

# Achieving Natural Gas Savings Goals: Commercial Heating Programs Heat It Up

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## ABSTRACT

Program administrators throughout the United States are facing several challenges meeting natural gas savings goals. This paper summarizes those challenges as well as program strategies employed to meet them. The program strategies presented in this paper are primarily based on Xcel Energy's experience with their commercial heating programs in Colorado and Minnesota. External Strategies employed by Xcel Energy include heating optimization studies, enhanced tune-up offerings, early retirement incentives, trade ally engagement, the addition of new types of measures and the creation of heating advisory boards. Internal utility strategies include energy efficiency specialists that target small to medium customers to complement account managers' efforts with larger customers.

## Introduction

Natural gas energy efficiency programs have spread rapidly across North America in recent years. Expenditures on such programs have seen a 700% increase in the last ten years and state mandates on natural gas programs now exist in 41 of 50 states (York 2012). However, program administrators throughout the United States face two major challenges meeting the natural gas savings goals set for these programs. First, the current low natural gas price, particularly pronounced in some states, has resulted in fewer cost-effective measures available for programs to offer. Another result of the low natural gas price is the greater priority that program providers may place on electric savings programs due to the higher avoided costs for electricity.

Program administrators may also be faced with the challenge of a limited base of natural gas customers, at least on the commercial side, since many large nonresidential customers are gas transport customers. Gas transport customers are normally ineligible for energy efficiency programs offered by the utility because they do not pay into the system benefit charge that fund these programs. This increases the need to reach smaller nonresidential customers effectively for these programs.

The Business Heating Efficiency programs in Colorado and Minnesota, part of Xcel Energy's business demand-side management (DSM) portfolios in those states, are designed to encourage business customers to install new high-efficiency gas-fired hot-water boilers and furnaces, improve existing boilers or hot water heaters with efficiency enhancements, or conduct boiler tune-ups to maintain peak operating efficiency. As the measures are prescriptive, no pre-approval is required.

This paper is primarily based on 2011 evaluation results. Tetra Tech conducted a comprehensive evaluation of the programs. The process evaluation provided Xcel Energy with a thorough understanding of participating and nonparticipating commercial customer and trade ally awareness, attitudes and behaviors as well as best practices information for similar programs offered throughout the country. The impact evaluation assessed the program's gross energy and

demand savings and calculated net-to-gross ratios as best estimates of program attribution. The evaluation research included staff interviews, quantitative participant and nonparticipant surveys, qualitative trade ally interviews, a benchmarking study of other utility programs including program manager interviews and an engineering review of the program's baseline and technical assumptions. The evaluation results are supplemented with in-field experience and secondary resources to characterize the primary challenges facing natural gas programs and successful strategies that heating programs can use to meet these challenges.

## **Where will the savings come from?**

Xcel Energy has implemented a wide array of strategies, ranging from industry standard practice to innovative tactics, to achieve program savings goals. Below, we discuss strategies employed to meet the following challenges: a dearth of cost-effective measures, customer awareness and interest regarding implementation of gas energy efficiency projects and a smaller eligible customer base that may exclude the largest nonresidential customers.

### **Challenge #1: A Dearth of Cost-Effective Measures**

Xcel Energy offers incentives on many types of equipment, in addition to new boilers. These include water heaters, furnaces (in Colorado), and various efficiency enhancements for existing boilers. While some measures were discontinued, particularly in Colorado due to cost-effectiveness issues, Xcel Energy has continued to offer some 'borderline' cost-effective measures in their portfolio to keep consistency in offerings. As a result, available measures are not constantly changing in response to the natural gas prices, alleviating customer and trade ally dissatisfaction with the program.

To encourage increased savings within measure offerings, Xcel Energy offers tiered rebates. The evaluation conducted benchmarking research of thirteen other heating programs and found that offering tiered rebates is a best practice for heating programs (Tetra Tech 2011). Tiered rebates normally include an aggressive high-efficiency level and a less aggressive high-efficiency level. The benchmarking research found that aggressive high-efficiency rebates typically range from \$1000 - \$5000/MMBTUH, with less aggressive high-efficiency level rebates ranging from \$500 - \$2000/MMBTUH. Tiered rebate levels allow heating programs to cost-effectively capture a wide variety of boiler installations and accommodate changes in technology without radical shifts in incentive structures.

