

Running Hot and Cold: Predictable HVAC Programs with Unpredictable Results

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ABSTRACT

The residential HVAC market will soon experience unprecedented changes in standard efficiency levels. In October 2009, leading manufacturers of residential central air conditioners, furnaces, and heat pumps signed a historic, voluntary agreement with the nation's leading energy efficiency advocacy organizations supporting new federal standards for those products. The agreement calls for regional efficiency standards to replace national standards and recommends more stringent building code provisions for new construction. These changes come on the heels of industry-driving trends, including increased efficiency requirements as part of the American Reinvestment and Recovery Act and increased manufacturer rebates and utility initiatives.

With a multitude of factors influencing the residential HVAC market, why are some programs smashing their goals while other programs struggle to succeed? And how are program managers, utilities, and regulators reacting to the unexpected results? This is particularly perplexing when programs have similar program designs.

Consumers Energy (Michigan) and National Grid (New York State) are providing HVAC programs to their customers for the first time in many years. The programs, first implemented in 2009, have evolved quickly. These utilities have had significant (and surprising) program uptake in some territories while struggling in others.

As a result of program progress (or lack thereof), program managers are faced with the need to make early program design changes. The programmatic changes being proposed and/or implemented may have ramifications for the programs' uptake and portfolio of offerings in future years.

This paper presents these utilities' early experiences and reactions to their 2009 performance. Program evaluators supplement their story with data captured through trade ally and program staff interviews.

National Grid's Story: A Tale of Two Markets

Regulatory Background

New York State utilities were required to propose efficiency programs in response to the state's Energy Efficiency Portfolio Standard (EEPS) established in June 2008 by the New York Department of Public Service (DPS) in support of energy-saving goals set by Governor Paterson. Through the EEPS, electricity consumption is targeted to be reduced 15% below baseline by 2015; natural gas use is set to decline by 4.34 BCF of gas annually through 2011 and 3.45 BCF annually after 2011.

Efficiency programs established under the EEPS have been ordered to run through 2011. The ordered energy savings goals and budgets are based upon utility proposals submitted in

August and September 2008; many programs were approved as proposed, while other were ordered to proceed with goals and/or budgets significantly higher or lower than proposed. Due to the volume of proposed programs and infrastructure to be established, program approvals took place in stages throughout late 2008, 2009 and into early 2010.

Program funding and savings may not be shifted between sectors or between programs without a modifying order from the DPS. All program changes must be approved by DPS Staff with 90 days' notice, and programs may not be suspended or canceled without 90 days' notice and an order from the Commission. Utilities may file for a shareholder incentive, and penalties apply for underperformance. There is no established mechanism to recover program costs in excess of the ordered budget amount for each program.

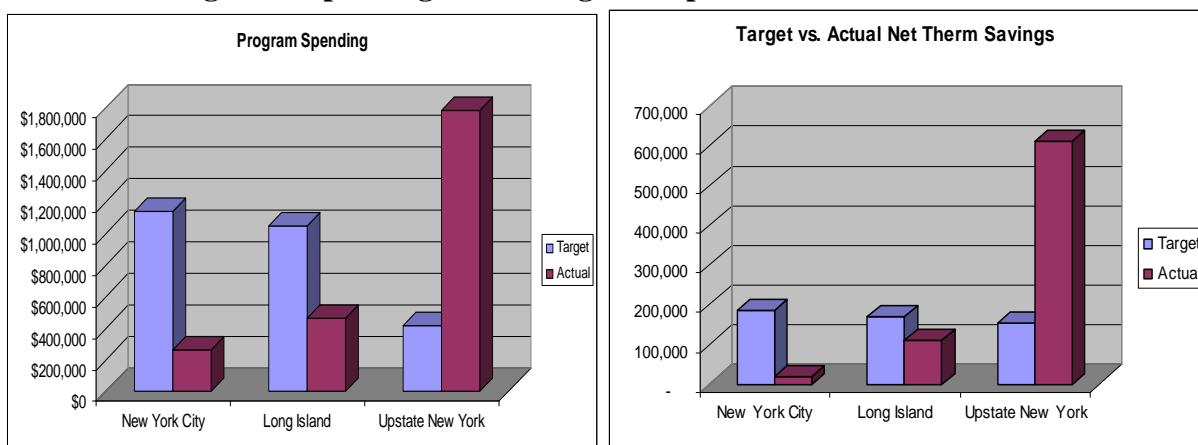
Many New York utilities, including National Grid, proposed rebate programs for high-efficiency gas heating and water heating equipment and were ordered to implement programs starting in mid-2009 and running through 2011. The commission required that incentive levels and measure eligibility be uniform statewide.

