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March 28, 2013

Ms. Kristi Rhude
Secretary of the Commission
Arkansas Public Service Commission
P.O. Box 400 Little Rock, AR 72203

Re: ASPC Docket No. 07-078-TF
IN THE MATTER OF THE APPLICATION FOR APPROVAL OF ARKANSAS WESTERN GAS COMPANY'S INITIAL ENERGY EFFICIENCY PROGRAM PLAN

Dear Ms. Rhude:

Please find attached for filing with the Arkansas Public Service Commission SourceGas Arkansas Inc.'s Energy Efficiency Program Portfolio Annual Report for the program year 2012, which includes a narrative report and an electronic spreadsheet to be filed in the above referenced docket.

Please contact me at Matthew.Greene@sourcegas.com or at (479) 582-7818 if you have any questions.

Respectfully,

Matthew A. Greene

Matthew A. Greene
Deputy General Counsel
SourceGas Arkansas Inc.

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BEFORE THE

ARKANSAS PUBLIC SERVICE COMMISSION

IN THE MATTER OF THE APPLICATION	**)**	
FOR APPROVAL OF ARKANSAS	**)**	**Docket No. 07-078-TF**
WESTERN GAS COMPANY'S INITIAL	**)**	
ENERGY EFFICIENCY PROGRAM PLAN	**)**	

Comprehensive Energy Efficiency Plan

Program Year 2012

Annual Report

March 28, 2013

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1.0 EXECUTIVE SUMMARY

This annual report is provided to the Arkansas Public Service Commission ("APSC" or the "Commission") as a review of SourceGas Arkansas Inc.'s[1], ("SGA" or the "Company") Comprehensive Energy Efficiency Plan ("CEEP") for Program Year 2012, and results pursuant to Section 9 of the "Rules for Conservation and Energy Efficiency Programs ("C&EE Rules"). SGA's CEEP for 2012 was approved by the APSC in Order No. 25 in Docket No. 07-078-TF on June 30, 2011. The approved plan covers the period July 1, 2011 thru December 31, 2013. In the plan, SGA proposed to implement eight comprehensive Energy Efficiency ("EE") programs. The individual programs are described more fully in this document.

In an effort to maximize program design and efficiency, SGA collaborated with CenterPoint Energy Arkansas ("CenterPoint') and Arkansas Oklahoma Gas ("AOG") to plan, analyze and design its CEEP. This collaboration allowed SGA and collaborating utilities to reduce administrative costs and ultimately saved ratepayers money while offering diverse EE programs. Although the utilities worked together, not all programs offer the same rebate structure.

SGA uses deemed savings, as approved by Order No. 9 in Docket No. 07-152-TF, and contained in the Arkansas Technical Reference Manual Version 2.0 approved by Order No. 17 in Docket No. 10-100-R, to evaluate and measure the individual program results. SGA, CenterPoint, and AOG have engaged a third party Evaluation Measurement and Verification ("EM&V") contractor. ADM Associates, Inc. ("ADM") has evaluated SGA's comprehensive EE programs in order to accurately report energy savings. The statewide Arkansas Weatherization Program ("AWP") is being evaluated separately by ADM, and Energy Efficiency Arkansas ("EEA") has contracted with Cadmus Group to evaluate the EEA.

Major Accomplishments:

This was the third year that SGA had the opportunity to provide comprehensive energy efficiency programs in Arkansas. The Company has continued to participate in the Parties Working Collaboratively ("PWC") along with other investor owned utilities and interveners. Overall, SGA met 94% of its targeted participation goal during the Program Year. While participation in all programs has not been as great as SGA would like, the Company is very encouraged with the increased participation and energy savings over Program Year 2011 results.

[1] SourceGas Arkansas was formerly known as Arkansas Western Gas Company

Goals and Objectives for EE Portfolio:

SGA's portfolio of programs is contributing to the energy efficiency objectives per Section 2 of the Commission's C&EE Rules by:

- Reducing end-use natural gas consumption in a cost-effective manner to save money for consumers and conserve non-renewable resources;
- Protecting the environment by encouraging installation of energy efficiency measures that help reduce carbon dioxide emissions and air pollutants;
- Increasing residential and commercial customer awareness of available energy efficiency opportunities, including equipment upgrades and behavioral changes;
- Generating customer awareness of energy efficiency programs through the Excess is Out campaign to support energy efficiency objectives;
- Identifying cost-effective natural gas savings measures;
- Improving relationships with customers, trade allies, and stakeholders by providing value-added energy efficiency services, training and education, hardware, verification, and support; and
- Supporting a more robust local and statewide economy by using local labor (when possible), and helping Arkansas residents reduce their monthly energy expenses.

Progress Achieved vs. Goals and Objectives:

SGA's programs are on the way to accomplishing the goals and objectives of SGA and the Commission. In June of 2012, in an effort to increase the penetration of the Company's EE programs, SGA expanded its relationship with CLEAResult. CLEAResult is now responsible for implementation of the majority of SGA's EE programs (Opower Home Energy Reporting Program ("OHERP"), AWP, EEA and SGA's Water Conservation Kits are still administered separately). As a result, during 2012, SGA's EE programs have shown encouraging results.

Ultimately, SGA achieved 925,308 therms of net energy savings during the Program Year, which equates to 79% of its total portfolio goal of 1,169,620 therms. As knowledge of the CEEP programs and the benefits of using energy efficient technology expand, SGA believes that the participation levels in all programs will continue to expand and thus produce increased energy savings.

Program performance relative to the established APSC goal was much better than program performance relative to SGA's filed goal. The APSC savings goal for a gas utility in 2012 was to achieve a 0.30% reduction from its 2010 baseline throughput excluding Self Direct customers. This represented a savings goal for SGA of 667,247 therms. The Company achieved a savings of 925,308 therms, or 138.7% of this goal,

and therefore qualified for an incentive as detailed in APSC Docket 08-137-U Order No. 15.

Highlights of Well-Performing Programs:

While SGA was encouraged by the performance of its CEEP as a whole, certain programs did perform at higher levels than others. Top performing programs are as follows:

Heating Equipment Rebate Program

The SGA Heating Equipment Rebate Program ("HERP") provided rebates to 491 participants during 2012. Expected participation for 2012 was 315 for all available measures. SGA saw net savings of 63,672 therms, which represented 117.7% of its savings goal of 54,090 therms.

Water Heating Program

The SGA Water Heating Program ("WHP") provided a combined 101 rebates on both standard tank type water heaters and tankless/condensing water heaters. SGA saw net savings of 32,092 therms, which represented 112.8% of its savings goal of 28,450 therms.

Opower Home Energy Report

The Company's OHERP provided 25,000 residential customers with a minimum of four home energy reports in 2012 regarding their natural gas usage and how each of them compared with 100 of their similarly situated neighbors. SGA saw net savings of 254,748 therms, which represented 97.1% of its savings goal of 262,350 therms.

Commercial & Industrial Solutions Program

SGA had four industrial customers receive rebates for custom Energy Conservation Measures ("ECM") in 2012. This represented total net savings of 288,871 therms. Energy efficient aerators and pre-rinse spray valves were installed in commercial applications at no charge to customers. Net savings for these direct install measures were 271,704 therms. Over all, this program achieved 560,575 net therms or 104.4% of the 536,810 therms of the Company's savings goal. Through facility audits performed by CLEAResult in 2012, over 3,000,000 therms in ECM opportunities have been identified.

Lower Performing Programs:

Commercial Rebate Programs

SGA's Commercial Cooking Equipment Rebate Program and the Commercial/Industrial Boiler Equipment Rebate Program are still not performing up to their potential. With CLEAResult taking over the implementation of these programs, customer awareness is increasing.

Arkansas Weatherization Program

SGA's CEEP for Program Year 2012 called for 113 homes to be weatherized by the Arkansas Community Action Agencies Association ("ACCA") and the Arkansas Department of Human Services Office of Community Services ("DHS OSC"). In 2012, only 32 homes were weatherized in SGA's service area, down from 47 in 2011. Savings of 9,957 therms represents 18.4% of the anticipated savings goal of 54,010 therms.

Planned Changes to programs or budgets:

At this time, SGA is not considering any significant changes to its portfolio for 2013.

Discontinued Programs in 2012:

No programs were discontinued in 2012.

New Programs 2012:

No new programs were added in 2012.

Training Achievements for 2012:

SGA provided training to trade allies, employees of the Company, and continued training for the program administrator.

Development of Long-Term energy savings goals and integration into Energy Planning:

The reduction in gas consumption expected as a result of SGA's energy efficiency program, as well as the naturally occurring conservation will be integrated into the Company's Gas Supply Plan as appropriate.

Summary of Costs for SGA's CEEP

Set forth below are summaries of the cost involved for SGA's CEEP for 2012 program year. This information includes budgeted versus actual costs by program and in total,

budget versus actual costs by cost type, budgeted versus actual program spending as a percentage of Company revenue and budget versus actual annual energy sales as a percentage of Company Sales.

SourceGas Arkansas Inc.
07-078-TF
EE Portfolio Summary by Program

Program Name	Program Type	Market	2012 RBudget ($)	2012 Actual ($)	% of RBudget
HERP	Rebates	All	425,220	425,168	100%
WHP	Rebates	All	129,310	94,112	73%
CIBERP	Rebates	Non-Residential	140,819	68,593	49%
CCERP	Rebates	Non-Residential	65,824	41,446	63%
AWP	Weatherization	Res (Single-Family)	140,198	42,369	30%
EEA	Market Transformation	All	68,801	57,945	84%
OHERP	Market Transformation	Res (All)	188,738	187,585	99%
C&I Solutions	Custom and Bundled	C&I (All)	1,012,822	836,388	83%
Regulatory	-	-	32,302	26,490	82%
		Total	**2,204,034**	**1,780,096**	**81%**

EE Portfolio Summary by Cost Type

EE Program Cost Summary	2012 Total Cost			
Type	% of Total	RBudget ($)	Actual ($)	% of Total
Planning / Design	2%	54,525	50,320	3%
Marketing & Delivery	42%	929,697	835,660	47%
Incentives / Rebates	41%	910,619	602,378	34%
Evaluation, Measurement, and Verification	11%	247,407	244,355	14%
Administration	1%	29,484	20,892	1%
Regulatory	1%	32,302	26,490	1%
Total	100%	**2,204,034**	**1,780,096**	100%

Company Statistics

Program Year	Revenue and Expense: Total Revenue (a) ($000's)	RBudget: RBudget EE Portfolio Spending (b) ($000's)	RBudget: Spending as % of Revenue (% = b/a)	Actual: Actual EE Portfolio Spending (c) ($000's)	Actual: Spending as % of Revenue (% = c/a)	Energy: Total Annual Energy Sales (d) Therms	Plan: EE Net Annual Energy Savings (e) Therms	Plan: Savings as % of Energy Sales (% = e/d)	Evaluated: EE Net Annual Energy Savings (e) Therms	Evaluated: Savings as % of Energy Sales (% = f/d)
2009			-		-			-		-
2010	$ 139,965	$ 814	0.6%	$ 373	0.3%	250,681,550	338,090	0.13%	56,570	0.02%
2011	$ 140,791	$ 1,576	1.1%	$ 1,070	0.8%	247,401,443	643,030	0.26%	317,453	0.13%
2012	$ 117,908	$ 2,204	1.9%	$ 1,780	1.5%	189,752,329	1,169,620	0.62%	925,308	0.49%

NOTE: This schedule should report program year data, when available. This schedule should not report forecasted data.

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Conclusion

Although savings resulting from SGA's CEEP for the Program Year 2012 were lower than projected, savings increased significantly from those seen in 2011. The improved results seen in 2012 have been due to intensive focus on customer awareness of the programs thru the implementation efforts provided by CLEAResult. Through the training of customers, trade allies, and SGA employees, the work of the PWC, EEA, and increased public awareness, SGA has seen a marked increase in therm savings and an improvement over past years toward meeting its goals for its EE Programs.

SGA spent 81% of the allotted Budget Dollars and achieved 79% of its approved Energy Savings Goals for the 2012 Program Year. SGA's portfolio performed at a high enough level to receive an incentive for the 2012 Program Year.

2.0 PORTFOLIO IMPACT

This section provides a tabular overview of each program's results for a three year time frame (when available – 2010 savings were filed as lifetime savings). The results presented are for annual net energy savings and program costs (actual versus budget).

Annual Program Cost

RBudget ($)	2010			2011			2012		
Program Name	RBudget ($)	Actual ($)	% of RBudget	RBudget ($)	Actual ($)	% of RBudget	RBudget ($)	Actual ($)	% of RBudget
HERP	201,184	88,812	44%	231,336	226,859	98%	425,220	425,168	100%
WHP	210,957	87,688	42%	117,944	63,581	54%	129,310	94,112	73%
CIBERP	123,033	40,113	33%	120,912	34,167	28%	140,819	68,593	49%
CCERP	93,934	39,779	42%	56,642	28,632	51%	65,824	41,446	63%
AWP	40,000	56,233	141%	139,956	59,383	42%	140,198	42,369	30%
EEA	36,995	44,362	120%	49,246	48,439	98%	68,801	57,945	84%
OHERP	N/A	N/A	-	135,587	131,840	97%	188,738	187,585	99%
C&I Solutions	N/A	N/A	-	637,926	486,284	76%	1,012,822	836,388	83%
Regulatory	0	0	-	0	0	-	32,302	26,490	82%
Total	**706,103**	**356,987**	**51%**	**1,489,549**	**1,079,185**	**72%**	**2,204,034**	**1,780,096**	**81%**

Net Annual Savings (Energy & Demand)

ENERGY Therms	2010			2011			2012		
	Energy Savings			Energy Savings			Energy Savings		
	Therms		% of	Therms		% of	Therms		% of
Program Name	Plan	Evaluated	Plan	Plan	Evaluated	Plan	Plan	Evaluated	Plan
HERP	N/A	N/A	-	48,730	47,087	97%	54,090	63,672	118%
WHP	N/A	N/A	-	27,460	31,163	113%	28,450	32,092	113%
CIBERP	N/A	N/A	-	92,970	0	0%	180,590	2,425	1%
CCERP	N/A	N/A	-	36,420	0	0%	53,320	1,839	3%
AWP	N/A	N/A	-	54,550	21,317	39%	54,010	9,957	18%
EEA	N/A	N/A	-	0	0	-	0	0	-
OHERP	N/A	N/A	-	70,390	22,430	32%	262,350	254,748	97%
C&I Solutions	N/A	N/A	-	312,510	195,456	63%	536,810	560,575	104%
Total	**0**	**0**	**-**	**643,030**	**317,453**	**49%**	**1,169,620**	**925,308**	**79%**

DEMAND Therms	2010			2011			2012		
	Demand Savings			Demand Savings			Demand Savings		
	Therms		% of	Therms		% of	Therms		% of
Program Name	Plan	Evaluated	Plan	Plan	Evaluated	Plan	Plan	Evaluated	Plan
HERP	N/A	N/A	-	740.0	533.0	72%	830.0	750.6	90%
WHP	N/A	N/A	-	40.0	94.7	237%	40.0	117.1	293%
CIBERP	N/A	N/A	-	1,320.0	0.0	0%	1,690.0	2.8	0%
CCERP	N/A	N/A	-	100.0	0.0	0%	150.0	6.3	4%
AWP	N/A	N/A	-	570.0	315.8	55%	650.0	170.3	26%
EEA	N/A	N/A	-	0.0	0.0	-	0.0	0.0	-
OHERP	N/A	N/A	-	700.0	339.0	48%	2,620.0	3,921.4	150%
C&I Solutions	N/A	N/A	-	3,130.0	67.7	2%	5,380.0	1,713.6	32%
Total	**0.0**	**0.0**	**-**	**6,600.0**	**1,350.2**	**20%**	**11,360.0**	**6,682.1**	**59%**

3.0 PORTFOLIO PROGRAMS

3.0.1 Portfolio Overview

SGA's suite of energy efficiency programs is in compliance with the objectives of the APSC's C&EE Rules as approved in Docket No. 06-004-R. These programs have helped SGA's customers in all rate categories see the benefits of actively reducing their natural gas consumption.

As required by C&EE Rules, SGA provided at least one program specifically targeted to each customer rate type.

- **Heating Equipment Rebate Program ("HERP"):** SGA offered both residential and commercial customers rebates ranging from $250 to $600 for the purchase of qualifying high efficiency natural gas heating equipment. SGA approved 491 rebates. SGA saw net savings of 63,672 therms, which represented 117.7% of its savings goal of 54,090 therms.
- **Water Heating Program ("WHP**"): SGA offered both residential and commercial customers rebates ranging from $50 for tank type heaters to $500 for tankless/condensing water heaters, along with offering customers the opportunity to receive water conservation kits. SGA paid 101 water heating equipment rebates, and provided 392 water conservation kits to customers. SGA saw 32,092 therms of net savings, or 112.8% of its target goal.
- **Commercial/Industrial Boiler Equipment Rebate Program ("CIBERP"):** SGA had 4 participants in this program in 2012.
- **Commercial Cooking Equipment Rebate Program ("CCERP"):** SGA had 5 participants in this program in 2012.
- **Arkansas Weatherization Program ("AWP"):** The AWP weatherized 32 homes. While not achieving the goal of 113 homes, the AWP achieved 18.4% of its target energy savings.
- **Energy Efficiency Arkansas ("EEA"):** This program is a statewide education program funded by all collaborative utilities to promote energy efficiency. The EEA utilizes all forms of media to help increase the awareness of all energy efficiency programs in Arkansas. The EEA also teams with Arkansas Manufacturing Solutions and the Arkansas Industrial Energy Clearinghouse to help commercial and industrial customers across the state with training opportunities and on site facility audits to help them become more educated about energy spending in their locations.
- **Opower Home Energy Reporting Program ("OHERP"):** SGA chose to implement this program as a different approach to residential energy efficiency. Home energy reports encourage customers to conserve natural gas in their

homes by changing behavior patterns. SGA is able to report 254,748 net therms savings, for 97.1% of target savings.

- **Commercial/Industrial Solutions Program ("C&I Solutions"):** The primary goal of this program is to produce cost effective gas energy savings via energy efficiency in commercial and industrial environments. This is a two pronged program that provides directly installed measures along with customized rebates for more extensive energy savings projects. Net savings of 560,575 therms were seen or 104.4% of plan goal.

3.1 Heating Equipment Rebate Program

3.1.1 Program Description

SGA's Heating Equipment Rebate Program promotes high efficiency natural gas heating equipment in new and existing homes and businesses. This program is available to all SGA residential and commercial/industrial heating customers for existing or new construction where natural gas is the primary heating fuel, or where the potential customer has made a commitment to take natural gas service from SGA as the primary heating fuel. In an effort to make the program as cost effective as possible, SGA targets customers who are seeking to replace space heating and for new construction. SGA provides a financial incentive in the form of prescriptive rebates to customers who purchase qualifying heating measures.

3.1.2 Program Highlights

- Due to the overwhelming response to SGA's heating equipment rebate offerings during 2012, the Company chose to use the budget flexibility given to it by the APSC by Order No. 25 in Docket 07-078-TF and increase the rebate dollars available for 2012. But for this increase in available rebates, SGA would have had to cease providing rebates to its customers in early October of 2012.
- SGA's HERP was available to customers for all of 2012.
- A total of 491 rebates were paid through HERP in 2012.
- No direct vent wall furnaces were rebated.
- In June of 2012, SGA contracted with CLEAResult to implement this program.

3.1.3 Program Budget, Savings, and Participants

HERP												
2010			Plan Savings		Evaluated Savings		% of Plan		2010		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$201,184	$88,812	44%	N/A	N/A	N/A	N/A	-	-	465	79	17%
2011			Plan Savings		Evaluated Savings		% of Plan		2011		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$231,336	$226,859	98%	740	48,730	533	47,087	72%	97%	293	294	100%
2012			Plan Savings		Evaluated Savings		% of Plan		2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$425,220	$425,168	100%	830	54,090	751	63,672	90%	118%	315	491	156%
3 Year Program Average			Plan Savings		Evaluated Savings		% of Plan		2010 - 2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$285,913	$246,946	86%	785	51,410	642	55,380	82%	108%	358	288	81%

*Net Annual Savings

3.1.4 Program Events & Training

- SGA encouraged its employees to speak with local contractors and home builders on the availability of high efficient equipment rebates.
- Call center representatives were provided information about rebates to be passed on to customers as requested.
- In September/October rebate brochures were included as bill stuffers for all SGA customers.
- February 2012 – Northwest Arkansas Home Builders Association Home Show – SGA distributed rebate information to its customers.
- www.ExcessIsOut.com continues to be an information repository for all of SGA's energy efficiency offerings.

3.1.5 Savings

- The deemed savings were based on values contained in the Deemed Savings, as approved in Docket No. 07-152-U, contained in the Arkansas Technical Reference Manual Version 2.0 approved in Docket No. 10-100-R.
- SGA had a total energy savings goal of 54,090 therms for 2012. This goal assumed a total participation of 315 rebates. A total of 491 rebates were given for a total net savings of 63,672 therms; representing an achievement of 117.7% of the established goal.

3.1.6 Challenges & Opportunities

- SGA's primary challenge for this program will be to encourage participation by purchasers of direct vent wall furnaces.
- The number of participating contractors who had not previously participated in the program has increased thru the efforts of CLEAResult to directly contact trade allies and provide them information about SGA offerings.

3.1.7 Outlook for Continuation, Expansion, Reduction, or Termination

- SGA plans to continue the program in its present form.
- In 2012, SGA used the Commission granted 10% budget flexibility to provide a greater number of rebates to its customers.

3.1.8 Planned or Proposed Changes to Program & Budget

- SGA will continue to update and revise the program for to incorporate new technology and equipment.
- As mentioned above, SGA used the Commission granted 10% budget flexibility to provide a greater number of rebates to its customers and to take advantage of the increased savings the extra heating measures provided.

3.2 Water Heating Program

3.2.1 Program Description

SGA's Water Heating Program promotes high efficiency natural gas water heating equipment in new and existing homes and businesses. It also makes available energy efficient water conservation kits containing customized energy efficiency measures. This program is available to all residential and commercial/industrial SGA customers for existing or new construction where natural gas is their primary fuel for water heating, and to residential customers and businesses that have committed to take natural gas service from SGA for water heating. SGA provides a financial incentive in the form of prescriptive rebates to customers who purchase equipment with qualifying efficiency and no cost water/natural gas conservation kits to customers heating water with natural gas.

3.2.2 Program Highlights

- SGA's WHP was available to customers for all of 2012.
- A total of 101 rebates were paid through the WHP in 2012.
- 392 Water Savings kits were distributed.
- In June of 2012, SGA contracted with CLEAResult to implement this program.

3.2.3 Program Budget, Savings, and Participants

WHP												
2010			Plan Savings		Evaluated Savings		% of Plan		2010		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$210,957	$87,688	42%	N/A	N/A	N/A	N/A	-	-	3,868	1,426	37%
2011			Plan Savings		Evaluated Savings		% of Plan		2011		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$117,944	$63,581	54%	40	27,460	95	31,163	237%	113%	1,917	1,705	89%
2012			Plan Savings		Evaluated Savings		% of Plan		2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$129,310	$94,112	73%	40	28,450	117	32,092	293%	113%	1,917	493	26%
3 Year Program Average			Plan Savings		Evaluated Savings		% of Plan		2010 - 2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$152,737	$81,794	54%	40	27,955	106	31,628	265%	113%	2,567	1,208	47%

*Net Annual Savings

3.2.4 Program Events & Training

- SGA encouraged its employees to speak with local contractors and home builders on the availability of high efficient equipment rebates.

- Call center representatives were provided information about rebates to be passed on to customers as requested.
- In September/October rebate brochures were included as bill stuffers for all SGA customers.
- February 2012 – Northwest Arkansas Home Builders Association Home Show – SGA distributed rebate information to its customers.
- www.ExcessIsOut.com continues to be an information repository for all of SGA's energy efficiency offerings.

3.2.5 Savings

- The deemed savings were based on values contained in the Deemed Savings, as approved in Docket No. 07-152-U, contained in the Arkansas Technical Reference Manual Version 2.0 approved in Docket No. 10-100-R.
- SGA had a total energy savings goal of 28,450 therms for 2012. This goal was based on participation by 1,917 customers. During the Program Year, 101 equipment rebates were given, resulting in net savings of 33,121 therms, and 392 Water Conservation Kits were distributed, resulting in net savings of 5,971 therms. A combined net savings of 39,092 therms represented 112.8% of the savings goal.

3.2.6 Challenges & Opportunities

- SGA tried two new methods of promoting the distribution of water conservation kits. Kits were promoted through Opower reports in February. A website was set up for customers to order their kits. Of the 25,000 reports delivered, only 200 kits were requested. An "onsert" was also done on customers' monthly gas bill in August detailing the kit information and how to order online. Very few kits were requested via this method as well.
- Business sized cards containing information about the conservation kits and online ordering were distributed during 2012.
- For 2013, the Company anticipates returning to a Business Reply order card to offer customers access to receive conservation kits while including the online ordering option.

3.2.7 Outlook for Continuation, Expansion, Reduction, or Termination

- In response to the recommendations by SGA's EM&V evaluator, the Company will be evaluating offering customers the opportunity to select the components available in its conservation kits.

3.2.8 Planned or Proposed Changes to Program & Budget

- SGA will continue to update and revise the program for additions of new technology and equipment.

3.3 Commercial/Industrial Boiler Equipment Rebate Program

3.3.1 Program Description

SGA's Commercial/Industrial Boiler Equipment Rebate Program promotes high efficiency natural gas heating equipment in new and existing businesses where natural gas is the primary heating/water heating fuel.

This program is available to all SGA commercial/industrial customers for existing or new construction where natural gas is the primary heating/water heating fuel, or where the potential customer has made a commitment to take natural gas from SGA as its primary heating/water heating fuel. In an effort to make the program as cost effective as possible, SGA targets customers who are either seeking to replace boiler equipment or who are building a new business and are in the process of specifying equipment. SGA provides a financial incentive in the form of a prescriptive rebate to customers who purchase qualifying efficiency measures.

3.3.2 Program Highlights

- SGA's CIBERP was available to all Commercial/Industrial customers for all of 2012.
- In June of 2012, SGA contracted with CLEAResult to implement this program.

3.3.3 Program Budget, Savings, and Participants

CIBERP												
2010			Plan Savings		Evaluated Savings		% of Plan		2010		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$123,033	$40,113	33%	N/A	N/A	N/A	N/A	-	-	70	0	0%
2011			Plan Savings		Evaluated Savings		% of Plan		2011		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$120,912	$34,167	28%	1,320	92,970	0	0	0%	0%	89	0	0%
2012			Plan Savings		Evaluated Savings		% of Plan		2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$140,819	$68,593	49%	1,690	180,590	3	2,425	0%	1%	89	4	4%
3 Year Program Average			Plan Savings		Evaluated Savings		% of Plan		2010 - 2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$128,255	$47,624	37%	1,505	136,780	1	1,213	0%	1%	83	1	2%

*Net Annual Savings

3.3.4 Program Events & Training

- SGA participated in the Arkansas Hospitality Association Annual Convention in Little Rock, AR in September.
- SGA encouraged its employees to speak with local contractors on the availability of high efficient equipment rebates.
- Call center representatives were provided information about rebates to be passed on to customers as requested.
- In September/October rebate brochures were included as bill stuffers for all SGA customers.
- February 2012 – Northwest Arkansas Home Builders Association Home Show – SGA distributed rebate information to its customers.
- www.ExcessIsOut.com continues to be an information repository for all of SGA's energy efficiency offerings.

3.3.5 Savings

- The deemed savings were based on values contained in the Deemed Savings, as approved in Docket No. 07-152-U, contained in the Arkansas Technical Reference Manual Version 2.0 approved in Docket No. 10-100-R.
- SGA had a total energy savings goal of 180,590 therms for 2012. This goal assumed a total participation of 169 rebates. The Company saw a net savings of 2,425 therms with 4 measures being rebated.

3.3.6 Challenges & Opportunities

- SGA's primary challenge for this program will be to encourage greater participation rates by enlisting greater trade ally buy-in.
- ADM feels that there may not be enough equipment in use in SGA's service territory for this program to be successful on its own.
- SGA now employs a Commercial and Industrial Account Manager who helps promote the Company's EE Portfolio each time he meets with a customer.

3.3.7 Outlook for Continuation, Expansion, Reduction, or Termination

- SGA plans to continue the program in its present form.

3.3.8 Planned or Proposed Changes to Program & Budget

- SGA will continue to update and revise the program for additions of new technology and equipment.

3.4 Commercial Cooking Equipment Rebate Program

3.4.1 Program Description

The SGA Commercial Cooking Equipment Rebate Program promotes high efficiency natural gas cooking equipment in new and existing commercial businesses. This program is available to all commercial customers of SGA at existing locations or new construction where natural gas is used as the cooking fuel, and to potential customers of SGA who have made a commitment to take natural gas service from SGA as a cooking fuel. In an effort to make the program as cost effective as possible, SGA targets customers seeking to replace cooking equipment or building a new facility. SGA will provide a financial incentive in the form of a prescriptive rebate to customers who purchase qualifying efficiency measures.

3.4.2 Program Highlights

- SGA's CCERP was available to all Commercial customers for all of 2012.
- In June of 2012, SGA contracted with CLEAResult to implement this program.

3.4.3 Program Budget, Savings, and Participants

CCERP												
2010			Plan Savings		Evaluated Savings		% of Plan		2010		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$93,934	$39,779	42%	N/A	N/A	N/A	N/A	-	-	89	2	2%
2011			Plan Savings		Evaluated Savings		% of Plan		2011		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$56,642	$28,632	51%	100	36,420	0	0	0%	0%	34	0	0%
2012			Plan Savings		Evaluated Savings		% of Plan		2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$65,824	$41,446	63%	150	53,320	6	1,839	4%	3%	50	5	10%
3 Year Program Average			Plan Savings		Evaluated Savings		% of Plan		2010 - 2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$72,133	$36,619	51%	125	44,870	3	920	3%	2%	58	2	4%

*Net Annual Savings

3.4.4 Program Events & Training

- SGA participated in the Arkansas Hospitality Association Annual Convention in Little Rock, AR in September.
- SGA encouraged its employees to speak with local contractors on the availability of high efficient equipment rebates.

- Call center representatives were provided information about rebates to be passed on to customers as requested.
- In September/October rebate brochures were included as bill stuffers for all SGA customers.
- February 2012 – Northwest Arkansas Home Builders Association Home Show – SGA distributed rebate information to its customers.
- www.ExcessIsOut.com continues to be an information repository for all of SGA's energy efficiency offerings.

3.4.5 Savings

- The deemed savings were based on values contained in the Deemed Savings, as approved in Docket No. 07-152-U, contained in the Arkansas Technical Reference Manual Version 2.0 approved in Docket No. 10-100-R.
- SGA had a total energy savings goal of 53,320 therms for 2012. This goal assumed a total participation of 50 rebates. The Company saw a net savings of 1,839 therms with 5 measures being rebated.

3.4.6 Challenges & Opportunities

- SGA's primary challenge for this program will be to encourage greater participation rates by enlisting greater trade ally buy-in.
- In June of 2012, SGA contracted with CLEAResult to implement this program.
- ADM feels that there may not be enough equipment in use in SGA's service territory for this program to be successful on its own.
- SGA now employs a Commercial and Industrial Account Manager who helps promote the Company's EE Portfolio each time he meets with a customer.

3.4.7 Outlook for Continuation, Expansion, Reduction, or Termination

- SGA plans to evaluate its offerings for rebate opportunities due to revisions to the Technical Resource Manual Version 2.0 vs. Version 1.0.

3.4.8 Planned or Proposed Changes to Program & Budget

- SGA will continue to update and revise the program for additions of new technology and equipment.

3.5 Commercial/Industrial Solutions Program

3.5.1 Program Description

The C&I Solutions Program promotes cost effective gas energy savings through energy efficiency. This is a twofold program that gives both commercial and industrial customers the opportunity to save on their natural gas usage through a direct installation of water aerators and pre-rinse spray valves as well as through customized rebates for more complex projects. SGA and its contractors work to identify, recruit, develop, motivate, and assist in customer custom upgrades.

3.5.2 Program Highlights

- SGA's C&I Solutions Program was available to all Commercial and Industrial customers in 2012.
- 288,871 net therms were seen in annual savings from the custom rebate portion and 271,704 net therms from direct install measures, or 104.4% of SGA's program goal.
- SGA had four industrial customers take advantage of the custom program.
- 512 customer locations took advantage of direct install measures, installing 90 Pre-rinse spray valves and 10,364 aerators.
- CLEAResult performed 35 facility audits during 2012
- Between July 1, 2011 and December 31, 2012, more than 3,000,000 therms in natural gas savings had been identified.

3.5.3 Program Budget, Savings, and Participants

C&I Solutions												
2010			Plan Savings		Evaluated Savings		% of Plan		2010		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
N/A	N/A	-	N/A	N/A	N/A	N/A	-	-	N/A	N/A	-
2011			Plan Savings		Evaluated Savings		% of Plan		2011		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$637,926	$486,284	76%	3,130	312,510	68	195,456	2%	63%	530	181	34%
2012			Plan Savings		Evaluated Savings		% of Plan		2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$1,012,822	$836,388	83%	5,380	536,810	1,714	560,575	32%	104%	773	514	66%
2 Year Program Average			Plan Savings		Evaluated Savings		% of Plan		2011 - 2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$825,374	$661,336	80%	4,255	424,660	891	378,016	21%	89%	652	348	53%

*Net Annual Savings

3.5.4 Program Events & Training

- SGA participated in the Arkansas Hospitality Association Annual Convention in Little Rock, AR in September.
- SGA encouraged its field employees and call center representatives to speak with customers about the availability of this program.
- In September/October rebate brochures were included as bill stuffers for all SGA customers.
- CLEAResult provided ECM training for SGA customers on July 11, 2012 in Jonesboro, AR and on July 12, 2012 in Ft. Smith, AR. This gave the Company's customers not located in Northwest Arkansas the opportunity to attend. These training sessions were done in conjunction with CenterPoint, AOG, and Entergy.
- www.ExcessIsOut.com continues to be an information repository for all of SGA's energy efficiency offerings.

3.5.5 Savings

- The deemed savings were based on values contained in the Deemed Savings, as approved in Docket No. 07-152-U, contained in the Arkansas Technical Reference Manual Version 2.0 approved in Docket No. 10-100-R.
- SGA had a total energy savings goal of 536,810 therms for 2012. In 2012, net savings of 560,575 therms were seen from both direct install measures and four custom rebates. .

  - 10,364 faucet aerators and 90 pre-rinse spray valves were installed for a net annual savings of 240,247 and 31,456 therms, respectively.
  - The custom rebate program saw four rebates paid with a net annual savings of 288,871 therms.
- SGA was able to meet 104.4% of its savings goal.

3.5.6 Challenges & Opportunities

- SGA's primary challenges in this program will be to assist CLEAResult in finding opportunities for custom projects. A large capital investment by our customers can be required to participate in this program.
- The challenge remains to recover from the large number of therms lost from the program by customers choosing to opt-out. SGA must encourage participation by customers remaining eligible to opt-out.
- Through facility audits performed by CLEAResult in 2012, over 3,000,000 therms in ECM opportunities have been identified.
- SGA now employs a Commercial and Industrial Account Manager who helps promote the Company's EE Portfolio each time he meets with a customer.

3.5.7 Outlook for Continuation, Expansion, Reduction, or Termination

- SGA plans to continue the program in its present form.

3.5.8 Planned or Proposed Changes to Program & Budget

- SGA will continue to update and revise the program as required.

3.6 Opower Home Energy Report Program

3.6.1 Program Description

The Opower Home Energy Reporting Program is a program which delivers comparative home energy reports to residential customers. Opower's Advanced Customer Engagement platform delivers energy usage information, insights and targeted efficiency tips which are projected to result in up to 85% of selected participants taking measurable action to save energy. Opower's rigorous measurement and verification approach will confirm the savings results for the Comparative Home Energy Reporting Program. The methodology for measuring savings from the program has been explicitly endorsed in the California Evaluators Protocols and the guidelines for the National Plan for Energy Efficiency.