Even though Xcel Energy has attempted to offer as many comprehensive and tiered offerings as they can, the reality is there still are less cost-effective measures available, especially in Colorado. Therefore, Xcel Energy has also included early retirement incentives as part of the Colorado Heating Efficiency Program and is also considering this change in Minnesota as well.

Early retirement incentives encourage customers to upgrade their inefficient, but still functional, heating equipment. This allows utilities to realize additional savings for the remaining measure life of the replaced equipment. An early retirement program targets customers who have functional equipment and are not necessarily in the market for new equipment, informing them of the value of early retirement and making it more cost effective for them to upgrade to a unit that exceeds minimum efficiency standards. (Cofer 2010) Xcel Energy started offering an increased early retirement incentive in their heating efficiency program starting in 2010.

While this category only makes up about 10% of program savings, participants who replaced boilers or furnaces early through the program reported high program influence on their

decision as measured by a net-to-gross factor (which was over 90% for this category). The evaluation research also found qualitative evidence that the larger early retirement incentive available through the program generated additional customer and trade ally interest in the program (Tetra Tech 2011).

In essence, this program component can ‘piggy-back’ on practices already utilized by contractors: the ‘upsell.’ When called to repair an inefficient unit, the contractor can leverage the utility incentive to give the customer a better deal on the purchase of a new, efficient unit. The early retirement program utilizes contractors as a direct line to the customers most in need of upgrade, allowing for effective targeting of this sector that may not be achieved through indirect methods.

Early retirement of heating equipment is a practice not widely employed by utilities due to the complexity of accurately calculating the additional savings resulting from early retirement for prescriptive projects. Xcel Energy works with vendors to accurately capture the needed information to allow them to calculate early retirement savings from heating equipment. Program staff report that early retirement tends to occur when the vendor is performing routine maintenance on a system. This is then an up-sell opportunity the vendors can attempt. The vendor is encouraged to work with customers to identify this opportunity. There is an important customer education piece that is also needed since it cannot always be assumed that people generally recognize the typical life of a boiler.

A first step for a utility in determining whether or not to offer an early retirement incentive should be to assess the extent to which early retirement is already occurring among the program participant population. If there does appear to be opportunity for early retirement, the utility may then want to take steps in their program design and delivery to capture these additional savings.

Heating Advisory Boards have also helped Xcel Energy identify cost-effective measures for the program. Xcel Energy uses the Heating Advisory Boards to involve trade allies directly in program design improvements. The Heating Advisory Boards are comprised of 10-15 different trade ally firms across each state. The Boards meet twice a year to ensure the program is meeting the needs of both natural gas customers and the contractors that serve those customers. Trade ally feedback is solicited on a variety of program design and delivery topics, in addition to program-eligible equipment, such as the application process and incentive levels. One of the advantages of the Boards has been identifying or vetting cost-effective measures that could be added to the programs’ prescriptive offerings. For example, infrared heater technology is currently under consideration in Minnesota.

## **Challenge #2: Customer Outreach**

Another issue associated with decreased natural gas prices is the low level of customer interest in engaging in gas savings projects. Program staff have found it is harder to sell gas saving projects because customers are less motivated since gas is a smaller expense for them than electricity and because the payback for gas projects is not as enticing with the current low level of prices. One way to overcome that is to talk to customers at the same time about electric and gas saving projects. However since that is only possible if the utility provides both fuels to the customers, utilities also need other strategies to get customers attention regarding gas conservation. Xcel Energy utilizes enhanced tune-ups and heating optimization studies to introduce customers to the program and motivate them to conduct additional gas savings projects.

Enhanced tune-ups are an important aspect of the success of the Business Heating Efficiency program in Minnesota. By offering enhanced tune-ups, Xcel Energy is able to not only assure the efficiency of a given customer's system, but also get a "foot in the door" to see which customers would be likely candidates for replacements or upgrades. Program staff can then follow-up with these customers about a new boiler or other heating system optimization opportunities that provide greater savings potential than the tune-up alone. In essence, the tune-up serves as a form of marketing, allowing Xcel Energy to more effectively and more directly reach the customers that are most in need of upgrades.

Tune-up offerings and the savings that can be attributed to them, as measured through a net-to-gross factor, are a source of debate among policy-makers. Many customers have ongoing maintenance service agreements that already include tune-ups. Therefore, the argument suggests, these customers do not need the program incentive. These customers could be considered 'free-riders' on the program, which reduces the net-to-gross factor that may be used to calculate program net, or directly attributable, savings. However, Xcel Energy's enhanced tune-up offering differs from, and delivers more savings than, a regular maintenance agreement tune-up. In addition, Xcel Energy differentiates the regular tune-up as well by laying out clearly tune-up quality requirements.

