

**Final
Process
Evaluation
Report**

**Massachusetts 2010 Residential
Retrofit and Low-Income
Evaluation—Brushless Fan
Motors**

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1. Executive Summary

This report provides detailed findings from the Brushless Fan Motor (BFM) process evaluation, which used in-depth interviews, surveys, and a review of materials associated with the program to determine the following:

- Program processes, implementation strengths, and areas for improvements;
- Program tracking data sufficiency;
- Contractor practices, perceptions, and participation barriers;
- Customer behavior, motivations, awareness, and satisfaction;
- Program outreach and recruitment efficacy; and
- Participants' potential changes in fan use, from pre- to post-installation.

This report has been prepared for the program administrators (PAs), NSTAR, National Grid, Columbia Gas, Unitil, Cape Light Compact, Berkshire Gas, New England Gas and Western Massachusetts Electric Company (WMECO).

Program Overview

BFBMs replace existing blower motors, permanent split-capacitor (PSC) motors—also known as induction motors—with new, electronically commutated motors (ECM), also known as brushless DC motors (or BFBMs) in residential HVAC systems. In comparison to conventional induction motors, brushless fan motors require less energy to operate when moving warm or cool air from the furnace or central air conditioner throughout the home. Induction motors, when on, operate at a consistently high speed, and as a result use more energy than is necessarily required at a given time. Brushless fan motors guarantee an optimal air flow by varying their speed over time to create ventilation more evenly with less wasted energy.

For both Massachusetts and Rhode Island, Conservation Services Group (CSG) offers BFBMs as a component of the Cool Smart Program. The program has been designed to encourage HVAC contractors to actively promote and retrofit existing forced hot air and central cooling system fan motors with BFBMs. The program permits contractors to install two BFBMs per home. Eligible systems must provide heating and cooling features to ensure sufficient run hours.

Evaluation Methodology and Activities

As part of the process evaluation we conducted interviews and surveys with program staff, contractors, and customers. Table 1 summarizes the 2010 and 2011 evaluation tasks. Note this report presents findings from the process evaluation; the impact analysis (Task 3) is still ongoing and will be completed later in 2011.

Data collection for the process evaluation included:

- Six in-depth telephone interviews with program administrator and implementer staff from Conservation Services Group (CSG)
- Five qualitative in-depth interviews with HVAC contractors who have participated in the Cool Smart BFM program component, and five interviews with HVAC contractors who

have not participated in the BFM component, but have participated in Cool Smart or GasNetworks programs.

- Surveys with 70 end-use participating customers in Massachusetts, and seven customers in Rhode Island (of a population of only 27 unique customers).

In addition to the primary data collection we reviewed BFM program materials addressing marketing, implementation, and the participant database.

Table 1. Summary of 2010–2011 Evaluation Tasks

Evaluation Task	Details
Task 1 – Site Selection Protocols	Develop an in-stream process for selecting sites for M&V.
Task 2 – M&V Protocol Development and Training	Select contractors, develop site procedures, and provide training.
Task 3 – Site Visits, Data Retrieval, and Analysis	Pick up loggers deployed by contractors, and download and analyze logged data.
Task 4 – Program Staff and Implementer In-Depth Interviews (n=6)	Clarify specific implementation process elements to identify strengths and areas for improvement.
Task 5 – Review of Program Materials and Data	Review marketing materials and customer tracking systems.
Task 6 – Contractor Interviews (n=10)	Conduct qualitative in-depth interviews with participating and nonparticipating contractors to define perceptions, practices, and recommendations.
Task 7 – Participant Survey (n=77)	Conduct a phone survey with participating MA and RI end-use customers.

Summary of Findings and Recommendations

The process evaluation revealed a number of ways the program succeeded as well as some opportunities for improving processes and outcomes. Notable findings include:

- **Data Tracking.** Our review of the implementation contractors 2010 participant-tracking database revealed clearly labeled parameters and largely complete, important data fields. However, we also found some inconsistencies and erroneous data entries.
 - **Recommendation:** Consider including a unique participation identifier (such as an ID number), BFM manufacturer and model numbers (which would prove helpful for verification purposes); and add a parameter to capture numbers of motors incented per home (which would help indicate if contractors are paid for more than two motors per home).
- **Marketing to Contractors.** The BFM program component has focused on soliciting contractor participation through e-mail, direct mail, and seminars, targeting contractors in other Cool Smart Program components and in GasNetworks. Contractor participation, however, has been lower than expected. Discussions with nonparticipating contractors revealed limited knowledge of the program offering (and even of BFMs). While the PA's use e-mail outreach they may want to consider increasing the number of e-mails and modify the messaging to focus on increasing participation.
- **Marketing to Customers.** As this program component has only recently finished its pilot phase, marketing to end-use customers has been quite limited. A letter to end-use

customers, designed for contractors to distribute, describes BFM and their benefits, and explains how to participate in the BFM program component. Generating demand among customers will encourage contractors to engage in the program.

- **Contractor Value Proposition.** Although the participation has exceeded planning goals, participating contractors have limited their participation levels due to technical challenges (e.g., inadequate static pressure), perceptions of limited cost-effectiveness, and lack of demand from their customers. However, contractors still have been installing more BFMs than they would have in absence of the program, particularly as the program provides additional ancillary revenue opportunities (especially during off-seasons).
 - **Recommendation.** Explore options for making program participation more cost-effective for contractors. For example, consider allowing contractors to bill customers for parts or labor that exceed a “typical” installation.
- **Snapback.** The evaluation determined minimal evidence of end-use customers changing their fan settings from “auto” to “on,” which would effectively reduce the program savings through what is known as a snapback or rebound effect. Two of the five participating contractors we spoke with, however, were making recommendations to customers that could elicit them to leave their fans on all the time. These may be the result of health and safety issues where the customer needed to keep the air cleaner running; these air cleaners are part of the air duct system that operates when the fan is on.
- **Program Satisfaction.** Participating contractors and end-users expressed high satisfaction with the Cool Smart staff’s training, support, and communication.

2. Introduction

Program Overview

Given the Cool Smart Program pilot's success in incentivizing BFM's for new high-efficiency furnaces and cooling systems, Program Administrators (PAs) launched a pilot in Massachusetts and Rhode Island to test BFM technology as retrofit measures in residential air distribution systems. The retrofit measure was officially included as part of the Cool Smart program in 2010.

BFMs replace existing blower motors, permanent split-capacitor (PSC) motors—also known as induction motors—with new, electronically commutated motors (ECM), also known as brushless DC motors (or BFM's) in residential HVAC systems. In comparison to conventional induction motors, brushless fan motors require less energy to operate when moving warm or cool air from the furnace or central air conditioner throughout the home. Induction motors, when on, operate at a consistently high speed, and as a result use more energy than is necessarily required at a given time. Brushless fan motors guarantee an optimal air flow by varying their speed over time to create ventilation more evenly with less wasted energy.

For both Massachusetts and Rhode Island, Conservation Services Group (CSG) implements the BFM offering as a component of the Cool Smart Program, which operates in the National Grid, NSTAR, Cape Light Compact (CLC), and Western Massachusetts Electric (WMECO) electric service territories. Through contractor rebates intended to cover costs of the motors and their installation, the program has been designed to encourage HVAC contractors to actively promote and retrofit existing forced hot air and central cooling system fan motors with BFM's. The program permits contractors to install two BFM's per home. Eligible systems must provide heating and cooling features to ensure sufficient run hours.

3. Methodology

Program Staff and Implementer Interviews

In December 2010, we conducted six in-depth telephone interviews with the following program administrator and implementer staff:

- Richard Moran (NSTAR)
- Keith Miller (National Grid)
- Anthony Fornuto (WMECO)
- Briana Kane (CLC)
- Agnes Hagopian and Charles McCrackin (CSG)

The interview sought to understand the roles of individuals and groups involved in the program as well as the program's approaches and processes. These interviews informed our understanding of program delivery, helping to determine strengths and areas for improvements. Specifically, the in-depth interviews with program staff addressed the following research areas:

- Program design, delivery, and status;
- Program participation and marketing; and
- Program data tracking and verification.

Table 2 summarizes interview subjects' organizations and roles.

Table 2. Summary of BFM's Program Staff and Implementer In-Depth Interviews

Organization	Role
NSTAR	Program Manager
National Grid	Program Manager
Western Mass Electric	Program Manager
Cape Light Compact	Program Manager
Conservation Services Group	Program Manager
Conservation Services Group	Senior Field Technician

Review of Program Materials and Data

In early 2011, we reviewed BFM materials addressing marketing, implementation, and a participant database,¹ and assessed the material for:

¹ The participant database, maintained by CSG, was provided on January 12, 2011.

- Data tracking sufficiency;
- Program documentation and application materials' clarity and completeness; and
- Marketing materials' effectiveness.

Contractor Interviews

In February and March 2011, we conducted qualitative in-depth interviews with HVAC contractors who have participated in the BFM program component, and with HVAC contractors who have not participated, but have participated in Cool Smart or GasNetworks programs. These interviews sought to determine:

- Participating contractors' perceptions of the program's design and implementation;
- Nonparticipating contractors' participation barriers; and
- Program improvement recommendations.

Appendixes A and B contain both participant and nonparticipant contractor interview guides.

We spoke with five contractors participating in the BFM program component. Four of the five only had customers in Massachusetts, and one had customers in Massachusetts, but primarily worked in Rhode Island. Four contractors were highly active participants, and one contractor was less active. In total, respondents represented 297 incented BFMs, or 69 percent of the total installations in 2010.