3.6.2 Program Highlights

- 25,000 SGA residential customers were selected to take part in SGA's OHERP.
- Participating customers received at least four customized home energy reports in 2012.
- Several SGA employees were designated to participate in the program, in order to familiarize them with the program. However, results of their participation are not included in the final savings numbers.
- SGA maintains a waiting list of customers requesting to be added to the program.
- Each report provides customers with ideas for ways to save on their natural gas bill.
- Home Energy Reports were used to promote SGA's Water Conservation Kits as well as Heating and Water Heating Equipment rebates.

3.6.3 Program Budget, Savings, and Participants

OHERP												
2010			Plan Savings		Evaluated Savings		% of Plan		2010		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
N/A	N/A	-	N/A	N/A	N/A	N/A	-	-	N/A	N/A	-
2011			Plan Savings		Evaluated Savings		% of Plan		2011		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$135,587	$131,840	97%	700	70,390	339	22,430	48%	32%	25,000	25,000	100%
2012			Plan Savings		Evaluated Savings		% of Plan		2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$188,738	$187,585	99%	2,620	262,350	3,921	254,748	150%	97%	25,000	25,000	100%
2 Year Program Average			Plan Savings		Evaluated Savings		% of Plan		2011 - 2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$162,163	$159,712	98%	1,660	166,370	2,130	138,589	128%	83%	25,000	25,000	100%

*Net Annual Savings

3.6.4 Program Events & Training

- Call center representatives were provided with information about this program and given access to a customized website so as to be able to assist customers calling in with questions and concerns.
- A specialized Home Energy Report web portal, https://sga.opower.com/ was created for participants to access their program information.

3.6.5 Savings

- Opower computes savings for this program by comparing participants' usage with a control group of residential customers not participating in this program.
- SGA had a total energy savings goal of 262,350 therms for 2012. Savings of 254,748 therms were actually seen. This number represents a 97.1% of the goal.

3.6.6 Challenges & Opportunities

- Several older participants have a negative view of this program. They have commented that they feel singled out based on their comparatively high usage of natural gas.
- SGA's primary challenge for this program will be to continue to assure a small segment of participants that the purpose of this program is to make them aware of their usage and that opportunities to reduce their natural gas consumption can be as simple as remembering to set back the thermostat when leaving home.

- Younger customers that are driven to be in constant contact with friends and neighbors enjoy the competitive nature of the program and it is motivating them to increase their savings.
- SGA will be encouraging our customers to take advantage of money saving rebates through the Home Energy Reports.

3.6.7 Outlook for Continuation, Expansion, Reduction, or Termination

- SGA plans to continue the program in its present form.

3.6.8 Planned or Proposed Changes to Program & Budget

- SGA has no plans to revise the program at this time.

3.7 Arkansas Weatherization Program

3.7.1 Program Description

The AWP is a statewide program jointly filed by Entergy Arkansas, Southwestern Electric Power Company, Oklahoma Gas & Electric Company, Empire District Electric Company, CenterPoint Energy Arkansas Gas, Arkansas Oklahoma Gas Corporation, and SGA (together, the "AWP Utilities"). The AWP is a residential program offered to residential customers of the AWP Utilities who live in severely energy-inefficient homes as determined solely by energy efficiency criteria. The AWP is modeled on the Department of Energy's ("DOE") Weatherization Assistance Program ("WAP") using DOE protocols, standards, and quality control provisions. The AWP utilizes the WAP delivery network of the Central Arkansas Development Council ("CADC") as administrator along with support and coordination from the Arkansas Community Action Agencies Association ("ACAAA").

3.7.2 Program Highlights

- The AWP was available to all qualifying residential customers for all of 2012.
- Weatherizations were performed by the Universal Housing Corporation, the Office of Human Concerns, the Crawford-Sebastian Community Development, and Ozark Opportunities, Inc. on behalf of SGA in 2012.
- 32 houses were weatherized through the AWP.
- For more detailed information, see Appendix B for EM&V Report of the AWP, as well as the separate annual report being filed by the AWP Program in Docket No. 07-079-TF.

3.7.3 Program Budget, Savings, and Participants

AWP												
2010			Plan Savings		Evaluated Savings		% of Plan		2010		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$40,000	$56,233	141%	N/A	N/A	N/A	N/A	-	-	47	47	100%
2011			Plan Savings		Evaluated Savings		% of Plan		2011		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$139,956	$59,383	42%	570	54,550	316	21,317	55%	39%	70	47	67%
2012			Plan Savings		Evaluated Savings		% of Plan		2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$140,198	$42,369	30%	650	54,010	170	9,957	26%	18%	113	32	28%
3 Year Program Average			Plan Savings		Evaluated Savings		% of Plan		2010 - 2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$106,718	$52,662	49%	610	54,280	243	15,637	40%	29%	77	42	55%

*Net Annual Savings

3.7.4 Program Events & Training

- Call center representatives were provided information about this program to pass on information to customers.
- In September/October Energy Efficiency Program brochures were included as bill stuffers for all SGA customers.
- February 2012 – Northwest Arkansas Home Builders Association Home Show – SGA distributed rebate information to its customers.
- www.ExcessIsOut.com continues to be an information repository for all of SGA's energy efficiency offerings.
- For more detailed information, see Appendix B for EM&V Report of the AWP, as well as the separate annual report being filed by the AWP Program in Docket No. 07-079-TF.

3.7.5 Savings

- The savings information will be more fully provided in the AWP Annual Report.
- SGA had a total energy savings goal of 54,010 therms for 2012. This goal was based on a total of 113 homes being weatherized. A total of 32 homes were weatherized in 2012 for an annual savings of 9,957 therms.
- For more detailed information, see Appendix B for EM&V Report of the AWP, as well as the separate annual report being filed by the AWP Program in Docket No. 07-079-TF.

3.7.6 Challenges & Opportunities

- Since SGA has no direct control of this program, it has no ability to directly influence the annual results.
- It is the Company's understanding that there exist a number of extenuating circumstances preventing higher participation in the AWP.
    - Funding for the weatherizations performed under this program is under the control of DHS OSC and is not always submitted to the appropriate community action agency in a timely fashion.
    - While all of the AWP is under the umbrella of ACAAA and data collected by the CADC, there is no direct accountability of any community action agency to participate in the AWP.
- For all of 2012, the data reporting website hosted by a 3rd party contractor has been being rebuilt and SGA has not been able to assess program results on an as needed basis.
- Other challenges and opportunities of the program will be addressed in the AWP Annual Report for 2012.
- For more detailed information, see Appendix B for EM&V Report of the AWP, as well as the separate annual report being filed by the AWP Program in Docket No. 07-079-TF.

3.7.7 Outlook for Continuation, Expansion, Reduction, or Termination

- SGA plans to continue the program in its present form.

3.7.8 Planned or Proposed Changes to Program & Budget

- For more detailed information, see Appendix B for EM&V Report of the AWP, as well as the separate annual report being filed by the AWP Program in Docket No. 07-079-TF.

3.8 Energy Efficiency Arkansas

3.8.1 Program Description

The Energy Efficiency Arkansas program is a joint-utility program coordinated by the Arkansas Energy Office ("AEO") to cost-effectively deliver relevant, consistent, and fuel neutral information and training that encourages people to consume less energy through energy efficiency and conservation measures. This program includes a dissemination of educational material and messages through print, television and radio advertisements, as well as training and certification programs.

3.8.2 Program Highlights

- EEA was available to all SGA customers for all of 2012.
- The EEA program successfully met the goals of the Memo of Understanding for 2012.
- For more detailed information, see the separate annual report being filed by the EEA Program in Docket No. 07-083-TF.
- The Arkansas Energy Office began the process of contracting with a 3rd party EM&V evaluator that will be involved in reporting 2012 results and continuing in 2013.

3.8.3 Program Budget, Savings, and Participants

EEA												
2010			Plan Savings		Evaluated Savings		% of Plan		2010		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$36,995	$44,362	120%	N/A	N/A	N/A	N/A	-	-	0	0	-
2011			Plan Savings		Evaluated Savings		% of Plan		2011		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$49,246	$48,439	98%	0	0	0	0	-	-	0	0	-
2012			Plan Savings		Evaluated Savings		% of Plan		2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$68,801	$57,945	84%	n/a	n/a	n/a	n/a	-	-	n/a	n/a	-
3 Year Program Average			Plan Savings		Evaluated Savings		% of Plan		2010 - 2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	Therms	Therms	Therms	Therms	Therms	Therms	Plan	Actual	Plan
$51,681	$50,249	97%	0	0	0	0	-	-	0	0	-

*Net Annual Savings

3.8.4 Program Events & Training

- Call center representatives were provided information about this program to pass on information to customers.

- In September/October Energy Efficiency Program brochures were included as bill stuffers for all SGA customers.
- February 2012 – Northwest Arkansas Home Builders Association Home Show – SGA distributed rebate information to its customers.
- www.ExcessIsOut.com continues to be an information repository for all of SGA's energy efficiency offerings.
- Tighten Up Arkansas Ad Campaign
- For more detailed information, see the separate annual report being filed by the EEA Program in Docket No. 07-083-TF.

3.8.5 Savings

- No savings are projected for this program since this is an education outreach effort.

3.8.6 Challenges & Opportunities

- For more detailed information, see the separate annual report being filed by the EEA Program in Docket No. 07-083-TF.

3.8.7 Outlook for Continuation, Expansion, Reduction, or Termination

- For more detailed information, see the separate annual report being filed by the EEA Program in Docket No. 07-083-TF.

3.8.8 Planned or Proposed Changes to Program & Budget

- For more detailed information, see the separate annual report being filed by the EEA Program in Docket No. 07-083-TF.

4.0 BENEFIT COST RESULTS

Cost Benefit Analysis was performed by ADM Associates. SourceGas' EE Portfolio had a Total Resource Cost ("TRC") ratio of 3.18 for 2012. HERP, WHP, AWP, and C& I Solutions all had TRC's of greater than one at the individual program level.

Cost-Effectiveness Test	2012 Program Year						
	Annual Energy Savings			Lifetime Energy Savings	Total Resource Cost (TRC)		TRC Levelized Cost
	Net	Gross	Effective Net-To-Gross Ratio (NTGR)				
Program	Therms	Therms		Therms	Net Benefits ($000's)	Ratio	$ / Therms
HERP	63,672		0.85	1,461,100	671	1.71	0.4698
WHP	32,092		0.94	619,576	320	3.42	0.2239
CIBERP	2,425		0.80	60,620	25	0.32	2.4894
CCERP	1,839		0.80	27,588	13	0.30	2.5153
AWP	9,957		1.00	144,742	83	1.97	0.3952
EEA	0						
OHERP	254,748		1.00	254,748	173	0.92	0.7170
C&I Solutions	560,575		0.99	7,184,875	4,006	4.98	0.1518
EE Portfolio Total	**925,308**		0.98	**9,753,249**	**5,291**	**3.18**	**0.2192**

Cost-Effectiveness Test	2012 Program Year							
	Participant Cost Test (PCT)		Ratepayer Impact Measure (RIM)		Program Administrator Cost (PAC)		Other Test (Specify)	
Program	Net Benefits ($000's)	Ratio	Net Benefits ($000's)	Ratio	Net Benefits ($000's)	Ratio	Net Benefits ($000's)	Ratio
HERP	681	2.42	619	0.70	619	1.45		
WHP	256	4.83	301	0.86	301	3.20		
CIBERP	14	0.89	24	0.30	24	0.34		
CCERP	12	2.67	12	0.23	12	0.29		
AWP	68	NA	78	0.63	78	1.84		
EEA								
OHERP	183	NA	172.67	0.47	173	0.92		
C&I Solutions	2897	14.95	3,788.07	0.94	3,788	4.53		
EE Portfolio Total	**4,111**	**7.50**	**4,994**	**0.84**	**4,994**	**2.91**		

5.0 SUPPLEMENTAL REQUIREMENTS

5.1 Training

Training

EXTERNAL TRAINING (contractors, trade allies, consumer groups, etc.)

Event No.	Date	Class	Class Description	Training Location	Sponsor	No. of Attendees (A)	Length of Session (B)	Training Session Man-hours (A x B)	Any Certificates Awarded? (Y or N)	# of Certificates Awarded
1	1/12	SourceGas and OG&E EE Program Offerings	SourceGas and OG&E EE Program Offerings	Ozark, AR	Ozark Rotary Club	20	0.3	6	N	
2	2/12	SourceGas C&I Programs	Presentation of SGA C&I Programs	Little Rock, AR	Arkansas Chapter of the Association of Energy Enginners	50	0.5	25	N	
3	2/12	Arkansas Industrial Energy Conference	Steam System Assessment, Process Heat Management, Boiler Efficiency Methods	Little Rock, AR	Arkansas Manufacturing Solutions	125	3	375	Y	125
4	2/12	SourceGas EE Programs	Presentation of SGA EE Programs	Rogers, AR	Home Builders Association Annual Home Show	3500				
5	2/12	SWEPCO Kick Off Meeting for Residential Contractors	SourceGas Residential EE Program Offerings	Springdale, AR	SWEPCO	75	2.5	187.5	N	
6	3/12	SourceGas EE Programs	Presentation of SGA EE Programs	Bentonville, AR	Building Owners & Managers Association	25	0.5	12.5	N	
7	3/12	SourceGas EE Programs	Presentation of SGA EE Programs	Rogers, AR	Poultry Federation of Arkansas Vendor Trade Show	500		30		
8	3/12	SourceGas EE Programs	Presentation of SGA EE Programs	Little Rock AR	Annual Arkansas Earth Day Festival at Heifer Internations Campus	2000				
9	5/12	AMS Boiler Training	SourceGas EE Program Offerings	Fayetteville, AR	AMS	50	6	300	Y	50
10	7/12	SourceGas EE Program Offerings	SourceGas EE Program Offerings	Springdale, AR	Community Action Agencies Annual Meeting for WEP	100				
11	7/12	Commercial & industrial energy efficiency equipment & best practices	Energy Recovery Wheels	Jonesboro, AR	CLEAResult	30	1.5	45	Y	30
12	7/12	Commercial & industrial energy efficiency equipment & best practices	Steam System Efficiency & Best Practices	Jonesboro, AR	CLEAResult	30	1.5	45	Y	30
13	7/12	Commercial & industrial energy efficiency equipment & best practices	Energy Recovery Wheels	Fort Smith, AR	CLEAResult	14	1.5	21	Y	14
14	7/12	Commercial & industrial energy efficiency equipment & best practices	Steam System Efficiency & Best Practices	Fort Smith, AR	CLEAResult	14	1.5	21	Y	14
15	9/12	SourceGas EE Programs	SourceGas EE Program Offerings	Little Rock, AR	Arkansas Hospitality Association Trade Show	1100				
16	10/12	2009 IEEC and Utility EE Programs	Presentation on how 2009 IEEC and Utility EE programs affect new construction in Arkansas	7 Locations around AR	Home Builders Association of AR and Energy Efficiency Arkansas	400	1.5	600	N	
17	10/12	SourceGas EE Programs	SourceGas EE Program Offerings	Hot Springs, AR	Arkansas Association of Facility Administrators	250				
18	10/12	SourceGas EE Programs	SourceGas EE Program Offerings	Fayetteville, AR	Sustainablility Summit	150				
19	10/12	SourceGas EE Programs	SourceGas EE Program Offerings	Little Rock, AR	Arkansas Association of College & University Business Officers Conference	70				
20	10/12	SourceGas EE Programs	SWEPCO Lunch & Learn	Fayetteville, AR	SWEPCO	45				
21	11/12	SourceGas EE Programs	SourceGas EE Program Offerings	Bentonville, AR	Green Appraiser Class	25				
22	11/12	SourceGas EE Programs	SourceGas EE Program Offerings	Fayetteville, AR	University of Arkansas Benefit Fair for Faculty and Staff	250				
23	4/12	SourceGas EE Programs	SourceGas EE Program Offerings	Fayetteville, AR	Kawnis Club of Fayetteville	20	0.5	10	N	
Totals:	***Sessions:***	23				8843		1678		263

INTERNAL TRAINING (Utility or Administrator Staff)										
Event No.	Date	Class	Class Description	Training Location	Sponsor	No. of Attendees (A)	Length of Session (B)	Training Session Man-hours (A x B)	Any Certificates Awarded? (Y or N)	# of Certificates Awarded
1	01/10/12	Tuesday Webcast for Industry: Key Energy-Saving Activities for Smaller Facilities	Energy Savings for Smaller Facilities	Webinar	DOE	1	1	1	N	
2	5/7/2012	An Energy Efficient Resource for Natural Gas Utilities	State and Local Energy EfficiencyAction Netowrk information and how it is to replace NAPEE	Webinar	SEE Action Network	1	1	1	N	
3	05/17/12	Using Experimental Design to Measure Energy Efficiency	Behavior Based Program Evaluations	Webinar	SEE Action Network	1	1	1	N	
4	05/22/12	Infrared Process Heating Seminar	Using Infrared technology in process applications	Webinar	Energy Solutions Center	1	1	1	Y	1
5	05/08/12	Tuesday Webcast for Industry: Tax Rebates/Credits Available for Energy Efficiency Actions	Tax Rebates/Credits Available for Energy Efficiency Actions	Webinar	DOE	1	1	1	N	
6	9/12	Arkansas Gas Association Convention	Multiple session on EE and issues in natural gas	Ft. Smith	Arkansas Gas Association	1	8	8	N	
7	10/12	Opower/ EE review	Training of SGA Call Center Staff on Dealing with Opower customers and general EE information	Fayetteville, AR	SGA	50	2	100	N	
8	10/12	Basics for Natural Gas Ratemaking	Included a session on how EE affects Natural Gas Utilities	Albquerque, NM	New Mexico State University Center for Public Utilities	1	4	4	Y	1
Totals:	***Sessions:***	8				57		117		2

5.2 Lost Contribution to Fixed Costs

The proposed Lost Contribution to Fixed Costs ("LCFC") is calculated based on the evaluated net savings for 2012 as shown in SGA's CEEP for Program Year 2012 Annual Report and the projected savings for 2013 per Table 8 on page 13 of SGA's EE Plan approved by the APSC Order No. 26 issued in Docket No. 07-078-TF. Per the Commission's Order No. 15 issued in Docket No. 10-100-R, 2012 actual savings have been adjusted to reflect a net to gross percentage determined by program EM&V evaluators based on surveys of actual participants of SGA's portfolio. These savings have been further reduced to recognize that the savings occurred throughout the year and not at the beginning of the Program Year. Net savings produced by measures installed during Program Year 2011 have been extended to 2012 along with actual net savings seen in 2012. Looking forward, annual net savings seen in both 2011 and 2012 have been projected into 2013. All savings have been allocated to the rate class where they were incurred. The projected savings for 2013 have also been adjusted to reflect a net to gross identified by ADM. Those 2013 net savings have been further reduced to recognize that the savings will occur throughout the year and not at the beginning of the Program Year.

As per the Commission's Order No. 14 issued in Docket No. 08-137-U, the proposed LCFC has been calculated on a rate class and rate schedule basis, "accurately reflecting and appropriately attributing the fixed cost portion of revenues forgone due to the energy savings caused by utility energy efficiency programs." The

true-up of projected 2012 LCFC collected through the EECR rate, approved by Commission Order #25 issued in Docket No. 07-078-TF, has also been factored in to the final LCFC recovery being requested. SGA is requesting a total LCFC recovery of $358,674.

Lost Contribution to Fixed Cost (LCFC)

Program Name	LCFC Energy Savings Therms 2011	2012	2013	LCFC ($) 2011	2012	2013
HERP	26,610	126,620		$ 6,383	$ 28,919	
WHP	15,378	128,564		$ 3,692	$ 27,240	
CIBERP	0	34,428		$ -	$ 6,368	
CCERP	0	26,172		$ -	$ 4,831	
AWP	9,701	52,106		$ 2,147	$ 11,737	
EEA	0	0		$ -	$ -	
OHERP	22,430	307,140		$ 5,385	$ 69,186	
C&I Solutions	9,522	1,099,844		$ 1,767	$ 144,188	
	LCFC Total:			$ 19,374	$ 292,471	$ -
	Total Actual Portfolio Expense:			$ 1,096,153	$ 1,780,096	$ -
	LCFC as a % of Portfolio Total:			1.8%	16%	-

5.3 Utility Performance Incentives

SGA is seeking a utility incentive in its requested EECR rate for its 2012 EE Programs. The Commission stated in Order No. 15 issued in Docket No. 08-137-U that the Commission would "review and approve shared savings of net benefit incentive proposals which award 10% of the net benefits to a utility for achievement above 80% of the savings goals established in this order." This goal for gas utilities was a reduction of 0.30% of therms delivered during 2010. SGA achieved 139% of the Commission established savings goal.

Utility Performance Incentives			
2010 Annual Energy Sales (Therms)	Sales as Adjusted for SD Exemptions		
	2011	2012	2013
250,414,358	222,353,778	222,353,778	
Portfolio Level Summary	**2011**	**2012**	**2013**
RBudget ($)	$ 1,520,909	$ 2,204,034	
Actual Expense ($)	$ 1,096,153	$ 1,780,096	
Net Savings	**2011**	**2012**	**2013**
Commission Established % Goal	0.20%	0.30%	0.40%
Therms Goal	444,708	667,061	0
Therms Achieved	317,453	925,308	
% of Goal Achieved	71%	139%	-
Incentive Calculations	**2011**	**2012**	**2013**
Portfolio Net Benefits ($)		$ 5,290,653	
10% of Portfolio Net Benefits ($)	$ -	$ 529,065	$ -
Incentive Cap	0.00%	7.00%	-
Maximum Allowed Incentive $	$ -	$ 154,282	$ -
Eligible Incentive $'s	$ -	$ 154,282	$ -

5.4 Challenges & Opportunities

- In June of 2012, SGA contracted with CLEAResult to expand its implementation of the Company's programs. By making this change SGA and CLEAResult are working to moving these programs toward a greater market penetration and maturity.
- SGA has an opportunity to increase program participation by engaging more trade allies with in-depth knowledge of the Company's EE offerings.
- The Company has hired a Commercial and Industrial Account Manager and will continue to leverage any contact with customers as an opportunity to promote EE programs.
- See Appendix A: ADM Associates, Inc – SourceGas EM&V Contractor Report for additional comments.

5.5 Market Maturity

- Prescriptive Rebate Programs – All of SGA's prescriptive rebate programs are not yet fully mature.
    - Both the HERP and WHP programs are beginning to see participation by an increasing number of contractors who understand the program offerings and assist customers in using the rebates to their full potential.
    - The commercial rebate programs (CIBERP & CCERP) have seen very limited participation since their inception.

- Commercial/Industrial Solutions Program – All programs under this umbrella have yet to become fully mature.
    - The Direct Install Program is available to all non-residential SGA customers that use natural gas to heat their water. As such, there are still significant opportunities available for this program.
    - The Custom Installation piece of the program is just beginning to make its mark on energy efficiency efforts. Important inroads have been made to fill the pipeline for rebate opportunities for 2013 and beyond. As technologies for more energy efficient equipment become stronger, the opportunities for natural gas savings will continue.
- Opower Home Energy Reports – To realize the full savings potential of this type of program, successive years of delivering reports and promoting energy efficiency are needed. To remind participating customers of their enrollment in the Opower program during the winter of 2012 – 2013, a recap of their results will be used to kick the program off again in the fall of 2013.
- Discussion of the market maturity of the AWP can be found in Appendix B of this report as well as the separate annual report being filed by the AWP Program in Docket No. 07-079-TF.
- Discussion of the market maturity of the EEA will be available in the separate annual report being filed by the EEA Program in Docket No. 07-083-TF.

5.6 Staffing

- In June of 2012, SGA contracted with CLEAResult to expand its implementation of the Company's programs. By making this change, SGA along with CLEAResult staff has been able to increase the awareness and participation of both residential and non-residential customers.
- The Company has hired a Commercial and Industrial Account Manager and will continue to leverage any contact with customers as an opportunity to promote EE programs.

5.7 Stakeholder Activities

SGA is a participant in the PWC, the EEA Working Group, and the AWP Working Group as established by the Commission. See Section 5.1 for a full list of all Training and Activities sponsored or attended by SGA.

5.8 Estimation of EE Resource Potential

The Company has not performed an independent technical potential study or market assessment study of the energy efficiency resource potential for Arkansas.

5.9 Information Provided to Consumers to Promote EE

SGA's marketing plan relies on traditional marketing channels to promote the programs, including print media, direct mail, Internet presence, and radio advertisements. Additionally, SGA uses customer touch points such as service calls, customer newsletters, on-bill messaging, and speaking engagements at seminars, conferences, and community events to spread the word about its programs. Over the past year, marketing for SGA's energy efficiency programs has included:

- Continued Internet presence through the www.ExcessIsOut.com website which features:
  - A list of energy savings tips.
  - Information on all SGA's EE programs and instructions on how to participate in each program with contact information for further questions.
  - Printable rebate forms along with online rebate submission information.
  - Links to other useful resources, such as a free online energy audit tool and energy efficiency organizations.
  - Samples of marketing materials, including print advertisement, EE brochure, along with radio and television advertisements.
  - A direct email link for more information or questions regarding any SGA EE program.
- Continued Internet presence through www.sourcegasarkansas.com website that contains information about all SGA EE programs with links to www.excessisout.com for more specific program information.
- Opower Home Energy Reporting
  - Website that is available to all SGA customers to use to view "Ideas and Advice" pages.
  - Website contains link to SGA rebate information.
  - SGA is leveraging the mailed energy report to promote residential rebate programs.
- Due to the heavy Hispanic presence in SGA's service territory, the EE Brochure has been translated into Spanish and is available on www.excessisout.com website.

Examples of these offerings can be seen in Appendix C of this report.

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6.0 Appendix A: ADM Associates, Inc. – SourceGas EM&V Contractor Report

Evaluation of 2012 DSM Portfolio

Submitted to:

SourceGas Arkansas

March 2012

Final

ADM Associates, Inc.
Innovologie, LLC
Research America, Inc.

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We would like to thank the staff at SourceGas Arkansas for their time and effort in contributing to the EM&V of the 2012 programs. This evaluation was conducted with regular coordination with staff at SourceGas, who provided quick feedback and turnaround to the requests of the evaluation team as well as open and forthright insights into the operations of their programs.

Further, we would like to acknowledge our gratitude towards SourceGas customers, implementation contractor staff, and trade allies. As with the staff at SourceGas, their active participation allowed for the evaluation team to collect all needed data for this effort.

In final, we would like to thank staff at the Independent Evaluation Monitor for their involvement in providing thorough answers and clarification to the evaluation team when higher-level questions arose over the course of the 2012 EM&V effort.

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1. Executive Summary

This report is to provide a summary of the evaluation effort of the 2012 Demand Side Management (DSM) portfolio by the SourceGas Arkansas (SourceGas). This evaluation was led by ADM Associates (ADM), with support by Innovologie, LLC and Research America, Inc. This report provides verified gross and net savings estimates for evaluated programs.

1.1 Summary of SourceGas Energy Efficiency Programs

In 2012, the SourceGas DSM portfolio contained the following programs:

- Heating Equipment Rebates;
- Water Heating & Conservation[1];
- C&I Boiler Equipment Rebates;
- C&I Solutions;
- Commercial Cooking Equipment Rebates; and
- Home Energy Reports;

1.2 Evaluation Objectives

The goals of the 2012 EM&V effort are as follows:

- For prescriptive measures, verify that savings are being calculated according to appropriate Technical Reference Manual (TRM) guidelines. For most measures, this constitutes applying TRM V2.0 methodologies. For measures for which insufficient data was collected to apply TRM V2.0 (which was approved in September 2012), TRM V1.0 is applied. Verification by telephone and by site visit as appropriate is conducted for prescriptive measures
- For custom measures, this effort comprises the calculation of savings according to accepted protocols (such as IPMVP). This is to ensure that custom measures are cost-effective and providing reliable savings.
- Conduct process evaluation of all SourceGas programs and of the portfolio overall. This is to provide a comprehensive review of program operations,

[1] The two program components, Water Heating Equipment Rebates and Water Conservation Kits, are evaluated as separate programs.

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marketing and outreach, quality control procedures, and program successes relative to goals. From this, the evaluators are to provide program and portfolio-level recommendations for SourceGas. Process evaluation activities include interviews of key program actors, surveys of participants and non-participants, literature reviews and best-practices assessments, and documentation of program activities, successes, and shortcomings.

- Conduct net-to-gross assessments. The evaluators developed net-to-gross ratios specific to each program, departing from the 2011 stipulated value of 80% for programs that had sufficient participation levels to support this analysis.

1.3 Summary of Findings

1.3.1 Impact Findings

Error! Reference source not found. and 1-2 present the gross and net impact by rogram.

Table 1-1 Gross Impact Summary

Program	Annual Energy Savings (Therms)		Lifetime Energy Savings (Therms)		Peak Therms		Gross Realization Rate
	Ex Ante	Ex Post	Ex Ante	Ex Post	Ex Ante	Ex Post	
Heating Equipment Rebates	73,055	73,055	1,461,100	1,461,100	750.63	750.63	100%
Water Heating Equipment Rebates	38,469	36,044	600,281	563,906	106.13	99.44	93.7%
C&I Boiler Equipment Rebates	3,031	3,031	60,620	60,620	2.84	2.84	100%
C&I Solutions	546,584	560,574	6,291,327	7,184,875	1,760.5	1,713.6	102.5%
Commercial Cooking Equipment Rebates	2,299	2,299	27,588	27,588	6.29	6.29	100%
Home Energy Reports	296,301	254,748	296,301	261,617	4,440.1	3,921.4	88.3%
Water Conservation Kits	10,463	5,568	104,630	55,670	34.98	18.61	53.2%
Total	970,202	935,319	8,841,847	9,608,507	7,101.5	6,512.8	97.1%

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Table 1-2 Net Impact Summary

Program	Annual Energy Savings (Therms)		Lifetime Energy Savings (Therms)		Peak Therms		NTGR	Net Realization Rate
	Ex Ante	Ex Post	Ex Ante	Ex Post	Ex Ante	Ex Post		
Heating Equipment Rebates	58,544	62,050	1,168,880	1,241,000	616.7	654.76	84.9%	106.2%
Water Heating Equipment Rebates	30,755	33,120	480,225	515,751	89.90	91.31	91.8%	107.6%
C&I Boiler Equipment Rebates	2,425	2,425	48,496	48,496	2.27	2.27	80%	100%
C&I Solutions	437,267	556,145	5,033,062	7,143,151	1,408.4	1,713.6	99.2%	127.2%
Commercial Cooking Equipment Rebates	1,839	1,839	22,070	22,070	5.03	5.03	80%	100%
Home Energy Reports	296,301	254,748	296,301	254,748	4,440.1	3,921.4	100%	88.3%
Water Conservation Kits	8,370	5,971	83,704	60,406	27.98	36.00	107.2%	71.3%
Total	835,501	916,298	7,132,738	9,285,622	6,590.4	6,424.4	97.9%	110.4%

Further, the evaluators put the net savings into the context of SourceGas' 2012 goal. Table 1-3 summarizes the performance against goals of programs evaluated in this report.

Table 1-3 SourceGas 2012 DSM Portfolio Performance against Goals

Program	2012 Verified Net Therms	2012 Net Therms Goal	% of Goal Attained
Heating Equipment Rebates	62,050	54,090	114.7%
Water Heating & Conservation	39,091	28,451	117.4%
C&I Boiler Equipment Rebates	2,425	125,010	1.9%
C&I Solutions	556,145	536,810	103.6%
Commercial Cooking Equipment Rebates	1,839	53,330	3.4%
Home Energy Reports	254,748	262,350	97.1%
Total	916,298	1,061,041	86.4%

Failure to meet portfolio goals is attributable to poor performance of the C&I Boiler Equipment Rebates and Commercial Cooking Equipment Rebates programs. All other programs were near to or exceeded their goal. IT should be noted that the SourceGas DSM portfolio also has a savings goal for their participation in the Arkansas Weatherization Program, but this is evaluated in a separate report.

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1.3.2 Process Findings

Following a review of present program offerings and interviews with utility and third party implementation staff, the evaluators found that:

1.3.2.1 Portfolio Findings

- The programs are adequately staffed. With the hiring of outside implementation contractors in August 2012, SourceGas has allocated sufficient resources to successfully promote and implement their program offerings. The staff is knowledgeable regarding energy efficiency technologies and the market opportunities in their service territory.

- Program tracking data often lacked facility contact names for commercial projects. Further, tracking data did not always have all inputs needed to calculate savings (such as weather zone).

1.3.2.2 Heating Equipment Rebates

- Much of the success of the Heating Equipment Rebates program was driven by customers needing to replace their air conditioner. HVAC contractors hired for this purpose successfully sold high efficiency furnaces using the program incentive, but in many instances the customer installed a standard efficiency air conditioner.

- Trade allies have been engaged and are active in the program. HVAC contractors received training through the program and have shown significantly higher sales of 95%+ AFUE condensing furnaces as a result.

- The program has derived significant participation from municipal housing authorities, with one housing authority being responsible for 154 rebates in 2012.

1.3.2.3 Water Heating Equipment Rebates

- Much of the program's success was driven by retrofits by hotels. The evaluators found that these hotels first participated in the C&I Solutions direct install component accounted for over 90% of program savings for the Water Heating Equipment Rebate Program.

- Plumbing contractors have been engaged, though to a lesser extent than the Heating Equipment Rebates program. The evaluators would suggest that SourceGas offer a trade ally incentive for top-level installations, in a manner similar to programs offered by CenterPoint and AOG.

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- Over 90% of residential participation was for tankless units. The program is not capturing the storage tank or emergency replacement markets, and should consider a midstream incentive approach for these segments.

- Residential customers have been receptive to prescriptive measures. Residential participation levels in the Space Heating and Water Heating programs are meeting program expectations and goals. Further, customers opt more often for the higher efficiency option available, such as 95%+ AFUE furnaces and tankless water heaters.

1.3.2.4 C&I Boiler Equipment Rebates

- The C&I Boiler Equipment Rebates program fell far short of meeting goals. The program goal is likely infeasible in that at the time it was developed, the assumption was that this program would cover both HVAC and process loads.

- The program changed implementers late in 2012 and as such further research is warranted in 2013 to judge program success.

1.3.2.5 Commercial Cooking Equipment Rebates

- The Commercial Cooking Equipment Rebates program fell far short of meeting goals. The goals for participants versus savings are misaligned in that they assume a level of savings that is not achievable with TRM V2.0 deemed values for food service equipment.

- Some equipment incentives were misaligned in terms of cost per Therm and percent of incremental cost covered. The program chapter identifies these and provides recommendations for modifications.

- The program structure may inhibit participation in that incentives cannot be signed over to third-party rebate processors. These are often used by corporate chain restaurants to facilitate program participation, and their business model relies upon the ability to sign over incentives.

- The program should move measure offerings towards ENERGY STAR® and FSTC-tested equipment, which would entail the removal of some current measures (broilers, pasta cookers) and the addition of others not presently covered (steam cookers, griddles, and dishwashers).

- The program changed implementers late in 2012 and as such further research is warranted in 2013 to judge program success.

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1.3.2.6 C&I Solutions

- The C&I Solutions Direct Install component was highly successful both in generating cost-effective energy savings and in introducing non-residential customers to energy efficiency. Participants in the direct install component were seen later participating in other SourceGas DSM programs, with the most marked success in this regard being the Water Heating Equipment Rebates Program.

- The C&I Solutions custom component was successful in 2012, closing out four high-saving custom projects, totaling 288,871 Therms. Further, the evaluators found many projects with incentives reserved and installation in progress which will install in 2013.

- The program has not engaged trade allies in a meaningful manner. There are some measure categories (such as boiler controls and steam line insulation) which could be drive by trade allies rather than audits.

1.3.2.7 Home Energy Reports

- The Home Energy Reports program is providing evaluable savings estimates in line with other similar programs implemented elsewhere.

- Surveys of recipient and control group households found statistically significant differences in awareness of household energy consumption, perception of household use as being higher or lower than average, and of behavioral change in thermostat setting.

1.3.2.8 Water Conservation Program

- SourceGas' Water Conservation Program was not as successful as similar programs implemented by AOG and CenterPoint. This may be due in large part to the marketing strategy being focused on internet channels, rather than the direct mail approach used by AOG and CenterPoint in encouraging participation from hard-to-reach segments.

- The program had some lost opportunities for savings in only sending one showerhead per kit. AOG sends two per kit and CenterPoint allows for kit customization with 0-3 showerheads, resulting in increased installations.