The standard tune-up offers a rebate of 25% of the tune-up cost up to \$250/boiler. In addition to annual maintenance cleaning and tuning, the tune-up must include electronically analyzing combustion gases and making adjustments to ensure the boiler runs at an optimal fuel/oxygen mix for safety and efficiency. If the initial combustion analyzer test shows problems (such as high CO) then the vendor must strip and clean the boiler down to the heat exchanger. The standard tune-up also includes cleaning and inspecting burners, nozzles and combustion chamber, heat exchanger surface and water-side surfaces (when possible due to operating schedules); checking safety controls and electrical systems; and checking boiler skin for scale and deposits, and cleaning if needed.

Xcel Energy's Tune-Up Plus goes to the next level by giving additional information to help customers call the shots for future improvements. The Tune-Up Plus includes the standard tune-up, plus an assessment of additional money-saving boiler-system improvements such as pipe insulation, blow-down improvement, condensate management, boiler equipment and more identified opportunities. Xcel Energy pays a higher rebate for the Tune-Up Plus (75% of costs, up to \$750 per facility) as they believe it is a tool for customer long-term energy planning. Providers of the Tune-Up Plus must complete Xcel Energy's special training and assessment to ensure the customer system is assessed with the rigor and expertise needed to determine a long-term plan for energy savings for customers.

It is important to think strategically about ways to keep program attribution high for tune-ups since they can be a major component of gas savings programs. Almost half of Xcel Energy's overall heating efficiency programs savings come from tune-ups in Minnesota. Xcel Energy has added the above requirements for contractors who offer to perform program tune-ups in order to realize savings above standard practice tune-ups. Because tune-up standard practice has increased, Xcel Energy is now rolling out the Tune-Up Plus in order to try and continue to maximize the programs' net savings.

Heating optimization studies are another aspect of successful program implementation in Minnesota and represent yet another method of engaging customers in energy efficient practices that can lead to larger gas savings projects. The Minnesota program provides rebates for heating optimization studies, which goes into even more depth than the Tune-Up Plus. Incentives for the heating optimization studies cover up to 75 percent of the study costs with a \$25,000 maximum.

The issue with the Heating optimization studies, as with any energy efficiency study or audit, is that energy savings do not occur just because of the study. It is important that the study results in energy efficiency improvements. Therefore while importance is placed on these studies, Xcel Energy has been targeting customers with higher savings potential for the studies. These studies are designed to identify ways participants can increase the efficiency of their heating systems either by examining the entire system or by focusing on one or more areas (such as steam traps). The 2011 evaluation found that almost all program participants who had conducted a Heating System Optimization Study followed several of the recommendations from the study. The recommendations most frequently followed included: installing boiler enhancements, conducting tune-ups, and repairing old equipment.

### **Challenge #3: Reaching the Customer, Especially the Small Ones**

In many service territories, larger nonresidential gas customers choose to be ‘gas-transport’ customers. Gas transport customers do not buy their gas from their regulated investor-owned utility. For these customers the utility is only responsible for the transport of natural gas to the customer premise. In these cases, the customer is not eligible for utility energy efficiency programs since they do not contribute to the funding mechanisms that support these programs. As a result, gas efficiency programs often have to target small to medium nonresidential customers, which tend to be more difficult to reach than large nonresidential customers. In general, small to medium customers tend to be less ‘energy savvy’ and have less established relationships with utilities. Xcel Energy utilizes both their relationships with trade allies and their Business Solutions Center to effectively reach small to medium nonresidential customers in addition to direct outreach to customers.

**Get trade allies on board.** Xcel Energy engages trade allies directly in program implementation. This tactic takes advantage of contractors’ role as an additional ‘sales force’ for the program, which is particularly helpful with small to medium nonresidential customers. It can also result in future program market effects, by positively influencing trade ally stocking and sales practices to result in more efficiency sales both outside and through the program. These market effects could result in quantifiable nonparticipant spillover savings attributable to the program in the future (which increases the previously mentioned net-to-gross factor).

