delphis often use summary statistics of numerical forecasts to arrive at consensus. This somewhat rigid approach may result in an outlier skewing results, or may simply result in illogical forecasts. For example, using the median forecast in each year might result in penetration curves that are highly volatile, with counter-intuitive peaks and valleys. By allowing an interactive discussion, the MDA was able to select single forecasts in *toto*, or even create a whole new one on the phone, when appropriate.
- **Efficiency.** By effectively "negotiating" a consensus verbally, the process of converging on a single set of forecasts was considerably speeded up, and the number of iterations necessary was substantially reduced.

Had all communication been written and anonymous, it is unlikely all these issues and opportunities would have surfaced. In addition, by sharing and exploring each individual's reasoning, everyone's understanding of the market and thought process was refined.

Reaching Consensus

At the first teleconference participants developed a tentative set, or sets, of consensus penetration curves. In some cases, the teams agreed quickly that a particular individual's forecast represented the best guess (often this was the median forecast of the group). In other cases, a blend of assumptions and reasoning from several participants were used to come up with an entirely new penetration curve. In still others, it was agreed that all opinions had merit, and averages were calculated different ways, for review and decision later (e.g., a simple mean by year, a median forecast, and median estimates for each year). For some markets, it was agreed that either more information would be helpful, or new information which came to light in discussions should be considered. In these cases, a participant was

assigned to research or incorporate new information and develop a new forecast for distribution.

Most teams agreed on consensus estimates in one teleconference. In cases where multiple averages were calculated, or where new information was incorporated, forecasts were again distributed to the team and discussed, and a single set of forecasts were agreed upon. One benefit of relatively homogenous teams was that many participants were members of numerous teams. This substantially increased the efficiency with which teleconferences were scheduled and performed. Often a core group would work, with other individuals dropping off or dialing in for specific market discussions. On the flip side, the overlap of individuals across teams likely resulted in reduced overall variance, and perhaps a false sense of accuracy.

Presentation and Feedback

The sector leaders presented consensus forecasts, along with a detailed explanation of underlying assumptions and reasoning, to a wider audience of stakeholders. This allowed a fresh perspective, and served as a peer review of the process and results. Feedback from stakeholders was brought back to each team via teleconference for one final opportunity to accept or reject comments and modify forecasts as appropriate.

Results

Figures 1 and 2 provide an example of the MDA results. They show forecasted market effects for the C&I new construction unitary HVAC markets, for Tier 1 and Tier 2 level efficiencies, respectively.[6] To illustrate the process it is useful to elucidate the reasoning behind the consensus HVAC estimates. The penetration estimates represent units that meet or exceed the efficiency criteria. Because any Tier 2 unit by definition exceeds Tier 1, the Tier 1 penetrations include both Tier 1 and 2 units.

Figure 1 shows the with- and without-program levels closely tracking each other. This indicates an expectation that Tier 1 will steadily increase market share despite the program. Both with and without program levels reach a maximum 100% in 2007, reflecting an assumption that in 2006 federal standards will adopt at least Tier 1 levels regardless of whether the program is implemented. Because of existing inventories, maximum penetration lags the federal standards by one year. The increase in slope from 2001 to 2002 shows a projection that the Massachusetts code will adopt Tier 1 efficiency standards in 2002, but for only large units. The significantly lower in-program penetration in the first three years reflects a belief that many customers will purchase qualifying units, but not apply for the incentive. In 2001 and 2002 the program will no longer offer financial incentives for Tier 1 units, explaining the continued divergence between in-program and with- and without-program levels.

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[6] Tier 1 and 2 are efficiency levels developed by the Consortium for Energy Efficiency, to encourage consistent criteria among utility DSM programs to further market transformation.