We also interviewed five nonparticipating contractors. Two were derived from a list of contractors participating in the GasNetworks programs and receiving BFM marketing materials. Though the other three had not participated in the BFM program component, they had actively participated in Cool Smart Programs, with each completing 10 or more Cool Smart projects, for a combined representation of over 50 projects. Similarly to the participating contractors, four of the five nonparticipating contractors only had customers in Massachusetts; one had customers in Massachusetts, but primarily worked in Rhode Island.

End-User Participant Surveys

In January and February 2011, we completed end-user participant surveys to assess:

- Awareness of the program component;
- Marketing and outreach;
- Behaviors related to thermostat controls before and after installation ("snapback"); and
- Satisfaction with the BFM program component, contractors, and motors.

Appendix C contains the end-user participant survey instrument.

At the time we fielded the survey, all 2010 participants had BFMs installed for at least part of the cooling or heating season, allowing them to comment on their behaviors and satisfaction with the equipment across both seasons. We conducted surveys with 70 end-use participating customers in Massachusetts, and seven customers in Rhode Island (of a population of only 27 unique

customers). In total, we conducted surveys with 77 end-user participants, shown in Table 3, providing 90 percent confidence and 8 percent precision overall.²

Table 3. BFM End-User Participant Surveys by State

State	Completed Surveys		Total Participant Population	
	Number of Completed Surveys	Percent of Completed Surveys	Total Population ^a	Percent of Total Population
Massachusetts	70	91%	321	92%
Rhode Island	7	9%	27	8%
Total	77	100%	348	100%

^a Unique contacts in the population. The total number of installed BFMs is higher than this as households can have up to two BFMs installed in their HVAC systems.

Most end-user participant survey respondents (82 percent) were National Grid customers, reflecting the large percentage (72 percent) of the program population served by National Grid (see Table 4). We could not complete surveys with any CLC territory participants; this result, however, should not be surprising as, across other Massachusetts survey efforts, we have experienced difficulties in completing interviews in the region during winter. Despite WMECO's participation in the BFM program component, we could not complete surveys with WMECO customers as none of the company's customers participated in the 2010 program.

Table 4. End-User Participant Surveys by PA

PA	Completed Surveys		Total Participant Population	
	Number of Completed Surveys	Percent of Completed Surveys	Total Population ^a	Percent of Total Population
National Grid	63	82%	252	72%
NSTAR	14	18%	77	22%
Cape Light Compact	0	0%	19	5%
Total	77	100%	348	100%

^a References unique contacts, not the number of installed BFMs.

² As we only completed seven surveys with Rhode Island participants, we report survey results in total rather than by state. Note that the confidence/precision levels are based on the assumption of a binomial distribution with a proportion of 0.5, and are adjusted to reflect the relatively small population through a finite population correction factor.

4. Findings

Program Design, Administration, and Goals

Interviews with program staff and implementers indicate the program generally runs smoothly and consistently across the four PAs that include BFM in their residential HVAC programs.

Program Design and Delivery

Since BFM were offered as a pilot, CSG has provided implementation services across all PAs. Specifically, CSG provides: marketing, contractor training, and technical support; data collection; verification; application processing; and payments.

In turn, PAs oversee these activities and provide high-level programmatic direction. Given the single implementation contractor and PAs' frequent (monthly) meetings, the program component has run consistently across the four Massachusetts service territories as well as National Grid's Rhode Island service territory.

This Cool Smart Program component presents tremendous potential as a permanent measure in the Cool Smart program. The program staff's consensus indicates BFM serve as a valuable technology, providing significant energy savings, and the encompassing technical support CSG provides contractors in the field is one of the program's great strengths.

When we initially asked a sample of contractors if they wished to assist with logger deployment, we learned some contractors thought the BFM program component was no longer running. Further discussion with PAs confirmed the program offering had been suspended in NSTAR's service territory (as it had achieved its goals and exhausted its 2010 budget earlier than expected). However, when we interviewed additional participating contractors through the process evaluation, respondents all said they found it easy to stay informed about the program and were aware of the limited program suspension.

Goals and Objectives

PAs interviewed consistently defined the objective of this component to the Cool Smart program: to increase residential HVAC systems' efficiency through BFM unit installations. As shown in Table 5, nearly all PAs achieved their 2010 unit goals. Slightly less than 400 motors were installed in Massachusetts, and nearly 40 were installed in Rhode Island, nearly doubling the total program goal. Given a limited program budget, NSTAR suspended its BFM offerings midyear upon achieving its goal. As National Grid had a greater available budget, it continued the program offering, tripling its goal by the year's end.

Table 5. 2010 BFM Unit Installations by Utility

Utility	2010 Unit Installation Goal	2010 Unit Installations
NSTAR	100	104
National Grid (MA and RI)	100	303*
Western Mass Electric	1	0
Cape Light Compact	20	21
Total	221	428

Source: 2010 Brushless Fan Motor Program Tracking Data (Received January 12, 2011)

*38 of these were in RI and 265 were in MA.

Program Materials and Data

Materials

The Cool Smart Program produces a single marketing item—a letter to end-use customers. This letter describes BFMs, outlines their benefits, and explains how customers can participate in the program offering. The letter includes a list of frequently asked questions, and clearly describes the program offering and the motors. However, it does not specifically suggest customers use their HVAC systems' automatic setting as much as possible, nor does it encourage them to avoid leaving the fan on.

The PAs produce limited programmatic materials, designed to support the program implementation. The BFM program component has yet to include an implementation manual or data tracking QA/QC procedure documentation.

We received and reviewed the following 2010 materials:

- **A training presentation for participating contractors:** This presentation clearly presents BFMs' benefits and system specifications for installation. Used during contractor training, it is accompanied by manufacturers' installation guides and cut sheets.
- **A contractor agreement form:** This form details contractors' terms and conditions for participating in the BFM program component. Though clear and easy to follow, the agreement form does not specifically prohibit contractors from suggesting customers leave their fans set to "on" nor suggest contractors advise customers to use the automatic mode.
- **A project data reporting form:** This clear and easy to follow form allows contractors to submit information required for payment. It limits contractors to selecting NSTAR or National Grid as the customer's electric utility. As the program expands and more PAs participate this could confuse contractors.

Database

Currently, CSG collects and stores all participant data in an Excel database, which its team verifies throughout the data collection and entry process. CSG provides participation data to PAs in Excel format, either monthly or quarterly (depending on the PA). PAs report they check to ensure collected data matches expectations.

Our review of the 2010 participant-tracking database revealed parameters clearly labeled and important data fields largely completed. However, some database inconsistencies and areas of concern emerged:

- Thirty-two contacts do not have phone numbers.
- Thirteen contacts do not have electric utility account numbers.
- Three cases do not have installation dates.
- Six cases do not have a Job ID.
- Two contacts share one Job ID.

This final inconsistency (two contacts sharing a single Job ID) most likely resulted from contractors (rather than the Cool Smart Program) assigning Job IDs. The BFM program component does not seem to have protocols for assigning unique identifiers for each installation. Moreover, only relying on electric utility account numbers could become troublesome due to the number of utilities participating, and could present tracking issues as the BFM program component expands.

Additionally, the PAs and CSG may consider adding certain fields to the participant database to prepare for future growth. For example, including the BFM manufacturer and model number would prove helpful for verification purposes, and including a field for the number of motors installed per home would help indicate if contractors are paid for more than two motors per home.

Marketing and Outreach

Currently, CSG executes all BFM marketing, targeting contractors through e-mail “blasts,” training sessions, and seminars.

Contractors

PAs express interest in expanding the number of participating contractors to meet increasing unit installation goals. However, interviews with nonparticipating contractors indicate current marketing efforts could be strengthened: only two of five nonparticipating contractors knew of the BFM program component, with the two informed contractors learning of it through conversations with Cool Smart Program staff and through Cool Smart e-mails.

Participating contractors largely learn about the BFM program component through a variety of Cool Smart-specific marketing channels: breakfast meetings, conversations with program staff, direct mail, and e-mails. One participant learned about it through a GasNetworks seminar.

Initially, only contractors involved in other Cool Smart Program components were eligible for BFM incentives in 2010. In late 2010, however, Cool Smart began marketing to contractors participating in GasNetworks programs. Per program staff, these contractors unfortunately have expressed little interest.

Nearly all nonparticipants (four of five) stay informed about GasNetworks or Cool Smart Programs through e-mail, which participants also cite as the best way to inform them about programs, training, and events. Nonparticipants also mention faxes, suppliers, and seminars as

ways they keep current with developments. One nonparticipant suggested seminars would be the best way to keep contractors informed. Interestingly, though the BFM program component has attempted using these channels to reach contractors, nonparticipants still had not learned about it. Contractor outreach may require modifying messaging or increasing its frequency.

Nearly all participants (four of five) also stay informed about the BFM program component through e-mail, and all cite e-mail as the best way to contact them about similar types of programs. One participant suggested sending letters to his office would also be a good way to keep his staff informed about the BFM program component.

End Users

As the customer letter is the only marketing material the BFM program component produces for distribution to end users, participating contractors report also using manufacturers' marketing materials to describe motors to their customers.

Not all participating contractors recall receiving program-produced marketing materials to provide to end users. Two participating contractors said they have never received marketing materials, but that would like to receive materials describing BFMs and their benefits. They said such materials would make it easier to demonstrate the value of BFMs to customers.