National Grid's Heating Program Design and Performance

National Grid began its Heating Program offerings in June 2009 in both its downstate territories (Long Island and parts of New York City) and upstate territory (covering a wide swath of New York from Albany to Syracuse). These EEPS programs were simple and identical in design, but the outcomes were very different.

National Grid's New York City and Long Island programs, with a combined budget of \$2.2 million and annual savings goals totaling 354,000 therms, ended 2009 at 36% of its savings goal (see Figure 1). The New York City program, in particular, drew very few participants despite vigorous outreach and education efforts. In contrast, the upstate program spent its entire 2009 budget of \$419,671 plus an additional \$1.36 million by the end of 2009, representing its entire 2010 budget and most of the 2011 budget. The program delivered 611,596 therms of annual savings, 403% of the ordered goal. Other utilities encountered a similar pattern, finding it very difficult to draw participants in downstate New York but facing major oversubscription in the upstate region.

Figure 1. Spending and Savings for Upstate and Downstate New York



Source: National Grid

The goals were established for these programs on the basis of residential customer counts. National Grid's Downstate New York territories are significantly more populated than the Upstate territories; therefore, the goals established were much higher. No other factors were taken into consideration when setting program goals.

Exploring the Differences in Performance

What could explain the vast difference in program results for the uniform EEPS programs? We started by looking for differences between the upstate and downstate populations. Evaluators recently concluded a participant survey and are planning a nonparticipant survey to illuminate the differences in populations between these two markets. In the meantime, interviews with program staff and HVAC contractors were used to gather their perceptions of the drivers of performance in the two markets, including distinctions in the upstate and downstate populations. Below are several theories voiced by some of the program staff and 35 trade allies interviewed as part of this process evaluation.

Climatic differences. Upstate New York is notoriously colder and has longer winters than downstate New York. Therefore, the return on investment for high-efficiency furnaces is higher for upstate New York residents. Home heating may also be a more salient topic for upstate New Yorkers.

Income differences. Several contractors commented that upstate New York participants tend to have lower incomes. Trade allies theorized that the dollar amount of the rebate may be more motivating to customers with lower incomes, while households in downstate New York may be more capable of purchasing high-efficiency furnaces on their own without the program. This theory was tested through the customer surveys. The rebate values, which do not vary by region, are also thought to cover less of the incremental cost in downstate than upstate New York.

Contractor awareness. With contractor-driven programs new to the market, it is essential for the program to first establish awareness within the contractor pool. National Grid employs several staff that focus on trade ally relationships. Several interviewees theorized that contractor awareness was greater in upstate New York for several potential reasons. First, it is a smaller market which enhances the ability for the program to market to contractors. It takes fewer trade ally representatives to reach a higher percentage of contractors. Second, it may be that program staff were able to more effectively reach and educate supply houses that provide equipment to these HVAC contractors.

Housing infrastructure. Several contractors interviewed commented that housing infrastructure differs greatly by region. Upstate New York is mostly single-family housing and multifamily housing tends to have a small number of dwelling units. Downstate New York and New York City in particular has a higher percentage of multifamily housing in larger complexes. These buildings are more difficult – and more costly – to retrofit than buildings with fewer units. Additionally, National Grid is serving buildings with five or more units through a separate program entirely, which reduces the size of the eligible market.

Predominant heating system type and building codes. Downstate New York is dominated by boiler systems, whereas the great majority of upstate housing use forced hot air furnaces. In

comparison to furnaces, both nominal and incremental costs for boilers are much higher and energy savings of available high-efficiency units tend to be lower, especially for steam systems. The relatively mild downstate climate further limits the dollar savings to the consumer. Higher costs discourage customers from making incremental investments in efficiency. Additionally, New York City has strict building codes related to venting which add to the complexity of replacing standard efficiency with high-efficiency HVAC equipment.