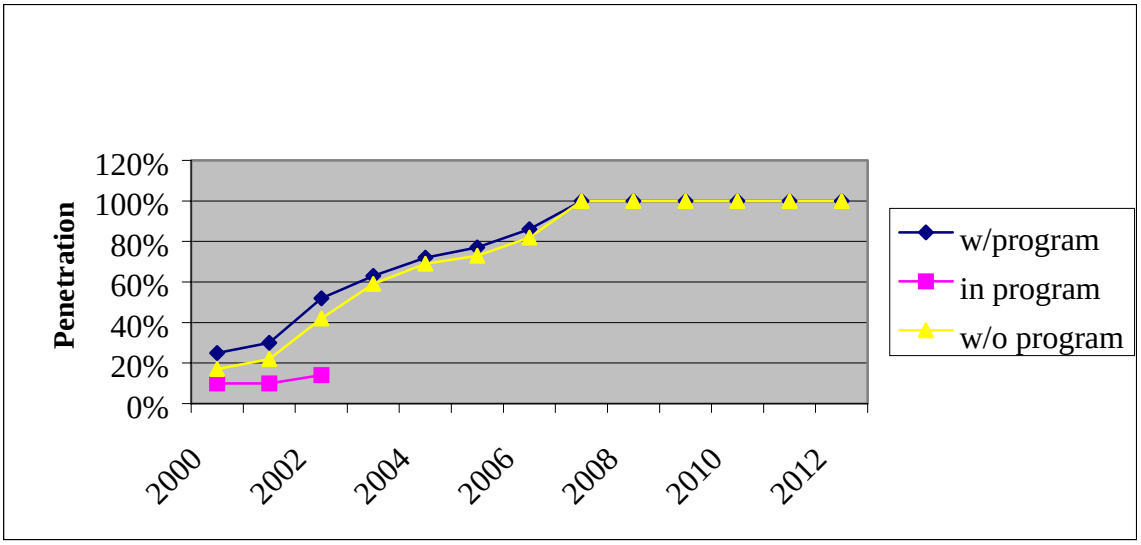

Figure 1. Unitary HVAC New – Tier 1

Figure 2 differs substantially from 1. Without the program experts predicted that Tier 2 levels would increase very moderately during the planning period. With the program penetration would grow much faster, and most consumers opting for Tier 2 equipment would apply for a rebate. The slight with-program dip in 2003 reflects some predicted backsliding after the program ends, with then some gradual improvements resulting from lasting effects of the program. The team believes that with an effective program that substantially raises Tier 2 market share, and also includes explicit efforts by NSTAR to influence the federal standard setting process scheduled for 2006, a Tier 2 standard would be adopted. Therefore, with-program levels jump significantly in 2007. Without these program efforts, consensus was that the federal standard would be set at Tier 1. Tier 2 with-program levels reach a maximum of only 70% because the federal standards only address small units. Large units will be addressed by Massachusetts code, slated to be updated in 2002. Experts believed it was not possible for the program to alter the MA code in such a short time frame.