1.4 Report Organization

This report is organized with one chapter providing the full impact and process summary of a specified program. The report is organized as follows:

- Chapter 2 provides general methodologies;

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- Chapter 3 provides a summary of portfolio-level issues;
- Chapter 4 provides results for the Heating Equipment Rebates Program;
- Chapter 5 provides results for the Water Heating Equipment Rebates Program;
- Chapter 6 provides results for the C&I Boiler Equipment Rebates Program;
- Chapter 7 provides results for the C&I Solutions Program;
- Chapter 8 provides results for the Commercial Cooking Equipment Rebates Program;
- Chapter 9 provides results for the Home Energy Reports Program;
- Chapter 10 provides results for the Water Conservation Kits Program;
- Chapter 11 provides a summary of the evaluator's review of SourceGas' program offerings and recommendations for program and/or portfolio-level changes; and
- Appendix A provides the site-level custom reports for the C&I Solutions Program.

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2. General Methodology

This section details general impact evaluation methodologies by program-type as well as data collection methods applied. This section will present full descriptions of:

- Gross Savings Estimation;
- Sampling Methodologies;
- Free-Ridership determination;
- Process Evaluation Methodologies; and
- Data Collection Procedures.

2.1 Glossary of Terminology

As a first step to detailing the evaluation methodologies, the evaluators provide a glossary of terms to follow[2]:

- *Ex Ante* – Forecasted savings used for program and portfolio planning purposes (from the Latin for "beforehand"
- *Ex Post* – Savings estimates reported by an evaluator after the energy impact evaluation has been completed (From the Latin for "From something done afterward")
- *Deemed Savings* – An estimate of an energy savings or demand savings outcome (gross savings) for a single unit of an installed energy efficiency measure. This estimate (a) has been developed from data sources and analytical methods that are widely accepted for the measure and purpose and (b) are applicable to the situation being evaluated. (e.g., assuming 17.36 Therms savings for a low-flow showerhead)
- *Gross Savings* – The change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated
- *Gross Realization Rate* – Ratio of Ex Post Savings / Ex Ante Savings (eg. If ADM verifies 15 Therms per showerhead, Gross Realization Rate = 15/17.36 = 86%)
- *Free-Rider* – A program participant who *would have* implemented the program measure or practice in the absence of the program. Free riders can be total, partial, or deferred.
- *Spillover* – Reductions in energy consumption and/or demand caused by the presence of the energy efficiency program that exceed the program-related gross savings of the participants. There can be participant and/or non-participant

[2] Arkansas TRM V2.0, Volume 1, Pg. 80-86

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spillover rates depending on the rate at which participants (and non-participants) adopt energy efficiency measures or take other types of efficiency actions on their own (i.e., without an incentive being offered).

- *Net Savings* – The total change in load that is attributable to an energy efficiency program. This change in load may include, implicitly or explicitly, the effects of free drivers, free riders, energy efficiency standards, changes in the level of energy service, and other causes of changes in energy consumption or demand. (eg., if Free-Ridership for low-flow showerheads = 50%, net savings = 15 Therms x 50% = 7.5 Therms)
- *Net-to-Gross-Ratio (NTGR)* = (1 – Free-Ridership % + Spillover %), also defined as Net Savings / Gross Savings
- *Ex Ante Net Savings* = Ex Ante Gross Savings x Ex Ante Free-Ridership Rate
- *Ex Post Net Savings* = Ex Post Gross Savings x Ex Post Free-Ridership Rate
- *Net Realization Rate* = Ex Post Net Savings / Ex Ante Net Savings
- *Effective Useful Life (EUL)* – An estimate of the median number of years that the efficiency measures installed under a program are still in place and operable.
- *Gross Lifetime Therms* = Ex Post Gross Savings x EUL

2.2 Overview of Methodology

The proposed methodology for the evaluation of the 2012 SourceGas DSM Portfolio is intended to provide:

- Net impact results at the 90% confidence and +/-10% precision level; and
- Program feedback and recommendations via process evaluation

In doing so, this evaluation will provide the verified net savings results, provide the recommendations for program improvement, and ensure cost-effective use of ratepayer funds. By leveraging experience and lessons learned from impact evaluation of the 2011 program year, the 2012 evaluation is significantly expanded and can provide greater guidance as to methods by which program and portfolio performance could be improved.

2.2.1 Sampling

Sampling is necessary to evaluate savings for the SourceGas DSM portfolio insomuch as verification of a census of program participants is typically cost-prohibitive. As per evaluation requirements set forth by the Independent Evaluation Monitor (IEM), samples are drawn in order to ensure 90% confidence at the +/- 10% precision level. Programs are evaluated on one of three bases:

- Census of all participants

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- Simple Random Sample
- Stratified Random Sample

2.2.1.1 Census of Participants

A census of participant data was used for select programs where such review is feasible. For example, the Home Energy Reports program's savings estimates are based on a regression model that incorporates billing data for a census of program recipients. Programs that received analysis of a census of participants include:

- Home Energy Reports;
- Commercial & Industrial Solutions – Custom Component

2.2.1.2 Simple Random Sampling

For programs with relatively homogenous measures (largely in the residential portfolio), ADM conducted a simple random sample of participants. The sample size for verification surveys is calculated to meet 90% confidence and 10% precision (90/10). The sample size to meet 90/10 requirements is calculated based on the coefficient of variation (CV) of savings for program participants. CV is defined as:

$$CV(x) = \frac{Standard\ Deviation\ (x)}{Mean(x)}$$

Where x is the average Therms savings per participant. Without data to use as a basis for a higher value, it is typical to apply a CV of 0.5 in residential program evaluations. The resulting sample size is estimated at:

$$n_0 = \left(\frac{1.645 * CV}{RP}\right)^2$$

Where,

1.645 = Z score for 90% confidence interval in a normal distribution

CV = Coefficient of Variation

RP = Required Precision, 10% in this evaluation

With 10% required precision (RP), this calls for a sample of 68 for programs with a sufficiently large population. However, in some instances, programs did not have sufficient participation to make a sample of this size cost-effective. In instances of low participation, ADM then applied a finite population correction factor, defined as:

$$n = \frac{n_0}{1 + {}^{n_0}/_{N}}$$

Where

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n_0 = Sample Required for Large Population

N = Size of Population

n = Corrected Sample

For example, if a program were to have only 100 participants, the finite population correction would result in a final required sample size of 41. The evaluators applied finite population correction factors in instances of low participation in determining samples required for surveying or onsite verification. Programs subject to Simple Random Sampling include:

- Heating Equipment Rebates – Residential;
- Water Heating Equipment Rebates – Residential;
- Water Conservation Kits; and
- Home Energy Reports (survey component only).

2.2.1.3 Stratified Random Sampling

For the SourceGas Commercial & Industrial programs, Simple Random Sampling is not an effective sampling methodology as the CV values observed in business programs are typically very high because the distributions of savings are generally positively skewed. Often, a relatively small number of projects account for a high percentage of the estimated savings for the program.

For example, the 2012 Commercial & Industrial Solutions Program direct install component had a CV of 2.34 at year's end. Using the base simple random sample function, this would call for a sample of 1,481. The 2012 C&I Solutions Program had 412 participating facilities, and as such, a finite population adjustment is needed. Adjusting for the population, the required simple random sample is 322, which would be prohibitively expensive.

To address this situation, we use a sample design for selecting projects for the M&V sample that takes such skewness into account. With this approach, we select a number of sites with large savings for the sample with certainty and take a random sample of the remaining sites. To further improve the precision, non-certainty sites are selected for the sample through systematic random sampling. That is, a random sample of sites remaining after the certainty sites have been selected is selected by ordering them according to the magnitude of their savings and using systematic random sampling. Sampling systematically from a list that is ordered according to the magnitude of savings ensures that any sample selected will have some units with high savings, some with moderate savings, and some with low savings. Samples cannot result that have concentrations of sites with atypically high savings or atypically low savings. As a result of this methodology, the required sample for the C&I Solutions Program was reduced to 24 with one certainty stratum and four sample strata. Programs that were evaluated using stratified random sampling include:

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- Heating Equipment Rebates – Non-Residential;
- Water Heating Equipment Rebates – Non-Residential;
- Commercial & Industrial Solutions – Direct Install Component.

2.2.2 Free-Ridership

In determining ex post net savings for the SourceGas DSM portfolio, the evaluators provide estimates of free-ridership for individual programs. Free-riders are program participants that would have implemented the same energy efficiency measures at nearly the same time absent the program. As per TRM guidelines, free-riders are defined as:

> "…program participants who received an incentive but would have installed the same efficiency measure on their own had the program not been offered. This includes partial free riders, defined as customers who, at some point, would have installed the measure anyway, but the program persuaded them to install it *sooner* or customers who would have installed the measure anyway but the program persuaded them to install more efficient equipment and/or more equipment. For the purposes of EM&V activities, participants who would have installed the equipment within one year will be considered full free riders; whereas participants who would have installed the equipment later than one year will not be considered to be free riders (thus no partial free riders will be allowed)."[3]

Given this definition, participants are defined as free-riders through a binary scoring mechanism, in being either 0% or 100% free-riders. Models of free-ridership utilized in these EM&V efforts were aimed at providing a probability of free-ridership; this probability value was then rounded to a whole-number free-ridership value.

2.2.2.1 Residential Free-Ridership

The general methodology for evaluating free-ridership among residential participants involved examination of four factors:

(1) Demonstrated financial ability to purchase high efficiency equipment absent the rebate

(2) Importance of the rebate in the decision-making process

(3) Prior planning to purchase high efficiency equipment

(4) Demonstrated behavior in purchasing similar equipment absent a rebate

In this methodology, Part (1) is essentially a gateway value, in that if a participant does not have the financial ability to purchase energy efficient equipment absent a rebate, the other components of free-ridership become moot. As such, if they could not have

[3] Arkansas TRM V1.0, Pg. 53.

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afforded the high efficiency equipment absent the rebate, free-ridership is scored at 0%. If they did have the financial capability, the evaluators then examine the other three components. The respondent is determined to be a free-rider based upon a preponderance of evidence of these three factors; that is, if the respondent's answers indicate free-ridership in two or more of these three components, they are considered free-riders. Specific questions and modifications to this general methodology are presented in the appropriate program chapters.

For residential programs, free-ridership is calculated as the average score determined for the sample of participants surveyed. For programs that are contractor-driven, the free-rider score of a survey respondent incorporates the relative importance of advice from their contractor, provided that the contractor is a program trade ally that received training from the appropriate program. This value is then applied to the program-level savings to discount savings attributable to free-ridership.

2.2.2.2 Prescriptive Non-Residential Free-Ridership

The general methodology for evaluating free-ridership among prescriptive program participants involved examination of four factors:

(1) Demonstrated financial ability to purchase high efficiency equipment absent the rebate

(2) Importance of the rebate in the decision-making process

(3) Prior planning to purchase high efficiency equipment

(4) Importance of the contractor in influencing the decision-making process[4]

In this methodology, Part (1) is essentially a gateway value, in that if a participant does not have the financial ability to purchase energy efficient equipment absent a rebate, the other components of free-ridership become moot. As such, if they could not have afforded the high efficiency equipment absent the rebate, free-ridership is scored at 0%. If they did have the financial capability, the evaluators then examine the other three components. The respondent is determined to be a free-rider based upon a preponderance of evidence of these three factors; that is, if the respondent's answers indicate free-ridership in two or more of these three components, they are considered free-riders. Specific questions and modifications to this general methodology are presented in the appropriate program chapters.

For non-residential programs, free-ridership is calculated as the average score determined for the sample of participants surveyed. This value is then applied to the program-level savings to discount savings attributable to free-ridership.

[4] Contractor recommendations were considered to be program-inducement in instances where findings from vendor interviews showed that the program changed the mix of products sold by the vendor and that the vendor responsible for the customers' installation was a program trade ally.

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2.2.2.3 Custom Free-Ridership

For custom projects from the C&I Solutions Program, free-ridership is assessed on a case-study basis, through which the evaluators conduct an in-depth interview that includes a battery of questions addressing:

- The timing of learning of the program relative to the timing of the planning of the retrofit;
- The impact the program incentive has on measure payback relative to the stated payback requirements by the respondent;
- Whether the respondent learned of the energy efficiency measure from a program-funded audit; and
- Whether any influence the program had in modifying the project affected savings by greater than 50%.

In the C&I Solutions chapter, the free-rider "case studies" are provided for every custom project

2.2.3 Process Evaluation

2.2.3.1 General Approach

The Evaluator's general approach to process evaluation begins with interviews with SourceGas staff. These interviews, along with guidance from IEM protocols, inform the establishment of goals for the process evaluation, provide background history of programs, and give an introduction to portfolio-level issues. From this, the evaluators then develop a list of data collection activities. The data collection procedures for process evaluations typically included:

- *Participant Surveying*. The evaluators surveyed statistically significant samples of participants in each program in order to provide feedback for the program and provide an assessment of participant satisfaction.
- *In-Depth Interviews*. The evaluators conducted in-depth interviews with high-level program actors, including SourceGas program staff, third-party implementation staff, and program Trade Allies. These interviews are semi-structured, in having general topics to be covered, without fully prescribed question and answer frameworks.
- *Review of Program Theory*. The evaluators reviewed program designs in order to determine whether program designs are informed by sound theory and best practices. Additionally, the programs are evaluated on a basis of their fit within the SourceGas DSM portfolio, any areas of portfolio overlap, and identification of gaps in comprehensiveness of the portfolio of programs. The review of program theory is surmised in a logic model that clarifies the inputs, outputs, and goals of

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the program, and whether the program is operating according to the described theory.

- *Review of Marketing Materials*. The evaluators reviewed marketing materials for each program, providing feedback as to the appropriateness of the message in reaching its target audience, the breadth of the audience that the effort is attempting to reach, and identifying possible cross-promotional opportunities.
- *Best Practices Assessment*. The evaluators compared the SourceGas programs and portfolio as a whole against industry best practices. The best practices were drawn from the self-benchmarking tool at eebestpractices.com and from the 2004 Best Practices study completed by Quantum Consulting on behalf of the California Public Utilities Commission[5].

Some programs had additional data collection activities where appropriate, as detailed in the program-specific chapters. The goal of the process evaluation is to provide continuous feedback to inform improvements in program delivery. Rather than providing program recommendations *post-hoc,* the approached used in this evaluation effort was to provide real-time feedback, so that SourceGas could begin planning for acting on recommendations where needed. Thus, many of the recommendations in this report have already been detailed to SourceGas in supplementary memorandums or ad hoc communications.

2.2.3.2 Researchable Issues

Though every program has its own idiosyncrasies and unique researchable issues, there are some common threads across process evaluations. The following are examples of issues raised and researched across all SourceGas programs:

- Does the program design fit cohesively into the SourceGas DSM portfolio? This includes identification of any overlaps in effort or market coverage and the synergies of this program's interaction with other SourceGas program offerings.
- Are the program goals reasonable given the size and composition of SourceGas' market? The evaluators reviewed the savings goals by program for SourceGas and addressed whether those goals are appropriate given the size of the associated market sector.
- Do the program administration processes conform to industry best practices? A comparative review of program administration processes and of other similar programs run elsewhere was conducted for each program, identifying potential changes in program administration to correspond with industry best practices.
- Are staffing and funding levels adequate?

[5] Volume S – Crosscutting Best Practices and Project Summary. Quantum Consulting. December 2004

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- Does the tracking data system allow for efficient administration and evaluation of the program?
- Do the marketing efforts of the program effectively reach the appropriate market sectors? Are there sectors that have responded to the current marketing strategies in greater magnitude than others?
- Does the program have adequate QC processes in place to ensure proper allocation of program funds to incentives and direct install efforts?
- Is the program on track to meet savings and participation goals?
- What is the customer response to the program? Do customers perceive the program as meeting their organization's needs? Does the program sufficiently engage market allies? What market effects (both intended and unanticipated) has the program had?

Further questions specific to each program are detailed in the appropriate program chapters.

2.3 Non-Participant Surveying

The evaluators conducted non-participant surveying with representative subsets of the SourceGas customer population. The evaluators instructed SourceGas IT staff on the requirements of a customer data pull. The IT staff at SourceGas was instructed to:

1) Take the master customer list, and separate out the Residential and Small Commercial populations.
2) Filter out by account number any customer that has participated in a SourceGas program in 2010-2012.
3) For the Residential population, they were further instructed to filter out the Non-Recipient Group from Home Energy Reports.
4) From these filtered groups, a random draw of 20,000 residential customers and 5,000 small commercial customers were provided to the evaluators.

The dataset provided to the evaluators included:

- Customer name
- Account number
- Premise ID
- Address
- District

The evaluators conducted these surveys with a couple of purposes in mind:

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Program awareness & market barriers. The evaluators used the non-participant surveys to assess levels of market awareness for SourceGas DSM programs. The surveys were also used to address reasons for non-participation, and to obtain feedback from non-participants as to what SourceGas could possibly change to make the programs more appealing to them.

Market potential assessment. The SourceGas programs have been designed and implemented without the benefit of guidance from a market potential study. As such, there may be areas in which marketing and outreach resources could have been allocated in an inefficient manner. The evaluators leveraged the opportunity presented by the non-participant survey to ask customers questions related to their natural gas usage. Examples of such questions included:

- For residential customers, what percent have tankless vs. storage tank water heaters, and how old are the units.
- For commercial, customers were asked to identify their highest gas loads, as well as to provide the age of the equipment serving these gas loads.

Though this effort cannot substitute for a full market potential study, it can be used to provide some guidance to SourceGas in directing their program resources.

2.3.1 Residential Non-Participant Surveying

The evaluators conducted a non-participant survey with a sample of 300 residential customers.

The non-participant survey addressed customer awareness, barriers to participation, and potential non-participant spillover for:

- Heating Equipment Rebates;
- Water Heating Equipment Rebates; and
- Water Conservation Kits.

Questions addressed in this survey included:

- What programs offered by SourceGas (if any) is the customer aware of?
- If they are aware, why haven't they participated?
- What could SourceGas do to make these programs more appealing?
- Are there any demographic characteristics of non-participants that differ significantly from participants? How should these differences inform program marketing and outreach strategies?
- Are there differences in program awareness across SourceGas districts?

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- Have the non-participants installed any energy efficient equipment in the past year? Were these installations influenced by outreach and education efforts from SourceGas' DSM program offerings?

2.3.2 Commercial Non-Participant Surveying

The SourceGas tracking data for small commercial did not include business type. The evaluators added business type to this data set by researching the specific customer names and addresses of the sample drawn prior to beginning the survey. From this, facilities were classified as follows:

- Small Office (<30k sq. ft.)
- Large Office (>30k sq. ft.)
- Government Office
- Retail/Service
- Grocery
- K-12 Education
- College/University
- Agriculture
- Industrial
- Medical
- Assembly/Worship
- Warehouse
- Fast Food Restaurant
- Casual Dining

2.3.2.1 Small Commercial

The evaluators split off the Fast Food Restaurant and Casual Dining customers into a separate population. The survey for non-food service customers was focused on the Heating and Water Heating rebate programs, as these customers are unlikely to be served by central HVAC heating (precluding the need to ask about the Commercial Boiler program).

2.3.2.2 Food Service

For food service customers, a separate survey was conducted with one sample of 40, covering all SourceGas districts. This was to ensure sufficient representation of customers with food service equipment as an end-use, though these respondents were asked questions pertaining to all SourceGas commercial programs.

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2.3.2.3 Large C&I

The non-participant list for Large C&I is significantly more limited than for residential or small commercial. To ensure that the evaluation efforts did not impede implementation efforts for the C&I Solutions Program, the evaluators coordinated with CLEAResult in finalizing a non-participant list, reviewing their list of eligible SourceGas customers and assessing which customers had shown no interest in the program. In this market sector, program awareness is largely not a problem; it is a small sector with high potential savings per-customer, and as such the facilities within this sector are targeted for personalized marketing efforts. A sample of 30 was drawn list of customers from CLEAResult that indicated no interest in SourceGas program offerings.

2.3.3 Non-Participant Survey Summary

Table 2-1 summarizes the non-participant survey effort, including sample sizes, program applicability, and use of the surveys by program.

Table 2-1 Non-Participant Survey Summary

Survey	*Sample Size*	*Program*
Residential Non-Participant Survey	300	Heating Equipment
		Water Heating Equipment
		Water Conservation Kits
Small Commercial Non-Participant Survey	140	Heating Equipment
		Water Heating Equipment
		C&I Solutions – DI Component
Small Commercial Food Service Non-Participant Survey	40	Commercial Cooking Equipment
Large C&I Non-Participant	30	C&I Boiler
		C&I Solutions DI & Custom

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3. Portfolio-Level Findings

This chapter provides a summary of the portfolio-level findings and any cross-cutting evaluation activities that occurred over the course of the 2012 EM&V Effort. Specifically, this chapter includes:

- A summary of program and portfolio performance in 2012;
- A summary of EM&V activities and expenditures in 2012;
- High-level findings that cut across programs.

3.1 Summary of EM&V Effort

2012 is the first program year where the SourceGas DSM portfolio was subject to a full-scale M&V effort. The 2011 M&V was limited to documentation review and interviews with program and third-party implementation staff.

Table 3-1 SourceGas DSM Portfolio 2012 EM&V Expenditures

Evaluators' EM&V Expenditures	2012 EM&V Expenditures	2012 Program Expenditures	Evaluator's EM&V as % of Budget
$60,386.35	$237,318.76	$1,673,508.62	3.6%

None of the programs in the SourceGas DSM Portfolio had received a formal process evaluation at this point. As such, all programs received both impact and process evaluation in 2012. Table 3-2 summarizes the data collection efforts for the 2012 EM&V effort. "Interviews" should be distinguished from "Surveys" in that "Interviews" reflect semi-structured, in-depth discussions with high-level program actors (such as utility staff and third-party implementation staff) whereas surveys are fully-structured and typically conducted with program participants.

Table 3-2 Summary of Data Collection Efforts

Program	# Site Visits	# Surveys	# Interviews
Heating Equipment Rebates	15	81	15
Water Heating Equipment Rebates	12	39	12
C&I Boiler Equipment Rebates	0	0	3
C&I Solutions	27	36	16
Commercial Cooking Equipment Rebates	0	0	3
Home Energy Reports	0	480	2
Water Conservation Kits	0	80	2
Residential Non-Participants	-	300	-
C&I Non-Participants	-	210	-
Total	54	1,226	53

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3.2 Tests of Portfolio Comprehensiveness

The Arkansas Public Service Commission has in place a set of criteria in order to determine whether a DSM portfolio qualifies as "Comprehensive." These criteria are:

- ***Factor 1:*** *Whether the programs and/or portfolio provide, either directly or through identification and coordination, the education,* ***training****, marketing, or outreach needed to address market barriers to the adoption of cost-effective energy efficiency measures;*

In 2012 this was not achieved. Two programs, C&I Boiler Equipment and Commercial Cooking Equipment fell far short of participant goals. These programs have a new implementation contractor but this contractor did not begin until October, and as such their performance on these two programs cannot be adequately assessed.

- ***Factor 2:*** *Whether the programs and/or portfolio, have adequate* ***budgetary****, management, and program delivery resources to plan, design, implement, oversee and evaluate energy efficiency programs;*

In 2011 and most of 2012, the SourceGas programs were not adequately staffed. However, with the addition of a third party implementer for Heating Equipment, Water Heating Equipment, C&I Boiler Equipment, and Commercial Cooking Equipment programs, the staffing levels for their DSM portfolio have increased significantly, and are adequate for a portfolio of this size.

- ***Factor 3:*** *Whether the programs and/or portfolio, reasonably address all major* ***end-uses*** *of electricity or natural gas, or electricity and natural gas, as appropriate;*

As presently constituted, the SourceGas DSM portfolio offers prescriptive rebates for:

- Residential space heating;
- Residential water heating;
- Water conservation equipment;
- Commercial space heating;
- Commercial water heating; and
- Commercial food service.

Gaps in the commercial sector are filled with the custom options available through the Commercial & Industrial Solutions program. The one area where the SourceGas portfolio may be lacking is in residential building envelope rebates. Presently, these are offered through SourceGas' participation in the Arkansas Weatherization Program. This program has participation criteria that may make it difficult for many SourceGas customers to apply. It is the Evaluator's recommendation that SourceGas investigate the feasibility of offering prescriptive incentives for residential building envelope improvements to those not eligible for current program offerings. This has been done

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with marked success in the joint partnership between Oklahoma Gas & Electric and the Arkansas Oklahoma Gas Corporation with their weatherization program that runs parallel to the AWP.

- ***Factor 4:*** *Whether the programs and/or portfolio, to the maximum extent reasonable, comprehensively address the needs of customers at one time, in order to avoid* ***cream-skimming*** *and lost opportunities*

The portfolio covers a wide range of end-uses. This helps to ensure that the comprehensive needs of customers are being met. Some programs do offer "cream-skimming" measures as a teaser or introduction to energy efficiency, with the intent that the savings from these measures will induce further participation.

- ***Factor 5:*** *Whether such programs take advantage of opportunities to address the comprehensive needs of* ***targeted customer sectors*** *(for example, schools, large retail stores, agricultural users, or restaurants) or to leverage non-utility program resources (for example, state or federal tax incentive, rebate, or lending programs)*

The evaluators found participation among a wide range of market segments in the SourceGas service territory. This factor is covered in most respects. Areas identified as needing further outreach include:

- **Residential storage tank water heating.** As stated later in this report, the evaluators concluded that this segment would be better-reached with incentives delivered at the distributor level.
- **Ceiling Insulation & Building Envelope Improvements.** The SourceGas portfolio faces a gap in that the only program that offers residential building envelope improvements is the Arkansas Weatherization Program[6]. In this instance, SourceGas is cofounding efforts by another entity (the Arkansas Community Action Agencies Association). This program is limited in scope, and as such the SourceGas portfolio misses on savings opportunities from these improvements in their general residential market.
- ***Factor 6:*** *Whether the programs and/or portfolio enables the delivery of all achievable,* ***cost-effective*** *energy efficiency within a reasonable period of time and maximizes net benefits to customers and to the utility system;*

This factor has to be balanced with the demands of Factor 4; it is simultaneously insisted that the SourceGas DSM portfolio avoid cream-skimming and maximize cost-effectiveness, when these should be recognized as two important, yet potentially conflicting goals. It has been the evaluators' finding that SourceGas has quite

[6] The Arkansas Weatherization Program (AWP) is a statewide effort funded by four electric and three gas utilities to leverage federal funds in providing weatherization services for hard-to-reach market segments. Though SourceGas pays for part of the program and claims savings from this program, it is evaluated in a separate report.

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successfully balanced these two demands, in offering a wide range of available energy efficiency measures and funding significant outreach while still maintaining cost-effectiveness in the face of rapidly declining natural gas commodity prices.

- ***Factor 7:*** *Whether the programs and/or portfolio, have evaluation, measurement, and verification "EM&V") procedures* ***adequate*** *to support program management and improvement, calculation of energy, demand and revenue impacts, and resource planning decisions.*

With the added implementation contractors, most programs have adequate quality control measures, including invoice documentation review and random post-inspection. Custom projects are in particular held to high scrutiny, with every project receiving M&V according to IPMVP protocols.

The one program that seemed to lack adequate QC procedures was Water Conservation Kits. The evaluators found that 6.7% of survey respondents indicated not having received all equipment listed in the kit.

3.2.1 Portfolio-Level Findings

These data were used to inform findings and recommendations regarding changes and improvements that could be made at both the utility and regulatory level. Issues affecting the DSM portfolio in a cross-cutting manner include:

- The structure of annual goals vs. implementation cycle goals;
- Effects of oversubscription and available responses;
- Uncertainty surrounding the TRM updating process; and
- Difficulties surrounding cross-utility coordination.

The issues examined within these categories are summarized in Table 3-3.

Table 3-3 Portfolio-Level Summary of Issues & Recommendations

Issue	***Raised in 2011 Process Evaluation?***	***Consequences***	***Steps Undertaken to Address***	***Additional Recommended Steps***
Utilities having three single-year goals, with no incentive to over-perform.	Yes.	Mid-year shutdown of programs. Loss of program momentum and institutional capital.	None at this time.	Allow over-performance in programs to be credited to the subsequent program-year goal.
Retroactive TRM deemed savings updates.	No.	Uncertainty on the part of the utilities, who respond by attempting to oversubscribe programs to mitigate risk of lost savings from deemed revision.	An exemption was granted for measures that had new data collection requirements in TRM V2.0 updates.	Change TRM updates to be prospective-only
No set framework for cross-fuel coordination between utilities.	Yes.	Lost collaboration opportunities. Higher program costs. Less cohesion in marketing efforts.	Initial discussions have begun to establish the basis of and parameters for cross-fuel coordination.	Develop a framework where utilities can “sell” their accrued cross-fuel savings to the electric utility serving the applicable region.
Lack of clarity in TRM revision process as to who can submit proposed amendments.	Yes.	Under-utilization of existing expertise from parties external to the IEM team.	The IEM has established a framework where external parties can submit workpapers for review and comment to be added to the TRM.	None.
Residential building envelope program offerings are limited	No	Lost savings opportunities. Failure to meet ASPC comprehensiveness guidelines	SourceGas has begun discussion with SWEPCO to file an amendment to offer a joint-run weatherization program that will allow for greater participation from SourceGas’ residential customers.	Engage in similar discussions with Entergy.

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3.2.1.1 Portfolio-Level Detailed Findings

The issues affecting the overall portfolio include:

Utilities having three single-year goals, with no incentive to over-perform. The current goal structure for DSM programs is to set three discrete one-year goals over a three-year implementation cycle. Should a utility's portfolio over-perform in a given year, this increased savings is not credited towards their next year's goal. As such, it is a concern among SourceGas and other gas utilities that over-performance would remove some of their available participation market, making future goals harder to attain without providing tangible benefit for doing so. This causes the utilities to shut down programs in such instances, delaying the participation process and curtailing program momentum.

Retroactive TRM deemed savings updates. The updates to TRM V2.0 values were retroactive to the beginning of the 2012 program year. These updates were not completed until September 2012. This put SourceGas in the position of uncertainty for the first eight months of implementation, as it was unclear as to what savings values to expect for deemed measures. Due to this, SourceGas was not able to adjust participant goals by program until Q4 of the 2012 program year, leading to eight months of suboptimal allocation of resources.

No set framework for cross-fuel coordination between utilities. SourceGas has expressed interest in engaging in program coordination with Entergy and SWEPCO where feasible. Potential areas of coordination include:

- Running of joint building-envelope incentive programs. This would allow for SourceGas and an electric utility to split the incentive cost in cases where a building envelope improvement provides both electric and natural gas savings. This would follow a model similar to the AOG/OG&E Weatherization Program, with the exception being that the AOG/OG&E program provides the measures free of charge.
- Joint implementation of low-flow mailer kits. SourceGas cannot control what water heating fuel type is used by customers that receive mailer kits; they can only determine whether the residence has an active SourceGas account. As such, the Water Conservation Kits Program produces electric savings, and though SourceGas can incorporate these savings values into their program TRC score, it is the preference that these savings be "sold" to the appropriate electric utility, so as to reduce program costs.
- Improved coordination for C&I Solutions projects. There have been instances of customers participating in Entergy's and SourceGas' C&I Solutions program, with a project that produces savings for both fuel types. Presently, this requires two sets of applications, signatures, and incentive agreements, creating multiple layers of administration and sizable burden on the part of participating customers.

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- *Lack of clarity in TRM revision process as to who can submit proposed amendments.* At the outset of the TRM revision process in 2012, there was some uncertainty on the part of utilities and implementation staff as to who could propose changes or additions to the TRM. It has since been clarified that utilities, their evaluators, or third party implementers to submit work papers for new measures, with the IEM engineering staff then vetting and approving these papers.

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4. Heating Equipment Rebates

The Heating Equipment Rebates Program provides incentives to residential and business customers for high efficiency heating equipment. Eligible measures for this program include:

- $300 for Direct Vent Wall Furnaces with 80% AFUE or higher;
- $400 for Gas furnaces with 90%-94.9% AFUE;
- $600 for Gas furnaces with 95% or higher AFUE; and
- $400 for Hydronic Heating Systems.

Further, a $50 trade ally incentive is provided for all qualifying equipment. The Space Heating Equipment Rebates is targeted at Residential and Small Commercial market sectors. Retrofit and New Construction applications are both allowed, utilizing the same 78% baseline AFUE. The marketing efforts for the Heating Equipment Rebates Program were largely directed at HVAC contractors; their involvement is seen as crucial, as they are generally a primary source of information for end-use customers when deciding upon a replacement system.

4.1 Program Overview

The Heating Equipment Rebates Program began in 2010. The program is designed to incentivize the purchase of high efficiency non-central space heating equipment. Presently, the program incentivizes high efficiency furnaces, direct vent heaters, and hydronic heating systems. Incentive levels were raised significantly in 2011 and 2012 in order to counteract the loss of American Recovery and Reinvestment Act-funded (ARRA) incentives. The program was internally implemented by SourceGas until September 2012, at which point CLEAResult Consulting (CLEAResult) was brought on board to implement SourceGas' prescriptive programs.

The history of program performance and expenditures is presented in Table 4-1.

Table 4-1 Heating Equipment Rebates Historical Performance against Goals

Program	# Participants		Budget		Net Therms	
Year	Actual	Goal	Spent	Allocated	Achieved	Goal
2010	-	-	$88,812	$201,184	-	-
2011	533	740	$226,859	$231,336	47,087	48,730
2012	491	821	$425,167	$256,612	63,672	54,090

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4.1.1 Participation Summary

4.1.1.1 Residential Participation Summary

The 2012 Heating Equipment Rebates Program had a total of 491 processed rebates. The participation comprised:

- 284 residential rebates at 258 premises; and
- 207 commercial rebates at 188 premises.

At the equipment level, residential participation included:

- 16 furnaces with 90-94.99% AFUE;
- 267 furnaces with 95% AFUE or greater; and
- 1 Hydronic heating system.

4.1.1.2 Commercial Participation Summary

Commercial participation was divided in two subcategories:

1. Municipal housing authorities:
    a. Municipal housing authorizes received rebates for 107 units with 90-94.99% AFUE and 70 rebates for units with 95% AFUE or greater;[7]
2. And commercial facilities, which received incentives for 17 95%+ AFUE furnaces.

[7] The decision-makers for housing authorities are surveyed as a commercial participant. They own the homes and pay for the retrofits, but the bills are paid by the end-use customer.

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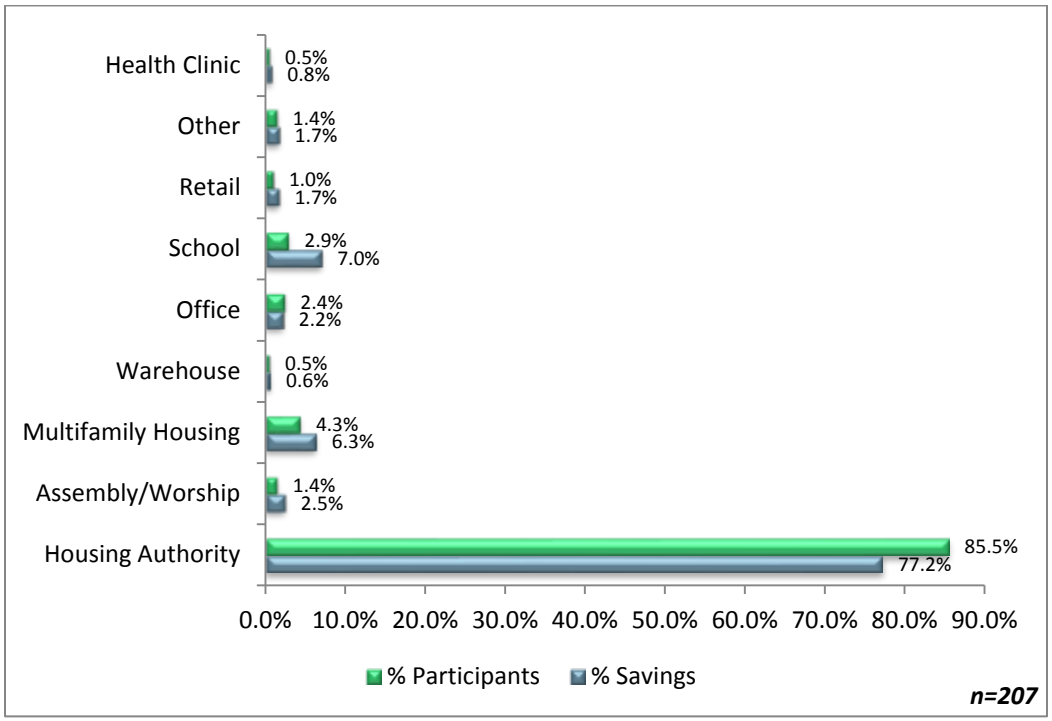

Figure 4-1 Heating Equipment Rebates Summary of Commercial Participation by Facility Type

The bulk of commercial participation was through municipal housing authorities. Savings for these facilities were calculated using residential deemed protocols but the homes are owned by the housing authority that pays for the upgrades. One housing authority in particular was responsible for 154 incentives. These units were single-family homes owned by the municipality, but are metered at the end-user, with the occupants paying the energy bills. It is analogous to a landlord-tenant relationship.