Impact of marketing efforts. The slower program uptake downstate cannot be attributed to less effort directed at marketing. In fact, interviews with program staff indicate that they are spending more effort thinking through creative marketing solutions for the contractors and target population in the difficult downstate market. However, the downstate region is significantly more concentrated with other advertisements than upstate New York, making it more difficult to capture the attention of consumers. Additionally, marketing in downstate New York is significantly more expensive due to the higher cost of radio, billboard, and newspaper advertisements as well as other marketing channels. Downstate New Yorkers may also tend to be a more skeptical group – a “tougher sell” – than their upstate counterparts.

Contractor attitude toward high-efficiency units. Program staff that regularly interact with contractors believe there is a difference in attitudes toward high-efficiency units between upstate and downstate New York with a higher percentage of contractors in downstate New York that do not buy into the benefits of high efficiency units. Interviews with non-active HVAC contractors revealed that a number of these contractors not only do not believe installing high-efficiency units will save the customer significantly in energy costs, but some also believe the units are less reliable than standard efficiency units. One contractor said he believes the useful life of the high-efficiency units to be as low as nine years. In contrast, upstate contractors have reported to program staff that they have used the program as a major marketing tool during the economic downturn, and that some would have lost their businesses or been forced to lay off workers in the absence of the program.

The Commission and National Grid’s Reactions to Progress

Staff from the New York Department of Public Service organized a meeting with the utilities in late December of 2009 to discuss oversubscription and other issues affecting the utilities’ gas heating and water heating programs. In response to this meeting, National Grid submitted a memo outlining a series of proposed changes including shifting \$5.3 million in funding from its downstate programs to the upstate program, increasing some incentives downstate and reducing or eliminating other incentives upstate. The memo made it clear that due to the extremely high rate of spending associated with the upstate program (in excess of \$500,000 per month), the program would have to be suspended in the absence of a decision from the Commission that would expand funding for it to continue.

At the time the memo was submitted, the upstate program had spent its entire 2009 – 2011 budget. Program staff faced a painful decision. On one hand, they had the option of continuing to spend upwards of \$500,000 per month with a risk of not recovering those costs. On the other hand, they could suspend the program but risk jeopardizing National Grid’s credibility as an energy efficiency provider and its relationships with customers and contractors. In March 2010 a decision was made to petition to suspend the program. As of late March, at least two

other upstate utilities had also suspended their oversubscribed programs. As of late March 2010, National Grid continues to wait for a decision on this issue.

The loss of the upstate Heating and Water Heating program may have wider effects on National Grid's portfolio beyond cost-effectiveness performance or energy savings. An on-bill financing pilot that has been in the works for months in collaboration with NYSERDA, the first of its kind for gas efficiency, was designed to work with the Heating and Water Heating program. As a result of the potential program suspension, this may be put back on the shelf. Valuable synergies will also be lost. Without a heating equipment program, the bread and butter of natural gas efficiency, the company's other residential programs may struggle due to the loss of potential spillover effects. The valuable marketing opportunities offered by a behavioral home energy reporting program administered by OPOWER will be reduced because National Grid will have fewer programs to offer to gas customers. And of course, relationships and credibility with customers and the trades are likely to suffer.

National Grid Lessons Learned

New York utilities were required to implement their programs very quickly. They only had 3 months from the issuance of the order to the proposal due date. This is not an uncommon trend in the utility and DSM industry. In hindsight, a number of lessons were learned within the first few months of program delivery.

Lesson #1 – assess the market when establishing goals. As many utilities do when designing their programs, they take 'best guesses' at the market and program uptake that could be expected within the market for which they are delivering their new program. This is especially true for utilities where they run similar programs in other states; they take the program model that worked well for other states and hope the same model is effective in the new location.

In National Grid's case, the target goals were established by considering the number of customers within each of National Grid's territories. Because upstate New York has fewer residential customers, the goals established for that region were significantly lower than the goals established for downstate New York. The goals did not take into account the barriers that may negatively impact program progress including housing stock, product availability, and economic differences. Had a market assessment been used to inform the goals, program managers may have recognized the differences in the regions and adjusted the budgets and goals so the programs were better aligned with those markets.