However, contractors appreciate receiving marketing materials and find them helpful. The three participating contractors who received manufacturer brochures and the letter used them to explain BFMs to their customers, and said the materials were useful. One participating contractor believed his company would not have had such high participation rates without the materials.

Surveys with end users indicate, unsurprisingly, that contractors provide a key marketing channel for BFMs and the overall Cool Smart Program:

- Seventy-three percent of participating end users first learned of the BFM program component from their contractors; 15 percent learned of it through family or friends, and 8 percent learned of it from their PA's marketing materials.³
- Contractor recommendations motivated one-quarter of end users to participate in the program.

All participating contractors report notifying their customers that contractors receive rebates through the Cool Smart Program on behalf of the PAs, and they understand they cannot charge customers for the fan motor; most respondents (79 percent) said their contractor informed them that the PA would provide a rebate to the contractor after installation of the BFM. When explaining BFMs to prospective end users, contractors most often point out energy savings benefits and drops in energy bills resulting from BFM installation.

However, end-users are less familiar with the Cool Smart Program: of 77 end-user participants completing the surveys, only 60 percent knew BFM installation in their HVAC system was a Cool Smart Program component.

³ Interviews with program staff and implementers indicated no materials were sent directly to customers; the evaluation team assumes these respondents most likely had other Cool Smart services performed and were referred through those direct marketing materials.

The program did not become heavily involved in linking customers with participating contractors. In fact, only one respondent mentioned finding a contractor through his or her utility. Most participants had used their contractor in the past (44 percent) or learned about the contractor through a friend or family member (22 percent).

Significant potential exists for promoting the program more broadly to customers. While BFM, as technical measures, might be difficult for consumers to understand, at least one program staff member noted more opportunities exist to market to end-use customers and drive consumer demand, and 25 percent of participating end-use customers even reported the program should conduct more marketing. This could, in turn, further motivate contractors to enlist in training, as their increased skill sets could potentially yield new clients.

Participation Barriers and Opportunities

Conversations with program staff, the implementation team, contractors, and end-use customers reveal a number of barriers and opportunities for the BFM program component.

Participation Barriers

Aside from the measure's considerably technical nature, making it difficult for end users to understand (and hence desire), program staff acknowledge contractor engagement remains the program's greatest challenge. As noted, only two nonparticipating contractors had heard of the BFM program component prior to being interviewed. While one nonparticipant said he planned to attend a BFM training event, neither was familiar with how the program component works prior to the interview. One of the respondents saying he was aware of the program was familiar with ECMs, but he was not sure if they were the same as BFMs.

Interviews with participating contractors indicate challenges they face diminish their incentive to install more BFMs:

- **Technical issues make installing BFMs challenging.** First, it is challenging to find the right system in which to install BFMs through the program: In order to save the desired amount of energy and accordingly be eligible for an incentive, the BFM program components requires that the HVAC systems' supply and return ductwork have static pressure equal to or less than 0.60" water column (w.c.). However, many HVAC systems do not have adequate static pressure to be eligible for an incentive because the systems' ducts are too small. Therefore, contractors cannot install BFMs in these systems through the program. Second, depending on the manufacturer of the existing HVAC system, sometimes it is physically more challenging to install a BFM than would have been anticipated, because units do not have the necessary or correct installation brackets, making BFMs more costly and time-consuming to install.
- **BFMs' variable prices can make them less cost-effective to install.** According to one contractor, at the program's beginning, Cool Smart purchased motors for the contractors, guaranteeing a fixed price for the motors. He notes current BFM retail prices are higher than initial prices, making continued participation more challenging to justify.
- **Incentives are not high enough.** All contractors mention BFM costs and the labor-time needed to perform installations, relative to incentive amounts, do not make them profitable or necessarily cost-effective, from a business perspective to market the BFMs

as their own separate service. The current service agreement prohibits contractors from charging customers for the fan motor, and seems to imply that they can also not charge customers for labor, although actual practice was not verified as part of this evaluation.

- **Customers' awareness of BFM is virtually nonexistent.** Contractors report their customers not being terribly aware of options for making their HVAC systems more energy efficient. No customers, on their own volition, approached them to install BFMs.

Program staff understand the challenges the BFM program component faces. For example, the staff know of the technical challenges involved with the first few installations, specifically if additional installation brackets are required. Staff acknowledge these challenges have deterred some contractors from continuing to participate, but the BFM program component also provides comprehensive technical and on-site support to assist contractors because of these challenges. Program staff have found, once contractors overcome this initial learning curve, installation no longer remains a challenge. Once contractors have started participating, they "embrace" the BFM program component, installing many units, as shown by the number of installations in 2010. Moreover, program staff encourage that contractors utilize the BFM installation opportunity in conjunction with other types of service calls in order to increase the cost-effectiveness of the installation (on behalf of the contractor).

Participation Opportunities

Despite challenges involved with installing BFMs, evidence indicates significant potential exists to increase participation in the BFM program component:

- **Contractors are pleased with BFMs.** Four of five participating contractors see energy savings as BFMs' key benefit; three contractors also reference reduced noise. Contractors have few to no post-installation issues.
- **Contractors do have an incentive to participate.** Contractors report being motivated to participate to make themselves more attractive to customers by setting themselves apart from other contractors or satisfying customers' interests in improving their HVAC systems. While contractors reference the limits of BFMs as sizable revenue sources, the PAs have learned contractors find installing BFMs an easy way to marginally increase revenues without additional marketing or outreach, as contractors can couple BFMs with other types of service calls. Participating contractors also report, in comparison to other Cool Smart Program components, such as Quality Installation Verification, BFM installations can be conducted during off-seasons when standard livelihood sources are limited.
- **The market contains considerable potential.** While finding the correct system for installing BFMs can be technically challenging (e.g., finding adequate static pressure), most participating contractors say about half of their customers can benefit from BFMs.
- **Customers show little resistance.** Customers do not resist installing BFMs in their systems, and trust contractors' recommendations. Participating contractors report little to no resistance from customers when recommending BFMs. More often than not, contractors believe customers choose to install BFMs because they trust their contractor will make the best recommendation for them.

- **Customers want to save energy.** Customers express enthusiasm about achieving energy savings, making this an excellent avenue to drive contractor participation. All nonparticipating contractors say their customers express interest in increasing their HVAC systems' efficiency. From participating contractors' perspectives, the BFM program component attracts customers by offering a no cost replacement for the fan motor, lowering their energy bills. This makes implementing the BFM program component easier as contractors have a greater incentive to provide the service to please their customers.

Influence on Business Practices

Interviews indicate the BFM program component has increased BFM installation rates among participating contractors. Before the BFM program component, only two participating contractors installed and sold BFMs. Both said, before the BFM program component, they very rarely recommended BFMs as the cost made them difficult to sell. Both now recommend BFMs more often due to the program. All participating contractors interviewed claim to recommend BFMs often, and three of five say they recommend them whenever they can.

Despite positive feelings about BFMs, participating contractors express mixed views about the value the BFM program component provides their businesses. Three of five say they like installing BFMs as a way to increase business and revenues from new or past customers. One contractor said selling and installing BFMs provided his company with a competitive advantage over those who do not. In contrast, another two respondents did not regularly leverage the BFM program component to increase their companies' overall business. They found the incentive amount the BFM program component offered did not render the program cost-effective, given the time they would invest in marketing or making site visits to install BFMs as a standalone service. Participating contractors report deriving 5 percent or less of their revenues solely from BFMs sales and installations.

Snapback Indicators

As previously noted, Cool Smart's BFM documentation does not explicitly instruct contractors about advice to offer customers regarding setting their thermostat fans. Participating contractors and end-user participants interviewed provide some evidence of snapback. Snapback occurs when end users leave their new fans in the "on" position where they formerly left the previous fan in a less consumptive mode-- the "auto" position. When this occurs, participants as a result do not end up saving the same amount of energy that is assumed with the installed measure.

Contractors

Two contractors provide advice to their customers about how to set fans on their thermostats (three said they do not provide advice):

- One contractor specifically advised customers to leave fans on during summer (and thus may be the source of potential snapback).
- One contractor advised customers to leave fans on "auto," but suggested they turn it to "on" if the home stays too hot.

Discussions with program staff reveal that these recommendations may be the result of health and safety issues where the customer needed to keep the air cleaner running; these air cleaners are part of the air duct system that operates when the fan is on.

In addition, one participating contractor said he never provided guidance, yet he told customers who said they left the old fan set to “on” that it would operate more energy efficiently with that setting compared to how it would have operated prior to the installation of the BFM. This could not be considered snapback as customers would already be using the “on” setting, still resulting in net energy savings. However, greater potential savings exist if contractors emphasize “auto” settings provide steeper net savings over previous usage behaviors.

End Users

To capture evidence of snapback, we asked end users how they set fans on their thermostats before and after installing BFM. As shown in Table 6, below:

- The majority of respondents (84 percent) do not change their behaviors at all. Moreover, three-quarters of participants (75 percent) always set their old fans on “auto” and continue to do so.
- Changes in setting behaviors among end users from before to after BFM installation largely offset each other, resulting in no sizable evidence of snapback. Six percent of respondents, who would have left fans set on “auto” prior to BFM installation, now leave new fans “on” (a sign of snapback); however, another 3 percent, who would have kept their fans “on” now leave it on “auto” (a sign of increased efficiency).
- Findings in regard to partial snapback cancel themselves out: 1 percent of end users, formerly switching fan settings back and forth, now always leave it on; another 1 percent, always leaving it on “auto” now switch it back and forth (which are both signs of partial snapback). However, 4 percent who used to switch it back and forth now always leave it set on “auto” (a sign of increased efficiency).