4.2 Heating Equipment Rebates Process Evaluation

The evaluators conducted the process evaluation of the Heating Equipment Rebates Program with several researchable issues in mind. In addition to the general questions outlined in Section 2.2.3, questions addressed by this evaluation included:

- Can the Heating Equipment Rebates Program overcome the loss of federal incentives for high efficiency furnaces?
- What drives furnace replacements and residential participation? To what extent is the participation pool the passively-developing pool of replacements on equipment failure vs. inducement to early replacement of functioning equipment? Were there instances of replacement that were driven by the customer needing to replace their central air conditioner?
- What level of regulatory risk does the program face with the possibility of advancing efficiency standards?

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- Are there measures that can be added to supplement the program?

The efforts detailed for the process evaluation in Section **Error! Reference source not ound.** provided the necessary research and information to address these questions.

4.2.1 Data Collection Activities

The process evaluation of the Heating Equipment Rebates Program included the following data collection activities:

- *SourceGas Program Staff Interviews*. The evaluators interviewed staff at SourceGas involved in the administration of the Heating Equipment Rebates Program. These interviews built upon interviews conducted during the 2011 Limited Process Evaluation, in which the evaluators collected initial background information on program history and implementation. These interviews captured any operational changes on SourceGas' side, as well as informing the evaluators as to any new developments in the program. The evaluators conducted in-depth interviews with SourceGas staff involved in administration of the Heating Equipment Rebates Program.
- *Program Implementation Staff Interviews*. In August of 2012, SourceGas brought on CLEAResult Consulting to implement their prescriptive programs. Prior to this, SourceGas' prescriptive programs were internally implemented with an external rebate processor handing application review. This rebate processor was replaced, as CLEAResult took over program implementation, application review, and rebate processing for the Heating Equipment Rebates program.
- *Program Marketing Materials Review*. The evaluators collected marketing materials used by the Heating Equipment Rebates Program. This included customer mailers, audit reports, and a review of the SourceGas program website. This was compared against marketing materials from successful programs run in other territories in informing marketing improvements.
- *Review of Program Quality Control Procedures*. The evaluators reviewed the QC procedures in place for the Heating Equipment Rebates Program. This included review of pre- and post-installation inspection procedures, the M&V procedures in place by SourceGas and CLEAResult, and identification of any issues or gaps in the program QC process.
- *Participant Surveying*. The evaluators surveyed separate samples of residential and non-residential participants in the Heating Equipment Rebates Program. In addition to their use in developing free-ridership and spillover estimates, these surveys informed the process evaluation of the Heating Equipment Rebates Program. These surveys addressed issues including participant satisfaction with the program offerings, demographics and firmographics, and other contextual issues regarding the participation process.

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Table 4-2 summarizes the data collection for this process evaluation effort. This includes the titles, role, and sample sizes for data collection.

Table 4-2 SourceGas Heating Equipment Rebates Data Collection Summary

Target	Component	Activity	N	Role
SourceGas Program Staff	Manager of Energy Efficiency	Interview	1	Overall administration of SourceGas DSM programs. This manager is involved in the larger strategic decisions associated with the DSM portfolio, and is involved with the Heating Equipment Rebates Program and in the overall coordination of utility resources.
CLEAResult Staff	Energy Engineer	Interview	1	Responsible for technical review and HVAC contractor outreach.
	Program Coordinator	Interview	1	Handles day-to-day operations, including mass market outreach, application review, billing, and logistics
Program Participants	Residential	Survey	80	The evaluators selected 80 residential participants at random for surveying
	Commercial	Survey	1	The decision maker for one large participating housing authority was interviewed
Non-Participants	Residential	Survey	300	300 residential non-participants were interviewed as part of a general population survey to addresses market barriers and program interest.
	Commercial	Survey	210	210 commercial non-participant surveys were conducted along similar lines
Vendor Interviews	Participating	Interview	8	Participating vendors drive the program and receive incentives for top-level installations
	Non-Participating	Interview	4	Non-participating vendors provide feedback as to behaviors occurring absent the program.
Marketing & Outreach	Marketing Materials	Literature Review	-	The full scope of paper and electronic marketing materials used in implementation for the Heating Equipment Rebates Program was reviewed by the evaluators.
Evaluation History	Prior Evaluation Reports	Literature Review	1	Findings from the Limited Process Evaluation conducted in 2011 were reexamined to determine to what extend recommendations were implemented
	Comparative Review	Literature Review	-	Evaluation reports of similar programs conducted elsewhere were examined in order to provide recommendations for improvement based upon lessons learned elsewhere.

4.2.2 Process Results & Findings

This section will present the results and key findings from the data collection Activities. These findings are based upon interviews with utility staff, implementation staff, surveys with participants, and thorough and in-depth literature review.

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4.2.2.1 Program Theory & Design

The Heating Equipment Rebates Program was designed to provide a simplified program that HVAC contractors could use to sell high efficiency equipment to a wide range of customer classes. The program is largely focused on high efficiency furnaces in the residential and small commercial sector because these two customer classes are often served by the same contractors. This contrasts with large C&I space heating, which often involves a central plant and would utilize a difference class of contractor for installation.

After interviewing SourceGas program management staff, it was found that the primary effort of the Heating Equipment Rebates Program was to educate Arkansas HVAC contractors on the installation procedures for premium-efficiency condensing furnaces (with 95% AFUE or greater). It was perceived that this class of equipment was facing a barrier to market penetration in that the installation is more complicated than a simple swapping of the furnace; the flue and ventilation system require upgrading and the contractor must ensure that condensate is properly discharged. It was thought that by educating HVAC contractors and providing a simple application for these contractors to follow, the marketing of the program would then be driven by companies that already have “boots on the ground” and access within the residential and small commercial market segments.

4.2.2.2 Program Administration

The Heating Equipment Rebates Program is overseen by the Manager of Energy Efficiency at SourceGas. This manager is responsible for oversight of all SourceGas programs. When the SourceGas programs were internally-implemented, this was problematic in being an excessive workload for the sole staff-member. With the addition of third-party implementation, this problem is alleviated, though as processes are put in place with the implementer the internal staffing levels at SourceGas should be reexamined.

This manager’s responsibilities include oversight of the third party implementation staff and guidance of the mass-marketing efforts.

The program is supported by implementation staff at CLEAResult. CLEAResult took over the program in September 2012. Their responsibilities include targeted marketing, application and rebate processing, and quality control.

The evaluators found that the staff associated with the Heating Equipment Rebates Program was well-trained in the specific equipment and issues associated with the program. There was marked experience both in technical and marketing fields, allowing for successful implementation of the program.

4.2.2.3 Program Implementation and Delivery

As a fully-prescriptive program, The Heating Equipment Rebates Program receives applications for already-purchased equipment (no measures require pre-screening).

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There is a pre-prescribed menu of accepted equipment types, without the option for a custom component. The steps involved include:

- *Purchase of Equipment*. The customer has selected and purchased the space heating equipment. The rebate form is generally filled out at this time by the equipment dealer, which helps to ensure accurate information recorded in the application.
- *Application Submittal*. Applications need to be submitted within 90 days of purchase or at December 31 of the calendar year of purchase, whichever comes first. Information in the application includes full Customer and Dealer information (names, contact information, gas account number, and dealer information) specifications of the equipment (type, BTU, manufacturer, model #, and serial #), a copy of the purchase invoice, and the preferred method of contact for follow-up. The application is available in paper and .pdf form. The application uses multiple-choice selections for most key inputs (such as facility and system type), minimizing errors associated with application submittal. Additionally, areas required in order for rebates to be processed are highlighted in yellow, with bold-print warnings and reminders as to needed information and filing deadlines.
- *Application Review*. CLEAResult in-house rebate processing staff reviews all incoming applications to ensure that the account number is served by SourceGas and that the equipment model qualifies for the program. At this time, any discrepancies are sorted out with the customer, and if necessary the application may be resubmitted. The applications are then entered into a database that can provide customized Excel-based reports.
- *Rebate Payment*. Rebate payment occurs 6-8 weeks after receipt of the accepted application. Rebates are paid solely to the end-use customer listed in the application; the customer cannot sign over their rebate to a third party (such as a vendor or Trade Ally).
- *Quality Control Inspection*. CLEAResult internally QA/QC inspects a sample of residential and commercial rebates. Such procedures were not in place before they were brought on board, and should help to ensure verified savings by the Heating Equipment Rebates Program

4.2.2.4 Program Marketing & Outreach Efforts

Much of the marketing efforts associated with the Heating Equipment Rebates Program are through the contractor outreach and training. SourceGas held training sessions for interested HVAC contractors, providing both technical training on the installation of condensing furnaces and step-by-step instruction on the application process for the program. This ensured minimal application error, and participating contractors remarked that they found the Heating Equipment Rebates Program to be very easy to use and incorporate into their sales efforts.

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In addition to the contractor outreach, SourceGas engaged in mass-market and targeted-market program promotion. This included:

- For residential customers, the Heating Equipment Rebates Program was promoted through traditional program advertisement channels, such as bill inserts, internet, and media advertisement. The marketing materials were found to include estimates of monthly bill savings as well as information on the importance of natural gas conservation in helping the environment. Further the marketing materials stressed the added comfort of a new furnace. The evaluators found that the marketing materials provided a wide range of messages as to the reasons one might choose to participate, covering a wide swath of potential interest-triggers within the residential segment.
- For non-residential customers, Heating Equipment Rebates Program staff engaged in specific targeted marketing efforts for segments with large numbers of smaller, non-central plant heating systems. This included outreach to municipal housing authorities, school districts, large churches and private schools, and small office complexes. This segmentation ensures that marketing expenditures were properly targeted to audiences most likely to have opportunities to participate.

4.2.2.5 Tracking Database Review

The evaluators received a tracking database developed by CLEAResult. The initial gathering and compiling of tracking data is crucial in facilitating a smooth evaluation effort, and as such the evaluators reviewed this tracking data in order to verify that it contained the required data to:

(1) Recreate energy savings calculations;

(2) Contact participants and trade allies; and

(3) Ensure proper rebate payment amounts;

<u>Energy Savings Calculation Data</u>

After reviewing the tracking data base, it was found to include:

- Unit capacity (BTU); and
- Unit efficiency (AFUE);

The tracking data did not contain an indicator for weather zone. This should be added as a regular component of tracking data to allow for easy recreation of savings calculations. Further, for commercial, there was not a facility type category. This should be added as well, listing the facility type from the TRM V2.0 EFLH look-up table.

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Participant and Trade Ally Contact Information

After reviewing the data, the evaluators found that it contained full and comprehensive tracking data for residential program participants, including contact name, address, phone number, email, and a unique rebate number. However, for commercial participants, the tracking data did not list a contact name; only a name of the business that participated was included. The tracking data should be modified to have an extra field for the principle point of contact at the business, in order to better-facilitate the evaluation process.

4.2.2.6 Application Review

After reviewing the program application, the evaluators would recommend the following changes:

1. **Modify facility type list to correspond to TRM V2.0 guidelines.** TRM V2.0 established an EFLH list for commercial space heating; the program application should reflect this list.
2. **Change the value in the facility size question from "Less than or equal to 25,000 sq. ft." to "Less than or equal to 30,000 sq. ft.".** This will ensure proper delineation between small and large offices as defined by TRM V2.0.

4.2.2.7 Quality Control Procedures Review

With the addition of CLEAResult as the third-party program implementer, quality control procedures for the Heating Equipment Rebates program were increased markedly. Specifically, the evaluators found:

1. All applications are reviewed by CLEAResult rebate processing staff. In this process, it is confirmed that the customer has an active SourceGas account, has the necessary documentation to prove purchase and installation, and that the unit is AHRI tested and qualified for the appropriate incentive.
2. A census of commercial applications was post-inspected. Though limited in number, CLEAResult opted to post-inspect all commercial applications, with the goal being to provide an early secondary check to their documentation review process. It is the intention of CLEAResult staff to move to random post-inspection as participation levels increase and application and documentation review processes are fully formalized.
3. A random sample of residential applications was post-inspected. As part of their program plan, CLEAResult randomly inspected 10% of residential applications.

4.2.3 Residential Survey Response

The evaluators completed 80 surveys with residential program participants in the Heating Equipment Rebates Program. The disposition of the customers contacted is

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presented in Table 4-3. Customers listed as "No answer/answering machine" received three attempts at contact before the evaluators substituted an alternate sample point.

Table 4-3 Heating Equipment Rebates Residential Survey Disposition

Disposition	***N***
Completed surveys	80
No answer/answering machine	96
Callback- has not started survey	8
Callback to complete- has started survey	3
Initial refusal	4
Disconnected	7
Business number	8
Computer tone	1
Hearing/Language barriers	0
Break-off	1
Wrong number	0
Blocked number	5
Total called	213

Further, the evaluators collected demographic information on the respondents during the survey. These were compared against non-participant residential demographics in order to address differences between participants and the general population. These are summarized in Figure 4-2 through Figure 4-4.

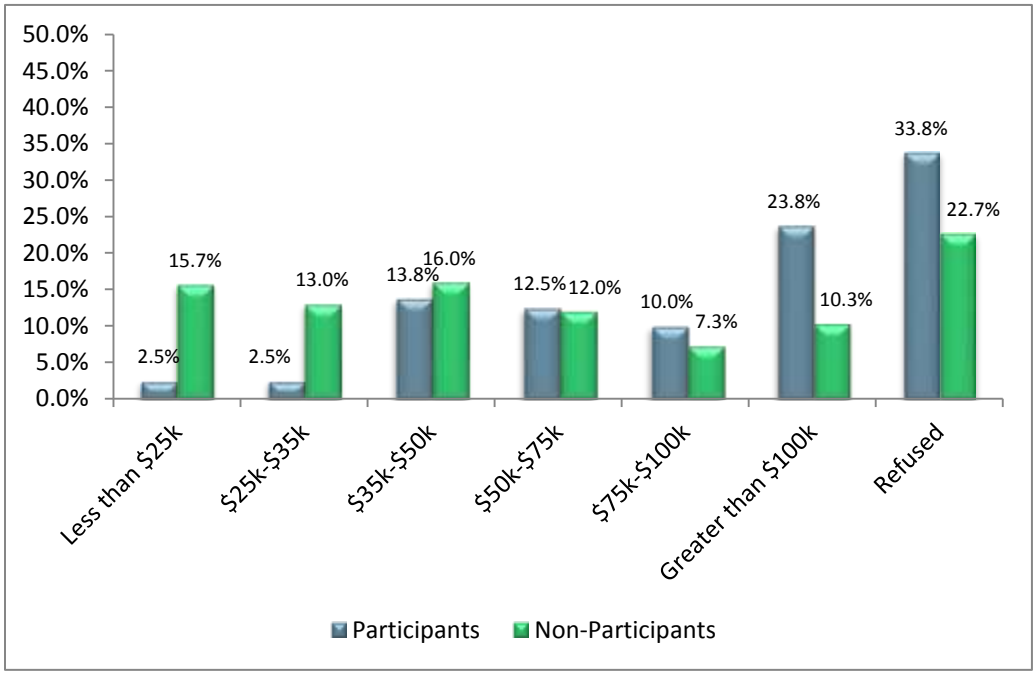

Figure 4-2 Differences in Income between Participants and Non-Participants

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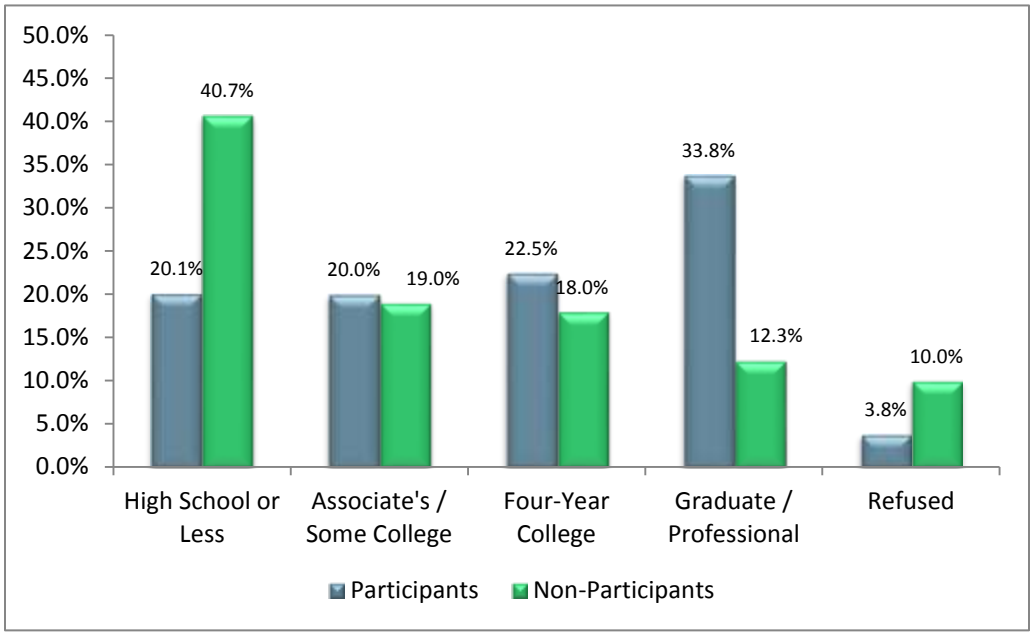

Figure 4-3 Differences in Education between Participants and Non-Participants

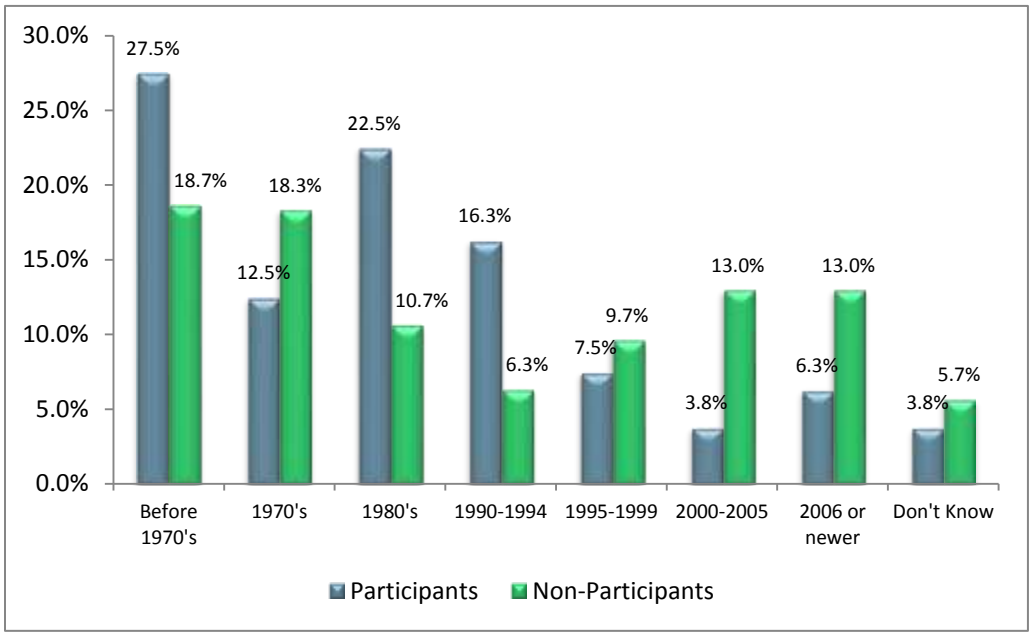

Figure 4-4 Differences in Home Age between Participants and Non-Participants

From the demographic analysis, the evaluators found that:

- Program participants have significant higher income levels than non-participants. The percent of respondents with income of $35,000 or as well as $100,000 or above displayed differences significant at the 90% confidence level.

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- Program participants are more educated than non-participants. The rate of college-education among participants was higher and significant at the 90% confidence level.
- Participant homes are older than non-participants. Twenty seven percent of participant homes are more than 40 years old, compared to 18.7% of non-participants. This value was also significant at the 90% confidence level.

The differences in participant and non-participant demographics are not surprising; the equipment rebated through this program is expensive and as a result participation is more likely to occur among households with disposable income. Insomuch as income is correlated with education level, this explains the difference in education level among participants and non-participants as well. Difference in home age is likely attributable to newer homes being less likely to have a failed furnace.

Program staff could use these findings to direct marketing dollars; if areas with more affluence and higher education levels are more likely to participate, then fewer marketing dollars are likely needed to capture savings potential from these regions. Program staff should investigate the possibility of sub-setting marketing efforts and expenses on the basis of census data reflecting the income and education levels by zip code, in order to direct marketing efforts at segments that require further education and outreach in order to induce participation.

4.2.3.1 Program Awareness

SourceGas' marketing of the Heating Equipment Rebates Program is driven through multiple channels, including both customer-direct outreach and marketing through HVAC contractors. Fifty-six percent of residential respondents surveyed indicated having learned of the program from an HVAC contractor. Other commonly indicated sources of program awareness included word of mouth from friends and relatives (11%), SourceGas mailers (10%), and from salesmen at equipment retailers (7%). The sources of awareness for the Heating Equipment Rebates Program are summarized in Table 4-4.

Table 4-4 Heating Equipment Rebates Sources of Program Awareness

Source of Awareness	*Residential*
Mailer	5.0%
Newspaper or magazine article/ad	1.3%
Contractor	56.3%
Word of mouth/friends & relatives	10.0%
TV ad	2.5%
SourceGas bill insert	5.0%
SourceGas brochure	1.3%
SourceGas website	2.5%
Retailer/in-store	5.0%
Other	5.0%
Don't Know	8.8%
N	80

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Most participants learned of the program through their HVAC contractors, who have been actively engaged by SourceGas in marketing the program. Table 4-5 summarizes the contractor interactions of residential respondents, subdivided between customers that indicated that their participation was based on emergency replacement versus non-emergency replacement.

Table 4-5 Residential Space Heating Contractor Interactions

Source of Awareness	N	Spoke to Multiple Contractors	Received Multiple Bids	Satisfaction with Information from Contractor	Satisfaction With Quality of Work by Contractor
Emergency Replacement	20	55.0%	45.0%	4.50	4.65
Non-Emergency Replacement	60	56.7%	52.3%	4.52	4.73

Twenty-five percent of respondents indicated that their replacement was an emergency replacement due to failed equipment. Of the 75% that indicated having time to plan the replacement, 31.7% stated that they felt the furnace was close to failure. Thus, 68.3% of the total respondents indicated having replaced a furnace that was functional and not expected to soon fail. The evaluators found that many customers were engaged in simultaneous replacement of their furnace and central air conditioning. Eighty-one of respondents stated that they replaced their central air conditioning at the same time as they replaced their furnace. However, only 18.75% of these customers received an incentive from their electric utility for the air conditioner, despite 52.5% of these customers residing in areas with available incentives for high efficiency air conditioning. It is quite likely that if the HVAC contractors were jointly engaged by the electric and gas utilities, these customers could have been upsold on a high efficiency central air conditioner through programs run by one of the Arkansas electric IOUs. It is likely the case that these contractors were not engaged by the electric utilities in promoting high efficiency air conditioning, and this resulted in lost potential participation.

4.2.3.2 Reasons for Participation

Respondents were asked a series of questions addressing their reasons for installing a high efficiency furnace, and to indicate which reason was most important in their decision-making. Figure 4-5 summarizes the reasons given by residential survey respondents. The respondents were asked an open-ended question where they would list their reasons for participation, with the interviewers logging each reason indicated. Unsurprisingly, the most commonly indicated reason is a desire to reduce monthly gas bills. Without prompting, 9.5% of respondents indicated the rebate as a reason for purchasing a high efficiency furnace, and 12.5% listed the recommendation from their contractor as the reason.

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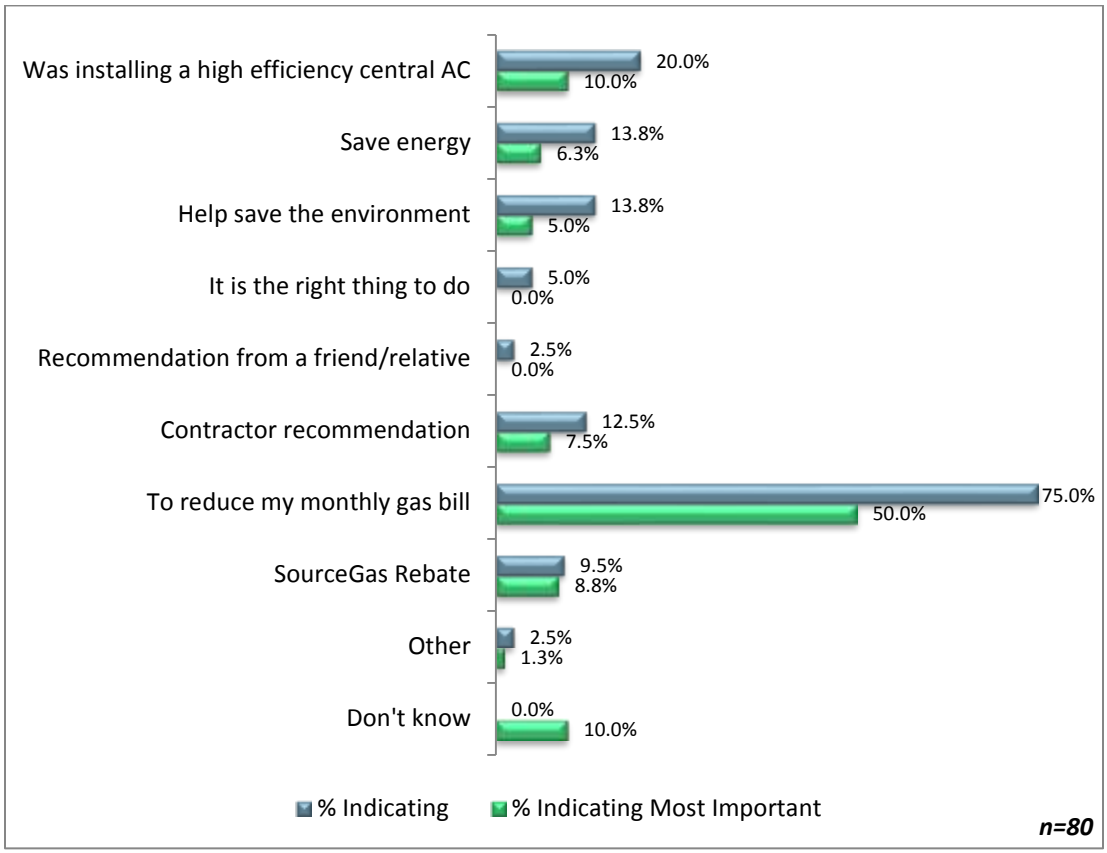

Figure 4-5 Residential Space Heating Reasons for Purchase of High Efficiency Furnaces

4.2.3.3 Program Satisfaction

Participants were asked to rate their satisfaction on a scale of 1-5, with 1 meaning "Very Dissatisfied" and 5 meaning "Very Satisfied" on a range of items related to their program experience. Table 4-6 tabulates the satisfaction results.

Table 4-6 Heating Equipment Rebates Residential Satisfaction Levels

Element of Program Experience	Very Satisfied	Somewhat Satisfied	Neither Satisfied or Dissatisfied	Somewhat Dissatisfied	Very Dissatisfied	Don't Know	Mean Score
Information provided by your contractor	70.0%	17.5%	7.5%	0%	2.5%	2.5%	4.56
The quality of installation work by your contractor	78.8%	15.0%	3.8%	2.5%	0%	0%	4.70
The performance of the space heating equipment you had installed	77.5%	12.5%	2.5%	1.3%	1.3%	5.0%	4.72
The savings on your monthly gas bill	27.5%	11.3%	18.8%	0%	0%	42.5%	4.15

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Element of Program Experience	Very Satisfied	Somewhat Satisfied	Neither Satisfied or Dissatisfied	Somewhat Dissatisfied	Very Dissatisfied	Don't Know	Mean Score
The effort required to apply for the rebate	62.5%	20.0%	10.0%	2.5%	1.3%	3.8%	4.45
The wait-time to receive the rebate	37.5%	5.0%	21.3%	2.5%	1.3%	2.5%	4.08
The service provided by SourceGas staff	41.3%	17.5%	11.3%	0%	2.5%	27.5%	4.31
Information provided by SourceGas on how to reduce your gas bill	23.8%	21.3%	20.0%	5.0%	0%	30.0%	3.91
Improvement in home comfort with the new space heating equipment	52.5%	22.5%	10.0%	0%	1.3%	13.8%	4.45
The rebate amount	57.5%	25.0%	8.8%	0%	0%	8.8%	4.53
Overall program experience	61.3%	31.3%	3.8%	1.3%	2.5%	0%	4.48

Overall satisfaction with the Heating Equipment Rebates Program is high. Respondents indicated particularly high satisfaction with the information provided by their contractor, the level of service provided by their contractor, the performance of the equipment installed, and the program rebate amount. This is indicative of a healthy program in that the SourceGas contractor network does not require official registration as a trade ally; SourceGas has taken an “open tent” approach, allowing any licensed contractor to receive a trade ally incentive. This approach was taken with the intent that it would maximize participation, and the survey data collected indicates that this approach has not sacrificed any quality of service or of equipment for the end-users.

On the operational side, customers indicated lower satisfaction levels with rebate wait-times and service provided by program staff, with scores of 4.08 and 4.31 respectively. From program staff interviews, the evaluators found that the contractor SourceGas had in place prior to September (EGIA) to process rebate applications was providing subpar performance. Customer complaints regarding the service on that end prompted SourceGas to seek a new contractor.

4.2.3.4 Residential Program Potential

The evaluators’ interviews with non-participants included a battery of questions designed to assess the state of space heating equipment in SourceGas’ residential customers’ homes, and how likely they are to replace this equipment in the near future. It was found that:

- 81.7% of respondents have gas heat. Of these, 75.9% have gas-fired furnaces, 11.0% have direct vent heaters, and 13.1% don’t know what equipment type they have.

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- 31.7% of respondents indicated that their heating system is over 10 years old. 15.3% indicated it being over 15 years old.
- 2.7% of respondents stated that they are likely to replace their furnace within the next two years, provided they do not change residences.

Respondents with direct vent heaters were more likely to be in the lower income brackets, though due to the high number of refusals on this demographic question, it could not be adequately tested for statistical significance. This subsection of the population would be difficult to capture with a traditional incentive program, in that by nature the segment that uses this equipment is less likely to be able to afford a replacement unit.

4.2.3.5 Non-Residential Program Potential

The evaluators conducted one interview for the commercial segment. This was of a municipal housing authority that purchased units for residential end-users. Do to the low participation level among commercial facilities, formal participant survey was conducted of this segment. However, evaluators surveyed 210 commercial & industrial non-participants in a general-population survey.

Seventy percent of respondents indicated that their space heating equipment is the largest consumer of gas in their facility. Eleven percent indicated that it is the second highest load in their facility. Figure 5-2 summarizes these results by facility type.

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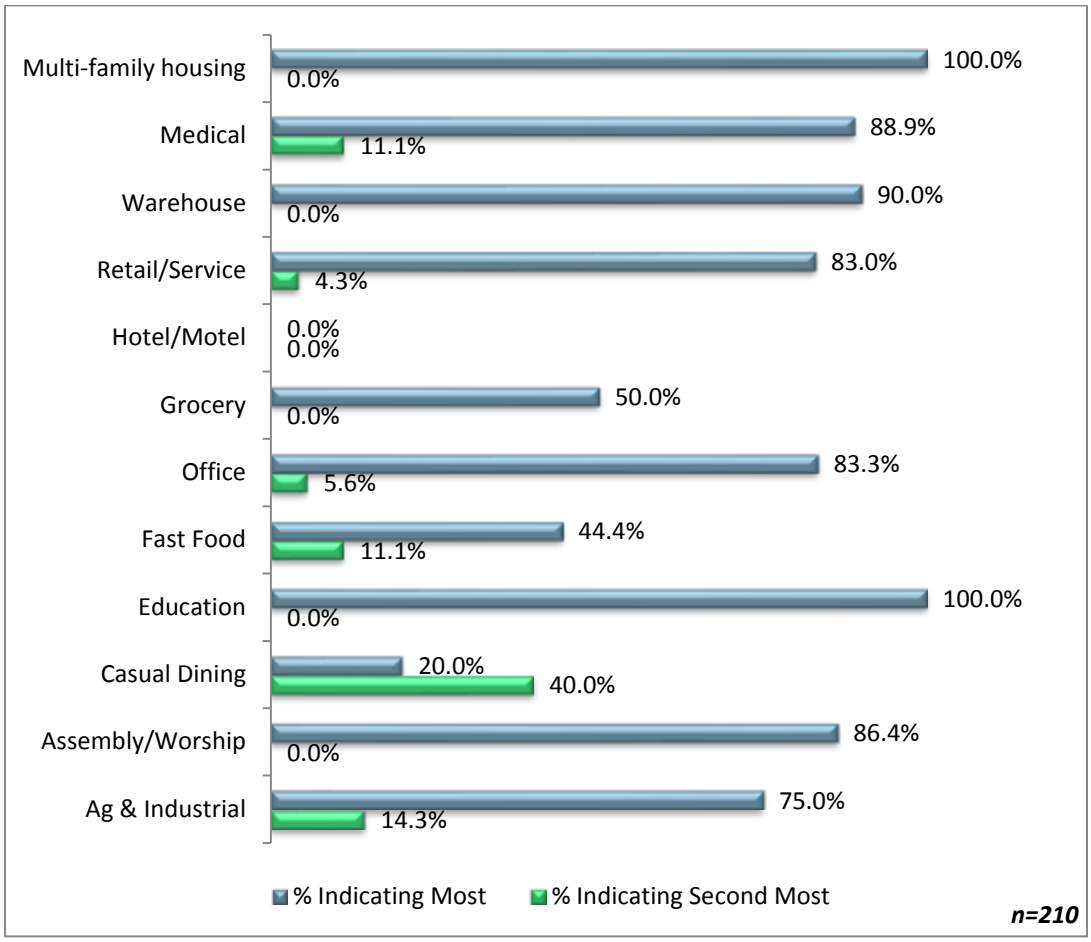

Figure 4-6 Percent of Facilities with Water Heating as Highest Load

Sixteen percent of respondents indicated having heard something about SourceGas' energy efficiency programs. Three percent indicated specific awareness of SourceGas' available incentives for space heating equipment. Respondents were also asked to rate their interest on a scale of 1-10 in SourceGas' programs (with "1" meaning "Not interested at all" and "5" meaning "Very interested"), based on brief descriptions of what the program offers. Average non-participant interest in the Heating Equipment Rebates Program was 3.88 out of 10. The evaluators then subset these responses by facility type, with the average scores presented in Figure 5-3.