Lesson #2 – establish market-sensitive incentive levels. In the case of the gas HVAC programs in New York, the Commission required that incentive levels be consistent statewide. There are benefits to establishing a consistent incentive level statewide. For example, program administrators could experience higher levels of customer complaints if some customers discover others are receiving a higher level of funding for similar projects. Additionally, it could simplify the process for trade allies that may operate in dual territories as they do not need to consider a participant's location when determining incentive levels.

However, establishing uniform incentive levels across a large, diverse state such as New York makes it difficult to address regional market barriers. As discussed above, trade allies and program managers interviewed said that in general HVAC retrofit projects are more expensive in

downstate than upstate New York. Therefore, the incentive level covers a lower percentage of project costs for those completed in downstate New York.

If the intention of the program is to afford consumers equal access to efficiency opportunities and to deliver the highest possible energy savings to all markets, the program design needs to consider any significant and generalizable differences in those markets. This includes the establishment of incentive levels.

Lesson #3 – consider revising equipment included in the program. National Grid continued to run the program in upstate New York for months even though the program has significantly outspent its budget and exceeded goals many times over. Ultimately, however, the decision was made to discontinue the program altogether to manage the portfolio's spending.

A different approach taken by other utilities (including Consumers Energy, discussed next) was to increase the qualifying levels for the equipment. The program may also discontinue providing incentives for equipment that may be popular but not result in as significant of savings or potentially unreliable savings, such as programmable thermostats which are no longer promoted by the EPA ENERGY STAR program.

This approach has several benefits. First, it will limit the expenditures of the program as only those that purchase the highest tier of efficient equipment will receive rebates. Second, it will have an additional benefit of pushing the market toward a higher level of efficient equipment.

National Grid Conclusions

In conclusion, a complex set of geographical and cultural differences led to wildly different program results for National Grid's heating programs in New York State that could not have been predicted with the information available when the programs were proposed. The program experience has pointed to a need for flexibility from both utilities and regulators to handle unforeseeable differences in regional performance. With a long planning horizon such as that found under New York's EEPS proceeding, adaptability becomes much more important to avoid long program gaps and/or unproductive periods until the next program cycle begins. A little flexibility could help us all as we strive to meet ambitious goals and deliver increasing amounts of cost-effective efficiency to consumers and businesses.

Consumers Energy's Story: The Crazy Catapult

To meet the energy savings targets of Act 295 in Michigan, Consumer Energy launched both a residential and non-residential portfolio of programs designed to deliver electric and natural gas savings, referred to as the Energy Optimization Programs.

The Consumers Energy Residential HVAC and Water Heating Program was launched as part of Consumer Energy's Energy Optimization Programs in July 2009. Through this program, Consumers Energy sought both electric and natural gas energy savings by stimulating the purchase and installation of high-efficiency heating, cooling, and water heating technologies.

Consumers Energy hired a third-party program implementer to deliver the program under Consumers Energy's oversight. The program uses a combination of market "push and pull" strategies. The program educates customers and builds awareness ("pull"), while providing a

range of promotional and support services to HVAC contractors, such as training and materials for trade allies to also “push” the market.

The program established goals as documented in Tables 1. Also documented in the tables is the performance against these goals including evaluation verified savings. The program was very successful in its first year, and this strong performance is expected to continue through out 2010. In 2009, Consumers Energy rebated 16, 006 measures representing 9, 449 unique customer households through the HVAC and Water Heating program.

Table 1. Program Savings for FY 2009

	Participation	Total kWh Savings	Total kW Reduction	Total MCF Savings
Reported Deemed (Consumer Energy)	16,243	1,934,130	1,032.1	156,623
Audited Deemed (Evaluation)	16,266	1,931,034	1,030.6	156,321
Difference	23	-3,096	-1.5	-302
Realization Rate	100.1%	99.84%	99.85%	99.81%

Source: Consumers Energy

Program staff and HVAC contractors interviewed through the process evaluation activities report that most major HVAC and water heater purchases are typically unplanned, and result from a breakdown of existing equipment. Consumers are generally price-sensitive, especially during the current times of a weak economy. This is particularly true in replacement sales of HVAC equipment due to its higher price. The program design is based on the assertion that the recommendation and effective sales presentation of a trusted contractor (i.e., “push”) is one of the key driving factors in most consumer purchase decisions. Purchase decisions are also driven by the upfront incremental cost difference between standard-efficiency and high-efficiency HVAC and water heating equipment, which is addressed through the program incentive.