Table 6. Fan Setting Behaviors Before and After Installation

Before Installation	After Installation		
	Always on “AUTO”	Switch back and forth	Always on “ON”
Always on “AUTO”	75%	1% ^a	6% ^a
Switch back and forth	4% [†]	3%	1% ^a
Always on “ON”	3% [†]	0%	6%

^a Snapback indicator

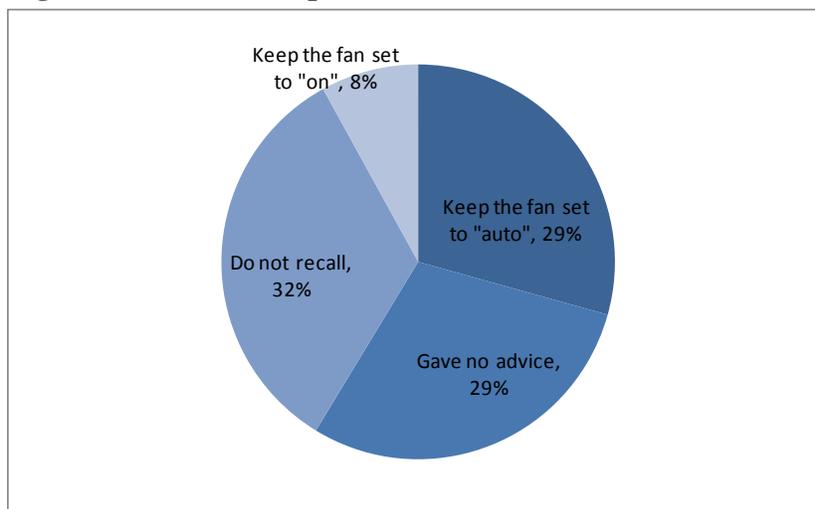
[†] Increased energy efficiency indicator

n=69, valid responses only

We asked end-users what advice their contractor offered about how to set fans on their thermostats once BFMs were installed. As shown in Figure 1, nearly two-thirds said their contractor offered no advice (29 percent), or they could not recall being advised (33 percent). A little over one-quarter of respondents (29 percent) said their contractor told them to keep the fan set on “auto.” A small share of respondents (8 percent) reported their contractor told them to keep the fan on. Of 11 respondents always leaving their new fans on, nearly half reported their contractor told them to do so. About one fifth (22 percent) of those interviewed had their BFMs

installed by one of the two contractors we interviewed who say they provide recommendations that would elicit snapback.

Figure 1. End-user Reports of Contractor Recommendations



Nearly all nonparticipating contractors do not provide regular guidance to their customers about how to set their HVAC system fans when providing HVAC services, although they may provide guidance under specific circumstances. For example, two said they only suggest customers can turn the fan to “on” if customers feel their homes are unevenly cooled, and two others do so if a home has an air filtration or variable speed system.

Program Satisfaction

Interviews with participating contractors and surveys with end-users indicate participants are pleased with the BFM program component.

Participating Contractor Satisfaction

Participating contractors are largely satisfied with the BFM program component, awarding Cool Smart Program staff the highest ratings. None of the participating contractors, however, report being very satisfied with incentive amounts, and three contractors are less than satisfied. They explain the motor’s cost and the time required to install it, relative to the incentive, does not make participation profitable or necessarily cost-effective. One contractor said the incentive would have to increase by nearly 50 percent to make it a profitable business component. In fact, when asked if they would participate if the program lowers the incentive, all say they would likely not be able to continue participating.

Participating contractors offered the following suggestions for improving the BFM program component:

- Overwhelmingly, contractors said incentive amounts should increase.
- Many said the BFM program component should provide more marketing assistance towards end users.
- One suggested Cool Smart should purchase BFMs for contractors.

The last suggestion is at odds with feedback PAs had received at the start of the BFM program component. At that time, the Cool Smart Program had been purchasing the motors on behalf of the contractors. However, contractors had communicated they were more likely to find less expensive BFMs in the market.

Nevertheless, contractors are quite pleased with most program components. They feel training they receive from the Cool Smart Program has been useful. All say they are more than satisfied with their communications with Cool Smart Program staff, the application process, and the payment process. All participants underscore (unprompted) how excellent all of their interactions with and support from Cool Smart Program staff have been. Nearly all were eager to continue participating (aside from the one who insisted increasing BFM prices may be a barrier to continued participation).

End-User Satisfaction

End users are satisfied with their contractors, BFMs, and the program overall. When asked about their satisfaction with the ease of scheduling their appointments, nearly all end users (95 percent) rate it a 7 or higher on a scale of 0 to 10, where 0 is “extremely dissatisfied” and 10 is “extremely satisfied.” Similarly, nearly all (97 percent) rate the contractor’s quality of work, and his or her professionalism, at a 7 or higher.

The majority of participants (88 percent) are satisfied with the performance of the BFM installed in their HVAC system. Only two respondents note some dissatisfaction (rating it a 4 or lower), with one of these respondents reporting the BFM does not provide adequate energy savings. Nearly a one-third of participants (38 percent), however, noticed energy savings on their bills after BFM installation.

Most end users (88 percent) rate satisfaction a 7 or higher for the Cool Smart Program overall. When we asked all end-users for suggestions for ways to improve the Cool Smart Program, nearly half (47 percent) offered no suggestions. Of 36 respondents providing suggestions, the most common was the program should provide more information about the equipment (31 percent) and conduct more marketing efforts (25 percent).

Appendix A: Participating Contractor Interview Guide

MA and RI RRLI Brushless Fan Motor Contractor Survey

1/28/2011

FINAL

Hello, I am calling on behalf of the sponsors of the Cool Smart Program. My name is _____ from Opinion Dynamics calling regarding your participation as a contractor in the Program. THIS IS NOT A SALES CALL. We are doing a brief survey with contractors who have participated in the Brushless Fan Motor Pilot.

We are interested in your experience with the program and any feedback you might like to provide. The Cool Smart program plans to use the information to improve the energy efficiency programs that contractors like you participate in.

Would you be willing to speak with me for about 10 to 15 minutes? Is now a good time or is there a more convenient time when I could call back?

Alert interviewee that the call will be recorded.

Note that responses will remain confidential and only be reported in aggregate with other responses.

FIRMOGRAPHICS

I first have a few general questions about your company.

- F1 Does your company serve residential customers ONLY in Massachusetts? [IF SERVING ONLY IN MA, SKIP TO NEXT SECTION]
- a. Does your company also serve residential customers in Rhode Island?
 - b. Do you serve residential customers outside of Massachusetts [IF SERVING RI, READ] and Rhode Island?

[IF SERVICE TERRITORY IS OUTSIDE OF MA AND RI] For the remainder of the survey we are going to focus only on your companies activities in Massachusetts [IF SERVING RI, READ] and Rhode Island.

MARKETING

- M1 Where did you first hear about the Brushless Fan Motor Pilot?

- M1A [IF M1=98, SKIP] Where or how else did you hear about it?
- M2 What is your understanding of the program's policy on charging the customers for the motor and its installation?
- M3. Do you explain the rebate program to your customers? [IF NO, SKIP TO M4]
- How do you describe the rebate program itself?
 - Do you explain to customers that the motor and its installation are rebated? [IF NO, SKIP TO M4]
 - When you explain the rebate to your customers, do you ever mention the utility company, [IF ON THE CAPE] Cape Light Compact, the Cool Smart Program, or Mass Save?
- M4 Have you received any marketing materials from the program? [IF NO, SKIP TO M5]
- What did you receive?
 - Do you provide these materials to your customers?
 - Do you think they are useful materials?
- M5 Are there any specific promotional materials that you would like the Cool Smart Program to provide you with that you could distribute to your customers? [IF YES, ASK] What are types of materials would be useful to you?
- M6 How do you continue to stay updated and informed about the program?
- M7 Do you find it easy to stay informed about changes in the program? [IF NO, ASK] Why do you say that?
- M8 What is the best way for the program to provide you with updates, and information about trainings and events?
- M9 During slow periods, do you use your practice of installing *free* brushless fan motors as a way to attract new customers or more business from past customers?

BUSINESS PRACTICES

- BP1 BEFORE participating in the program, did your company install brushless fan motors? [IF NO, SKIP TO BP2]
- a. How often would you say you recommended brushless fan motors BEFORE the program?
 - b. Did you find brushless fan motors difficult to sell BEFORE the program?
- BP2 How often would you say you recommend brushless fan motors (NOW)?
- BP3 In what instances do you recommend brushless fan motors?
- BP4 What do you see as the benefits of brushless fan motors?
- BP5 What are the issues with brushless fan motors?
- BP6 What percent of your customers would you estimate could benefit from a brushless fan motor?
- BP7 What percent of your business would you estimate is solely comprised of the sale and installation of brushless fan motors?
- BP8 How do you explain the benefits of brushless fan motors to your customers? Are there specific “slogans” you use to describe the benefits of the devices themselves? [IF NEEDED: That is, what selling points do you make about BFM to attract customers to them?]
- BP9 When you recommend brushless fan motors, how interested would you say your customers are in the device itself?
- a. Have there been instances where customers have turned down the free service?
 - b. [IF YES, ASK] Why did the customer(s) turn down the free service?
- BP10 What are the systems or conditions where you do not recommend the installation of brushless fan motors?
- BP11 Have there been any post-installation issues with the brushless fan motors you have installed? [IF NO, SKIP TO BP12]
- a. What happened?
 - b. How was it resolved?