Xcel Energy has built and leveraged strong relationships with both the equipment distributors and HVAC contractors working in their service territories. There are several aspects of Xcel Energy’s trade ally outreach. First, program staff actively communicate with trade ally groups to keep them up-to-date on program changes or promotions and to help them understand how the program can best assist them in increasing participation in the program. For example, the programs support trade allies with marketing materials, including co-branding materials, and financial modeling calculators they can utilize in their bids to clients. The programs also continually make improvements that ease the trade ally participation process. For example, the Minnesota program recently implemented an on-line application in 2011, which was a frequent request of trade allies. This allows them to more easily complete applications across multiple projects.

In addition to program staff that work with trade allies, Xcel Energy also has dedicated Channel Managers that are specifically in charge of trade ally outreach. Channel Managers identify and train new trade allies as well as work with established vendors and distributors to market Xcel Energy’s programs. They hold face-to-face meetings with HVAC contractors and

manufacturers in their territory, allowing program staff an opportunity to solicit feedback on the program. Likewise, contractors can ask questions about specific projects and the application process. This two-way communication is essential to fostering trade-ally networks. (Stiles et. al, 2008)

The evaluation also investigated the effectiveness of trade ally incentives for heating programs. The evaluation found that trade ally incentives could be effective, especially in markets with a large population of small HVAC contractors and nonparticipating contractors. The evaluation benchmarking research indentified several heating programs that offered incentives to trade allies that install equipment through heating efficiency programs. The trade ally incentives ranged from \$25 to \$175 per qualifying new equipment installed. In addition, one program offered incentives for boiler enhancements and steam traps: \$15 to \$25 per enhancement and \$3 per repaired or replaced steam trap. Interviewed program managers that participated in the evaluation benchmarking research reported that these incentives were well received, particularly by smaller HVAC contractors that used the money to compensate staff or invest in their business. Program managers reported that larger firms commonly used the incentive to buy-down the cost to the customer. However, interviews with participating trade allies indicate that the incentive, while viewed positively, would have little influence on their sales practices. This suggests an incentive would be most effective with HVAC contractors that are new to the program. Evaluators also indicated to Xcel Energy program staff that one main benefit of a trade ally incentive would be to encourage trade allies to submit completed and accurate program paperwork for customers, thereby streamlining program administration. A drawback of trade incentives also discussed between evaluators and Xcel Energy program staff is the fact that once an incentive is introduced, it can be difficult to discontinue the incentive even when it is no longer needed since it takes a financial benefit away from trade allies. At this time, Xcel Energy has decided not to move forward with trade ally incentives in order to prevent overburdening already constrained budgets.

**Provide outreach to smaller customers.** A common problem with energy efficiency programs is outreach to smaller nonresidential customers who do not have a dedicated account manager at the utility. Xcel Energy's Business Solutions Center (BSC) specifically serves small to medium nonresidential customers to complement account management efforts with larger customers. The BSC was re-organized in 2010 to include energy efficiency specialists. These specialists conduct direct marketing to customers, field questions and assist customers in filling out their applications. By utilizing energy efficiency specialists, Xcel Energy is able to more effectively target small to medium business customers, making it easier for them to not only learn about the program, but to participate in it. These energy efficiency specialists are trained specifically on energy-efficiency and Xcel Energy's program offerings, especially DSM programs, in order to encourage participation among non-managed customers. The BSC is extremely important to the success of the Business Heating Efficiency programs in that it complements the account managers that typically target the larger customers. This two-pronged approach allows Xcel Energy to effectively target both sectors.

Xcel Energy's direct marketing efforts to customers have also been an important contributor to the success of the Business Heating Efficiency programs. Xcel Energy's marketing efforts have proven effective, as evidenced through longitudinal research conducted in 2006 and 2010 on customer program awareness and attitudes where a gain of awareness of programs ranged from ten percent to thirty percent across individual programs. Xcel Energy's Awareness, Attitudes and Usage study pointed to a significant increase in program awareness

among customers in both Minnesota and Colorado. (Xcel Energy, 2010). As part of its marketing efforts for the programs, Xcel Energy conducts direct mailings and outbound calling to customers with recent boiler inspections; attends trades shows and expos; creates feature sheets and coupon books that are posted to the program website and handed out at in-person meetings; and distributes branded promotional material like temperature magnets used to identify hot spots in commercial buildings. In general, the objectives of advertising campaigns for Demand Side Management (DSM) programs should create awareness among consumers, change their behavior regarding energy consumption, and steer them toward buying or installing energy efficient measures (Green 2000).