In 2009, participating contractors had multiple opportunities to encourage participation by not only promoting the Program’s rebates, but also discussing the Federal tax credits on higher-end systems, and where applicable, any manufacturer rebates.

Hot Trade Allies!

The Consumers Energy program signed up over 600 participating contractors in 2009, which was only half of the calendar year. These totals produced an average of about 5 rebates per contractor. The rebate distribution was skewed, however, as the top 10 percent of contractors, in terms of rebate volumes, accounted for over one-half of the rebates. The average number of rebates per contractor in this high volume group was 26.

Three distinct data collection efforts with trade allies were conducted as part of the Consumers Energy’s evaluation research in 2009: (1) A focus group with 10 contractors, representing several high-volume rebate HVAC contractors. (2) Twelve completed questionnaires completed by contractors attending the focus group. (3) Completion of four in-depth telephone interviews with participating contractors who had submitted a low volume of rebates (fewer than eight). This research sought to collect feedback from participating contractors about their experiences with the HVAC program.

In data collection with participating contractors, evaluators found it challenging to isolate the impacts of Consumers Energy HVAC program across all aspects of the contractors’ business. All contractors interviewed worked both in Consumers Energy and a neighboring utility’s

service territory. Feedback from contractors was that their greatest benefit (i.e., selling point) was the substantial value to the customer by the combination of utility rebates, American Recovery and Reinvestment Act (ARRA) tax incentives, and manufacturers' rebates.

Participating contractors characterized their businesses similarly. A majority of contractor projects, about 95 percent, were for single-family homes; and over 90 percent of sales were HVAC equipment. Contractors interviewed report higher furnace sales compared to air conditioners, and also reported high sales of ENERGY STAR-qualified thermostats (which will be phased out in 2010 as there will no longer be an ENERGY STAR-qualified thermostat).

When asked why they decided to participate, most contractors indicated consumer requests for program-qualifying equipment drove their sales; they also highlighted the "win-win" aspect of increased sales for their business. The top-rebating contractors interviewed unequivocally claimed the program had a significantly positive impact on their bottom lines.

Contractors' sales efforts with customers included discussions on customers' potential energy savings—both short-term monetary savings and energy-efficiency savings over time. The contractors interviewed reported few customers were familiar with the Consumers Energy rebate program, the available tax incentive, or any manufacturer rebate prior to interactions with the contractor. However, contractors agreed that customers had an interest in energy efficiency, but were generally not familiar with specific information until a contractor discussed the options with them.

When contractors were asked what factors drove customers to purchase high-efficiency equipment, they simply stated the deals were too good to pass up. In addition to savings opportunities, contractors also noted the currently depressed Michigan housing market as a factor for increased high-efficiency sales.

Even with current saving opportunities, contractors discussed situations in which customers did not choose high-efficiency options. Cited program participation barriers included the initial price or "first-cost", even with rebates and tax incentives. Contractors discussed situations where customers could not financially cover the interim time from purchase to rebate, and, even more, the following year for the tax credit. Another cited barrier was landlords and residents who plan to move did not have an incentive to go high-efficiency, even if the price difference was negligible.

Contractors also expressed concerns about selling high-efficiency equipment where rebates were "subject to funding" due to the tight 2009 program budget. Contractors did not think their high-efficiency sales were in peril; rather, their concern was that customers viewed the potential non-payment of rebates as a poor reflection on their business.

Evaluators received mixed information from contractors regarding rebate levels, but did think the information corroborated other evidence that suggested decreasing rebate levels. About one-half of the contractors were comfortable with rebate levels, with a couple adding that increases would only help. Others, including a majority of those in the focus group, argued that rebates could be decreased. Within the context of the tight program budget, contractors did not think that a reasonable drop in rebates would affect sales and, moreover, would allow the budget to be spread across more rebates. In addition, there was a consensus at the focus group that any changes in rebate amounts should not apply to air conditioners. It was reported that air conditioners were already difficult to move given Michigan's heating-driven climate.