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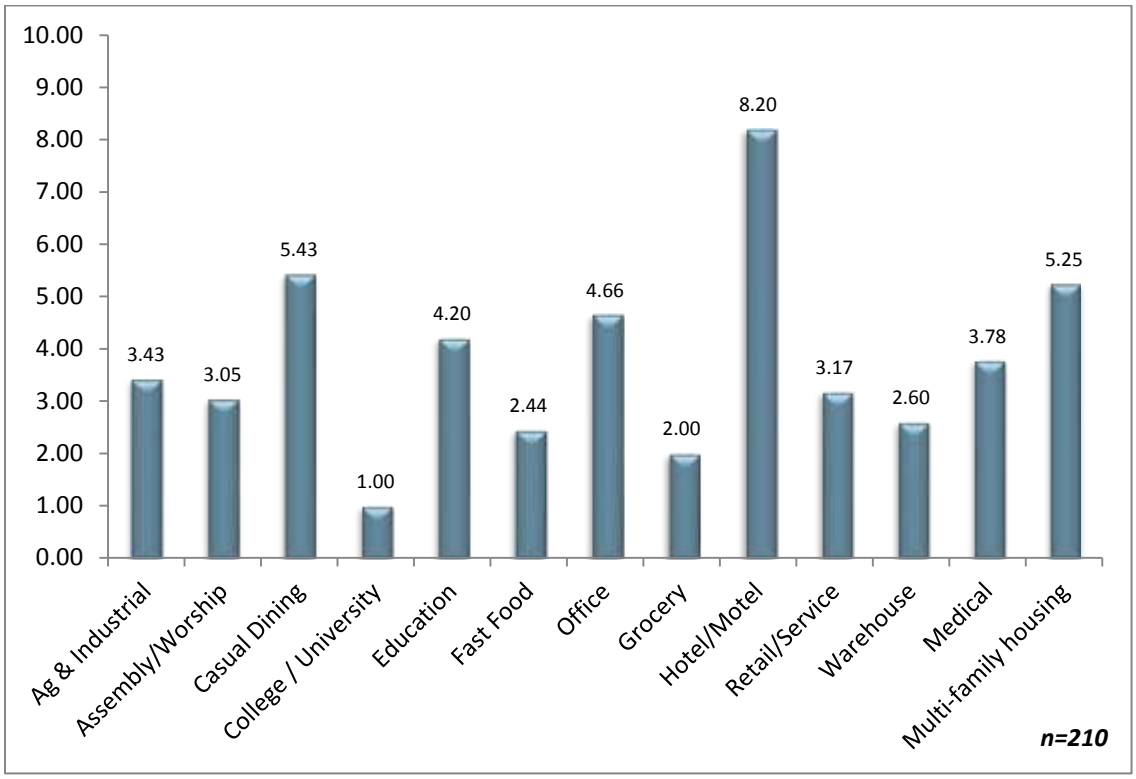

Figure 4-7 Non-Participant Interest in Heating Equipment Rebates Program

The facility types showing the highest interest were Hotel/Motel, Multifamily Housing, Casual Dining and Office. Of those interested in the program, 17.6% stated that the primary barrier to participating would be their inability to afford high efficiency equipment. Forty-seven percent stated that they do not need to replace any equipment. Further, 5.0% stated that they would not participate because they are leasing the space.

4.2.4 Program Development & Outlook

The Heating Equipment Rebates Program is designed to reach two specific market segments, promoting the installation of high efficiency furnaces in residential and small commercial applications. The evaluators found that given this targeting, the program has been successful to-date in achieving intended market transformation effects, and is likely to continue to do so going forward. After reviewing the varying equipment offerings of the Heating Equipment Rebates Program, the evaluators have identified the following risks to future program performance:

1. **Lack of uptake for Hydronic and Direct Vent heating systems.** There was no uptake for either of these two equipment types in the Heating Equipment Rebates Program in 2012. The evaluators found that these two equipment classes faced two distinct barriers:

    a. **Hydronic Heating Systems:** Though growing in popularity, these systems are typically viable only in new construction or large-scale

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remodel applications. The current deemed savings structure adds some difficulty to the effective promotion and incentivizing of these systems in that it does not provide firm guidelines on how to capture the full savings of an integrated tankless water heating and space heating system. When a hydronic heating system incorporates the domestic hot water load, the system can increase overall in efficiency by achieving a higher economy of scale on one water heater, as opposed to having separate systems. Currently, deemed savings guidelines in the TRM V2.0 would provide higher savings for two separate water heaters in a home with a hydronic system rather than integrating the two loads onto one water heater.

b. **Direct Vent Heating Systems:** These systems are typically found in older housing, and as such are more commonly associated with lower-income customers. The evaluators have found that the only direct vent heating retrofits have come through the Arkansas Weatherization Program, which has the capability to provide no-cost installation of a high efficiency direct vent heater. Though there has been significant uptake of high efficiency furnaces in multifamily housing run by municipal housing authorities, the type of housing that has direct vent heaters is typically not under the housing authorities' purview, restricting the ability of the Heating Equipment Rebates Program to affect this market segment. Should SourceGas desire to increase uptake of these systems through the Heating Equipment Rebates Program, they could increase the incentive for this equipment class. This would increase the cost per therm markedly, but may be needed if the market segment using direct vent heating faces a higher first-cost barrier. Though the cost per therm would increase, the free-ridership rate associated with this equipment class is likely to be low, given the market conditions associated with it and the fact that this measure has only had participation through the AWP and none through the Heating Equipment Rebates Program.[8]

4.2.5 Program Best Practices Assessment

The evaluators reviewed the program operations and compared them to best practices for residential and non-residential HVAC programs as listed in the Energy Efficiency Best Practices Self-Benchmarking Tool[9]. On this basis, the Heating Equipment Rebates Program was found to adhere strongly to program best practices in most respects. Particularly, the Heating Equipment Rebates Program adheres to best practices in:

[8] In 2012, 8 Direct Vent Heaters were processed in the AWP within SourceGas service territory.

[9] http://eebestpractices.com/ Best Practices Benchmarking for Energy Efficiency Programs

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1. **Program implementation is driven through trade ally outreach and education.** The Heating Equipment Rebates Program provides outreach and education to HVAC contractors and home builders, and enables them to market the program on behalf of SourceGas. This allows SourceGas staff to limit their intervention in the customer experience, to the extent that most respondents indicate not having had any interaction at all with SourceGas staff.
2. **Incentives are provided to trade allies for top-level installations.** In addition to providing training on condensing furnaces, the Heating Equipment Rebates Program provides an extra $50 incentive to trade allies for installing qualifying equipment. Further, in new construction applications, home builders have the option of collecting the full equipment incentive themselves. This allows home builders to quickly defray the cost of installation, as it can often be a lengthy period between the home builders' initial purchase of the furnace to the point of purchase and occupation of the home. SourceGas had higher uptake of 90-94.9% AFUE furnaces than other gas utilities in AR, however, and may want to consider replacing the $50 incentive for all furnaces 90%+ AFUE with a larger trade ally incentive for 95%+ AFUE.
3. **Evaluation is incorporated into the program improvement process.** SourceGas and CLEAResult have expressed a desire to obtain feedback from regular process evaluation and quickly incorporate such findings into their program implementation. The program process flow is flexible to the extent that adjustments can be made as-needed as issues are uncovered during real-time evaluation.
4. **Program implementation staff conducts post-inspections.** The post-inspections by CLEAResult help to ensure reliability of savings estimates from the program, and are performed as a regular part of the implementation process.

Areas where the Heating Equipment Rebates Program falls short of best practices include:

1. **Tracking data lacks some key elements.** As stated in the tracking data review, no primary point of contact for commercial projects is collected or listed in tracking data. This adds difficulty to the evaluation process as it is not clear whom to ask for when contacting program participants. Further, the tracking data does not list commercial EFLH or weather zone for either participant class.
2. **Slow rebate processing and a lengthy application process caused some participant dissatisfaction.** This occurred when EGIA was processing applications and rebates on behalf of SourceGas. The evaluators will reassess in 2013 whether this problem persists, but in bringing on a new implementation contractor SourceGas has shown that they are actively reviewing and attempting to correct issues in implementation as they arise.

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4.3 Heating Equipment Rebates Impact Evaluation

The impact evaluation effort of the Heating Equipment Rebates Program included the following:

- *Residential Verification*. The evaluators conducted impact evaluation of the residential component of the Heating Equipment Rebates Program utilizing deemed savings parameters established in the TRM V2.0. These parameters provide estimates of Therms savings using unit output BTU and weather zone. The evaluators conducted onsite verification inspections of a sample of 13 participating residential customers, verifying that unit parameters matched those listed in the tracking data.
- *Commercial M&V.* As with the residential component, the evaluators applied TRM V2.0 deemed savings parameters in conducting M&V of the commercial component. Further, the evaluators conducted verification inspections at 2 participating facilities.
- *Free-Ridership Estimation.* Free-Ridership Rates were developed for each of the two program components. They were developed using detailed participant surveys, addressing the decision-making process to participate in the program. Topics contributing to the free-ridership analysis included the magnitude of the incentive as a motivator, the extent to which the program educated customers about new energy-saving opportunities, timing of learning of the program relative to installation of the measures, and culminating in a determination of whether the participant would have installed the same or similar equipment within one year in the absence of the program. Further, the extent to which the respondent was influenced by a trade ally, coupled with the extent to which the trade ally altered their product mix as a result of program outreach is factored into the participant free-ridership estimation.
- *Spillover Estimation.* Spillover was addressed for the program participants. Participants were surveyed for free ridership and process evaluation, and over the course of that survey are asked a series of questions addressing whether the Program induced them to install other energy efficient equipment without program incentive. Additionally, the evaluators asked these customers for an estimate of savings that they expect from these measures.

For equipment rebated through the program in 2012, calculation methodologies were as described in Section 2.3 and Section 3.9 in the TRM Version 2.0 for residential and commercial furnace replacements, respectively.

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4.3.1 Residential Impact Evaluation

4.3.1.1 Energy Savings Calculations

Deemed parameters used in calculating savings were taken from AR TRM V2.0[10]. The deemed savings values for residential furnaces were developed through EnergyGauge, a simulation software program. Multiple equipment configurations were simulated in each of the four Arkansas weather zones in developing savings values denominated in Therms savings per input kBTUH of the unit. **Error! Reference source not found.** ummarizes the Therms savings calculation values for residential furnaces.

Table 4-7 Residential Furnace Savings Calculations by Weather Zone

Weather Zone	Annual Therms Savings per kBTUh		Peak Therms Savings per kBTUh	
	90-94.9% AFUE	95%+ AFUE	90-94.9% AFUE	95%+ AFUE
9	2.050	2.326	.031	.035
8	1.764	2.003	.032[11]	.037[1]
7	1.898	2.155	.034	.039
6	1.429	1.622	.035	.040

For example, a 70,000 BTU furnace with 96% AFUE installed in residential application in Weather Zone 8 would save:

$$Furnace\ Savings = \frac{70{,}000 * 2.003}{1{,}000} = 140.21\ Therms$$

4.3.1.2 Residential Field Inspection Findings

The evaluators conducted field inspections at 13 participating residential facilities. These field visits were scheduled and conducted by ADM staff with multiple goals in mind:

- First, the fieldwork was intended to verify that equipment was installed and matched specifications listed in the program tracking data. This included verification of capacity (BTUH) and efficiency (AFUE), as well as that the unit usage matched program tracking data (primary versus secondary furnace).
- Second, field staff verified that the installations were done in a professional manner, ensuring proper functionality of the furnace. This primarily focused on verifying that condensate was being properly discharged without leakage.
- Finally, the fieldwork was used as an opportunity to collect residential demographic data that may be of future use in deemed savings development and

[10] Arkansas TRM V2.0, Volume2 Pg. 22-23

[11] Data in table are for Blytheville peak. Other Zone 8 peaks can be calculated by multiplying Blytheville peak by appropriate factor, m. For Jonesboro, m = 0.985. For Fort Smith, m = .946

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updating. This included data on thermostat settings, number of bedrooms per home, number of occupants per home, and general usage habits of space heating equipment.

There was an initial sample of 68 intended for the residential component, but it was decided by IEM staff that further field verifications were not a needed effort and expenditure for the EM&V of the Heating Equipment Rebates Program. This recommendation was made on the basis of two assumptions:

1. Program staff conducted post-inspections; and
2. Surveys could be used to confirm participation and collected needed EM&V data.

Staff from CLEAResult conducted a significant amount of QA/QC inspection, and the evaluators were able to confirm participation via telephone survey. In the 13 field inspections completed, the evaluators found that all equipment matched program tracking data and that the installations were done in a manner that allows for the full efficient functionality of the furnaces.

4.3.1.3 Residential Free-Ridership

Free-ridership estimates for residential participants in the Heating Equipment Rebates Program were developed through combined scoring of the survey respondents and of participating HVAC vendors. This section will detail the questions and answers from the participant survey that contributed to the participant response portion of the program free-rider scoring.

The contributing questions are divided into three subcategories:

Timing & Information:

Q-5 Prior to your starting to install your new furnace, did you know that you could purchase the same size furnaces and air conditioners but some use more or less gas and electricity?

Eighty-five percent of respondents indicated that they were aware of variations in energy consumption by units of the same size. Fifteen percent of respondents were unaware that two units of the same capacity could potentially use different amounts of energy.

Q-6 Prior to your starting to replace your furnace did you know you might pay more or less on your gas bill based on the efficiency of the furnace?

Ninety-seven of respondents indicated that they were aware that their bill could vary based on the efficiency level of the furnace. Three indicated that they were unaware of this.

Q-7 When did you decide to buy a high efficiency furnace? Was it…

- ❑ Before or just when you started looking for a new furnace

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- While getting information about furnaces but before deciding on a contractor
- While deciding on a contractor
- After deciding on a contractor

Table 4-8 Timing of Decision to Purchase High Efficiency Relative to Timing of Selection of Contractor

Timing	%
Before or just when you started looking for a new furnace	55.0%
While getting information about furnaces but before deciding on a contractor	35.0%
While deciding on a contractor	0%
After deciding on a contractor	10.0%
n=80	

Q-8 Did you know about SourceGas' Heating Equipment Rebates Program…..

- Before starting to replace your unit or did you,
- Learn about it while replacing the furnace

Forty four percent of respondents were aware of the program before starting to replace their unit. 56.2% learned of the program after deciding to replace their unit.

Importance of Rebate

Q-10 Why did you decide to purchase a high efficiency furnace?

This question is open-ended, with the interviewers categorizing the answers given, and multiple answers allowed. Unprompted, 7.5% of respondents indicated the financial incentive as a reason for purchasing the high efficiency option.

Q-13 How important was SourceGas' rebate in your decision to buy the high efficiency space heating equipment?

When prompted to discuss the rebate, 43.8% of respondents indicated that the rebate was "very important" in their decision to purchase a high efficiency furnace. 23.8% stated that the rebate was "somewhat important', 10.0% stated "only slightly important", and 18.8% indicated that it was "not important at all".

Q-18 When deciding about the furnace, did you purchase a more efficient furnace than you would have because of the program rebate?

Thirty-eight percent responded "yes" to this question, 60.0% responded "no", and 2.5% indicated that they "don't know" if they purchased a more efficient option due to the rebate.

Free-ridership estimates for residential participants in the Heating Equipment Rebates were developed through combined scoring of the survey respondents and of

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participating HVAC vendors. This section will detail the questions and answers from the participant survey that contributed to the participant response portion of the program free-rider scoring.

Q-21 Did the SourceGas rebate encourage you to install the equipment sooner than you would have? How much sooner?

Table 4-9 Effect of Rebate in Moving up Purchase Timing

Installed Sooner?	***% Respond***	***How Much Sooner?***	***%***
Yes	18.8%	A year sooner	57.9%
		Two to three years sooner	21.1%
		Four to five years sooner	0%
No	80.0%	n=19	
Don't Know	1.2%		
n=80			

Importance of Contractor

The importance of information provided by the contractor contributes to free-ridership in that much of the participation in the Heating Equipment Rebates Program is driven by contractors that receive outreach from SourceGas instructing them about the program offerings. They in turn market the program to their customers. Contractor influence was factored into the survey respondents' free-ridership score if the survey respondent had their unit installed by a trade ally that received training through the program. This was factored in on the basis of the participating vendor interviews, where it was indicated that the share of condensing furnaces with 95%+ AFUE installed by these vendors was increased markedly as a result of program participation.

When asked an open-ended question addressing their reason for purchasing a high efficiency furnace, 12.5% of respondents indicated that it was based on a recommendation from their contractor. Additionally, 56.3% of respondents indicated that they learned of the program from their contractor.

Q-11 In your decision to buy the high efficiency furnace, how important was information, advice, and / or recommendations from your contractor?

Sixty-three percent of respondents indicated that advice and recommendations from their contractor were "Very Important" in their decision to purchase a high efficiency furnace.

Free-Rider Scoring Mechanism

The above factors are combined in estimating free-ridership for each survey respondent. Their responses are then weighted by therms savings for the respondent in determining the free-ridership rate for the commercial component. The scoring mechanism for commercial free ridership is presented in the flowchart

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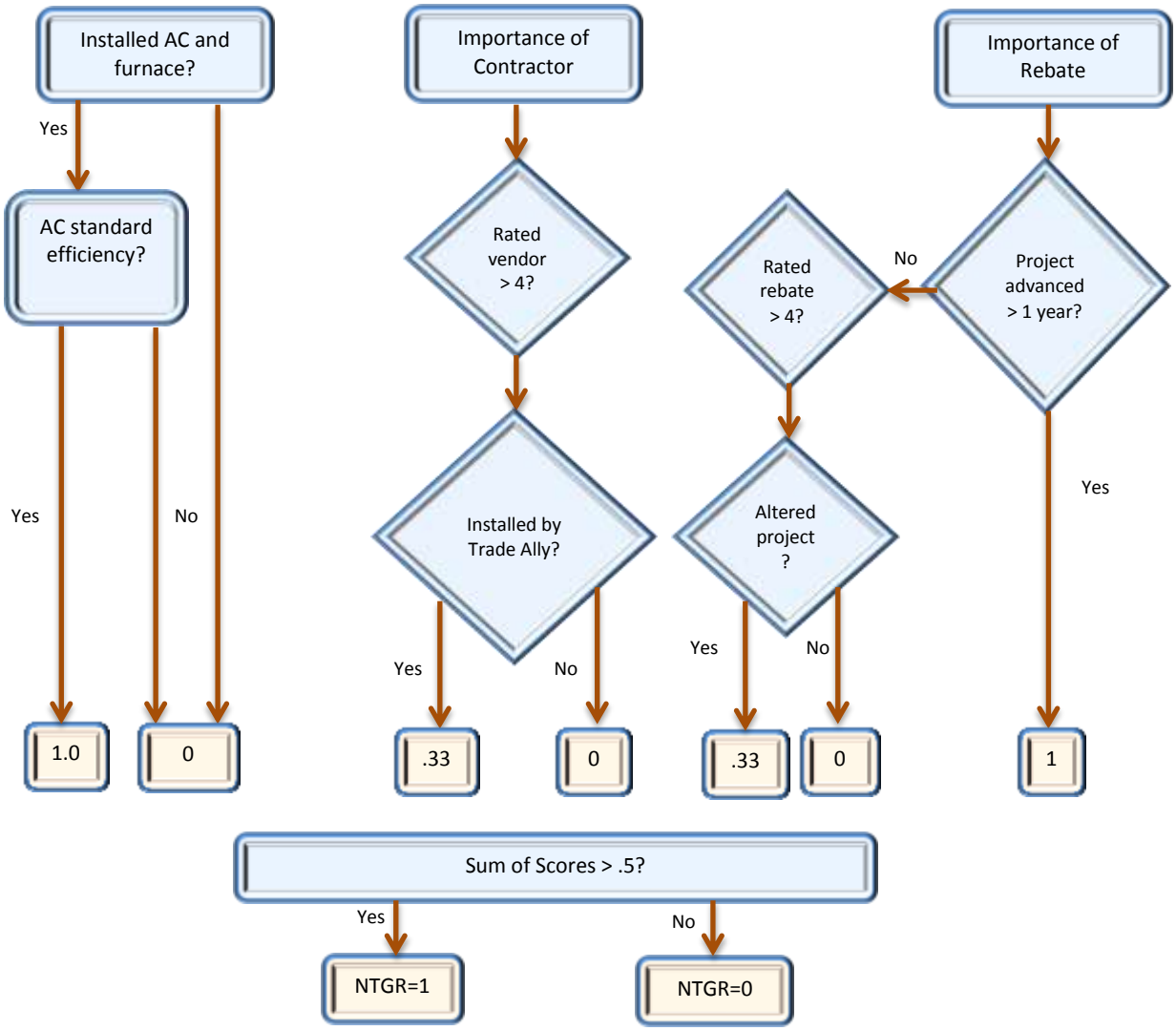

4.3.1.4 Participant Spillover

The residential participant survey addressed participant spillover. This was done through a battery of questions designed to:

1) Assess the behaviors taken by customers after their program participation where they installed energy efficient equipment; and
2) Get the respondent's self-reported value for how important they felt information from SourceGas was in inducing this non-incentivized behavior.

From these questions, the evaluators did not find any instances of attributable spillover.

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4.3.2 Commercial Impact Evaluation

Commercial impact evaluation was limited due to the small number of participants and savings. One commercial decision-maker was a municipal housing authority responsible for 154 rebates, but these were in a residential end-use. Due to the low number of commercial end-users, the evaluators verified that savings were correctly calculated according to TRM V2.0 protocols and applied the 80% stipulate NTGR. Savings were clouted as follows[12]:

$$Therms\ Savings = \frac{BTU\ Capacity * EFLH_H * \left(\frac{1}{Effic_{pre}} - \frac{1}{Effic_{post}}\right)}{100{,}000\ Therms/BTU}$$

The EFLH for a facility is a function of facility type and weather zone. The TRM V2.0 EFLH values are summarized in Table 4-10.

Table 4-10 EFLH Values

Building Type	Zone 6	Zone 7	Zone 8	Zone 9
College/University	389	446	437	388
Fast Food Restaurant	217	234	249	213
Full Menu Restaurant	378	414	437	376
Grocery Store	522	537	562	468
Health Clinic	698	668	747	640
Lodging	479	511	534	447
Large Office (>30k Ft^2)	275	286	300	256
Small Office (<30k Ft^2)	271	287	343	255
Retail	310	331	343	290
School	337	348	345	312

For example, if a Small Office in Little Rock (Zone 7) installed a 70,000 BTU 96% AFUE Furnace, The resulting Therms savings are calculated as:

$$Therms\ Saving = \frac{70{,}000\ BTU * 287\ EFLH * \left(\frac{1}{.78} - \frac{1}{.96}\right)}{100{,}000\ BTU/Therm} = 48.29\ Therms$$

4.4 Verified Savings

Table 4-11 presents the gross savings results of the evaluation of the 2012 Heating Equipment Rebates Program. Total Gross Savings summarizes the savings calculations performed by TRM protocols for Residential and Commercial furnaces.

[12] Arkansas TRM V2.0, Pg. 140-142

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Table 4-11 Heating Equipment Rebates Verified Therms Savings

Facility Category	Measure Category	Expected Therm Savings	Verified Therms Savings	EUL	Lifetime Therms Savings	Peak Therms
Residential	Hydronic Heating	177	177	20	3,540	2.66
	90-94.9% AFUE	2,876	2,876	20	57,520	43.28
	95%+ AFUE	45,026	45,026	20	900,520	677.51
Non-Residential	90-94.9% AFUE	11,590	11,590	20	231,800	12.62
	95%+ AFUE	13,386	8,958	20	267,720	45.57
Total Gross Savings		73,055	73,055	-	1,461,100	750.63

Net savings for the Heating Equipment Rebates Program were calculated using a residential free-ridership rate based on participant and vendor surveys and a stipulated 80% NTGR for commercial applications. The resulting net savings are presented in Table 4-12.

Table 4-12 Heating Equipment Rebates Net Savings Summary

Facility Category	Free-Ridership Rate		Net Annual Savings		Net Realization Rate	EUL	Net Lifetime Therms Savings	Net Peak Therms
	Ex Ante	Ex Post	Ex Ante	Ex Post				
Residential	20%	12.5%	38,463	42,069	109.4%	20	841,380	633.01
Non-Residential	20%	20%	19,981	19,981	100%	20	399,620	21.75
Overall:	20%	15.1%	58,444	62,050	106.2%	20	1,241,000	654.76

The residential free-rider rate of 12.5% is reflective of three components:

1. Participant self-reports on the impact of the program incentive;
2. The influence of the installing vendor on the decision to purchase the high efficiency unit; and
3. The impact of the program in educating and encouraging the specific vendor on installation of high efficiency furnaces.

4.5 Conclusions & Program Recommendations

4.5.1 Heating Equipment Rebates Conclusions

The evaluators have found that:

1. **Satisfaction with the program overall is high.** Satisfaction with the program operation includes customers' interactions with SourceGas, satisfaction with wait times, savings realized from program participation, and ease of the application process. Some participants indicated issues with slow application processing during the period where EGIA was administering the rebates. This will be reassessed when there is a full year of participation from CLEAResult.

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2. **Much of the residential participation was driven by the need to replace a central air conditioner.** Eighty-two percent of all residential survey respondents indicated that they replaced an air conditioner at the same time as the furnace. 52.5% of these respondents lived in areas that were eligible for an incentive for a high efficiency air conditioner, though only 21.4% installed a high efficiency unit. For these respondents, the need to replace an air conditioner led to interactions with an HVAC contractor. SourceGas has engaged the HVAC contractor market to a significant degree, and these contractors took the opportunity utilize the program financial incentive to upsell the customer on a high efficiency furnace as part of a package deal for replacement of the heating and cooling systems. That most of these customers purchased standard efficiency air conditioning while purchasing a high efficiency furnace speaks to the efficacy of the program financial incentives and SourceGas' engagement of the HVAC contractor market in inducing adoption of high efficiency space heating technology.
3. **The trade ally network is providing successful outreach and service.** SourceGas conducted multiple trade ally training sessions, instructing HVAC contractors as to the guidelines for participation (application process, equipment eligibility, etc.). These trade allies are actively marketing the program and have integrated the program offerings into their sales process. 10 vendors accounted for 42% of program incentives in 2012.
4. **SourceGas' efforts in contractor and builder education have allowed for further market penetration of condensing furnaces (95%+ AFUE).** SourceGas engaged in multiple outreach and training efforts to promote the installation of premium efficiency furnaces, endeavoring to assuage concerns from contractors as to the added cost and difficulty involved in the installation of a 95%+ AFUE furnace.
5. **In most cases, the program does not require SourceGas to directly interact with customers.** Much of the customer experience with the Heating Equipment Rebates Program is handled through the program trade allies, who assist in processing paperwork and market the program on SourceGas' behalf. SourceGas' involvement is focused on mass-market efforts, application review, and rebate processing. This is a sign of success in developing a turn-key, low-maintenance program.
6. **The Heating Equipment Rebates Program largely corresponds with industry best practices.** The evaluators found that the program corresponds with best practices in most areas, with the exceptions being in missing some key data elements in tracking data, having minor satisfaction issues with rebate processing, and not being informed by a market potential study.
7. **The program is at risk from federal efficiency guidelines.** Should the exemption for southern states be lifted, the Heating Equipment Rebates Program

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will face significantly declining savings per-unit as a result of a 90 AFUE baseline. Typical savings for a 95% AFUE furnace would decline by 66% if this guideline is enforced in Arkansas.

4.5.2 Heating Equipment Rebates Program Recommendations

The evaluators' recommendations for the Heating Equipment Rebates Program are as follows:

1. **Add a "Primary Point of Contact" field for commercial participants.** Many of the commercial participants lacked a point-of-contact name (only the business name was included). This slowed EM&V efforts as the evaluators found it necessary to either request names on an *ad hoc* basis from SourceGas or to ask for decision-makers by title during surveying or attempts to schedule site visits.
2. **Add weather zone and EFLH to the tracking data.** This would allow for easy recreation of savings estimates.
3. **Add an indicator for retrofit versus new construction to the tracking data.**
4. **Update the application to list TRM V2.0 building types.** The current application is set up based on TRM V1.0 guidelines for commercial savings estimates. This should be updated to capture the information needed for TRM V2.0 calculations. Specifically, this should also include changing the square feet input for the commercial component from "Less than or equal to 25,000 sq. ft." to "Less than or equal to 30,000 sq. ft." so as to better-delineate between small and large offices.
5. **Expand outreach to school districts and housing authorities.** School districts and housing authorities accounted for over 85% of commercial Heating Equipment Rebates Program incentives in 2012. These participants require direct contact with senior management in order to ensure integration of program offerings into their long term planning. SourceGas has observed some success in driving participation in these sectors and should continue to do so with school districts and housing authorities in their service territory.
6. **Increase the incentive for direct vent heaters.** Direct vent heaters have had no uptake in two years of program implementation. They have been implemented as part of the Arkansas Weatherization Program, however. On this basis, SourceGas can opt to either have this equipment class served solely by the AWP, or to attempt to increase uptake in the Heating Equipment Rebates Program by increasing the participant incentive. Based on the non-participant survey and secondary research, the evaluators found that this equipment class is more common in lower income market segments, and as such face a higher first-cost barrier than high efficiency furnaces.
7. **Advocate the development of deemed savings for integrated hydronic systems.** The TRM V2.0 does not account for the added benefit of an integrated

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hydronic system, where one tankless unit provides both the domestic hot water load and the hot water for the space heating load. Doing so could simplify the process for home builders installing integrated systems.

The issues and recommendations are summarized in Table 4-13.

Table 4-13 Heating Equipment Rebates Summary of Issues & Recommendations

Issue	***Consequences***	***Recommendation***	***Basis for Recommendation***
No primary point-of-contact included in commercial projects	Added difficulty in EM&V efforts	Add a point-of-contact field in the commercial tracking data	Evaluation best practices
Application not capturing all needed EM&V data	Application follow-up for savings calculations	Modify the facility type list to correspond to TRM V2.0. Change the square footage guideline from 25,000 to 30,000 square feet.	Review of requirements for savings calculations from TRM V2.0
Higher than expected share of 90-94.9% AFUE furnaces	Lost savings opportunities	Consider modifying the trade ally incentive from $50 for all furnaces to a larger amount for 95% AFUE furnaces	Furnaces 95% AFUE do not have as complicated of an installation and thus face fewer market barriers than 95%+ AFUE units.
No uptake of high efficiency direct vent heating systems	Underserved market segment of older housing stock and lower-income customers	Either increase the incentive for direct vent heaters to account for the higher first-cost barrier faced by the market segment using this equipment, or remove from the program and planning and leave to the AWP.	Comparison of uptake of DV Heaters in Heating Equipment Rebates Program and AWP. Findings from non-participant survey on heating system type and income levels.
No uptake of hydronic heating systems	Underserved market segment of new construction applications	Develop deemed savings in TRM V3.0 for an integrated heating and water heating system using one tankless water heater, and provide additional incentive for integrated systems that account for the benefits of savings from both loads.	Review of program tracking. Interviews with program trade allies.

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5. Water Heating & Conservation - Equipment Rebates

The Water Heating & Conservation Program has two distinct channels of operation: equipment rebates for high efficiency water heaters and mailer kits that include low flow showerheads and faucet aerators. This chapter addresses the equipment rebate component of the Water Heating & Conservation Program. For purposes of differentiation, this component will be referred to as Water Heating Equipment Rebates Program. Eligible measures for this program include:

- $50 for storage tank water heaters with 40 gallons or greater capacity with an EF of .62 or greater; and
- $500 for tankless water heaters with an EF of .80 or greater.

The Water Heating Equipment Rebates Program is targeted at Residential and Small Commercial market sectors. Retrofit and New Construction applications are both allowed, utilizing the same baseline Energy Factors as determined through equipment capacity. The marketing efforts for the program were largely directed at plumbing contractors; their involvement is seen as crucial, as they are generally a primary source of information for end-use customers when deciding upon a replacement system.

5.1 Program Summary

The Water Heating Equipment Rebates Program began in 2010. Incentive levels were raised significantly in 2011 and 2012 in order to counteract the loss of American Recovery and Reinvestment Act-funded (ARRA) incentives. The history of program performance and expenditures is presented in Table 5-1. This table combines the results of Water Heating Equipment Rebates Program and Water Conservation Program, as these are components of one filed program (Water Heating & Conservation) which does not have goals separated between the two program components.

Table 5-1 Water Heating Equipment Rebates Program Historical Performance against Goals

Program	# Participants		Budget		Net Therms	
Year	Actual	Goal	Spent	Allocated	Achieved	Goal
2010	-	-	$87,688	$210,957	-	-
2011	1,705	1,917	$63,581	$117,944	31,163	27,460
2012		1,986	$95,736	$131,309	39,091	28,450

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5.1.1 Participation Summary

The 2012 Water Heating Equipment Rebates Program had a total of 101 processed rebates. The participation comprised:

- 83 residential rebates at 80 premises; and
- 17 commercial rebates at 5 premises.

At the equipment level, residential participation included:

- 10 storage tank water heaters; and
- 73 tankless water heaters.

Commercial participation comprised:

- 3 high efficiency condensing storage tank water heaters; and
- 15 tankless water heaters.

Hotels accounted for 17 of 18 rebates and over 95% of program savings.

5.2 Water Heating Equipment Rebates Program Process Evaluation

5.2.1 Data Collection Activities

The process evaluation of the Water Heating Equipment Rebates Program included the following data collection activities:

- *SourceGas Program Staff Interviews*. The evaluators interviewed staff at SourceGas involved in the administration of the Water Heating Equipment Rebates Program. These interviews built upon interviews conducted during the 2011 Limited Process Evaluation, in which the evaluators collected initial background information on program history and implementation. These interviews captured any operational changes on SourceGas' side, as well as informing the evaluators as to any new developments in the program.
- *Program Marketing Materials Review*. The evaluators collected marketing materials used by the Water Heating Equipment Rebates Program. This included customer mailers, audit reports, and a review of the SourceGas program website. This was compared against marketing materials from successful programs run in other territories in informing marketing improvements.
- *Review of Program Quality Control Procedures*. The evaluators reviewed the QC procedures in place for the Water Heating Equipment Rebates Program. This included review of application QC processes as well as assessing any post-inspection or verification conducted by SourceGas.
- *Participant Surveying*. The evaluators surveyed separate samples of residential and non-residential participants in the Water Heating Equipment Rebates

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Program. In addition to their use in developing free-ridership and spillover estimates, these surveys informed the process evaluation of the Heating Equipment Rebates. These surveys addressed issues including participant satisfaction with the program offerings, demographics and firmographics, and other contextual issues regarding the participation process.

- *Non-Participant Surveying.* The evaluators surveyed separate samples of residential and non-residential non-participating customers as part of market sector-level survey efforts designed to provide feedback for all SourceGas programs. These surveys contributed to the process evaluation of the Water Heating Equipment Rebates Program though collecting data on non-participant behavior and level of interest on high efficiency water heating equipment.

Table 5-2 summarizes the data collection for this process evaluation effort. This includes the titles, role, sample sizes, timeframe of data collection.

Table 5-2 SourceGas Water Heating Equipment Rebates Data Collection Summary

Target	Component	Activity	N	Role
SourceGas Program Staff	Manager of Energy Efficiency	Interview	1	Overall administration of SourceGas DSM programs. This manager is involved in the larger strategic decisions associated with the DSM portfolio, and is involved with the Water Heating Equipment Program in the overall coordination of utility resources.
CLEAResult Staff	Energy Engineer	Interview	1	The Energy Engineer oversees technical aspects of the program, including review of equipment offerings and savings calculations. The Energy Engineer also engages in outreach to commercial customers.
	Program Coordinator	Interview	1	The program coordinator handles day-to-day administration, including scheduling of quality control inspections, application review, and marketing and outreach.
Program Participants	Residential	Survey	37	37 residential participants were randomly selected for surveying for NTGR and process issues
	Commercial	Survey	2	2 large participants in the commercial component were surveyed along similar lines.
Non-Participants	Residential	Survey	300	The evaluators selected 300 random non-participants for a general population survey addressing program awareness, interest, and market barriers
	Commercial	Survey	210	210 non-participant businesses were selected for a similar survey
Vendors	Participating	Interview	5	Participating vendors drive the program marketing
	Non-Participating	Interview	4	Non-participating vendors provide feedback as to behaviors occurring absent the program.

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Marketing & Outreach	Marketing Materials	Literature Review	-	The full scope of paper and electronic marketing materials used in implementation for the Water Heating Equipment Rebates Program was reviewed by the evaluators.
Evaluation History	Prior Evaluation Reports	Literature Review	1	Findings from the Limited Process Evaluation conducted in 2011 were reexamined to determine to what extend recommendations were implemented
	Comparative Review	Literature Review	-	Evaluation reports of similar programs conducted elsewhere were examined in order to provide recommendations for improvement based upon lessons learned elsewhere.

5.2.2 Process Results & Findings

This section will present the results and key findings from the data collection activities. These findings are based upon interviews with utility staff, implementation staff, surveys with participants, and thorough and in-depth literature review.