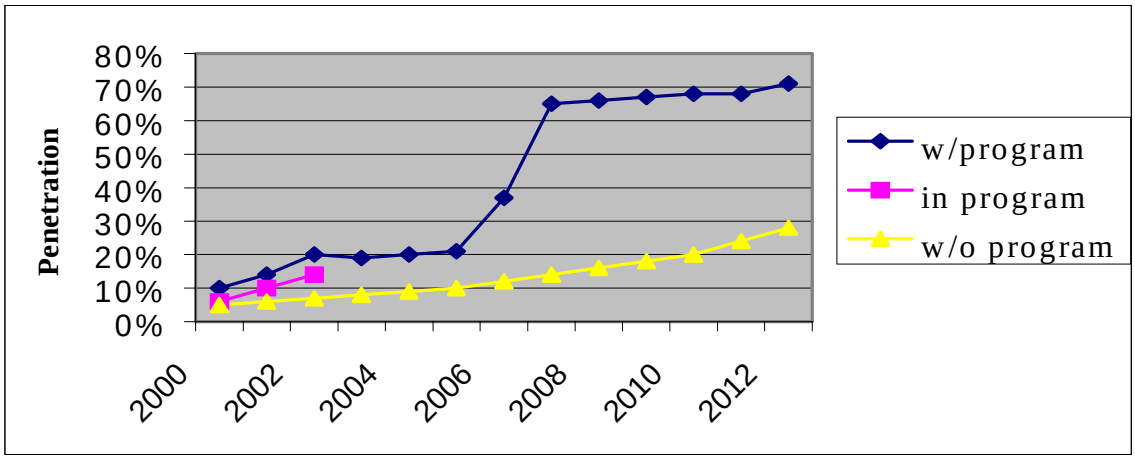

Figure 2. Unitary HVAC New – Tier 2

The HVAC illustration shows a significant benefit of the MDA process — the explicit articulation of a theory of how markets will be transformed, and what it will take to get there. In the case of unitary HVAC, it became clear that influencing federal efficiency standards offered a critically important opportunity for long term market effects. By developing consensus on the likely market shares of unitary HVAC equipment, it became obvious that timing of events was critical, given the short window of opportunity to influence the federal standards setting process.

In many cases initial individual forecasts were surprisingly consistent. This facilitated reaching consensus quickly. Interestingly, this was not the case for a similar Delphi market effects study (GDS & Feldman, 1999). The initial GDS Delphi estimates for the NEEP Motors program market effects were extremely divergent. For example, first year penetrations for large motors under the moderate scenario ranged from 9% to 63%. Our corresponding MDA results for C&I motors, on the other hand, were considerably closer.

This greater consistency is attributed to two factors. One is the greater level of homogeneity among our team members. As discussed above, it is possible that this introduced some bias into the process. The other, likely more important factor, was that all our motor team members were aware of a recent motor market assessment conducted for NEEP (Easton & Xenergy, 1999). This study, still in draft form at the time of our MDA, was not available when the GDS study was completed. As a result, the study served as a calibrating mechanism. Interestingly, the widely divergent GDS team estimates all had very similar shape and slopes, they simply started at different points. Unfortunately, when averaged together, they resulted in a forecast inconsistent with actual market data because of poor assumptions about the current state of the market.

We recommend sharing any existing market data with team members beforehand. If no data is available, it is still worthwhile to agree in advance on a consensus current year market baseline as the first stage in the MDA process. This calibrating exercise ensures a common understanding of the current market, and minimizes the potential influence of outliers.

Lessons Learned and Future Research Issues

MDA appears to be a viable method for forecasting market transformation market effects. It can be done relatively quickly. While significantly more costly than a single expert predicting effects, it may result in substantial cost savings compared to more traditional Delphi approaches or sophisticated modeling. In addition, it is not clear that quantitative modeling approaches to estimating market effects are feasible, both because a sufficient body of data does not yet exist, and because the clarity and precision of underlying program theories about transformation do not support it.

MDA is likely significantly more accurate than relying on a single expert (Loye, 1978). It benefits from multiple opinions and, perhaps more importantly, from a clear, thoughtful and systematic process of considering different viewpoints, information and reasoning. Finally, it allows and encourages a full investigation of the program theory, which in turn provides substantial benefits to program planners, implementers and evaluators.

Our experience identified some clear needs that would improve the process in the future:

Absolute clarity of understanding of assignments, definitions, parameters and markets. This is critical to obtaining reliable results, and may not be as simple as it seems. In one market, the process had to be repeated numerous times because of apparent misunderstandings of parameter definitions by some participants. The opportunity for discourse in the MDA helps to identify any misunderstandings early. A potential drawback of traditional Delphi is that misunderstandings may go unnoticed.

Common assumptions about baselines. As is shown by the comparison with the GDS study, calibration of initial estimates greatly improves the results, and allows all participants to benefit from any known information.

In addition to the above, it may be advantageous to invite a more diverse range of disciplines and professionals to participate. Because market effects must ultimately occur within markets, the absence of any market actors in the MDA was a significant omission. The possibility of too homogenous a group has been identified as a potential source of error (Lang, 1999 citing Masini, 1993, Webler et al, 1991). It is not clear whether, and in what direction, this omission may have biased results. Because all the participants work in the energy efficiency field, and because there was significant overlap of members between teams, it is likely that the bias was toward greater consistency among opinions, and perhaps greater optimism of the ability of programs to transform markets. While broadening both the diversity and number of participants may have benefits, they may also have costs. The logistics of assembling larger teams for teleconferences are daunting. As it was, it was often difficult to schedule calls so that all participants, who spanned four time zones, could participate.