Feedback from contractors indicated they were excited about continued participation in the Consumers Energy program. Their optimism primarily came from high sales levels they experienced in 2009.

Progress Overall: A Summary of Findings and Recommendations from the 2009 Program

Based on the trade ally interviews discussed above, program staff interviews, a benchmarking study and 168 participant surveys, the process evaluation identified key findings and recommendations. The major evaluation findings for the 2009 HVAC program are:

The program successfully launched and met 2009 program goals with high participant satisfaction, but there is a need to improve the rebate processing. Consumers Energy has hired an effective program implementer who was quickly able to ramp up the residential HVAC and Water Heating program and effectively engage contractors to promote and participate in the program. Participants reported they are highly satisfied with the program overall, the participating contractors, the performance and types of program-eligible HVAC equipment and the rebate amount. The biggest areas for improvement identified were the rebate application process and the length of time it took customers to receive their rebates.

The program rebate, combined with other available financial incentives, was effective in overcoming customers' first cost barriers to high efficiency equipment and increasing high efficiency sales. Contractors interviewed unequivocally claimed that the program had a significantly positive impact on their ability to sell high efficiency equipment over standard efficiency equipment, even in a weakened economy. Contractors highlighted the combined effect of the Consumers Energy program rebates, federal tax credits, and manufacturer's rebates as a strong combination to sell high-efficiency equipment. Customers did report high satisfaction with the rebate amount as cited above. Many participant survey respondents also reported that contractors discussed with them program funding and rebate availability. The program's 'first come, first serve' policy appears to have caused many customers to want to act quickly to make sure they could receive the rebate.

The combined pull and push program strategy appears to be one of the most important drivers of the 2009 program meeting its goals, according to contractors and participant surveys. The combination contributed to the 2009 program success. Seventy percent of participants reported they *first* heard about the program from their contractor. Almost all respondents reported that their contractors discussed the program rebates with them.

Participants are fairly energy efficiency savvy. About a quarter of program participants have purchased Energy Star appliances recently. In addition, the majority of program participants indicated they know what ENERGY STAR labeled products are and report that they believe they can save energy without sacrificing comfort in their homes.

An established customer demographic is more likely to participate in the program. The average program participant's housing characteristics can be described as a single family owner of a home approximately 41 years old, between 1,500 and 2,500 square feet with natural gas for heating and water heating. In addition, program participants tended to originate from an older demographic. Results show that about 70 percent of the "head of household" are aged 55 or higher, with about 40 percent in retirement age.

Consumers Energy Recommendations

The evaluation offered the following recommendations for program improvements for the 2010 program.

Recommendation #1 – implement quality installation requirements for participating contractors. In 2009, program staff made the decision not to require quality installation procedures for participating contractors in order to reduce participation barriers to the new program. The contractor focus group did indicate Consumers Energy should expect some contractor push-back and dissatisfaction with this requirement. At the same time, the literature review found that this requirement is part of many successful HVAC programs throughout the country.

Recommendation #2 – reduce rebate amounts in 2010 to improve program’s cost-effectiveness. The contractor focus group responses suggest a reduction of about one-third of heating rebates would not affect sales of heating high-efficiency equipment. At the same time, contractors reported that high efficiency air conditioning equipment is more difficult to move given the limited cooling season in Michigan and these rebates should not be reduced. It is our understanding from program stakeholder interviews that a reduction of rebates across all program equipment is planned.

Program Design Changes for 2010

Consumers Energy faced the need to make program design changes as they moved into 2010. The program had been in place less than six months at this point but they were faced with the need to address the oversubscription by either suspending the program or revising the program’s offerings. A neighboring utility’s residential HVAC program did oversubscribe in 2010 and had to be terminated. The early termination of program incentives has a negative impact on both customers and HVAC contractors.

Consumers Energy responded to both evaluation recommendations and also made additional program changes to both better control program demand and reduce the likelihood of early program termination during a calendar year. First, incentive levels for select measures were decreased. Rebate levels were reduced for most measures by \$50 to \$100.