5.2.2.1 Program Theory & Design

The Water Heating Equipment Rebates Program was designed to provide a simplified program that plumbing contractors could use to sell high efficiency equipment to a wide range of customer classes. To date, the program's greatest success has been in providing end-user incentives for tankless water heating systems.

After interviewing SourceGas program management staff, it was found that the primary effort of the Water Heating Equipment Rebates Program was to educate Arkansas plumbing contractors on the installation procedures for tankless systems. It was perceived that this class of equipment was facing a barrier to market penetration in that the installation is more complicated than a simple swapping of the water heater; there are added expenses with the ventilation requirements for these systems. It was thought that by educating plumbing contractors and providing a simple application for these contractors to follow, the marketing of the program would then be driven by companies that already have "boots on the ground" and access within the residential and small commercial market segments.

The secondary effort of the Water Heating Equipment Rebates Program was to attempt to increase availability of high efficiency storage tank models. Much of the storage tank replacement market is driven by equipment failure, and as such capturing this segment is reliant upon easy availability of high efficiency options. Participation levels in the storage tank segment have been moderate, though not high enough to assert that the segment is being fully captured.

5.2.2.2 Program Administration

The Water Heating Equipment Rebates Program is overseen by the Manager of Energy Efficiency at SourceGas. This manager is responsible for oversight of all SourceGas

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programs. When the SourceGas programs were internally-implemented, this was problematic in being an excessive workload for the sole staff-member. With the addition of third-party implementation, this problem is alleviated, though as processes are put in place with the implementer the internal staffing levels at SourceGas should be reexamined.

This manager's responsibilities include oversight of the third party implementation staff and guidance of the mass-marketing efforts.

The program is supported by implementation staff at CLEAResult. CLEAResult took over the program in September 2012. Their responsibilities include targeted marketing, application and rebate processing, and quality control.

The evaluators found that the staff associated with the Water Heating Equipment Rebates Program was well-trained in the specific equipment and issues associated with the program. There was marked experience both in technical and marketing fields, allowing for successful implementation of the program.

5.2.2.3 Program Implementation and Delivery

As a fully-prescriptive program, The Water Heating Equipment Rebates Program receives applications for already-purchased equipment (no measures require pre-screening). There is a pre-prescribed menu of accepted equipment types, without the option for a custom component. The steps involved include:

- *Purchase of Equipment*. The customer has selected and purchased the water heating equipment. The rebate form is generally filled out at this time by the equipment dealer, which helps to ensure accurate information recorded in the application.
- *Application Submittal*. Applications need to be submitted within 90 days of purchase or at December 31 of the calendar year of purchase, whichever comes first. Information in the application includes full Customer and Dealer information (names, contact information, gas account number, and dealer information) specifications of the equipment (type, BTU, manufacturer, model #, and serial #), a copy of the purchase invoice, and the preferred method of contact for follow-up. The application is available in paper and .pdf form. The application uses multiple-choice selections for most key inputs (such as facility and system type), minimizing errors associated with application submittal. Additionally, areas required in order for rebates to be processed are highlighted in yellow, with bold-print warnings and reminders as to needed information and filing deadlines.
- *Application Review*. CLEAResult in-house rebate processing staff reviews all incoming applications to ensure that the account number is served by SourceGas and that the equipment model qualifies for the program. At this time, any discrepancies are sorted out with the customer, and if necessary the application

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may be resubmitted. The applications are then entered into a database that can provide customized Excel-based reports.

- *Rebate Payment*. Rebate payment occurs 6-8 weeks after receipt of the accepted application. Rebates are paid solely to the end-use customer listed in the application; the customer cannot sign over their rebate to a third party (such as a vendor or Trade Ally).
- *Quality Control Inspection*. CLEAResult internally post-inspects a sample of residential and commercial rebates. Such procedures were not in place before they were brought on board, and should help to ensure verified savings by the Water Heating Equipment Rebates Program

5.2.2.4 Program Marketing & Outreach Efforts

Much of the marketing efforts associated with the Water Heating Equipment Rebates Program are through the contractor outreach and training. SourceGas held three training sessions in 2012 for interested plumbing contractors, providing both technical training on the installation of tankless water heaters and step-by-step instruction on the application process for the program. This ensured minimal application error, and participating contractors remarked that they found the Water Heating Equipment Rebates Program to be very easy to use and incorporate into their sales efforts.

In addition to the contractor outreach, SourceGas engaged in mass-market and targeted-market program promotion. This included:

- For residential customers, the Water Heating Equipment Rebates Program was promoted through traditional program advertisement channels, such as bill inserts, internet, and media advertisement. The marketing materials were found to include estimates of monthly bill savings as well as information on the importance of natural gas conservation in helping the environment. Further the marketing materials stressed the improved performance of a tankless heater. The evaluators found that the marketing materials provided a wide range of messages as to the reasons one might choose to participate, covering a wide swath of potential interest-triggers within the residential segment.
- For non-residential customers, outreach efforts were more targeted, attempting to focus on customers with higher water heating loads. The program received a large boost in savings late from the year from participation from several hotels and motels.

The program had minimal new construction participation in 2012. This contrasts sharply with what was observed in CenterPoint and AOG water heating programs, and should be examined. Going forward, program staff should focus some marketing resources to regional home builders.

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5.2.2.5 Tracking Database Review

The evaluators received a tracking database developed by CLEAResult. The initial gathering and compiling of tracking data is crucial in facilitating a smooth evaluation effort, and as such the evaluators reviewed this tracking data in order to verify that it contained the required data to:

(1) Recreate energy savings calculations;

(2) Contact participants and trade allies; and

(3) Ensure proper rebate payment amounts;

Energy Savings Calculation Data

After reviewing the tracking data base, it was found to include:

- Unit capacity (BTU); and
- Unit efficiency (EF);

The tracking data did not contain an indicator for weather zone, facility type, or the basis for savings calculation. These should be added to the tracking data going forward to as to make the savings calculations more transparent. The evaluators needed to make several supplementary data requests in order to validate savings for commercial applications.

Participant and Trade Ally Contact Information

After reviewing the data, the evaluators found that it contained full and comprehensive tracking data for residential program participants, including contact name, address, phone number, email, and a unique rebate number. However, for commercial participants, the tracking data did not list a contact name; only a name of the business that participated was included. The tracking data should be modified to have an extra field for the principle point of contact at the business, in order to better-facilitate the evaluation process.

5.2.2.6 Application Review

After reviewing the program application, the evaluators would recommend that SourceGas change the value in the facility size question from “Less than or equal to 25,000 sq. ft.” to “Less than or equal to 30,000 sq. ft.”. This will ensure proper delineation between small and large offices as defined by TRM V2.0.

5.2.2.7 QA/QC Process Review

With the addition of CLEAResult as the third-party program implementer, quality control procedures for the Water Heating Equipment Rebates program were increased markedly. Specifically, the evaluators found:

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1. All applications are reviewed by CLEAResult rebate processing staff. In this process, it is confirmed that the customer has an active SourceGas account, has the necessary documentation to prove purchase and installation, and that the unit is qualified for the appropriate incentive.
2. A census of commercial applications was post-inspected. Though limited in number, CLEAResult opted to post-inspect all commercial applications, with the goal being to provide an early secondary check to their documentation review process. It is the intention of CLEAResult staff to move to random post-inspection as participation levels increase and application and documentation review processes are fully formalized.

A random sample of residential applications was post-inspected. As part of their program plan, CLEAResult randomly inspected 10% of residential applications.

5.2.3 Residential Survey Response

The evaluators completed 37 surveys with residential program participants in the Water Heating Equipment Rebates Program.

5.2.3.1 Program Awareness

SourceGas' marketing of the Water Heating Equipment Rebates Program is driven through multiple channels, including both customer-direct outreach and marketing through plumbing contractors. 50% of residential respondents surveyed indicated having learned of the program from a contractor. Other commonly indicated sources of program awareness included word of mouth from friends and relatives (22.5%), SourceGas bill inserts (10%), and from salesmen at equipment retailers (7.5%). The sources of awareness for the Water Heating Equipment Rebates Program are summarized in Table 5-3.

Table 5-3 Water Heating Equipment Rebates Program Sources of Program Awareness

Source of Awareness	*% Indicated*
Mailer	2.7%
Contractor	40.5%
Word of mouth/friends & relatives	10.8%
SourceGas bill insert	8.1%
SourceGas brochure	2.7%
SourceGas website	13.5%
Respondent was a SourceGas employee or contractor	13.5%
Other	5.4%
Don't Know	2.7%
N	37

Most participants learned of the program through their contractors, who have been actively engaged by SourceGas in marketing the program. 21.6% of respondents indicated that their replacement was an emergency replacement due to failed

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equipment. Among non-participants, the Water Heating Equipment Rebates Program had relatively high program awareness compared to other SourceGas programs, with roughly 1.3% of non-participants stating that they knew of the program.

Of the 78.4% that indicated having time to plan the replacement, 6.9% stated that they felt the water heater was close to failure. Thus, 72.9% of the total respondents indicated having replaced a water heater that was functional and not expected to soon fail.

5.2.3.2 Reasons for Participation

Respondents were asked a series of questions addressing their reasons for installing a high efficiency water heater, and to indicate which reason was most important in their decision-making. Figure 5-1 summarizes the reasons given by residential survey respondents. The respondents were asked an open-ended question where they would list their reasons for participation, with the interviewers logging each reason indicated. The most commonly indicated reason was. Without prompting, 33.8% of respondents indicated the rebate as a reason for purchasing a high efficiency water heater, and 23.8 % listed the recommendation from their contractor as the reason.

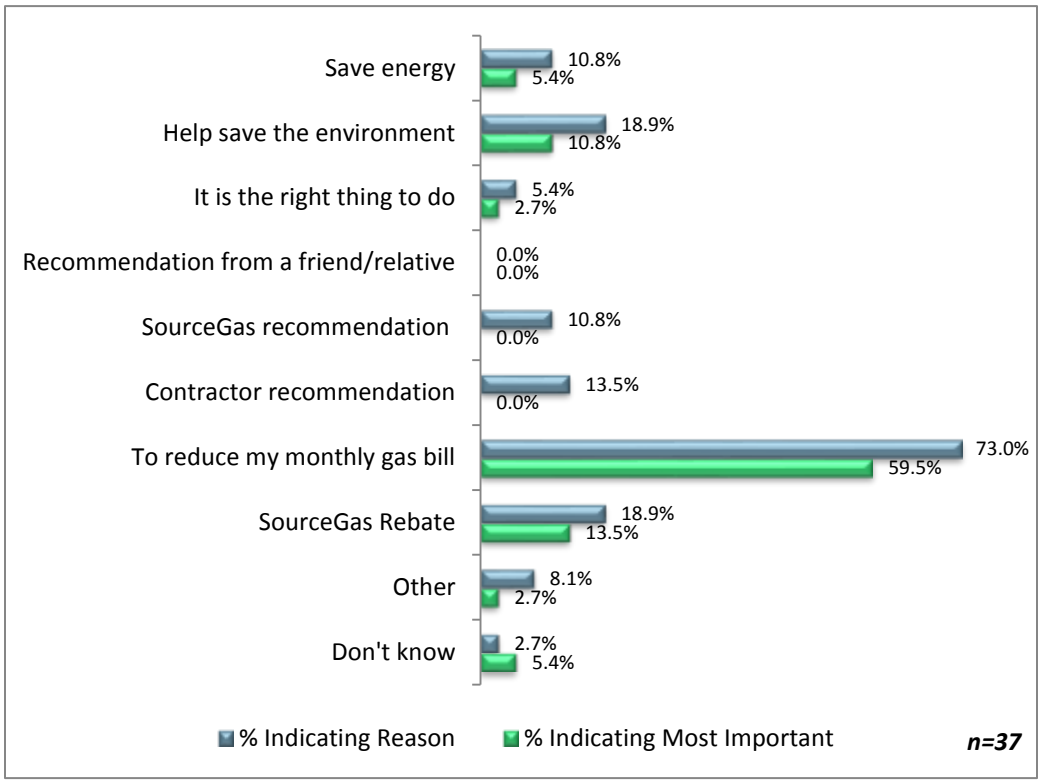

Figure 5-1 Residential Water Heating Reasons for Purchase of High Efficiency Equipment

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5.2.3.3 Program Satisfaction

Participants were asked to rate their satisfaction on a scale of 1-5, with 1 meaning "Very Dissatisfied" and 5 meaning "Very Satisfied" on a range of items related to their program experience. Table 5-4 tabulates the satisfaction results.

Table 5-4 Water Heating Equipment Rebates Program Residential Satisfaction Levels

Element of Program Experience	Very Satisfied	Somewhat Satisfied	Neither Satisfied or Dissatisfied	Somewhat Dissatisfied	Very Dissatisfied	Don't Know	Mean Score
Information provided by your contractor	75.7%	13.5%	0%	0%	2.7%	8.1%	4.74
The quality of installation work by your contractor	91.9%	2.7%	2.7%	0%	2.7%	0%	4.81
The performance of the water heating equipment you had installed	83.8%	10.8%	2.7%	2.7%	0%	2.7%	4.73
The savings on your monthly gas bill	37.8%	21.6%	32.4%	2.7%	0%	5.4%	4.00
The effort required to apply for the rebate	73.0%	8.9%	5.4%	0%	2.7%	0%	4.59
The wait-time to receive the rebate	48.6%	32.4%	8.1%	5.4%	5.4%	0%	4.14
The service provided by SGA staff	64.9%	5.4%	21.6%	0%	0%	8.1%	4.47
Information provided by SGA on how to reduce your gas bill	64.9%	2.7%	18.9%	0%	0%	13.5%	4.53
Improvement in home comfort with the new water heating equipment	75.7%	8.1%	8.1%	0%	2.7%	5.4%	4.63
The rebate amount	81.1%	16.2%	2.7%	0%	0%	0%	4.78
Overall program experience	81.1%	16.2%	0%	2.7%	0%	.=0%	4.76

Overall satisfaction with the Water Heating Equipment Rebates Program is high. Respondents indicated particularly high satisfaction with the level of service provided by their contractor, the performance of the equipment installed, and the program rebate amount.

Regarding the scores for information and service, when asked open-ended questions related to the reason for their scoring, most respondents indicated that they received no service or information from SourceGas at all over the course of the process; their interactions related to the program were solely with their contractor, who was more likely to have direct contact with SourceGas over the process.

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5.2.4 Non-Residential Surveying

The evaluators conducted interviews with two program participants. The two participants were hotels that received incentives for multiple tankless water heaters. Between these two participants, there was total claimed savings of 31,394 Therms. Following the interviews, it was found that they both were both introduced to SourceGas energy efficiency programs through participation in the C&I Solutions Direct Install component. From this, further conversations developed with CLEAResult leading to retrofits of their water heaters to tankless units. Given the nature of the participants and the low total response goal, the evaluators treated these as semi-structured interviews and case studies rather than a fully-structured questionnaire. From these semi-structured interviews, the evaluators made a qualitative judgment of the savings being program-induced.

5.2.4.1 Non-Residential Future Program Participation

Though no formal participant survey was conducted in this evaluation due to the low participation level, the evaluators surveyed 210 commercial & industrial non-participants in a general-population survey.

Nine percent of respondents indicated that their water heating equipment is the largest consumer of gas in their facility. Thirty-seven percent indicated that it is the second highest load in their facility. Figure 5-2 summarizes these results by facility type.

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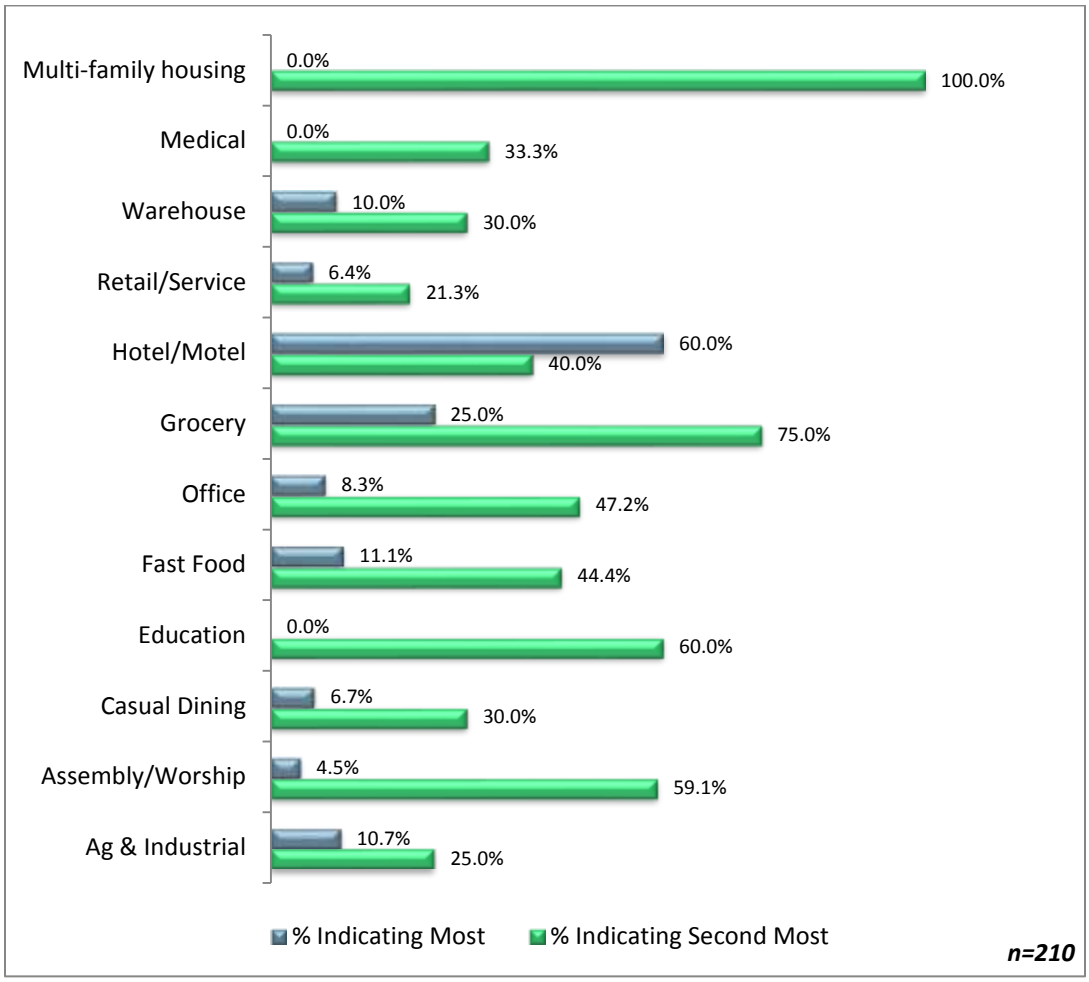

Figure 5-2 Percent of Facilities with Water Heating as Highest Load

Sixteen percent of respondents indicated having heard something about SourceGas' energy efficiency programs. Five percent indicated specific awareness of SourceGas' available incentives for water heating equipment. Respondents were also asked to rate their interest on a scale of 1-10 in SourceGas' programs (with "1" meaning "Not interested at all" and "5" meaning "Very interested"), based on brief descriptions of what the program offers. Average non-participant interest in the Water Heating Equipment Rebates Program was 3.78 out of 10. The evaluators then subset these responses by facility type, with the average scores presented in Figure 5-3.

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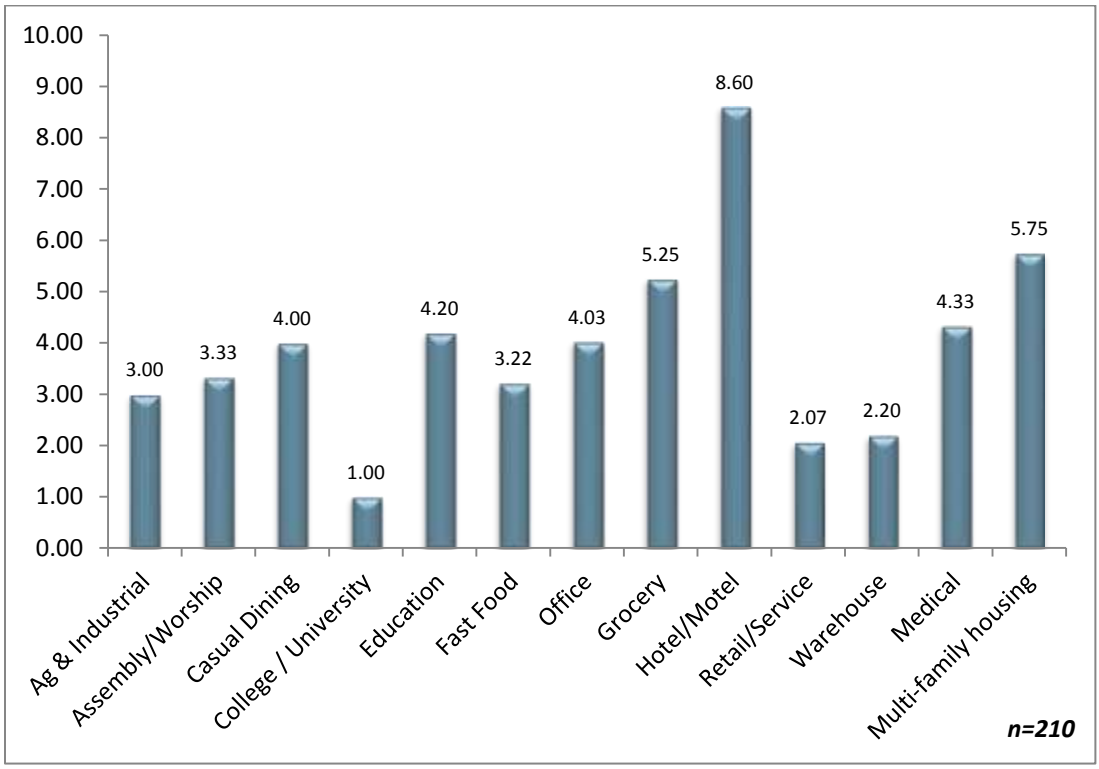

Figure 5-3 Non-Participant Interest in Water Heating Equipment Rebates Program

The facility types showing the highest interest were Hotel/Motel, Multifamily Housing, and Grocery facilities. Of those interested in the program, 17.6% stated that the primary barrier to participating would be their inability to afford high efficiency equipment. Forty-seven percent stated that they do not need to replace any equipment. Further, 5.0% stated that they would not participate because they are leasing the space.

5.2.5 Program Development & Outlook

The Water Heating Equipment Rebates Program is designed to reach two specific market segments, promoting the installation of high efficiency water heaters in residential and small commercial applications. The evaluators found that given these goals, the program is not meeting the long-term market transformation needs of some market segments. Given the findings of the evaluator's primary and secondary research, two underserved market segments have been identified:

1. **Emergency replacements.** With estimates that roughly two thirds of water heater replacements are due to equipment failure, the fact that 78.4% of the replacements in SourceGas' program were planned indicates that the emergency replacements are not captured. Emergency replacements are more likely to be storage tank installations, as the installation needs to be quick and on short notice, often precluding the installation of a more costly, complicated, and efficient system. Capturing of this market relies on item availability at the

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wholesale level, where plumbers and distributors have a qualifying, correctly-sized unit on hand for short-notice installation.

2. **Replacements by older plumbing companies.** The evaluators found that many older plumbing companies are generally uncomfortable with newer water heating technology, and would rather not risk a failed installation for the sake of selling a high efficiency model. This segment likely needs to be targeted with marketing directed at high-efficiency non-condensing storage tank models, as it seems a high barrier to get this segment to install more modern water heating technology.

Given these issues, the evaluators opted to review the program offerings under Water Heating Equipment Rebates Program and assessed the integration of the program in the current Water Heating market within SourceGas territory, within the context of larger developments within the overall industry.

5.2.6 Market Assessment

5.2.6.1 Residential Program Potential

Non-participants were asked a battery of questions related to the state of their water heater and likelihood of replacement going forward. From this, it was found that:

- Seven percent of water heaters were older than 10 years (i.e., past their EUL)
- Seventy percent of respondents indicated having a natural gas water heater
- Ten percent of respondents stated they were likely to replace their water heater within the next two years if they do not change residences
- Eight percent of respondents stated that they replaced their water heater within the past three years.

There is a high level of variety in types of water heating technology. Table 5-5 summarizes the current available water heating technologies in the residential market.

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Table 5-5 Available Water Heating Technologies

Product Type	Description	Efficiency Level
Standard efficiency storage tank unit	Insulated pressure vessel, gas burner, center flue, exhaust system	EF > .58 for a 50 Gallon unit
ENERGY STAR® storage tank unit	High efficiency version of classic storage tank design. May include improved blowers, dampers, and other features	EF = .67
Condensing storage tank water heater	Condenses flue gases to improve efficiency of extraction	EF .80 - .85
Tankless	On-demand generation with no standby losses	EF .82+
Hybrid	Combined storage/tankless unit. Reduced burner load; has standby losses less than storage but higher than tankless	No testing method; estimated EF .75
Absorption heat pump	Uses gas to transfer heat form ambient air to water	EF 1.4
Solar with gas backup	Uses solar heat for at least half of the load, with a backup gas storage tank unit	Solar Fraction (SF) > .5

Sources: ACEEE. 2011. *Emerging Hot Water Technologies and Practices for Energy Efficiency as of 2011*
DOE. 2010. *Residential Heating Products Final Rule Technical Support Document.*
ENERGY STAR. 2009. *ENERGY STAR Qualified Water Heaters: Partner Resource Guide.* US> Department of Energy.

As other high efficiency options enter the market and show declining costs, SourceGas should research the viability of integrating the offerings into the Water Heating Equipment Rebates Program. Based on secondary research, the evaluators concluded the following on the varying water heating technologies available:

- **Non-Condensing Storage Water Heaters:** These units are a stopgap in being the least-efficient option that could be considered in a program. They are more likely to be used in emergency replacement situations, given the relatively low upfront cost and high availability.
- **Condensing Storage Water Heaters:** These units allow for replacement of a storage tank with a higher efficiency option without as invasive of a renovation as needed to install a tankless water heater. These units could serve to provide a higher-efficiency alternative in applications where a tankless unit is not feasible. These have become available in the residential market and are currently incentivized through the program, though at the same incentive level as non-condensing storage tank water heaters.
- **Hybrid Storage/Tankless Water Heaters:** These units combine the benefits of storage tank and tankless units. Presently, the primary barrier is a lack of an effective test method for tanks between 2 and 20 gallons. However, many are rated at 90%+ TE and are incentivized through the SourceGas program. They should be delineated from standard tankless units, however, in that some have efficiency levels from 70-80%; those are still potentially viable but if they are to be incentivized it should be at a lower level than the $550 rebate for tankless and condensing tankless units.

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- **Condensing & Non-Condensing Tankless:** These units constitute the bulk of participation in the Water Heating Equipment Rebates Program and will continue to do so for the foreseeable future. Based on interviews with vendors and secondary research, the evaluators found that it is believed that condensing units will become the standard going forward. This is attributable to their relative ease of installation due to reduced venting requirements.
- **Solar with Gas Backup:** This system uses solar heating to remove 50% or more of the water heating load. These systems have been successfully incentivized elsewhere and should be considered for the Water Heating Equipment Rebates Program.

5.2.6.2 Feasibility of Replacement

Eighty-eight percent of the 2012 residential participants installed a tankless water heater. These are a far more efficient option, but the opportunities to install this equipment are limited in that it often requires a large-scale home remodel. Current estimates hold that 30% of homes cannot be cost-effectively retrofitted to a tankless unit[13]. Most water heater replacements are driven by emergency failures, in which the customer installs on short notice whatever properly sized unit is available. However, according to our participant data, 78.6% of the replacements rebated through the program were of functioning units. This conflicts with prior findings that indicated that roughly two thirds of water heater replacements are due to equipment failure[14]. This would imply that the program is being integrated into the decision-making of home remodels or larger-scale retrofits, but not capturing the emergency replacement market.

5.2.6.3 Underserved Market Segments

Given the findings of the Evaluator's primary and secondary research, two underserved market segments have been identified:

1. **Emergency replacements.** With estimates that roughly two thirds of water heater replacements are due to equipment failure, the fact that 78.6% of the replacements in SourceGas' program were planned indicates that the emergency replacements are not captured. Emergency replacements are more likely to be storage tank installations, as the installation needs to be quick and on short notice, often precluding the installation of a more costly, complicated, and efficient system. Capturing of this market relies on item availability at the wholesale level, where plumbers and distributors have a qualifying, correctly-sized unit on hand for short-notice installation.

[13] Charles Adams. 2010. "Water Heater Rating Improvement Act of 2009: Senate Bill S. 2908" A.O. Smith. Presented at ACEEE Water Heater Forum 2010

[14] D&R International. 2009. *Water Heater Market Profile 2009.* US Department of Energy

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2. **Replacements by older plumbing companies.** The evaluators found that many older plumbing companies are generally uncomfortable with newer water heating technology, and would rather not risk a failed installation for the sake of selling a high efficiency model. This segment likely needs to be targeted with marketing directed at high-efficiency non-condensing storage tank models, as it seems a high barrier to get this segment to install more modern water heating technology.
3. **Residential new construction.** CenterPoint and AOG had 20-25% of their participation come from home builders in new construction applications. The evaluators found that no home builders received incentives in the SourceGas tracking data.

5.2.6.4 Potential for Midstream Incentives

The two identified underserved market segments require a different approach than the direct-incentives currently provided by the Water Heating Equipment Rebates Program. Given the realities of the storage tank market, it may benefit SourceGas to investigate moving storage tank unit incentives from the end-use customer to the midstream distributor. Through incentivizing the distributors, SourceGas could potentially influence the stocking patterns, affecting the available equipment during emergency replacements and capturing more of the storage tank market. The evaluators would recommend against incorporating tankless units into this, however, as those are a technically complex installation requiring significant end-user education, and are better-served by direct end-user incentives.

Converting the storage tank component to midstream incentives would have trade-offs in terms of its impact on program delivery. Table 5-6 summarizes the differences in program implementation and outcomes of downstream versus midstream programs.

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Table 5-6 Comparison of Downstream and Midstream Incentives

	End-User Downstream Incentives	***Distributor Midstream Incentives***
Activities	End-user receives incentives (either mail-in or online) Training and marketing support to retailers Outreach to plumbing contractors	Incentives to retailers and distributors Marketing to end-users
Program theory	**Outcomes:** increases sales of high efficiency equipment through customer-direct education and incentives	**Outcomes:** Changed stocking patterns of retailers and distributors to contain more energy efficient technologies
Risks	May lack participant contact information if incentives are POS High free-ridership levels for equipment with low incentive/incremental cost ratio Higher program costs	Relies on retailers providing sufficient sales data in order to establish market share of high efficiency options Can be difficult to estimate free-ridership and baselines
Strengths	Simple to track participation and ensure program eligibility. No out-of-territory leakage	Lower cost of implementation overall. Can reach emergency replacement market to a further extent than end-user incentives.

5.2.7 Program Best Practices Assessment

The evaluators reviewed the program operations and compared them to best practices for residential and non-residential water heating programs as listed in the Energy Efficiency Best Practices Self-Benchmarking Tool. On this basis, the Water Heating Equipment Rebates Program was found to adhere strongly to program best practices in most respects. Particularly, the Water Heating Equipment Rebates Program adheres to best practices in:

1. **Program implementation is driven through trade ally outreach and education.** The Water Heating Equipment Rebates Program provides outreach and education to plumbing contractors and home builders, and enables them to market the program on behalf of SourceGas. This allows SourceGas staff to limit their intervention in the customer experience, to the extent that most respondents indicate not having had any interaction at all with SourceGas staff.
2. **Evaluation is incorporated into the program improvement process.** SourceGas & CLEAResult has expressed a desire to obtain feedback from regular process evaluation and quickly incorporates such findings into their program implementation. The program process flow is flexible to the extent that adjustments can be made as-needed as issues are uncovered during real-time evaluation.

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3. **The program has fully-developed post inspection procedures.** CLEAResult staff has developed randomized post-inspection procedures that help to ensure the validity of program savings claims.

Areas where the Water Heating Equipment Rebates Program falls short of best practices include:

1. **Tracking data lacks some key elements.** As stated in the tracking data review, no primary point of contact for commercial projects is collected or listed in tracking data. This adds difficulty to the evaluation process as it is not clear whom to ask for when contacting program participants.
2. **The program does not offer a trade ally incentive.** The program could enhance residential participation levels by offering a trade ally incentive for tankless units. CenterPoint offers a $50 incentive and AOG offers a $100 incentive. If SourceGas is concerned that a trade ally incentive is not necessarily warranted for all tankless units, they may want to consider it strictly for condensing tankless units (.92 EF and higher).
3. **The program has not had the benefit of a formal market potential study.** Though SourceGas has conducted some market research to inform their program design and implementation process, there has not yet been a formal market potential study. This hampers some outreach efforts and could possibly result in some market segments being underserved. However, the conducting of a market potential study should be a multi-utility, cross-fuel effort in order to ensure the most efficient use of ratepayer funds, and as such would require a great deal of coordination between SourceGas and other members of the Arkansas Parties Working Collaboratively.

5.3 Water Heating Equipment Rebates Program Impact Evaluation

For the equipment rebates component, savings were calculated using methodologies detailed in Section 2.20 and 3.31 of the TRM Version 1.0 for residential and commercial applications, respectively. The impact evaluation effort of the Water Heating Equipment Rebates Program included the following:

- *Residential Verification*. The evaluators conducted M&V of the residential component of the Water Heating Equipment Rebates Program utilizing deemed savings parameters established in the TRM V1.0. This was due to the TRM V2.0 parameters requiring the collection of occupancy data which was not tracked by SourceGas in 2012. These parameters provide estimates of Therms savings using input capacity and efficiency. The evaluators conducted onsite verification inspections of a sample of 10 participating residential customers, verifying that unit parameters matched those listed in the tracking data.

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- *Commercial Verification*. Savings for commercial projects were calculated using TRM V2.0 protocols. The evaluators conducted onsite verifications at two participating facilities, verifying the inputs used in TRM V2.0 savings calculations.
- *Free-Ridership Estimation.* Free-Ridership Rates were developed for each of the two program components. They were developed using detailed participant surveys, addressing the decision-making process to participate in the program. Topics contributing to the free-ridership analysis included the magnitude of the incentive as a motivator, the extent to which the program educated customers about new energy-saving opportunities, timing of learning of the program relative to installation of the measures, and culminating in a determination of whether the participant would have installed the same or similar equipment within one year in the absence of the program. These were further informed by interviews with participating vendors, who provided feedback as to the impact of the program on their ability to sell high efficiency equipment.
- *Spillover Estimation.* Spillover was addressed for the program participants. Participants were surveyed for free ridership and process evaluation, and over the course of that survey are asked a series of questions addressing whether the Program induced them to install other energy efficient equipment without program incentive. Additionally, the evaluators asked these customers for an estimate of savings that they expect from these measures.

5.3.1 Residential impact Evaluation

5.3.1.1 Energy Savings Calculations

Energy savings values for storage tank water heaters were developed using installed Energy Factor ratings as determined by the Gas Appliance Manufacturers Association Directory of Certified Water Heating Products[15]. Tank sizing must follow AHRI standards. Table 5-7 and Table 5-8 present the deemed savings values for storage tank annual and peak therm savings, respectively. The TRM Version 1.0 table for Peak Therms was incomplete, only listing values for 50 gallon water heaters. The evaluators completed the table by imputing the same ratio in annual savings between 30 and 40 gallon water heaters to 50 gallon water heaters and applying this same ratio to peak therms savings.