- c. What percentage of the time has there been a post-installation issue?
- BP12 How aware, would you say, are your customers of options available to make their HVAC systems more energy efficient?
- a. How often are customers aware of brushless fan motors before you recommend them?
- b. Have any customers come to you directly asking for a brushless fan motor installation?
[IF NO, SKIP TO BP13]
- c. Do you know how they heard about brushless fan motors?
- BP13 What, in your opinion, is the leading reason(s) why customers have decided to install brushless fan motors through the program?

SNAPBACK

- SN1 After you install the brushless fan motor, do you provide customers with any advice about how to set the fan on their thermostat?
- SN2 [IF SN1=YES, ASK] What do you tell them?
- SN3 [IF UNCLEAR, ASK] Do you ever suggest that customers set their fan to “on” instead of leaving it on “automatic”? [IF YES, ASK] How often?

PROGRAM DESIGN

- P1 Why did you decide to participate in the BFM program component?
- a. How long have you been participating in Cool Smart programs in general?
- b. What other Cool Smart programs do you participate in?
- c. How does the Brushless Fan Motor Pilot compare to other Cool Smart programs?
- P2 Do you participate in any Gas Networks programs? [IF NO, SKIP TO P3]
- a. How long have you been participating in Gas Networks programs?
- b. What other Gas Networks programs do you participate in?

- c. How does the Brushless Fan Motor Pilot compare to other Gas Networks programs?
- P3 What are some issues you face that make it challenging to install brushless fan motors? [Probe for available time, cost relative to incentive, paperwork difficulty, technical constraints, market need, and product acquisition, etc] Are there ways the program could help make these challenges easier?
- P4 As I understand it, the program provides you with a rebate of \$450 for each brushless fan motor you install. How satisfied are you with this incentive amount? [Very, Somewhat, Satisfied, Not Very, Not at All Satisfied]
- a. [If not satisfied with incentive, ASK] Why aren't you satisfied with the incentive amount?
- b. If the rebate amount were lowered from \$450, do you think that would change your participation in the program? [IF YES, ASK] How would a reduction in the rebate amount change your participation?
- P5 How useful was the brushless fan motor installation training you received from the Cool Smart program?
- a. [IF P5=not useful, ASK] What would have made it more useful?
- b. Is there anything you might suggest changing about the format or content of the trainings that are provided?
- P6 How satisfied are you with the following components of the Brushless Fan Motor Pilot:
- a. Communication with Cool Smart program staff? [If not satisfied] Why?
- b. The application process? [If not satisfied] Why?
- c. The payment process? [If not satisfied] Why?
- P7 Do you plan to participate in the Brushless Fan Motor Pilot again in the future? [IF NO] Why not?
- P8 Aside from anything we've discussed, do you have any recommendations of how the Brushless Fan Motor Program could be improved?
- P9 Lastly, approximately, how many employees does your company have in Massachusetts [IF SERVING RI, READ] and in Rhode Island?

This concludes our survey. On behalf of Cool Smart, thank you

Appendix B: Nonparticipating Contractor Interview Guide

MA RRLI Brushless Fan Motor Non-Participant Contractor Survey
1/28/2011

FINAL

Hello, I am calling on behalf of the sponsors of the Cool Smart Program. My name is _____ from Opinion Dynamics. THIS IS NOT A SALES CALL. We are doing a brief survey with <COOL SMART or GAS NETWORKS> contractors who have not participated in the Brushless Fan Motor Pilot. Specifically, we are interested in learning your thoughts on their Brushless Fan Motor Pilot [IF NEEDED] I realize you have not participated in the program; however, we were hoping to learn what factors have prevented you from participating.

The Cool Smart program plans to use the information to improve the energy efficiency programs that contractors like you can participate in. Would you be willing to speak with me for about 10 minutes? Is now a good time or is there a more convenient time when I could call back?

Alert interviewee that the call will be recorded.

Note that responses will remain confidential and only be reported in aggregate with other responses.

FIRMOGRAPHICS

I first have a few general questions about your company.

- F1 Does your company serve residential customers ONLY in Massachusetts? [IF SERVING ONLY IN MA, SKIP TO NEXT SECTION]
- a. Does your company also serve residential customers in Rhode Island?
 - b. Do you serve residential customers outside of Massachusetts [IF SERVING RI, READ] and Rhode Island?

[IF SERVICE TERRITORY IS OUTSIDE OF MA AND RI] For the remainder of the survey we are going to focus only on your companies activities in Massachusetts [IF SERVING RI, READ] and Rhode Island.

- F2 How long have you been participating in the <COOL SMART or GAS NETWORKS> program?

F3 Specifically, what other <COOL SMART or GAS NETWORKS> program components do you participate in?

MARKETING

- M1 Have you heard of Cool Smart's Brushless Fan Motor Pilot? [IF NO, SKIP TO M2]
- Where did you first hear about the Brushless Fan Motor program component?
 - [IF M1a=98, SKIP] Where or how else did you hear about it?
 - Have you attended any training events for the BFM program?

[IF M1=YES, SKIP TO NEXT SECTION]

M2 The Cool Smart Program currently provides a \$450 rebate to contractors for each brushless fan motor they install for residential customers who live in participating territories in Massachusetts or Rhode Island. The rebate is intended to cover the cost of the motor and its installation. Were you aware of this?

BUSINESS PRACTICES

- BP1 How familiar are you with brushless fan motors? [IF NOT FAMILIAR AT ALL, SKIP TO C1]
- BP1A Does your business currently sell or install brushless fan motors?
- BP2 [IF NOT SELLING/INSTALLING and FAMILIAR, ASK]
- Do you think brushless fan motors are applicable to any of your customers' HVAC systems?
 - [IF BP2a=NO, ASK] Why not? [IF CONTRACTOR DOES NOT DEAL WITH APPLICABLE SYSTEMS, SKIP TO C1]
 - [IF APPLICABLE TO SYSTEMS, ASK] What percent of your customers would you estimate could benefit from a brushless fan motor?
 - Did you ever consider selling and/or installing brushless fan motors [IF HAD ALREADY HEARD OF PILOT, READ] before you heard of the program?
 - What are some of the challenges to selling and/or installing brushless fan motors?
- BP3 [IF SELLING/INSTALLING, ASK]
- How often do you install brushless fan motors? What percent of your revenue would you guess selling and installing brushless fan motors comprises?

- b. How many of your customers do you think could benefit from a brushless fan motor? And how many of your customers (of the total) actually have them installed?
- c. In what instances do you recommend brushless fan motors? To what percent of your customers do you recommend them? When you recommend brushless fan motors, how interested would you say your customers are in the device itself?
- d. How do you explain the benefits of brushless fan motors to your customers? Are there specific “slogans” you use to describe the benefits of the devices themselves? [IF NEEDED: That is, what selling points do you make about BFM’s to attract customers to them?]
- e. What have been some challenges to selling and/or installing them? When you don’t recommend brushless fan motors, what are the reasons?
- f. About how much do you typically charge for a brushless fan motor? How much for the motor itself? How much for the installation?
- g. How often are customers aware of brushless fan motors before you recommend them? Have any customers come to you directly asking for a brushless fan motor installation? [IF YES] Do you know how they heard about them?

[ASK ALL]

BP4 How interested, would you say, are your customers in making their HVAC systems more energy efficient?

SNAPBACK

[IF NOT SELLING/INSTALLING BRUSHLESS FAN MOTORS, SKIP TO SN4]

- SN1 After you install brushless fan motors, do you provide customers with any advice about how to set the fan on their thermostat?
- SN2 [IF SN1=YES, ASK] What do you tell them?
- SN3 [IF UNCLEAR, ASK] Do you ever suggest that customers set their fan to “on” instead of leaving it on “automatic”? [IF YES, ASK] How often?
- SN4 In general, when you are providing < [IF SELLING INSTALLING, READ] other> HVAC services, do you ever provide customers with advice about how to set the fan on their thermostat? [IF NO, SKIP TO NEXT SECTION]
- SN5 What do you tell them?

- SN6 [IF UNCLEAR, ASK] Do you ever suggest that customers set their fan to “on” instead of leaving it on “automatic”? [IF YES, ASK] How often?

PROGRAM DESIGN

- P1 Do you think there is any potential for your business to benefit from participating in Cool Smart’s Brushless Fan Motor Pilot? [IF NO] Why not?
- P2 Is there any particular reason why your company hasn’t participated in the Brushless Fan Motor Pilot?
- P2A What are some issues that could make it challenging to participate [Probe for available time, cost relative to incentive, paperwork difficulty, technical constraints, market need, and product acquisition, etc]? Are there ways the program could help make these challenges easier?
- P3 [IF ALREADY SAID, READ] As I mentioned earlier... The program provides contractors with a rebate of \$450 for each brushless fan motor they install. This is intended to cover the cost of the motor and its installation. Contractors are not permitted to charge anything to the customer.
- a. How reasonable do you think this rebate is? [Very Reasonable, Somewhat Reasonable, Not Very Reasonable, Not at All Reasonable] How so?
 - b. [If not reasonable] If the incentive amount were higher, do you think you would participate in the program? What do you think a more realistic rebate amount would be?
- P4 How likely are you to participate in the Brushless Fan Motor Pilot in 2011? [Very Likely, Somewhat Likely, Not Very Likely, Not at All Likely] Why or why not?
- P5 [IF NOT LIKELY TO PARTICIPATE, ASK] Aside from anything we’ve discussed, do you have any recommendations of how the Brushless Fan Motor Pilot could be changed to make you more likely to participate?