Finally, our experience raises the following questions regarding how MDA might be used in the future:

What is the best role for MDA versus other approaches to incorporating the estimation of benefits from market effects into cost-benefit analysis? Many states and utilities have been struggling lately with the issue of how to incorporate benefits from market effects into prospective benefit-cost analyses, and MDA is only one of the approaches that have been proposed. Other approaches that have been suggested include standardized adders based on the rough magnitude of the expected ratio of benefits from market effects to benefits from near-term savings, and use of near-term evaluation results to extrapolate long-term market effects. What is the proper role of MDA in the overall mix of methods to be used? While it is difficult to answer this question in the absence of further industry experience with other approaches, our experience suggests that MDA is a flexible tool that could conceivably be combined with a range of other approaches. For example, MDA, standardized adders, and extrapolation of near-term evaluation results could each be used to develop an alternative benefit-cost ratio for a given program, and the dispersion of the results used to provide a sense of the range of plausible scenarios regarding program cost-effectiveness.

How can the results of MDA-type forecasts of market effects be linked to the planning and implementation of market assessment and evaluation efforts? Our experience suggests that there may be significant untapped potential for the results of MDA to help drive the planning of evaluation efforts. As noted earlier, in many cases, the MDA process resulted in a substantive consensus among participants regarding what specific events should be viewed as helping to determine market effects – for example, program-induced changes in codes and standards. One implication would appear to be that ex-post evaluations of these

programs should focus on assessing whether or not the programs and market responses to them are unfolding in a manner consistent with the hypothesized market event occurring as predicted. For example, in the example reviewed above involving Tier 2 unitary HVAC equipment, ongoing evaluation efforts might focus on whether or not early market response to the program tends to bear out the prediction that it is likely to favorably influence the Federal standard-setting process scheduled for 2006. In this sense, MDA seems to be highly compatible with the recent trend towards Theory-Based Evaluation, or developing detailed theories regarding the specific chain of events that a program is intended to cause in the marketplace, and designing evaluations to test whether early program experience is consistent with these theories. As a result, MDA offers not only a prediction, but a potentially valuable design, planning and implementation tool by better articulating the intended program theory.

How can the results of MDA-type exercises be used to reflect the uncertainties regarding program cost-effectiveness that result from uncertainties in forecasted market effects? We note that, while the MDA exercise reviewed in this paper focused on developing point estimates for the cumulative program-induced acceleration in measure adoption, the data produced by the exercise could have been used to support considerably more sophisticated analyses. For example, some measure of the range of forecasts provided by individual participants could have been used to develop alternative scenarios for overall program cost-effectiveness based on relatively pessimistic and optimistic assumptions regarding the ultimate magnitude of market effects. Given the substantial uncertainties surrounding forecasting of market effects, such an approach might yield more meaningful cost-benefit analyses than the use of a point estimate for program-induced acceleration. This seems like a worthwhile issue to explore in future MDA exercises.

How can benefits from market effects that are not reflected in acceleration of measure diffusion be forecasted and incorporated into benefit-cost analyses? Finally, we note that the MDA exercise reported on in this paper focused on only one category of market effects: those that are associated with long-term acceleration of measure diffusion. However, not all beneficial market effects necessarily have this effect. For example, market transformation initiatives may reduce the transaction costs of market participants by making it easier for them to find products, services, and/or other market participants. Such an outcome provides social benefits, but does not necessarily result in long-term acceleration of measure adoption. Depending on how central such effects are to the objectives of the program, it may be appropriate to attempt to include them in both prospective and retrospective cost-effectiveness analyses. MDA may be equally as appropriate to estimate outcome variables other than measure penetration. In fact, by facilitating a better understanding of the program theory, participants may inadvertently identify potential effects that had not previously been considered. The tractability of using MDA to forecast market effects not associated with long-term acceleration of measure adoption is an issue that has yet to be explored.

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