[15] Arkansas TRM V1.0, Pg. 72-77

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Table 5-7 Storage Tank Water Annual Therms Savings

	Gas Domestic Hot Water Replacement Baselines		
Approximate Volume (Gallons)	50	40	30
Federal Standard EF	.58	.59	.61
Annual Therms – Baseline	215	185	157
Minimum EF for Incentive Qualification - Gas	***Annual Therms Savings***		
.60	10	n/a	n/a
.61	14	n/a	n/a
.62	17	9	n/a
.63	20	12	n/a
.64	23	15	8
.65	26	17	Not Available
.66	29	20	Not Available
.67	32	22	Not Available

Table 5-8 Storage Tank Peak Terms savings

	Gas Domestic Hot Water Replacement Baselines		
Approximate Volume (Gallons)	50	40	30
Federal Standard EF	.58	.59	.61
Annual Therms – Baseline	215	185	157
Minimum EF for Incentive Qualification - Gas	***Peak Therms Savings***		
.60	.030	n/a	n/a
.61	.040	n/a	n/a
.62	.050	.026	n/a
.63	.059	.035	n/a
.64	.068	.044	.023
.65	.077	.050	Not Available
.66	.085	.059	Not Available
.67	.096	.066	Not Available

Error! Reference source not found. and **Error! Reference source not found.** display e deemed savings values for tankless water heater annual and peak therms, respectively[16]. As with storage tank water heaters, the TRM Version 1.0 table for peak therms for tankless water heaters was incomplete and needed to have values imputed.

[16] Ibid.

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Table 5-9 Tankless Water Heater Annual Therms Savings

	Size of Water Heater Being Replaced		
Approximate Volume (Gallons)	50	40	30
Federal Standard EF	.58	.59	.61
Annual Therms – Baseline	215	185	157
Minimum EF for Incentive Qualification – Gas Tankless	***Annual Therms Savings***		
.69	37	26	18
.78	58	45	34
.79	60	47	36
.80	62	49	37
.81	64	50	39
.82	66	52	40
.83	69	54	42
.84	69	55	43
.85	71	57	45
.92	82	67	53

Table 5-10 Tankless Water Heater Peak Therms Savings

	Size of Water Heater Being Replaced		
Approximate Volume (Gallons)	50	40	30
Federal Standard EF	.58	.59	.61
Annual Therms – Baseline	215	185	157
Minimum EF for Incentive Qualification – Gas Tankless	***Annual Therms Savings***		
.69	.106	.074	.052
.78	.167	.130	.098
.79	.173	.136	.104
.80	.179	.141	.107
.81	.184	.144	.0112
.82	.190	.150	.115
.83	.195	.153	.119
.84	.201	.160	.125
.85	.206	.165	.131
.92	.238	.194	.154

5.3.1.2 Residential Field Inspection Findings

The evaluators conducted field inspections at 10 participating residential facilities. These field visits were scheduled and conducted by ADM staff with multiple goals in mind:

- First, the fieldwork was intended to verify that equipment was installed and matched specifications listed in the program tracking data. This included verification of capacity (BTUH) and efficiency (EF).

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- Second, field staff verified that the installations were done in a professional manner, ensuring proper functionality of the water heater. This primarily focused on verifying that condensate was being properly discharged without leakage.
- Finally, the fieldwork was used as an opportunity to collect residential demographic data that may be of future use in deemed savings development and updating. This included data on water heater set points, number of bedrooms per home, number of occupants per home, and general usage habits of water heating equipment.

There was an initial sample of 68 intended for the residential component, but it was decided by IEM staff that further field verifications were not a needed effort and expenditure for the EM&V of the Water Heating Equipment Rebates Program[17]. This recommendation was made on the basis of two assumptions:

1. Program staff conducted post-inspections; and
2. Surveys could be used to confirm participation and collected needed EM&V data.

Staff from CLEAResult conducted a significant amount of QA/QC inspection, and the evaluators were able to confirm participation via telephone survey. In the 10 field inspections completed, the evaluators found that all equipment matched program tracking data and that the installations were done in a professional manner that allows for the full efficient functionality of the water heaters.

5.3.1.3 Residential Free-Ridership

Free-ridership estimates for residential participants in the Water Heating Equipment Rebates Program were developed through combined scoring of the survey respondents and of participating vendors. This section will detail the questions and answers from the participant survey that contributed to the participant response portion of the program free-rider scoring.

The contributing questions are divided into three subcategories:

Timing & Information

Q-4 Prior to starting to install your new water heater, did you know that you could purchase the same size water heater but some use more or less gas and electricity?

Eighty-seven percent of respondents indicated that they were aware of variations in energy consumption by units of the same size. Thirteen percent of respondents were unaware that two units of the same capacity could potentially use different amounts of energy.

[17] This was determined during the process of finalizing the program evaluation plan in September 2012, after the evaluators had completed a first batch of field inspections.

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Q-5 Prior to your starting to replace your water heater did you know you might pay more or less on your gas bill based on the efficiency of the water heater?

Ninety-two percent of respondents indicated that they were aware that their bill could vary based on the efficiency level of the water heater. Eight percent indicated that they were unaware of this.

Q-6 When did you decide to buy a high efficiency water heater? Was it…

- ❑ Before or just when you started looking for a new water heater
- ❑ While getting information about water heaters but before deciding on a contractor
- ❑ While deciding on a contractor
- ❑ After deciding on a contractor

Table 5-11 Timing of Decision to Purchase High Efficiency Water Heater Relative to Timing of Selection of Contractor

Timing	***%***
Before or just when you started looking for a new water heater	75.7%
While getting information about water heaters but before deciding on a contractor	10.8%
While deciding on a contractor	8.1%
After deciding on a contractor	5.4%
n=37	

Q-7 Did you know about SourceGas' Water Heating Equipment Rebates Program…..

- ❑ Before starting to replace your unit or did you,
- ❑ Learn about it while replacing the water heater

Forty-nine percent of respondents were aware of the program before starting to replace their unit. Fifty-one percent learned of the program after deciding to replace their unit.

<u>Importance of Rebate</u>

Q-9 Why did you decide to purchase a high efficiency water heater?

This question is open-ended, with the interviewers categorizing the answers given, and multiple answers allowed. Unprompted, 10.8% of respondents indicated the financial incentive as a reason for purchasing the high efficiency option.

Q-12 How important was SourceGas' rebate in your decision to buy the high efficiency water heating equipment?

When prompted to discuss the rebate, 48.6% of respondents indicated that the rebate was "very important" in their decision to purchase a high efficiency water heater. Twenty-two percent stated that the rebate was "somewhat important', 8.1% stated "only slightly important", and 21.6% indicated that it was "not important at all". This value of 21.6% stating the rebate was "not important at all" does not directly translate to a free-

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ridership-rate, however, in that this value does not necessarily account for program influence

Q-17 When deciding about the water heater, did you purchase a more efficient water heater than you would have because of the program rebate?

Forty-one percent responded "yes" to this question, 56.8% responded "no", and 2.7% indicated that they "don't know" if they purchased a more efficient option due to the rebate. This question provides a strong indicator as to the impact of the program financial incentive on the customer decision-making process, in that there is traditionally a social desirability bias in answering questions regarding to behavior in energy efficiency in the absence of a program incentive, yet despite this a large portion indicated that the program incentive specifically induced purchase of a higher efficiency unit.

Respondents were then asked to what extent the available incentives moved up their purchase of a high efficiency water heater.

Q-20 Did the SourceGas rebate encourage you to install the equipment sooner than you would have? How much sooner?

Table 5-12 Effect of Rebate in Moving up Purchase Timing

Installed Sooner?	***% Respond***	***How Much Sooner?***	***%***
Yes	32.4%	A year sooner	100%
		Two to three years sooner	-
		Four to five years sooner	-
No	67.6%	n=12	
Don't Know	2.7%		
n=37			

Importance of Contractor

The importance of information provided by the contractor contributes to free-ridership in that much of the participation in the Water Heating Equipment Rebates Program is driven by contractors that receive outreach from SourceGas instructing them about the program offerings. They in turn market the program to their customers. Contractor influence was factored into the survey respondents' free-ridership score if the survey respondent had their unit installed by a trade ally that received training through the program. This was factored in on the basis of the participating vendor interviews, where it was indicated that the share of condensing tankless water heaters installed by these vendors was increased markedly as a result of program participation.

When asked an open-ended question addressing their reason for purchasing high efficiency water, only 13.5% of respondents indicated that it was based on a

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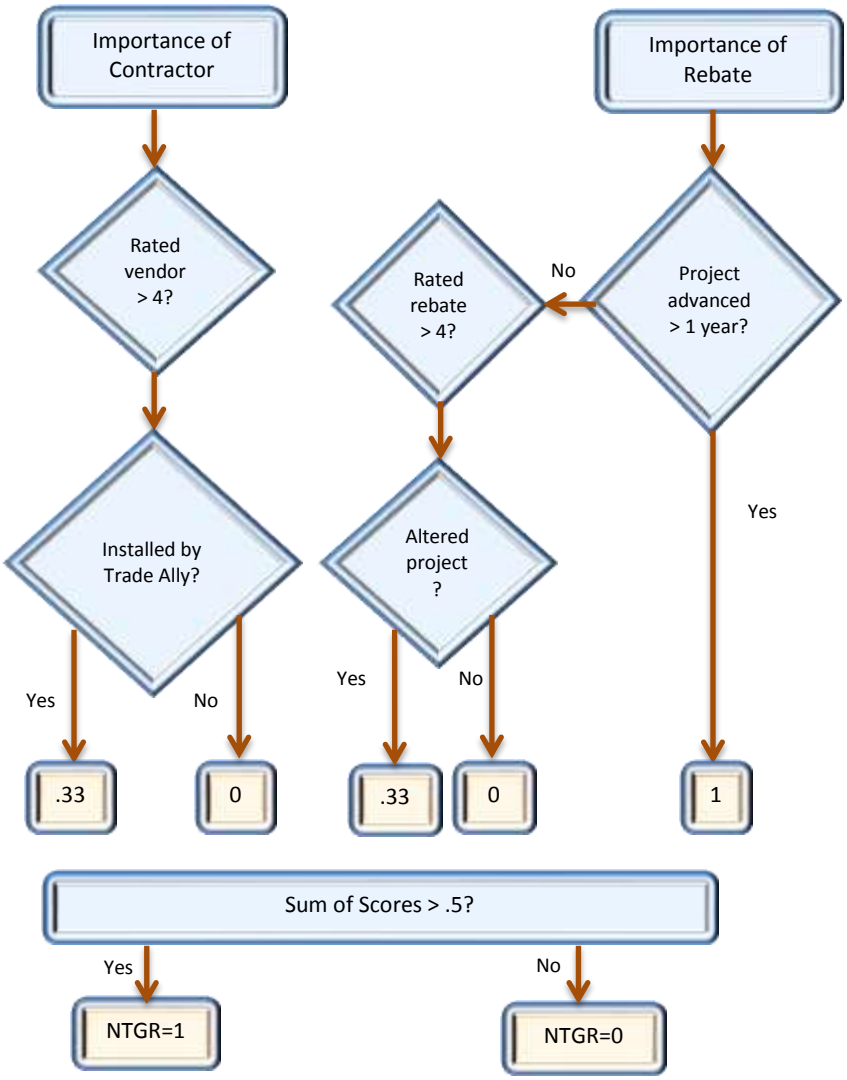
recommendation from their contractor. However, 40.5% of respondents indicated that they learned of the program from their contractor.

Q-10 In your decision to buy the high efficiency water heater, how important was information, advice, and / or recommendations from your contractor?

Forty-nine percent of respondents indicated that advice and recommendations from their contractor was "Very Important" in their decision to purchase a high efficiency water heater.

Free-Rider Scoring Mechanism

The above factors are combined in estimating free-ridership for each survey respondent. Their responses are then weighted by therms savings for the respondent in determining the free-ridership rate for the commercial component. The scoring mechanism for commercial free ridership is presented in the flowchart



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Based on the survey values, the evaluators found a free-ridership rate of 18.92% for residential participants.

5.3.1.4 Participant Spillover

The residential participant survey addressed participant spillover. This was done through a battery of questions designed to:

1) Assess the behaviors taken by customers after their program participation where they installed energy efficient equipment; and
2) Get the respondent's self-reported value for how important they felt information from SourceGas was in inducing this non-incentivized behavior.

After reviewing the survey data, the evaluators found no instances of participant spillover in the Water Heating Equipment Rebates Program

5.3.2 Commercial Water Heating Impact Evaluation

Commercial water heater savings calculations incorporate more facility-specific information than the residential methodology. Therms savings for commercial water heaters are calculated as[18]:

$$Therms\ Savings = \frac{\rho * C_P * V * \left(T_{SetPoint} - T_{Supply}\right) * \left(\frac{1}{EF_{pre}} - \frac{1}{EF_{post}}\right) * Days/Year}{100{,}000\ BTU/Therm}$$

P = Water Density, 8.33 lbs/Gallon

C_P = Specific Heat of Water, 1 BTU/Lb F

V = Average daily hot water use (gallons)

$T_{setpoint}$ = Water Heater setpoint, 140 deg F

T_{supply} = Supply water temperature, 58 deg F

EF_{pre} = Energy factor of existing water heater (.62 - .0019V)

EF_{post} = Energy factor of installed water heater

Days/Year = Days per year of operation

The required facility-specific inputs are volume and days/year. Volume can be calculated on the basis of square footage of the facility or from units served. Table 5-13 presents the volume and days of usage values for a facility by square footage[19]. Table 5-14 presents the volume and days of usage values by unit produced or person served.

[18] Arkansas TRM V2.0, Volume 2. Pg. 218-226

[19] Ibid

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Table 5-13 Hot Water Requirements by Facility Size

Building Type	Daily Demand (Gallons / Unit / Day)	Unit	Units / 1,000 Sq. Feet	Applicable Days / Year	Gallons / 1,000 Sq. Feet / Day
Small Office	1	Person	2.3	250	2.3
Large Office	1	Person	2.3	250	2.3
Fast Food Rest.	.7	Meal/Day	784.6	365	549.2
Sit-down Rest.	2.4	Meal/Day	340	365	816
Retail	2	Employee	1	365	2.0
Grocery	2	Employee	1.1	365	2.2
Warehouse	2	Employee	.5	250	1.0
Elementary School	.6	Person	9.5	200	5.7
Jr. High/High School	1.8	Person	9.5	200	17.1
Health	90	Patient	3.8	365	342.
Motel	20	Unit (Room)	5	365	100.0
Hotel	14	Unit (Room)	2.2	365	30.8
Other	1	Employee	.7	250	.7

Table 5-14 Hot Water Requirements by Unit or Person

Building Type	Size Factor	Average Daily Demand
Dormitories	Men	13.1 Gal. per Man
	Women	12.3 Gal. per Woman
Hospitals	Per Bed	90.0 Gal. per Patient
Hotels	Single Room with Bath	50.0 Gal. per Unit
	Double Room with Bath	80.0 Gal. per Unit
Motels	# Units:	
	Up to 20	20.0 Gal. per Unit
	21 to 100	14.0 Gal. per Unit
	101 and Up	10.0 Gal. per Unit
Restaurants	Full Meal Type	2.4 Gal. per Meal
	Dive-in Snack Type	0.7 Gal. per Meal
Schools	Elementary	0.6 Gal. Per Student
	Secondary and High School	1.8 Gal. Per Student

There were five participating facilities in the commercial component in 2012, totaling 33,584 therms in expected savings. The evaluators selected the two highest saving facilities, which accounted for 31,394 of the claimed savings. These two facilities had savings calculations redone based on facility-specific inputs determined through on-site verification. Further, the evaluators reviewed savings calculations for the remaining participant facilities. It was found that these facilities used the incorrect baseline for storage tank units of their size, and had savings revised accordingly. These factors combined in a resulting in 92.8% gross realization for the commercial component.

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5.4 Verified Savings

Table 5-15 presents the gross savings results of the evaluation of the 2012 Water Heating Equipment Rebates Program. Total Gross Savings summarizes the savings calculations performed by TRM protocols for Residential and Commercial water heaters.

Table 5-15 Water Heating Equipment Rebates Program Verified Therms Savings

Facility Category	Measure Category	Expected Therm Savings	Verified Therms Savings	EUL	Lifetime Therms Savings	Peak Therms
Residential	Storage Tank Water Heaters	131	131	11	1,441	.38
	Tankless Water Heaters	4,754	4,754	20	95,080	13.69
Non-Residential	Storage Tank Water Heaters	925	326	15	4,890	.89
	Tankless Water Heaters	32,659	30,833	15	462,495	84.47
	Total Gross Savings	38,469	36,044	-	563,906	99.44

Net savings for the Water Heating Equipment Rebates Program were calculated using residential and non-residential free-ridership rates based on participant and vendor surveys. The resulting net savings are presented in Table 5-16.

Table 5-16 Water Heating Equipment Rebates Program Net Savings Summary

Facility Category	Free-Ridership Rate		Net Annual Savings		Net Realization Rate	Net Lifetime Therms Savings	Net Peak Therms
	Ex Ante	Ex Post	Ex Ante	Ex Post			
Residential	20%	18.9%	3,908	3,962	101.4%	78,279	11.41
Non-Residential	20%	6.4%	26,867	29,159	108.5%	437,472	79.90
Overall:	20%	8.1%	30,755	33,120	107.6%	515,751	91.31

5.5 Conclusions & Recommendations

5.5.1 Conclusions

Based on the Evaluator's review of the Water Heating Equipment Rebates Program, we have concluded the following:

1. **Satisfaction with the program overall is high.** Overall satisfaction with the program was rated on average at 4.76 out of 5. Participant satisfaction with the quality of installation work and of the equipment performance was exceedingly high, with values of 4.81 and 4.73, respectively.
2. **Application processing times were too slow.** Respondents indicated moderate to low satisfaction levels with the wait time for application processing. SourceGas also indicated internal dissatisfaction with their rebate processing

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contractor, and have phased out this contractor in favor a third party implementer to handle all aspects of the program.

3. **The trade ally network is providing successful outreach and service.** SourceGas conducted multiple trade ally training sessions, instructing contractors as to the guidelines for participation (application process, equipment eligibility, etc.). These trade allies are actively marketing the program and have integrated the program offerings into their sales process.
4. **In most cases, the program does not require SourceGas to directly interact with customers.** Much of the customer experience with the program is handled through the program trade allies, who assist in processing paperwork and market the program on SourceGas' behalf. SourceGas' involvement is focused on mass-market efforts and quality control. This is a sign of success in developing a turn-key, low-maintenance program.
5. **The Water Heating Equipment Rebates Program largely corresponds with industry best practices.** The evaluators found that the program corresponds with best practices in most areas, with the exceptions being in lacking missing some key data elements in tracking data, and not being informed by a market potential study.
6. **SourceGas efforts in contractor education have allowed for further market penetration of tankless water heaters.** SourceGas engaged in multiple outreach and training efforts to promote the installation of tankless water heaters, overcoming concerns on the part of installing vendors surrounding the complexity of tankless installation.
7. **There has been little participation from home builders.** The evaluators found that levels of participation by builders were much lower for SourceGas than for comparable programs implemented by CenterPoint and AOG.
8. **The program has been less effective in incentivizing high efficiency storage tank units.** Storage tank units account for 12.0% of program participation in 2012. Though tankless units are more efficient, given the market share of storage tank water heaters, this low share of participation relative to the overall program may indicate a greater extent of lost opportunities.
9. **The program is not capturing the emergency replacement market.** Only 21.6% of residential participants indicated that there purchase was an emergency replacement, in conflict with larger studies that have indicated that typically two thirds of water heater replacements are emergency replacements. Thus it is likely that there is a large share of the emergency replacement market not captured by the program.

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5.5.2 Recommendations

1. **Research the feasibility of upstream and midstream incentives for storage tank water heaters.** Incentivizing at the retailer and distributor level has proven effective in changing the stocking patterns to provide more high efficiency options in the storage tank water heater market. These units are often self-installed, so the changes need to be made at the point of purchase, presenting more options to the end-using purchaser.
2. **Improve outreach to older plumbing companies.** Older companies displayed wariness over new water heating technologies. Outreach to these companies should first emphasize training in the installation practices of condensing and tankless water heaters, and if that fails, present options for non-condensing tankless units that are ENERGY STAR®-qualified.
3. **Add a "Primary Point of Contact" field for commercial participants.** Many of the commercial participants lacked a point-of-contact name (only the business name was included). This slowed EM&V efforts as the evaluators found it necessary to either request names on an *ad hoc* basis from SourceGas or to ask for decision-makers by title during surveying or attempts to schedule site visits.
4. **Add the calculation inputs to the tracking data.** The evaluators had to make supplementary requests for certain calculation inputs. Tracking data should include the inputs used to calculate savings according to TRM V2.0 methodologies, such as weather zone and volume of water use.
5. **Modify the rebate form "facility type" section.** The form as presently constituted does not include all facility types from the TRM V2.0. Collecting this at the time of application will ease the process of savings calculations by SourceGas and the evaluators.
6. **Ensure that tracking data flags commercial condensing storage tank units.** Units above a certain efficiency level were automatically tagged as tankless. Some of these units were condensing storage tank water heaters. Add fields that explicitly indicate such instances, and whether the efficiency value is the Energy Factor or Thermal Efficiency.
7. **Distinguish between hybrid and tankless units, and provide the gallons of the hybrid unit.**
8. **Research the viability of new water heating technologies as program additions.** The evaluators reviewed the available water heating technologies and have identified condensing storage tank units, hybrid tankless units, and solar with gas backup as possible formalized program additions. Distinct incentive levels should be set for added equipment classes in order to properly correspond to incremental cost and expected savings.

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9. **Add a trade ally incentive for tankless units.** Presently, the program does not offer a trade ally incentive for tankless units. CenterPoint offers a $50 trade ally incentive and AOG offers $100. Doing so could encourage more participation for tankless units. If SourceGas is concerned that the incentive is not necessary for all tankless units, they could consider offering it only for condensing tankless units (.92 EF and higher).
10. **Focus outreach on home builders.** The SourceGas Water Heating Equipment Rebates Program had little to no participation from home builders. This contrasts sharply with CenterPoint and AOG, for whom 20-25% of the residential participation was to home builders. These market actors need to be engaged, as the opportunity for savings from the homes built will be lost for 10-15 years if not brought into the program.

These issues are summarized in Table *5-17*.

Table 5-17 Summary of Recommendations for Water Heating Equipment Rebates Program

Issue	***Consequences***	***Recommendation***	***Basis for Recommendation***
Program isn't capturing the bulk of storage tank water heater sales	Lost opportunities for savings	Consider a program design that provides incentives at the distributor or retailer level, to change equipment availability	Comparison of established program implementation strategies in CA, NY, and MN.
Program isn't capturing emergency replacement market	Lost opportunities for savings	Incentivize distributors and plumbers to keep 40 gallon high efficiency storage tank models readily available for emergency replacements	Comparison of program implementation strategies in established service territories in CA, NY, and MN.
Program had lower than expected residential tankless participation	Shortfalls in goals for residential segment	Add a trade ally incentive either for all tankless or just for condensing tankless water heaters.	Comparison to practices in place by CenterPoint and AOG.
No primary point-of-contact included in commercial projects	Added difficulty in EM&V efforts	Add a point-of-contact field in the commercial tracking data	Evaluation best practices
Older plumbing companies wary of new technologies in water heating	Lost opportunities for savings	Targeted marketing and training of older plumbing companies in installation practices for new technologies. Presentation of options for water heaters that are higher efficiency but do not incorporate new technologies	Interviews with participating vendors subdivided by company age.
Lower than expected new construction participation	Underserved market segment and lost savings potential	Focus outreach efforts to target home builders.	The level of new construction participation was compared against levels observed in
Some water heating technologies not covered by the program	Lost opportunities for savings	Establish discrete measure categories and incentive levels for condensing storage tank, hybrid tankless, and solar with gas backup water heating systems	Reviews of program offerings in established programs in CA, NY, and MN.

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6. C&I Boiler Equipment Rebates

The C&I Boiler Equipment Rebates program provides incentives for installation of high efficiency boilers and various boiler controls. Eligible measures for this program include:

- $1,400/MMBTUH for boilers with 84%-93.9% efficiency;
- $4,000/MMBTUH for boilers with efficiency of 94% or greater;
- $1,000/MMBTUH for 6-step or fully modulating burners;
- $225 for boiler reset controls;
- $150 for boiler cut out controls; and
- $400 for boiler vent dampers.

The program as presently implemented is designed to provide prescriptive incentives for boilers and controls in HVAC applications. Boilers must be under 12.5 MMBTU. HVAC Boilers larger than 12.5 MMBTU and boilers serving process loads are handled through the C&I Solutions Program.

6.1 Program Overview

The C&I Boiler Equipment Rebates Program began in 2010. The program was initially designed to provide prescriptive incentives for all boiler replacements. The program goal was established based on the size of the overall boiler market within SourceGas' service territory, inclusive of both HVAC and process boilers. However, with the beginning of the Commercial & Industrial Solutions program in 2011, process boilers were no longer handled through the C&I Boiler Equipment program, significantly reducing the market size available to the program. Table 6-1 summarizes the historical performance against goals of the C&I Boiler Equipment program.

Table 6-1 C&I Boiler Equipment Rebates Historical Performance against Goals

Program	# Participants		Budget		Net Therms	
Year	Actual	Goal	Spent	Allocated	Achieved	Goal
2010	0	70	$40,113	$123,033	-	-
2011	0	89	$34,167	$120,912	0	92,970
2012	4	120	$73,229	$146,510	2,425	125,010

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6.2 C&I Boiler Equipment Rebates Process Evaluation

The C&I Boiler Equipment Rebates program had one participant receive rebates for four boilers in 2012. As such, the evaluators' activities were limited. The evaluators documented program history and interviewed program staff in order to assess possible improvements for the program in 2013. The program was internally implemented by SourceGas until September of 2012, at which point CLEAResult was brought on as the implementation contractor. They did not begin full implementation of the program until October of 2012, and as such there has not been sufficient time to assess program performance under their implementation.

6.2.1 Data Collection Activities

- *SourceGas Program Staff Interviews*. The evaluators interviewed staff at SourceGas involved in the administration of the C&I Boiler Equipment Rebates Program. These interviews built upon interviews conducted during the 2011 Limited Process Evaluation, in which the evaluators collected initial background information on program history and implementation. These interviews captured any operational changes on SourceGas' side, as well as informing the evaluators as to any new developments in the program. The evaluators conducted in-depth interviews with SourceGas staff involved in administration of the C&I Boiler Equipment Program.
- *Program Marketing Materials Review*. The evaluators collected marketing materials used by the C&I Boiler Equipment Rebates Program. This included customer mailers, audit reports, and a review of the SourceGas program website. This was compared against marketing materials from successful programs run in other territories in informing marketing improvements.
- *Program Goals & Market Assessment*. The evaluators reviewed the program goals relative to the market size in SourceGas' service territory, in order to determine if a program such as this is appropriate to implement, and if so, what is an appropriate savings and participation goal

Table 6-2 summarizes the data collection for this process evaluation effort. This includes the titles, role, and sample sizes for data collection.

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Table 6-2 C&I Boiler Equipment Rebates Data Collection Summary

Target	Component	Activity	N	Role
SourceGas Program Staff	Manager – Energy Efficiency Programs	Interview	1	Overall administration of SGA DSM programs. This manager is involved in the larger strategic decisions associated with the DSM portfolio, and is involved with the C&I Boiler Equipment Rebates Program in the overall coordination of utility resources.
CLEAResult Program Staff	Energy Engineer	Interview	1	The Energy Engineer oversees technical aspects of the program, including review of equipment offerings and savings calculations. The Energy Engineer also engages in outreach to commercial customers.
	Program Coordinator	Interview	1	The program coordinator handles day-to-day administration, including scheduling of quality control inspections, application review, and marketing and outreach.
Non-Participants	C&I Non-Participants	Survey	210	The evaluators surveyed a sample of C&I non-participants has part of a general population survey to gauge program awareness, interest, and barriers to participation.
Marketing & Outreach	Marketing Materials	Literature Review	-	The full scope of paper and electronic marketing materials used in implementation for the C&I Boiler Equipment Rebates Program was reviewed by the evaluators.
Evaluation History	Prior Evaluation Reports	Literature Review	1	Findings from the Limited Process Evaluation conducted in 2011 were reexamined to determine to what extend recommendations were implemented
	Comparative Review	Literature Review	-	Evaluation reports of similar programs conducted elsewhere were examined in order to provide recommendations for improvement based upon lessons learned elsewhere.

6.2.2 Process Findings & Results

This section will present the results and key findings from the data collection activities. These findings are based upon interviews with program staff.

6.2.2.1 Program Theory & Design

The C&I Boiler Equipment Rebates Program was designed to provide tools for large C&I customers and specialized boiler venders to engage in central plant improvements. The program provides easily calculable incentives for central plant improvements, including an online calculator for rebate estimation by participants or vendors.

6.2.2.2 Program Administration

The C&I Boiler Equipment Rebates Program is overseen by the Manager of Energy Efficiency at SourceGas. This manager is responsible for oversight of all SourceGas

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programs. When the SourceGas programs were internally-implemented, this was problematic in being an excessive workload for the sole staff-member. With the addition of third-party implementation, this problem is alleviated, though as processes are put in place with the implementer the internal staffing levels at SourceGas should be reexamined.

This manager's responsibilities include oversight of the third party implementation staff and guidance of the mass-marketing efforts.

The program is supported by implementation staff at CLEAResult. CLEAResult took over the program in September 2012. Their responsibilities include targeted marketing, application and rebate processing, and quality control. The evaluators found that the staff associated with the C&I Boiler Equipment Rebates Program was well-trained in the specific equipment and issues associated with the program.

6.2.2.3 Program Implementation and Delivery

As a fully-prescriptive program, The C&I Boiler Equipment Rebate Program receives applications for already-purchased equipment (no measures require pre-screening). There is a pre-prescribed menu of accepted equipment types, without the option for a custom component. The steps involved include:

- *Purchase of Equipment*. The customer has selected and purchased the boiler equipment. The rebate form is generally filled out at this time by the equipment dealer, which helps to ensure accurate information recorded in the application.
- *Application Submittal*. Applications need to be submitted within 90 days of purchase or at December 31 of the calendar year of purchase, whichever comes first. Information in the application includes full Customer and Dealer information (names, contact information, gas account number, and dealer information) specifications of the equipment (type, BTU, manufacturer, model #, and serial #), a copy of the purchase invoice, and the preferred method of contact for follow-up. The application is available in paper and .pdf form. The application uses multiple-choice selections for most key inputs (such as facility and system type), minimizing errors associated with application submittal. Additionally, areas required in order for rebates to be processed are highlighted in yellow, with bold-print warnings and reminders as to needed information and filing deadlines.
- *Application Review*. Staff at CLEAResult reviews all incoming applications to ensure that the account number is served by SourceGas and that the equipment model qualifies for the program. At this time, any discrepancies are sorted out with the customer, and if necessary the application may be resubmitted. The applications are then entered into a database tool that is capable of exporting specialized MS Excel-based reports.
- *Rebate Payment*. Rebate payment occurs 6-8 weeks after receipt of the accepted application. Rebates are paid solely to the end-use customer listed in

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the application; the customer cannot sign over their rebate to a third party (such as a vendor or Trade Ally).

6.2.2.4 Program Marketing & Outreach Efforts

The program is being marketed through direct customer contact and outreach to boiler equipment vendors. Thus far this has been with limited success, and at the time of interview, marketing strategies were not yet fully developed. This will be revisited during the 2013 evaluation.

6.2.2.5 Tracking Data Review

The tracking data did not contain the needed data for savings calculations. The tracking data should have the following changes:

- Add a facility type that corresponds to TRM V2.0;
- Add a point of contact name for commercial projects;
- Indicate whether the efficiency level being used is combustion or thermal;
- Add a field for weather zone; and
- Include the EFLH used in calculating energy savings.

6.2.2.6 Program Application Review

The evaluators reviewed the program applications used for boiler replacement and boiler components and have the following recommendations:

- Modify the facility type field to correspond to TRM V2.0 EFLH building types;
- Remove the field for Annual Operating Hours. It is not used for savings calculations and thus is not worth burdening the participant in asking for it.

6.2.2.7 QA/QC Process Review

To-date, there has been only one participating facility. This facility had their application reviewed for eligibility and received a QA/QC post-inspection. This matter will be addressed further should participation increase in 2013.

6.2.3 Non-Participant Survey Response

Though no formal participant survey was conducted in this evaluation due to the low participation level, the evaluators surveyed 210 commercial & industrial non-participants in a general-population survey.

70% of respondents indicated that their space heating equipment is the largest consumer of gas in their facility. 11% indicated that it is the second highest load in their facility. Figure 6-1 summarizes these results by facility type.

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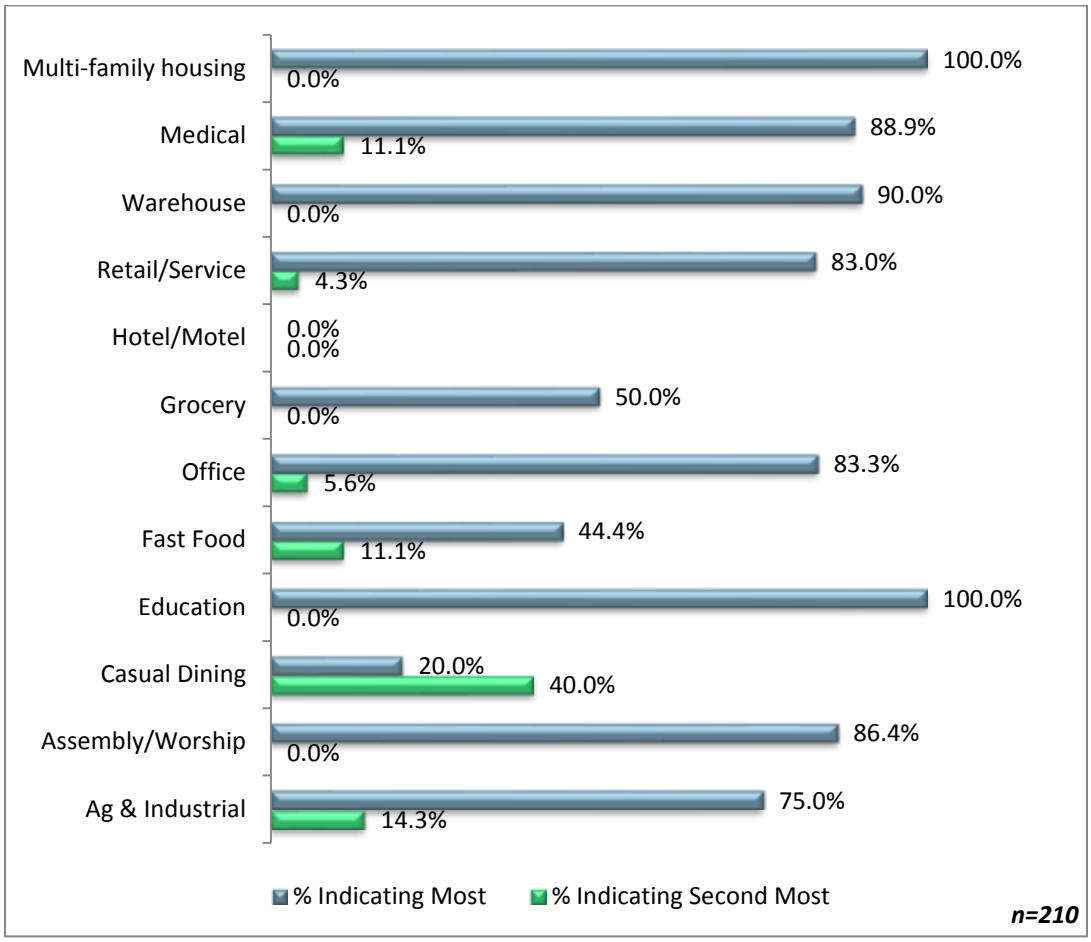

Figure 6-1 Percent of Facilities with Space Heating as Highest Load

Sixteen percent of respondents indicated having heard something about SourceGas' energy efficiency programs. One-half percent indicated specific awareness of SourceGas' available incentives for boiler equipment. Respondents were also asked to rate their interest on a scale of 1-10 in SourceGas' programs (with "1" meaning "Not interested at all" and "5" meaning "Very interested"), based on brief descriptions of what the program offers. Average non-participant interest in the Heating Equipment Rebates Program was 3.88 out of 10. The evaluators then subset these responses by facility type, with the average scores presented in Figure 6-2.