CONCLUSION

- C1 How do you stay updated and informed about the <COOL SMART or GAS NETWORKS> program? What is the best way to reach contractors like you about energy efficiency programs, trainings, and events?

C2 Lastly, approximately, how many employees does your company have Massachusetts [IF SERVING RI, READ] and Rhode Island?

This concludes our survey. On behalf of Cool Smart, thank you

DRAFT

Appendix C: End-user Participant Survey

MA & RI Retro Brushless Fan Motors Program- End use Participant Survey

January 27, 2010

<UTIL>: Utility or program administrator of end use participant

<INSTALL_DATE>: date BFM was installed

<STATE>: End user's state (MA or RI)

Introduction

Hello, my name is <INTERVIEWER> and I am calling from Opinion Dynamics on behalf of <UTIL>. According to our records you participated in <UTIL>'s Cool Smart Program where your contractor installed a Brushless Fan Motor in your heating and cooling system to increase your home's energy efficiency.

We are conducting a study to learn about your satisfaction and experiences with the program. The survey should take around 10 minutes and the information you provide will help <UTIL> improve its Cool Smart Program. Your responses will be kept strictly confidential.

S1. May I speak with **<CONTACT NAME>**?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[IF S1=1, SKIP TO S3]

S2. *Is there someone else in your home I could speak to who is knowledgeable about the installation of a brushless fan motor in your heating and cooling system?*

1. Yes
2. No
8. (Don't know)
9. (Refused)

[IF S2<>1, SKIP TO TERMINATE SCREEN or SCHEDULE CALL BACK]

[CONTINUE WITH CORRECT CONTACT]

S3. First of all, let me confirm that your contractor installed a brushless fan motor in your heating and cooling system on <INSTALL_DATE> as part of the Cool Smart Program you participated in. Is that correct? [INTERVIEWER: Date does not need to be correct, however, we do want to confirm installation]

1. Yes
2. No
8. (Don't know)
9. (Refused)

[IF S3= 2 OR 9, SKIP TO TERMINATE SCREEN]

[IF S3=1, SKIP TO M1]

S4. Do you recall having a contractor install a device to increase the energy efficiency of your heating and cooling system?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[IF S4<>1, SKIP TO TERMINATE SCREEN]

Marketing & Awareness

[IF <STATE> = RI, SKIP TO M8]

M1. Have you ever seen or heard the term "Mass Save"?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[IF M1<>1, SKIP TO M8]

M2. We're interested in all of the places where you may have heard about Mass Save. Have you ever... [1=Yes, 2=NO, 8=DK, 9=Ref] [ROTATE]

- a. Seen a Mass Save billboard
- b. Heard a Mass Save Red Sox Promotion on the Red Sox Radio Network, for example (WEEI)
- c. Heard about Mass Save on TV
- d. Seen a newspaper article or press release about Mass Save?
- e. Seen online advertising for Mass Save?
- f. Visited or seen a Mass Save booth at a public event, game or festival?
- g. Received Mass Save brochures while visiting the HGTV Green Home? [If needed: The green home in Plymouth, Massachusetts was featured in an HGTV home giveaway contest this summer]
- h. Seen or heard anything else about Mass Save? [SPECIFY]

[SKIP IF M2a-h ALL <>1]

M3. How influential was the Mass Save marketing you just mentioned in your decision to have the brushless fan motor installed in your heating and cooling system? Use a scale from 0 to 10 where 0 is "not at all influential" and 10 is "extremely influential". [0-10, 97=NA, 98=DK, 99=Ref]

M5. After hearing about Mass Save, did you do any of the following activities? [1=Yes, 2=NO, 8=DK, 9=Ref] [ROTATE]

- a. Visit MassSave.com
- b. Visit a utility or energy services provider website
- c. Use an online search engine to look for more information about saving energy
- d. Call your utility [or energy services provider] 800 number for more information
- e. Discuss Mass Save with friends or family
- f. Discuss Mass Save with a contractor

[ASK IF M5a <>1]

M6. Did you know Mass Save has a website, called MassSave.com?

1. (Yes)
2. (No)
8. (Don't know)
9. (Refused)

[ASK IF M5a=1 OR M6=1]

M7. In the past six months, how many times have you visited the MassSave.com website?

1. None
2. Once
3. 2-5 times
4. 6-10

5. 10 or more
8. (Don't know)

M8. Did you know the installation of the brushless fan motor in your heating and cooling system is a program included in the Cool Smart program offered by <UTIL> where they offer a number of rebates and incentives?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[IF M8 <>1, SKIP to M9b]

M9. How did you first hear about the Cool Smart program? [UNAIDED]

[IF <STATE> = RI, ELIMINATE RESPONSES 1, 3, 6, 7, AND 9]

1. (Mass Save billboard)
2. (Radio unspecified)
3. (Mass Save Red Sox Radio promotion)
4. (TV)
5. (Newspaper)
6. (Mass Save online advertisement)
7. (Mass Save booth at event, game or festival)
8. (Utility or Cape Light Compact mailing or marketing materials)
9. (Visited Mass Save.com)
10. (Word of mouth – friend, family, neighbor, coworker, etc)
11. (Contractor)
00. (Other, specify)
98. (Don't Know)
99. (Refused)

M9b. How did you first learn about the opportunity to have a brushless fan motor installed in your heating and cooling system for free? [UNAIDED]

1. (Word of mouth – friend, family, neighbor, coworker, etc)
2. (Contractor)
3. (Had participated in the Cool Smart program already)
4. (Utility website)
00. (Other, [specify])
98. (Don't Know)
99. (Refused)

M10. Prior to your participation in the Cool Smart Program were you aware of the benefits of installing high efficiency heating, cooling, and ventilation equipment?

1. Yes
2. No
3. (Don't know)
4. (Refused)

M11. Why did you decide to have a contractor install a new brushless fan motor in your heating and cooling system? [ACCEPT UP TO THREE RESPONSES]

1. (To lower my energy bills)
2. (To save energy)
3. (To minimize the amount of noise from my heating/cooling system)
4. (To reduce heating/cooling system maintenance)
5. (Old fan wasn't working properly)
6. (Recommendation from contractor)
00. (Other [SPECIFY])
98. (Don't know)
99. (Refused)

CONTRACTOR

C1. How did you find your contractor?

[IF <STATE> = RI, ELIMINATE RESPONSE CATEGORY 2]

1. (Utility website)
2. (MassSave website)
3. (Friend/relative/neighbor/word of mouth)
4. (Contractor search/referral service)
5. (Yellow pages or online directory)
6. (Same contractor I use to service my old equipment)
00. (Other, [specify])
98. (Don't know)
99. (Refused)

[IF C1<> 1 OR 2, SKIP TO C3]

- C2. How helpful was the website in helping you find a contractor? Please use a scale from 0 to 10, where 0 is “Not at all helpful” and 10 is “Extremely helpful.”

[Record 0-10; 98; 99]

[ASK IF C2 <5]

- C2a. How could the website have been more helpful in finding a contractor? [Open End; 98; 99]

- C3. What made you decide to work with this particular contractor?

01. (Easy to schedule an appointment)
02. (Have worked with the contractor before)
03. (It felt like my only option)
04. (Cost effective compared to other contractors)
05. (Was referred to me by friends/family)
06. (Was listed on website)
00. (Other, [SPECIFY])
98. (Don't know)
99. (Refused)

- C4. On a scale of 0 to 10 where 0 is extremely dissatisfied and 10 is extremely satisfied, how would you rate your satisfaction with the contractor on: [RECORD 0-10, 98=DK, 99=Refused]

- a. Ease of scheduling your appointment
- b. Work quality of the installation
- c. Professionalism

[ASK FOR EACH IF C4a<5 or C4b<5 or C4c<5]

- C5a/C5b/C5c. Why do you give it that rating?

00. (OPEN END)
98. (Don't know)
99. (Refused)

- C6. Did the contractor explain that the installation of the brushless fan motor was free for you because they received a rebate from <UTIL> after they installed it?

1. Yes
2. No
8. (Don't know)
9. (Refused)

SNAPBACK

As you may know, your thermostat has two types of switches. One of these turns the heating or cooling system on and the other switch controls the fan on your heating and cooling system. The switch for the fan on your heating and cooling system typically has two settings, 'On' and 'Auto.' I now want you to think about the FAN switch on your thermostat.

N1. Since the brushless fan motor was installed, when your system is on, how do you keep the switch on your thermostat, labeled FAN, set? Do you...

1. Always keep it 'On'
2. Always keep it set on 'Auto' or
3. Switch it back and forth between 'On' and 'Auto'
4. (Don't control the thermostat/Don't know what fan setting is) [\[SKIP TO NEXT SECTION\]](#)
8. (Don't Know) [\[SKIP TO NEXT SECTION\]](#)
9. (Refused) [\[SKIP TO NEXT SECTION\]](#)

[\[IF N1 <> 3, SKIP TO N8\]](#)

N2. You mentioned you switch the new fan back and forth between 'On' and 'Auto'. Does this vary by the time of year?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[\[IF N2=1, SKIP TO N4\]](#)

N3. Why do you switch the new fan back and forth between 'On' and 'Auto'?