### **Where have the savings come from?**

Below are the annual population savings and the 2011 evaluation net-to-gross (NTG) results at the measure-level for Xcel Energy's Colorado and Minnesota heating programs. In Colorado, boilers had the highest net-to-gross ratio and also make up the largest percent of program savings at sixty-five percent. This measure-category includes the previously discussed early retirement boilers. The NTG ratio for these boilers was found to be 100 percent, but they are not presented separately since only two early retirement boilers were included in the evaluation research due to limited uptake at that time. The measure-level boiler NTG ratio rises by 10 percent with the addition of participant like spillover for boilers. In other words, participants reported that the program influenced their installing additional efficient boilers in Xcel Energy's territory without going through the program. This high level of participant like spillover was also seen for heating system improvements in Colorado. Furnaces and hot water heaters, which are not part of the Minnesota Heating program, saw the lowest NTG ratios in Colorado.

**Table 1. Colorado Annual Business Heating Efficiency Savings Measure-Level Results**

Measure	Annual Projects	Therms Population Savings	Percent of Therms Savings	NTG ratio (1-freeridership <sup>1</sup> )	NTG ratio (1-freeridership) + participant like spillover <sup>2</sup>
Boiler	40	351,625	65%	.802	.904
Tune-up	59	106,748	20%	.599	.685
Furnace	7	8,221	2%	.471	.481
Hot water heater	2	2,975	1%	.560	.639
Heating system improvement	7	67,644	13%	.670	.857
<b>Total</b>	<b>115</b>	<b>537,213</b>	<b>100%</b>	<b>.760</b>	<b>.861</b>

Source: Tetra Tech 2011

Xcel Energy's heating efficiency program goals in Minnesota are much higher than Colorado. In contrast to Colorado, in Minnesota the majority of the evaluated annual program savings came from heating tune-ups and heating system improvements. These also had the highest NTG ratio results. Boilers in Minnesota did not include the early retirement additional incentive as in Colorado during the evaluation period. High levels of participant like spillover were found for the tune-up and heating system improvement measures increasing the overall program NTG ratio to over 100 percent. In other words, the program has influenced customers to do additional boiler tune-ups and heating system improvements in Xcel Energy's territory without receiving the program rebate. The net-to-gross research shows the program has been influential in the participant decision making process for heating efficiency projects with spillover savings offsetting the limited freeridership.

**Table 2. Minnesota Annual Business Heating Efficiency Savings Measure-Level Results**

Measure	Annual Projects	Therms Population Savings	Percent of Therms Savings	NTG ratio (1-freeridership)	NTG ratio (1-freeridership) + participant like spillover
Boiler	22	283,379	14%	.737	.80
Boiler tune-up	82	913,889	44%	.897	1.06
Heating system improvement	30	894,854	43%	.792	1.21
<b>Total</b>	<b>134</b>	<b>2,092,122</b>	<b>100%</b>	<b>.830</b>	<b>1.09</b>

Source: Tetra Tech 2011

<sup>1</sup> A free rider refers to a program participant who would have done some amount of the program-rebated energy efficient improvement in the absence of the program.

<sup>2</sup> Spillover refers to efficient equipment installed without participating in a program that is attributable to the program because the program *influenced* the additional installation. Participant like spillover refers to the installation of the same type of equipment that was rebated by the program.



## Keep Heating Programs from Cooling Off

Whether or not utilities should offer gas energy efficiency programs with the current low natural gas prices is a separate policy discussion outside the scope of this paper. However, if the utility is tasked with meeting natural gas savings goals it is important that these programs are given the necessary internal resources to meet those goals. This can be a challenge for dual-fuel utilities for which electric savings goals may receive more attention due to the higher avoided cost of electricity.

Xcel Energy utilizes a variety of means to meet their natural gas savings goals. Their Business Heating Efficiency programs in Colorado and Minnesota have been an important part of meeting the state portfolio natural gas savings goals. Overall, the programs' success is due to its many components working well in conjunction. These include efficient working relationships among the internal Xcel Energy DSM team; adoption of proven program design practices; comprehensive and consistent outreach to and engagement of trade allies; strong program influence on customer purchasing decisions (as evidenced through trade and customer evaluation research and evaluated high net-to-gross factors for both programs); and few "bottlenecks" in the program participation process. The programs have succeeded in meeting the twin challenges of low natural gas cost and a smaller base of eligible customers.

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