Second, Consumers removed measures to be rebated in 2010. One example is incentives for ECM blower motors which were removed for 2010. This decision was motivated by the desire to maintain electric budget availability for the cooling season as this program started late in 2009 and missed the cooling season. Depending on budget availability, ECMs may be added back into the program in the fall of 2010.

Third, in addition to decreasing rebates, the required efficiency levels for HVAC equipment were increased. Gas furnace requirements increased from 92 percent to 94 percent AFUE furnaces. The program eliminated air source heat pumps and central air conditioners with SEER ratings of 14.5. These changes are expected to increase the program’s cost effectiveness.

Finally, Consumers Energy changed their policy in regard to application completion and manual J analysis. In 2009, installation contractors were not required to complete the application for customers. For 2010, contractors are required to do this. Additionally, contractors are required in 2010 to do a manual J analysis. Both these changes, while improving the quality of

application data and ensuring the correct sizing of equipment are also expected to help control demand. Some contractors may choose not to participate due to the increased workload and qualifications required by these expectations. While this may have a negative impact on contractor satisfaction, the approach may help to manage the program uptake.

Keep Hot HVAC Programs from Cooling Off

The experience of National Grid in New York and Consumers Energy in Michigan indicate some key factors to keep in mind that should help residential HVAC programs continue to successfully and effectively capture energy savings from HVAC equipment.

One of the main future directions for residential HVAC programs in order to continue to capture energy savings, especially as efficiency standards increase, will be the proper sizing and installation of equipment with Quality Installation (QI) standards. HVAC programs throughout the country are moving toward requiring additional quality installation procedures, or offering and incentivizing quality installation verification (QIV) services. Some programs offer training for contractors to be QIV-certified. Others provide contractor training to use charge and airflow testing. An incentive is then paid to the contractor if the tests are within accepted parameters. Manual J requirements are a first step to move programs towards tougher QI standards. Programs will need to allocate proper resources and a training infrastructure for contractors as they move toward QI standards.

The experience of the different programs clearly demonstrates the importance of programs engaging HVAC contractors to promote and sell efficient equipment. It was the active participation of trade allies and the combined push/pull strategy that were key to both National Grid's success in upstate New York and Consumer's Energy success in Michigan. Likewise, part of the explanation of National Grid's difficulty in downstate New York was that the program was not able to actively engage trade allies. As programs move toward QI standards discussed above, program managers will need to assess how QI standards affect trade ally involvement. Contractor incentives to offset QI costs may be necessary at first to avoid internal program participation barriers for contractors.

HVAC programs will need to re-assess incentive levels needed to push higher efficiency equipment after federal tax incentives phase out in 2011. These incentive levels need to take into consideration each major market and potential barriers presented within the market. At the time of the writing of this paper, customer surveys are in the field with participants of both the National Grid and Consumers Energy programs to investigate several factors including the availability of different financial incentives including the federal tax credit, manufacturer rebates and utility incentives. Trade allies report that the federal tax credit by itself was not enough to push customers over to high efficiency equipment. They report this is because it is a delayed financial incentive and does not address the immediate upfront cost of the equipment. But the federal tax incentives, combined with other available incentives, appeared to be an effective combination. Therefore, after federal tax incentives phase out and manufacturer rebates may decrease as the economy improves, utility incentive levels will need to be assessed.

National Grid's experience in downstate New York indicates the difficulty in moving higher efficiency equipment in small multifamily buildings. The building codes and standards, along with the installation barriers, are unique for these multifamily buildings. Consumers Energy also encountered difficulty in reaching multi-family units as the majority of participants lived in single-family homes and only two percent were renters. HVAC programs should

continue to explore effective strategies for reaching the rental market sector, especially for territories where there is a larger concentration of multi-family homes.

Last, when developing programs it is critical to get a good understanding of the market to establish realistic and reasonable goals. Primary research that is stratified by markets of interest is necessary – from both the trade ally as well as customer perspectives. While a time consuming process that may not be afforded by the timeline established by the Commissions, setting the stage with this information could potentially avoid undesirable impacts of over or under subscription within a program.