01. (To keep a more consistent temperature throughout the house)
02. (To help with ventilation)
03. (Varies by season)

00. (Other, [SPECIFY])

98. (Don't know)

99. (Refused)

[ASK ONLY IF N3 = 3 OR N2 = 1, ALL ELSE SKIP TO N8]

N4. You mentioned that you switch the new fan back and forth between 'On' and 'Auto' depending on the season. Think about your heating system [IF NEEDED: Your furnace]...since the brushless fan motor was installed, when you turn your heat on, how do you keep the new fan set throughout the season? Do you...

1. Always keep it 'On'

2. Always keep it set on 'Auto' or

3. Switch it back and forth between 'On' and 'Auto'

8. (Don't Know)

9. (Refused)

[IF N4 <> 3, SKIP TO N6]

N5. Why do you switch the new fan back and forth between 'On' and 'Auto' during the heating season?

01. (To keep a more consistent temperature throughout the house)

02. (To help with ventilation)

03. (My installation contractor recommended it)

00. (Other, [SPECIFY])

98. (Don't know)

99. (Refused)

[IF <INSTALL_DATE> = > 20100815, SKIP TO N8]

N6. Now think about your cooling system [IF NEEDED: Your Central Air Conditioning system]... Since the new brushless fan motor was installed, when you turn your cooling system on, how do you keep the fan on it set throughout the summer cooling season? Do you...

1. Always keep it 'On'

2. Always keep it set on 'Auto' or

3. Switch it back and forth between 'On' and 'Auto'

4. (Don't have a cooling system) [SKIP TO N8]

8. (Don't Know)

9. (Refused)

[IF N6 <> 3, SKIP TO N8]

N7. Why do you switch the new fan back and forth between 'On' and 'Auto' during the summer cooling season?

01. (To keep a more consistent temperature throughout the house)
02. (To help with ventilation)
03. (My installation contractor recommended it)
00. (Other, [SPECIFY])
98. (Don't know)
99. (Refused)

N8. Now think back to before the brushless fan motor was installed, how did you set the old fan on your system? Did you...

1. Always keep it 'On'
2. Always keep it set on 'Auto' or
3. Switch it back and forth between 'On' and 'Auto'
8. (Don't Know)
9. (Refused)

[IF N8 <> 3, SKIP TO N15]

N9. You mentioned you switched the old fan back and forth between 'On' and 'Auto'. Did this vary by the time of year?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[IF N9=1, SKIP TO N11]

N10. Why did you used to switch the old fan back and forth between 'On' and 'Auto'?

01. (To keep a more consistent temperature throughout the house)
02. (To help with ventilation)
03. (My installation contractor recommended it)

- 00. (Other, [SPECIFY])
- 98. (Don't know)
- 99. (Refused)

[IF N9 <> 1, SKIP TO N15]

N11. You mentioned that you used to switch the old fan back and forth between 'On' and 'Auto' depending on the season. Think about your heating system [IF NEEDED: Your furnace]... when you used to turn your heat on, how did you keep the old fan set throughout the season? Did you...

- 1. Always keep it 'On'
- 2. Always keep it set on 'Auto' or
- 3. Switch it back and forth between 'On' and 'Auto'
- 8. (Don't Know)
- 9. (Refused)

[IF N11 <> 3, SKIP TO N13]

N12. Why did you used to switch the old fan back and forth between 'On' and 'Auto' during the heating season?

- 01. (To keep a more consistent temperature throughout the house)
- 02. (To help with ventilation)
- 00. (Other, [SPECIFY])
- 98. (Don't know)
- 99. (Refused)

N13. Continue to think back... when you used to turn your cooling system on, how did you used to keep the old fan on it set throughout the summer cooling season? Did you...

- 1. Always keep it 'On'
- 2. Always keep it set on 'Auto' or
- 3. Switch it back and forth between 'On' and 'Auto'
- 4. (Didn't have a cooling system) [SKIP TO N15]
- 8. (Don't Know)
- 9. (Refused)

[IF N13 <> 3, SKIP TO N15]

N14. Why did you used to switch the old fan back and forth between 'On' and 'Auto' during the cooling season?

- 01. (To keep a more consistent temperature throughout the house)
- 02. (To help with ventilation)
- 00. (Other, [SPECIFY])
- 98. (Don't know)
- 99. (Refused)

N15. Do you recall what advice your contractor gave you about how to set your new fan during the cooling season after they installed the brushless fan motor? Did they say...

- 1. To keep the fan always on 'On'
- 2. To keep the fan set to 'Auto' or
- 3. To change the fan settings as the temperature changes
- 00. (Other [Specify])
- 96. (Contractor did not give advice)
- 98. (Don't know/Don't remember)
- 99. (Refused)

[IF N15=96, SKIP]

N16. And do you recall what advice your contractor gave you about how to set your new fan during the HEATING season after they installed the brushless fan motor? Did they say...

- 1. To keep the fan always on 'On'
- 2. To keep the fan set to 'Auto' or
- 3. To change the fan settings as the temperature changes
- 00. (Other [Specify])
- 96. (Contractor did not give advice)
- 98. (Don't know/Don't remember)
- 99. (Refused)

PROGRAM SATISFACTION

F1. On a scale of 0 to 10 where 0 is extremely dissatisfied and 10 is extremely satisfied, how satisfied are you with the performance of the brushless fan motor that was installed in your heating and cooling system?

[Record 0-10; 98; 99]

[ASK IF F1<5]

F1a. Why aren't you satisfied with the performance of the brushless fan motor that was installed in your heating and cooling system?

1. (Fan is noisy)
2. (Fan doesn't work properly)
3. (System is not efficient enough)
00. (Other [Specify])
98. (Don't know)
99. (Refused)

F2. Have you seen any energy savings on your bills since the brushless fan motor was installed?

1. Yes
2. No
3. (Do not pay close attention to my energy bills/someone else pays the bill)
8. (Don't know)
9. (Refused)

[SKIP F2a IF F2>1]

F2a. On a scale from 0-10, where 0 is "extremely dissatisfied" and 10 is "extremely satisfied", how satisfied are you with the energy savings you have seen after having the brushless fan installed?

[Record 0-10; 98; 99]

[ASK F2b IF F2a<5]

F2b. Why do you rate your satisfaction with the energy savings that way?

00. [OPEN END]
98. (Don't know)
99. (Refused)

F3. On a scale from 0-10, where 0 is "extremely dissatisfied" and 10 is "extremely satisfied, how satisfied are you with the overall Cool Smart Program? [IF NEEDED: Again, the installation of the brushless fan motor in your heating and cooling system is a pilot program included in the Cool Smart program offered by <UTIL> where they offer a number of rebates and incentives]

[Record 0-10; 98; 99]

[ASK F3a IF F3<5]

F3a. Why aren't you satisfied with the overall Cool Smart Program?

1. (Unhappy with quality of the motor)
2. (Unhappy with the contractor)
3. (Had to pay more for the brushless fan than I expected)
00. (Other [SPECIFY])
98. (Don't know)
99. (Refused)

F4. What suggestions do you have for improvements that could be made to the Cool Smart Program?

00. [OPEN END]
96. (None)
98. (Don't know)
99. (Refused)

Green Battery

GR1. I am going to read you a list of five reasons why people might decide to make energy efficient improvements in their homes. Please tell me which of these would be the most important reason as to why you would make energy efficient improvements in your home. **[READ LIST. IF DON'T KNOW PLEASE PROBE "IF YOU HAD TO CHOOSE FROM THE FOLLOWING REASONS WHICH ONE WOULD MOTIVATE YOU THE MOST?"]**

1. Saving money on your energy bill
2. Improved comfort of your home
3. Protecting the environment
4. For the benefit of future generations
5. Reducing our dependence on foreign oil
8. (Don't know)
9. (Refused)

GR2. Now I'm going to read you a few statements. Please tell me how strongly you agree or disagree with each one using a 5 point scale where 1 is strongly disagree, 2 is somewhat disagree, 3 neither agree nor disagree, 4 is somewhat agree and 5 is strongly agree. How about...

GR2a. Energy efficient improvements are too expensive [READ RESPONSES IF NEEDED]

1. Strongly Disagree
2. Somewhat Disagree
3. Neither Agree Nor Disagree
4. Somewhat Agree
5. Strongly Agree
8. (Don't know)
9. (Refused)

GR2b. Energy efficient equipment doesn't look very good [READ RESPONSES IF NEEDED]

1. Strongly Disagree
2. Somewhat Disagree
3. Neither Agree Nor Disagree
4. Somewhat Agree
5. Strongly Agree
8. (Don't know)
9. (Refused)

GR2c. Energy efficient equipment doesn't perform very well [READ RESPONSES IF NEEDED]

1. Strongly Disagree
2. Somewhat Disagree
3. Neither Agree Nor Disagree
4. Somewhat Agree
5. Strongly Agree
8. (Don't know)
9. (Refused)

GR2d. Energy efficient equipment is hard to find [READ RESPONSES IF NEEDED]

1. Strongly Disagree
2. Somewhat Disagree
3. Neither Agree Nor Disagree

4. Somewhat Agree
5. Strongly Agree
8. (Don't know)
9. (Refused)

HOUSEHOLD CHARACTERISTICS

We are close to being done. I would now like to ask you a few questions about your home. These questions are for classification purposes only.

HC1. Which of the following best describes your home? [\[READ RESPONSE CATEGORIES\]](#)

01. Single family home
02. Two-family duplex or flat
03. Triple decker
04. low-rise (3 stories or less) multi-family building or attached row or townhouse
05. hi-rise multi-family building
06. Mobile home
07. Cottage or cabin
00. (Other, specify)
98. (Don't know)
99. (Refused)

HC2. When was your home originally built? Would you say it was..?

01. Before 1930
02. between 1930 and 1939
03. between 1940 and 1949
04. between 1950 and 1959
05. between 1960 and 1969
06. between 1970 and 1979

07. between 1980 and 1989
08. between 1990 and 1999
09. between 2000 and 2005
10. or between 2006 and 2010
98. (Don't know)
99. (Refused)

[ASK IF HC1=3, 4, OR 5]

HC3. And approximately how many units are in your building? [PROMPT RESPONSE CATEGORIES IF NECESSARY]

1. 2-4 units
2. 5 or more units
8. (Don't know)
9. (Refused)

HC4. Approximately, how many square feet is your home? Would you say..?

1. Less than 1,400
2. 1,400 to less than 2,000
3. 2,000 to less than 2,500
4. 2,500 to less than 3,500
5. 3,500 to less than 4,000
6. 4,000 to less than 5,000
7. 5,000 or more
8. (Don't know)
9. (Refused)

HC5. How many rooms, not counting bathrooms, are in your home? [PROMPT IF NECESSARY]

01. 1
02. 2

- 03. 3
- 04. 4
- 05. 5
- 06. 6
- 07. 7
- 08. 8
- 09. 9
- 10. 10 or more
- 98. (Don't know)
- 99. (Refused)

HC6. Do you own or rent your home?

- 01. Own
- 02. Rent
- 00. (Other, specify)
- 98. (Don't know)
- 99. (Refused)

[ASK IF HC6=2]

HC7. Do you pay your own electric bill or is it included in your rent?

- 1. Pay bill
- 2. Included in rent
- 8. (Don't know)
- 9. (Refused)

HC8. What is the main type of fuel used to heat the majority of your home? Is it ...?

- 01. Natural gas heating
- 02. Oil heating
- 03. Electric heating
- 00. Or some other type (Specify)

- 98. (Don't know)
- 99. (Refused)

[ASK IF HC8=1]

- HC9. What is the main type of gas system that is used to heat the majority of your home? Is it..?
- 01. Gas central forced warm air furnace
 - 02. Natural gas boiler with radiators, also called steam heating
 - 03. Natural gas boiler with baseboards near the floor; also called hydronic heating
 - 00. Or other system (Specify)
 - 98. (Don't know)
 - 99. (Refused)

[ASK IF HC8=2]

- HC10. What is the main type of oil system that is used to heat the majority of your home?
- 01. Oil central forced warm air furnace
 - 02. Oil boiler with radiators, also called steam heating
 - 03. Oil boiler with baseboards near the floor, also called hydronic heating
 - 00. Or other system (Specify)
 - 98 (Don't know)
 - 99 (Refused)

[ASK IF HC8=3]

- HC11. What is the main type of electric system that is used to heat the majority of your home? Is it..?
- 01. Electric hot water boiler with radiators
 - 02. Electric resistance [STRIPS OF BASEBOARD HEATING IN EACH ROOM]
 - 03. Electric wall heaters with fans
 - 04. Electric central forced warm air furnace
 - 05. Electric heat pump
 - 00. Or other system (Specify)
 - 98. (Don't know)
 - 99. (Refused)

[SKIP TO HC13 IF HC11<>5]

- HC12. Is your electric heat pump air-sourced or ground-sourced?
- 1. Air-sourced [LIKE CENTRAL AC – HAS A VENTED BOX ON TOP OF CONCRETE OUTSIDE YOUR HOME]
 - 2. Ground-sourced [HAS A FLUID FILLED LOOP BURIED IN THE GROUND]
 - 8. (Don't know)

9. (Refused)

[SKIP TO HC14 IF HC1= 1, 6, OR 7]

HC13. Does the main heating system serve only this residence or does it serve more than one residence?

1. Only this residence
2. More than one residence
8. (Don't know)
9. (Refused)

HC14. Does your home have central air conditioning?

1. Yes
2. No
8. (Don't Know)
9. (Refused)

[SKIP TO HC16 IF HC14<>1 OR HC1= 1, 6, OR 7]

HC15. Does the central air conditioning system serve only this residence or does it serve more than one residence?

1. Only this residence
2. More than one residence
8. (Don't know)
9. (Refused)

[SKIP TO HC17 IF HC1=1, 6, OR 7]

HC16. Does your water heater, or the source of your hot water, serve only this residence or does it serve more than one residence?

1. Only this residence
2. More than one residence
3. (This residence has no hot water)
8. (Don't know)
9. (Refused)

[SKIP HC17 IF HC16=3]

HC17. To the best of your knowledge, what type of fuel or energy does your water heater use?

- 01. Electricity
- 02. Natural gas
- 03. Propane or bottled gas, such as LP, propane, or butane
- 04. Solar
- 00. Or other fuel type (Specify)
- 98. (Don't know)
- 99. (Refused)

[ASK IF HC6=2 AND (HC8=1 OR HC17=2)]

HC18. Do you or someone else in your household, pay your own heating or water heating bill or is it included in your rent?

- 1. Pay heating and hot water
- 2. Pay hot water only
- 3. Pay heating only
- 3. Both are Included in rent
- 8. (Don't know)
- 9. (Refused)

K. DEMOGRAPHICS

I just have a few last questions and then we will be done. These last questions are for statistical purposes only.

K1. How long have you lived at your current residence? **[ENTER NUMBER OF YEARS]**

- 0. Less than a year
- 98. (Don't know)
- 99. (Refused)

K2. In what year were you born? **[NUMERIC OPEN END; 1890-1991]**

- 9999. (Refused)

K3. How many people currently live in your house year-round? [ENTER NUMBER OF PEOPLE]

98. (Don't know)

99. (Refused)

[SKIP IF K3<2, 98,99]

K4. Of the <READ IN K3 RESPONSE> people who live in your house, how many are under 18 years of age? [ENTER NUMBER OF PEOPLE]

98. (Don't know)

99. (Refused)

K5. Which of the following best represents your annual household income from all sources in 2010, before taxes?

Was it...

1. Under \$30,000

2. \$30,000 to under \$60,000

3. \$60,000 to under \$100,000 or

4. \$100,000 or more

98. (Don't know)

99. (Refused)

[ASK IF K5=1]

K5A. Was it...

1. Under \$10,000

2. \$10,000 to less than \$20,000

3. \$20,000 or more

98. (Don't know)

99. (Refused)

[ASK IF K5=2]

K5B. Was it...

1. \$30,000 to less than \$40,000
2. \$40,000 to less than \$50,000
3. \$50,000 or more
98. (Don't know)
99. (Refused)

[ASK IF K5=3]

K5C. Was it...

1. \$60,000 to less than \$70,000
2. \$70,000 to less than \$80,000
3. \$80,000 to less than \$90,000
4. \$90,000 to less than \$100,000
98. (Don't know)
99. (Refused)

[ASK IF K5=4]

K5D. Was it...

1. \$100,000 to less than \$150,000
2. \$150,000 to less than \$200,000
3. \$200,000 to less than \$250,000
4. \$250,000 to less than \$300,000
5. \$300,000 or more
98. (Don't know)
99. (Refused)

IF K3 (HOUSEHOLD SIZE)=	X	Ask if:
1	\$21,700	K5A=3
2	\$29,100	K5A=3
3	\$36,600	K5B=1
4	\$44,100	K5B=2
5	\$51,600	K5B=3
6	\$59,100	K5B=3
7	\$66,500	K5C=1
8	\$74,000	K5C=2
9	\$79,000	K5C=2
10	\$80,700	K5C=3
11	\$82,300	K5C=3
12	\$84,000	K5C=3

[ASK ONLY IF ON THE BORDER OF 200% CALCULATION, BASED ON CHART ABOVE]

K6. Was your income above or below <X>?

1. Above
2. Below
99. (Refused)

IF K3 (HOUSEHOLD SIZE)=	X	Ask if:
1	\$29,100	K5A=3 AND K6=1
2	\$38,100	K5B=1
3	\$47,000	K5B=2
4	\$56,000	K5B=3
5	\$65,000	K5C=1
6	\$73,900	K5C=2
7	\$75,600	K5C=2
8	\$77,300	K5C=2 AND K6=1

[ASK ONLY IF ON THE BORDER OF 60% OF ESTIMATED STATE MEDIAN INCOME CALCULATION,
BASED ON CHART ABOVE]

K7a. Was your income above or below <X>?

1. Above
2. Below
99. (Refused)

K7. What is the highest level of education you have completed?

01. Less than high school
02. High school graduate or equivalent (e.g., GED)
03. Attended some college (includes junior/community college)
04. Bachelors degree
05. Advanced degree
00. (Other, Specify)

98. (Don't know)
99. (Refused)
- K8. Do you consider yourself to be...?
01. White
02. Black or African American
03. American Indian, Native Hawaiian, Pacific Islander or Alaska Native
04. Asian
05. Hispanic or Latino
06. Mixed Race or
00. Other (specify)
98. (Don't know)
99. (Refused)
- K9. [RECORD GENDER. DO NOT ASK]
1. Male
2. Female

Thank you very much again for your time. Have a good day.