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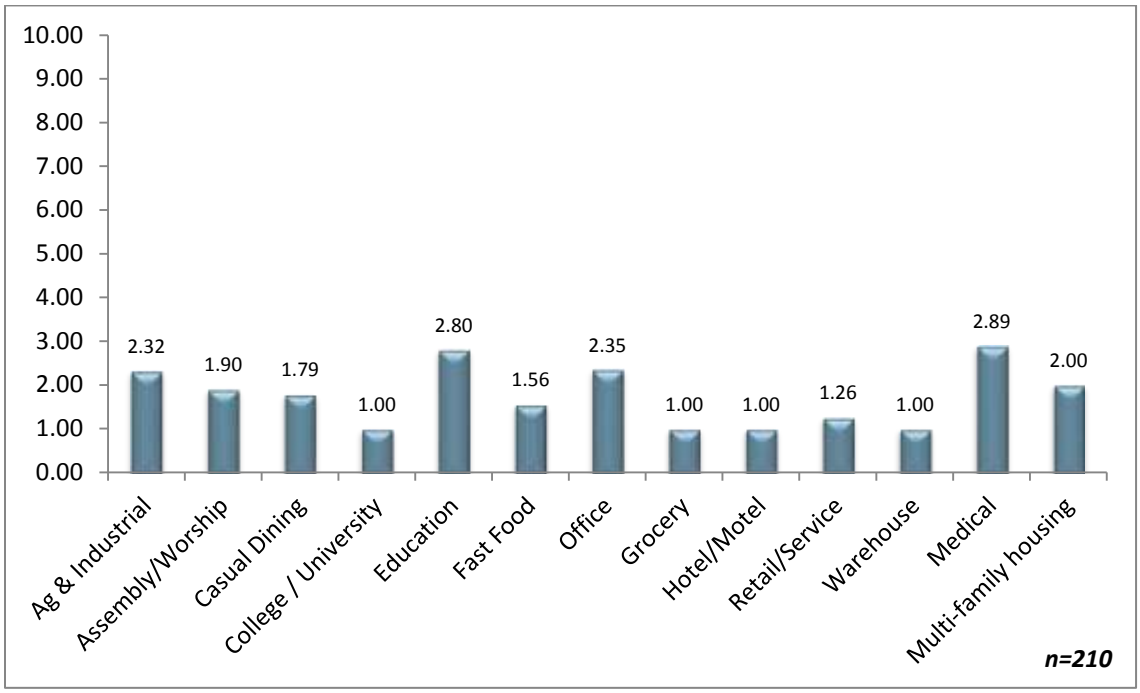

Figure 6-2 Non-Participant Interest in C&I Boiler Equipment Rebates Program

Interest in incentives for boiler equipment is exceedingly limited, owing to the fact that most facility types do not make use of this equipment. From the non-participant survey, the evaluators could not clearly identify areas where they program may focus to increase participation.

6.2.1 Program Development & Outlook

The C&I Boiler Equipment Rebates Program is designed to reach a specific market segment of large commercial customers with central plant HVAC systems. Given this, the program participation will typically be a low-volume and high savings. The program had no participants in 2011 and four rebates in 2012, and the evaluators have concluded that this is by and large due to the initial goals being set with the idea in mind that the C&I Boiler Equipment Rebates Program would cover both HVAC and process boilers. This is no longer the case with the development of the TRM and the addition of the C&I Solutions Program for process boilers. On this basis alone, the evaluators would suggest that SourceGas significantly curtail the budget and goals for the C&I Boiler Equipment Rebate Program in favor of other programs.

As to individual measure categories, the evaluators identified market barriers as follows:

1. **Replaced boilers are often purchased manufacturer-direct.** The class of customers installing replacement boilers often designs their system with internal staff or with short-term contracting with an engineering firm. This boiler is often then purchased manufacturer-direct, without going through an equipment wholesaler. Direct contact with program participants coupled with education of

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the manufacturers' sales reps would induce further participation in the boiler replacement component.

2. **Burners and controls can be trade ally-driven.** Recruitment of firms that engage in boiler maintenance can be used to drive boiler improvements. This effort could be supplemented potentially by a trade ally incentive for controls, as a modest incentive would constitute a larger share of the cost for the controls offered through the program.
3. **Boiler tune-up could supplement program offerings.** SourceGas may want to consider adding boiler tune-ups as a measure within the C&I Boiler Equipment Rebates Program. This would engage more vendors and could capture a market that is currently not served by the program. TRM V2.0 provides deemed savings parameters for this measure so SourceGas could do so with relatively reliable savings results.

Table 6-3 summarizes measure categories that are or could be served by the C&I Boiler Equipment Rebate Program and the associated barriers and risks.

Table 6-3 Boiler Measures, Barriers & Approaches

Measure Category	***Identified Market Barriers***	***Proposed Intervention***	***Risks***
Boiler replacement	Projects often have long planning and fund acquisition horizons. Purchases often manufacturer-direct, with regional sales representatives not located in Arkansas.	Outreach to manufacturers to identify regional sales representatives. Maintenance of contact with large commercial accounts (universities, hospitals, large hotels & offices) in order to keep apprised of long-term planning.	Free-rider risk from projects if program intervention occurs late in the decision-making process
Burner & controls replacement	Replacements may be driven by component failure and done on short notice. Target market is for older boilers, and market segment may be capital-constrained.	Engagement of local contractors and engineering firms to push measures. Addition of a trade ally incentive to encourage installation of qualifying equipment.	Free-rider risk if customer is replacing a failed modulating burner or failed control. Risk level dependent upon length of time boiler has operated with failed components.
Boiler tune-up	Requires education of customers as to benefits of regular boiler maintenance, which may be in excess of established practices and schedules.	Deliver incentive to trade ally to mark down cost of tune-up. Marketing efforts emphasizing the need of tune-ups to maintain boiler performance.	Free-rider risk if end-use customer has regular maintenance & tune-up practices. Gross savings risk associated with tune-ups if boilers need little maintenance.

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	Historically, this measure has required more oversight of trade allies than equipment replacements.

6.3 C&I Boiler Equipment Rebates Program Impact Evaluation

Due to the limited participation, the impact evaluation was constrained to:

1. Documentation review to ensure savings were calculated according to TRM V2.0 protocols; and
2. Application of the stipulated 80% NTGR.

6.3.1 Energy Savings Calculations

Therms savings calculations for commercial boilers require facility type, weather zone, and baseline efficiency. Baseline efficiency for boilers is detailed in Table 6-4[20].

Table 6-4 Commercial Boiler Minimum Efficiency Levels

Equipment Type	***Size Category***	***Subcategory***	***Minimum Efficiency***
Gas Fired Boiler	< 300,000 BTUh	Hot Water	80% AFUE
		Steam	75% AFUE
	>300,000 BTUh and < 2,500,000 BTUh	Minimum Capacity	75% E_t
	>2,500,000 BTUh	Hot Water	80% Ec
		Steam	80% Ec

Savings for commercial boilers are calculated as[21]:

$$Therms\ Savings = \frac{BTU\ Capacity * EFLH_H * \left(\frac{1}{Effic_{pre}} - \frac{1}{Effic_{post}}\right)}{100{,}000\ Therms/BTU}$$

The EFLH for a facility is a function of facility type and weather zone. The EFLH values from TRM V2.0 are summarized in Table 6-5.

[20] Arkansas TRM V2.0, Volume 2. Pg. 137-139

[21] Ibid

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Table 6-5 Commercial EFLH Values

Building Type	Zone 6	Zone 7	Zone 8	Zone 9
College/University	630	874	936	902
Fast Food Restaurant	288	440	474	455
Full Menu Restaurant	181	328	370	336
Grocery Store	688	935	995	965
Health Clinic	646	885	922	895
Lodging	389	587	635	605
Large Office (>30k Ft^2)	811	1,014	1,054	1,036
Small Office (<30k Ft^2)	353	538	568	538
Retail	780	1,041	1,131	1,099
School	774	1,026	1,089	1,064
Generic 24/7	630	1,156	1,303	1,237

For example, if a Grocery Store in Little Rock (Zone 7) installed an 800,000 BTU 96% efficient boiler, the resulting Therms savings are calculated as:

$$Therms\ Saving = \frac{800{,}000\ BTU * 935\ EFLH * \left(\frac{1}{.78} - \frac{1}{.96}\right)}{100{,}000\ BTU/Therm} = 2{,}182\ Therms$$

After reviewing the deemed savings calculations and conducting verification inspections, the evaluators found gross realization of 100% for commercial boiler retrofits.

6.4 Verified Savings

The evaluators found 100% gross realization for the C&I Boiler Equipment Rebates Program, and applied the stipulated 80% NTGR due to low participation levels. The savings for the program are summarized in Table 6-6.

Table 6-6 C&I Boiler Equipment Verified Savings

Measure Category	Annual Therms Savings	EUL	Lifetime Therms Savings	Peak Therm Savings
Total Gross Savings	3,031	20	60,620	2.84
Total Net Savings	2,425	-	48,496	2.27

7. Commercial and Industrial (C&I) Solutions Program

The C&I Solutions program is directed at developing and incenting custom energy efficiency projects for which deemed values are not applicable or feasible. It is implemented by CLEAResult Consulting on behalf of SourceGas. CLEAResult handles program administration, marketing and outreach, direct install of water conservation measures, and technical review of custom efficiency projects. Program participants are provided:

(1) No-cost direct installation of low flow faucet aerators and pre-rinse spray valves (PRSVs), if they have gas water heating; and

(2) $.80 per Therm for custom projects.

7.1 C&I Solutions Program Overview

The C&I Solutions Program has $1,017,884 in budget allocated for 2012. The C&I Solutions program's historical performance is summarized in Table 7-1.

Table 7-1 C&I Solutions Program Historical Performance against Goals

Program Year	# Participants		Budget		Net Therms	
	Actual	Goal	Spent	Allocated	Achieved	Goal
2011	404	790	$486,284	$637,926	500,906	451,808
2012	518[22]	773	$840,522	$1,017,884	560,574	650,000

The C&I Solutions program participants fall into one of three categories:

- Direct install;
- Custom audit recipients[23]; and
- Closed custom projects.

These participants are detailed in the subsections to follow.

7.1.1.1 Direct Install Participation Summary

In 2012, 412 facilities participated in the Direct Install component of C&I Solutions. Figure 7-1 summarizes the participation by facility type, quantified in percent of participating facilities as well as percent of total savings.

[22] This tally is the number of accounts that participated in the C&I Solutions Program. When sampling for Direct Install, the evaluators aggregated by premise. Some premises had multiple account numbers, and as a result, the population size listed later in the Direct Install component for sampling purposes is smaller than this tally.

[23] The evaluators tallied these but did not count them towards the program participation goal

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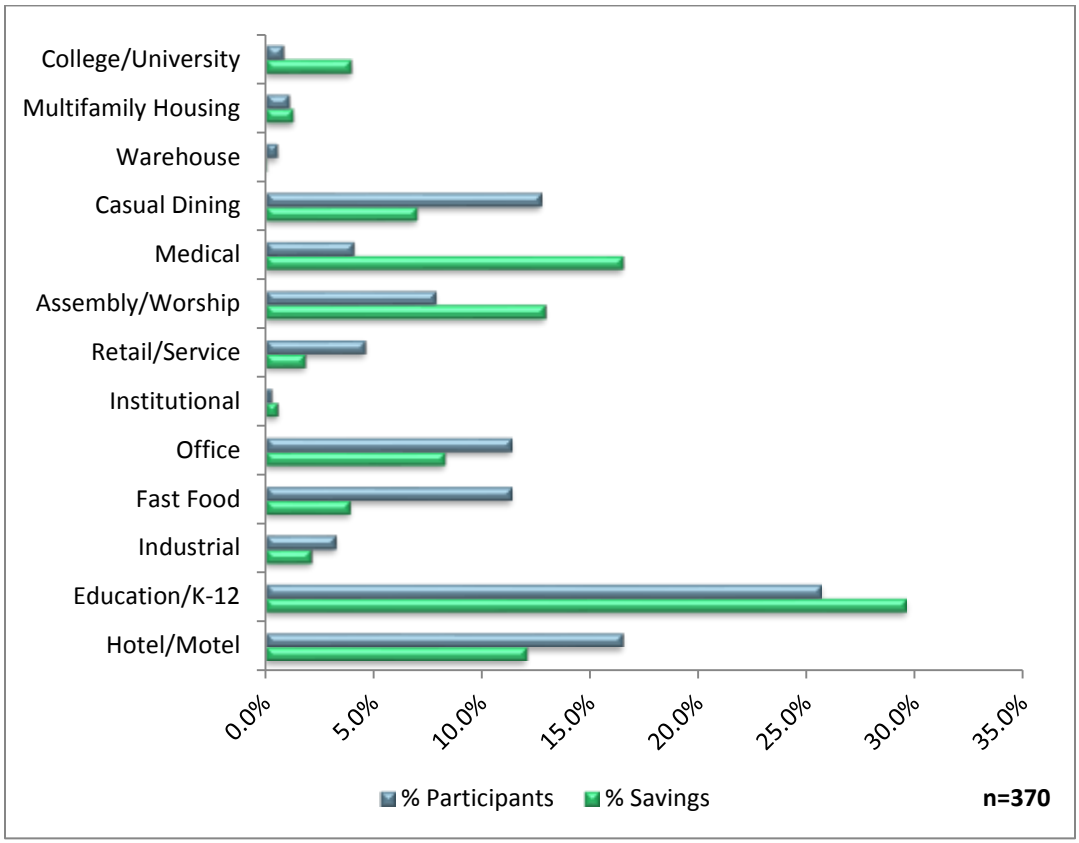

Figure 7-1 C&I Solutions Direct Install Participant Summary

The bulk of program savings was from K-12 education, medical, and assembly/worship facilities. These three groups accounted for 59.0% of program savings. Two medical engaged in facility-wide retrofits that accounted for 10.2% of program savings. It is the intention of the program to draw larger direct install participants into the custom component. However, most of the direct install participants would constitute "terminal projects" in that they lack opportunities for custom projects; most K-12 schools, retail facilities, and restaurants lack the equipment or consumption levels to justify an audit and custom measure assessment. For such participants, the C&I Solutions Direct Install component provides an introduction to energy efficiency with the no-cost measures as well as marketing materials for SourceGas' prescriptive programs that may be more appropriate for these business types.

The C&I Solutions Direct Install component provided relatively consistent participation throughout the 2012 program year. As see in Figure 7-2, the program faced no issues with early discontinuation in 2012.

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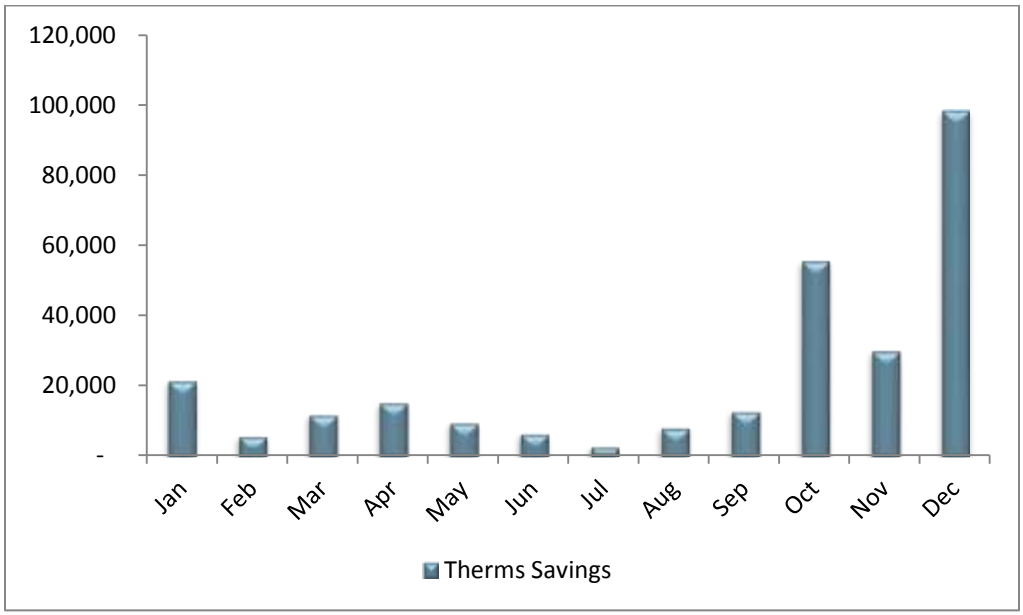

Figure 7-2 C&I Solutions Direct Install Monthly Therms Savings

The evaluators discussed the participation pattern with utility and program implementation staff, and were informed of issues causing a year-end spike in direct install activity. The spike in direct install savings in the fourth quarter was attributed to having a better picture of the likelihood of specific projects closing out in time for the 2012 program year, and adjusting the direct install activities accordingly. A couple of projects that were possible to close for 2012 got pushed back to 2013, increasing the need for direct install activity.

7.1.1.2 Completed Audits Participation Summary

The C&I Solutions Program is largely driven by on-site audits providing recommendations for custom projects. CLEAResult conducts an on-site audit, from which an audit report is developed that provides a high-level summary of potential energy efficiency improvements and their expected savings. After reviewing the program tracking data, the evaluators found that audits were conducted at 47 facilities. Of these 41 facilities, 7 were filtered out of the program for a variety of reasons, including:

- Two identified as free-ridership risks;
- Three with no viable custom projects; and
- Two that indicated the payback for the projects is not sufficient and that they would not go further with any projects.

The remaining 34 facilities followed through with a participation agreement that allowed for the development of an audit report. Figure 7-3 summarizes the quantity of measure recommendations and installations by category, and Figure 7-4 summarizes these measures by recommended versus installed therms.

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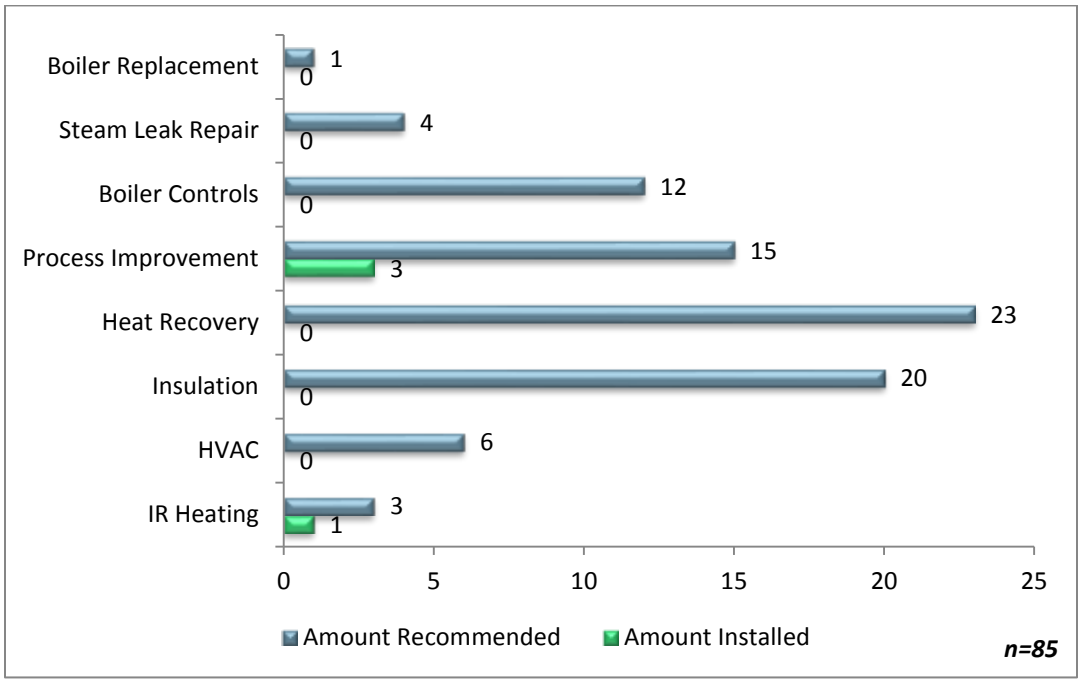

Figure 7-3 Summary of Measures Recommended & Installed

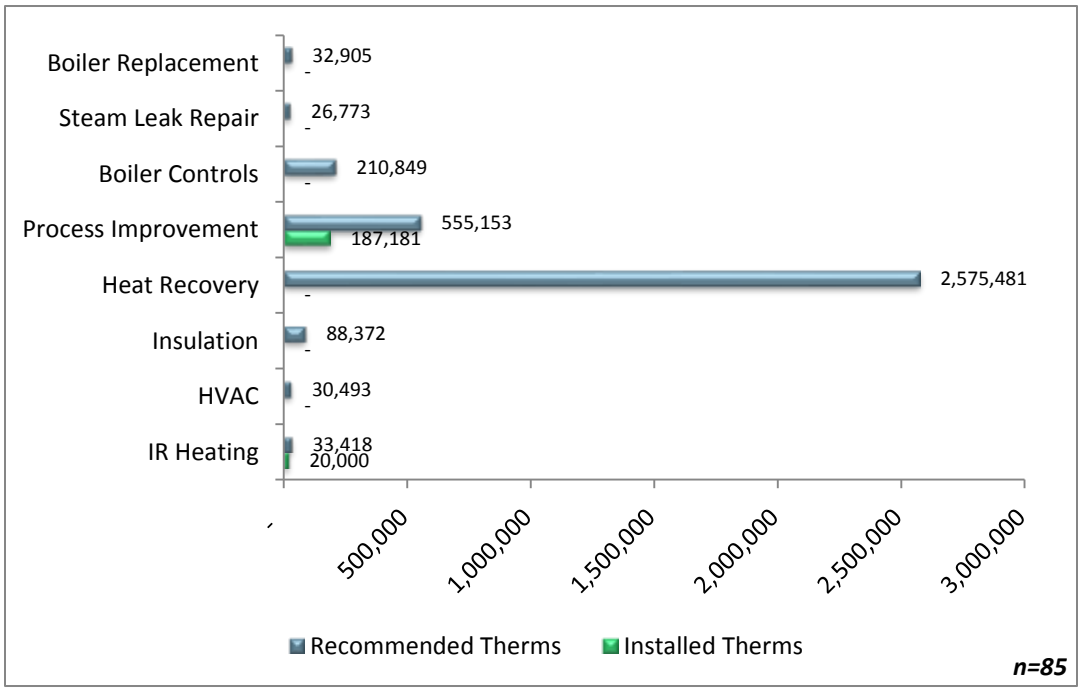

Figure 7-4 Summary of Therms Recommended & Installed

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Table 7-2 Summary of Projects Flagged as Free-Riders

Facility Type	Measure Category	Expected Therms
Medical	Boiler Controls	9,980
Food Processing	Steam Leak Repair	14,376

Though not all recommended projects are installed, there are some that are in progress and considered likely to complete for the 2013 program year. Table 7-3 summarizes the projects currently in the SourceGas C&I Solutions pipeline that are considered "likely to install" in 2013 or have already been installed and are currently in M&V.

Table 7-3 Current C&I Solutions Programs Projects Likely to Install in 2013

Measure Category	Projects Installed and in M&V Phase for 2013	# Projects in Pipeline Considered "Likely to Install"	Expected Therms
Insulation	-	7	25,980
Steam Leak Repair	-	2	12,397
Heat Recovery	-	9	736,741
Process Improvement	-	2	210,710
Infrared Heating	1	-	13,118
Boiler Replacement	-	1	32,905
Boiler Controls	-	8	174,373
HVAC	2	-	5,195
Total	3	29	1,211,419

The projects with the lowest incidence of installation relative to the volume of savings recommended are Process Improvements and Heat Recovery. These typically involve a customized retrofit of a key manufacturing process and as such have longer than typical decision timelines.

7.1.1.3 Closed Custom Project Participation Summary

Table 7-4 summarizes the completed custom projects for the 2012 C&I Solutions Program.

Table 7-4 Custom Project Participation Summary

Facility Type	Project ID	Measure
Manufacturing	SGA-CIS2012-001	Infrared Heating
Manufacturing	SGA-CIS2012-002	Dross Well Covers
Manufacturing	SGA-CIS2012-003	Dross Well Covers
Manufacturing	SGA-CIS2012-004	Pump-Well Covers

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7.2 C&I Solutions Process Evaluation

The evaluators conducted the process evaluation of the C&I Solutions Program with several researchable issues in mind. The questions addressed by this evaluation included:

- Does the program design fit cohesively into the SourceGas DSM portfolio? The evaluators reviewed the extent to which the C&I Solutions Program meets the needs of the SourceGas DSM portfolio. This includes identification of any overlaps in effort or market coverage and the synergies of this program's interaction with other SourceGas program offerings.
- Are the program goals reasonable given the size and composition of SourceGas' market? The evaluators reviewed the savings goals by program for SourceGas and addressed whether those goals are appropriate given the size of the associated market sector.
- Do the program administration processes conform to industry best practices? A comparative review of C&I Solutions Program administration processes and other similar programs run elsewhere was conducted, identifying potential changes in program administration to correspond with industry best practices.
- Are staffing and funding levels adequate?
- Does the tracking data system allow for efficient administration and evaluation of the program?
- Do the marketing efforts of the program effectively reach the appropriate market sectors? Are there sectors that have responded to the current marketing strategies in greater magnitude than others?
- Does the program have adequate QC processes in place to ensure proper allocation of program funds to incentives and direct install efforts?
- Is the program on track to meet savings and participation goals?
- What is the customer response to the program? Do customers perceive the program as meeting their organization's needs? Does the program sufficiently engage market allies? What market effects (both intended and unanticipated) has the program had?

The efforts detailed for the process evaluation in Section **Error! Reference source not ound.** provided the necessary research and information to address these questions.

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7.2.1 Data Collection Activities

The process evaluation of the C&I Solutions Program included the following data collection activities:

- *Program Actor In-Depth Interviews*. The evaluators conducted in-depth interviews with a series of program actors. These interviews covered a range of topics, including marketing efforts, feedback on program delivery, an assessment of barriers to program implementation and success, and recommendations for program improvement. Program Actors interviewed include:
  - *SourceGas Program Staff*. The evaluators interviewed staff at SourceGas involved in the administration of the C&I Solutions Program. These interviews built upon interviews conducted during the 2011 Limited Process Evaluation, in which the evaluators collected initial background information on program history and implementation. These interviews captured any operational changes on SourceGas' side, as well as informing the evaluators as to any new developments in the program. The evaluators conducted in-depth interviews with SourceGas staff involved in administration of the C&I Solutions Program.
  - *Third Party Implementation Staff Interviews.* The evaluators conducted interviews with CLEAResult involved with the C&I Solutions Program. These interviews addressed the development of the program over the 2012 program year as well as CLEAResult's perspective on a variety of implementation issues, including conversion of audits to completed projects and the process flow for direct install and custom projects.
- *Program Marketing Materials Review*. The evaluators collected marketing materials used by the C&I Solutions Program. This included customer mailers, audit reports, and a review of the SourceGas program website. This was compared against marketing materials from successful programs run in other territories in informing marketing improvements.
- *Review of Program Quality Control Procedures*. The evaluators reviewed the QC procedures in place for the C&I Solutions Program. This included review of pre- and post-installation inspection procedures, the M&V procedures in place by SourceGas and CLEAResult, and identification of any issues or gaps in the program QC process.
- *Attendance at CLEAResult Training Sessions.* CLEAResult periodically held customer training sessions for the C&I Solutions Program. These sessions are directed at getting face-to-face with the facility managers for large customers within SourceGas territory. They are given information on a wide range of possible energy efficiency improvements that could serve their facilities, as well as given program information detailing how to begin participation. Staff from the evaluators attended some of these sessions, taking note of the technical

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materials provided, the attendance at the session, and the participant feedback from the session.

- *Participant Surveying*. A census of custom participants and a sample of direct install participants were surveyed for this evaluation effort. These surveys included net-to-gross and process issues. The surveys provided valuable data for this process evaluation effort, providing participant feedback as to their pr4ogrma participation, recommendations for program improvement, and insight into the decision-making process of SourceGas' commercial and industrial customers.
- *Partial-Participant Interviewing.* Partial Participants (those that receive an audit report but do not install a project through the program) were interviewed to capture their perspective on the program. These interviews included their perception of the value of the C&I Solutions Program's auditing services, their reasons for not installing a project through the program, the likelihood of future program participation, and whether they installed any recommended measures without having applied for a program incentive.

Table 7-5 summarizes the data collection for this process evaluation effort. This includes the titles, role, sample sizes, timeframe of data collection.

Table 7-5 SourceGas C&I Solutions Data Collection Summary

Target	Component	Activity	N	Role
SourceGas Program Staff	Manager, Energy Efficiency	Interview	1	Overall administration of SourceGas DSM programs. This manager is involved in the larger strategic decisions associated with the DSM portfolio, and is involved with the C&I Solutions Program in the overall coordination of utility resources.
CLEAResult Staff	Senior Program Manager	Interview	1	The Senior Program Manager oversees the program implementation for CenterPoint, SourceGas, and AOG, handling cross-cutting issues as well as the largest projects associated with each of the three utilities' programs
	Program Coordinator	Interview	1	The Program Coordinator handles day-to-day operations, including tracking of outreach and implementation activities, payments for direct installation, and interfacing with Evaluation staff.
	Energy Engineer	Interview	1	The program Energy Engineer is the primary developer of audit reports with savings estimates as well as custom project M&V plans.
	Field Engineer	Interview	1	The Field Engineers conduct onsite audits and data collection as well as engaging in direct install activities.

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Program Participants	Custom Participants	Survey	3 (representing 4 custom projects)	Custom participants received a semi-structured interview at the beginning of a project and a structured survey at the close. The evaluators interviewed a census of participants
	Direct Install Participants	Survey	24	24 direct install participant decision-makers were interviewed to discuss their participation process.
	Partial Participants	Interview	11	A sample of 11 audit recipients that are considered "cold leads" by CLEAResult were interviewed to discuss their participation process and to attempt to identify any spillover. Due to limited population sizes, this sample of 11 includes audit recipients from CenterPoint, SourceGas, and AOG.
Marketing & Outreach	Facility Manager Training Session	Attendance	-	Facility manager training sessions are held by CLEAResult to educate representatives of SourceGas' large customers as to the energy savings opportunities available through the C&I Solutions Program.
	Marketing Materials	Literature Review	-	The full scope of paper and electronic marketing materials used in implementation for the C&I Solutions Program was reviewed by the evaluators.
Evaluation History	Prior Evaluation Reports	Literature Review	1	Findings from the Limited Process Evaluation conducted in 2011 were reexamined to determine to what extend recommendations were implemented
	Comparative Review	Literature Review	-	Evaluation reports of similar programs conducted elsewhere were examined in order to provide recommendations for improvement based upon lessons learned elsewhere.

7.2.2 Process Results & Findings

This section will present the results and key findings from the data collection activities. These findings are based upon interviews with utility staff, implementation staff, surveys with participants, and thorough and in-depth literature review.

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7.2.2.1 Program Theory & Design

The C&I Solutions Program was designed to provide outreach in hard-to-reach sectors of the C&I markets. The program activities and their expected outcomes are as follows:

- **Direct installation of water saving measures.** The C&I Solutions program provides no-cost direct installation of low flow faucet aerators and pre-rinse spray valves. These measures have a high return of savings relative to their cost and as such can be provided free-of-charge and remain cost-effective. The provide savings that are unlikely to occur absent the program; generally, if a respondent does not already have the equipment in place, the direct install activities induce an action that was not planned. It is also the intention that these activities will serve as an introductory teaser to energy efficiency for the recipients, and that they will then be further interested in participating in the custom component of the program.
- **Energy audits to large customers.** These audits are conducted by CLEAResult staff, providing recommendations for energy efficiency improvements and an audit report. These audits are intended to generate the bulk of the program savings, yielding high-return non-standard projects.
- **Incentives for custom measures.** The C&I Solutions program provides $.80 per therm for verified savings from custom projects. These projects may be driven by a program-funded audit, or be customer-directed. In some instances, customers attempting to participate in the C&I Boiler Equipment Rebates Program are referred to the C&I Solutions program if their application is ineligible for deemed savings. This many include cases where the boiler is greater than 12.5 MMBTU, the boiler serves a process load, or the control type is not covered by TRM V2.0 guidelines.
- **Referral to SourceGas prescriptive programs.** Conversely, there are instances where the CLEAResult audit identifies energy savings opportunities that qualify for a prescriptive incentive. In these instances, the project is referred to staff at SourceGas for processing, and the savings are not credited to the C&I Solutions program

7.2.2.2 Program Administration

The C&I Solutions program is overseen by SourceGas' Manager of Energy Efficiency. This manager's responsibilities primarily include interfacing with CLEAResult, who directly implement the program. Other activities by this manager include providing updated customer lists to CLEAResult to better-facilitate their implementation, review of custom applications, and at times assisting CLEAResult in customer interactions.

At CLEAResult's end, the program overall is led by the Senior Program Manager, who oversees the implementation of the C&I Solutions Program for all three AR natural gas utilities. This manager handles high-level issues across the programs, including

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regulatory compliance and reporting, as well as some level of intervention on the larger projects.

Much of the day-to-day activity is handled the Program Coordinator. The Program Coordinator reviews direct-install and audit activity, handles billing and administration with SourceGas, and coordinated with the evaluators in facilitating EM&V activities.

Direct install and audit activities are run by Energy Engineers and Field Engineers. These engineers oversee crews that perform direct installation and conduct the energy audits. After this, their responsibilities include development of the audit report and recommendations, and following up with the customer to gauge interest in completing a project

7.2.2.3 Program Implementation and Delivery

Throughout the program year, CLEAResult would provide the evaluators with updates regarding their pipeline of custom projects. The evaluators were provided with monthly updates, listing the full scope of facility audits, expected savings with associated recommended measures, and what stage the project was in. These stages are:

- *Pipeline*. Projects listed as Pipeline are in the first phase of involvement in the Commercial & Industrial Solutions Program. These participants are customers that have discussed the possibility of a facility audit and indicated systems of interest to CLEAResult. These facilities will receive a Pre-Inspection at a later date.
- *Pre-Inspected*. Projects listed as Pre-Inspected are in the phase where CLEAResult has just completed a facility audit. During these audits, CLEAResult conducts a comprehensive review of the facility's systems and operation practices. On this basis, CLEAResult then formulates initial recommendations for energy efficiency improvements. These are discussed with facility staff during the audit, in order to address the viability of recommended measures. Measures that are stated to be viable by the customer are then noted and focused upon in the next steps of the audit process.
- *Pre-Installation Calculation*. At this phase, CLEAResult is compiling high-level data needed to provide an initial estimate of energy savings. This step of the process compiles the information collected in the site audit, which are then used in the development of an Audit Report.
- *Audit Report Complete*. In this phase, viable measures from the Pre-Inspection are compiled into a formal audit report, providing the participant with further detail as to the scope of the project, initial savings estimates, associated incentives, expected project cost, and the payback period of the measure. Additionally, should the measure provide operational benefits to the facility (such as improved comfort or product reliability), these are indicated as well in order to provide the customer with a full scope of the benefits of the project.

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- *Project Agreement*. At this point, the customer has informed CLEAResult and SourceGas that they intend to install a program-recommended measure. When this occurs, CLEAResult then involves the evaluators. CLEAResult provides the evaluators with an M&V plan for the facility, detailing the project scope and proposed data collection and analysis. The Evaluator's engineering staff then reviews the M&V plan and makes recommendations for any changes needed. If this revises the savings amount, the Reserved Incentive in the application is revised application. A project agreement is then signed, in which the reserved incentive amount is detailed and reflects edits made by the evaluators.
- *Post-Inspection*. This phase marks the completion of post-inspection for an installed measure. CLEAResult has at this point post-inspected a measure and revised savings accordingly if the installed project differs from the proposed project. At this point, 60% of the reserved incentive is paid to the customer.
- *M&V*. M&V marks the phase when post-installation data is collected for an installed project in order to allow for calculation of a final savings estimate, from which the remaining incentive to the customer is determined. There are some measures that do not need post-retrofit data; for such measures, the M&V phase is short and requires completion of calculations based upon inputs verified in the Post-Inspection. For facilities that require post-installation data, the data collection period can range from 30 days to 6 months.
- *Complete*. Facilities marked as Complete have received their full incentive. As stated prior, 40% of the reserved funds for the incentive are available to pay the remaining incentive amount owed to the customer. If the verified savings are the Project Agreement savings, the customer's incentive is reduced accordingly, so as to keep incentive levels at $.80/Therm. If the verified savings are higher than the Project Agreement amount, CLEAResult and SourceGas then see if there are available incentive funds left for the program year. If the program has available funds, the customer receives a total incentive higher than the initial agreement. If the funds are not available, the customer's incentive is capped at the Project Agreement amount.

The process flow for the C&I Solutions Program is displayed in the flowchart below.

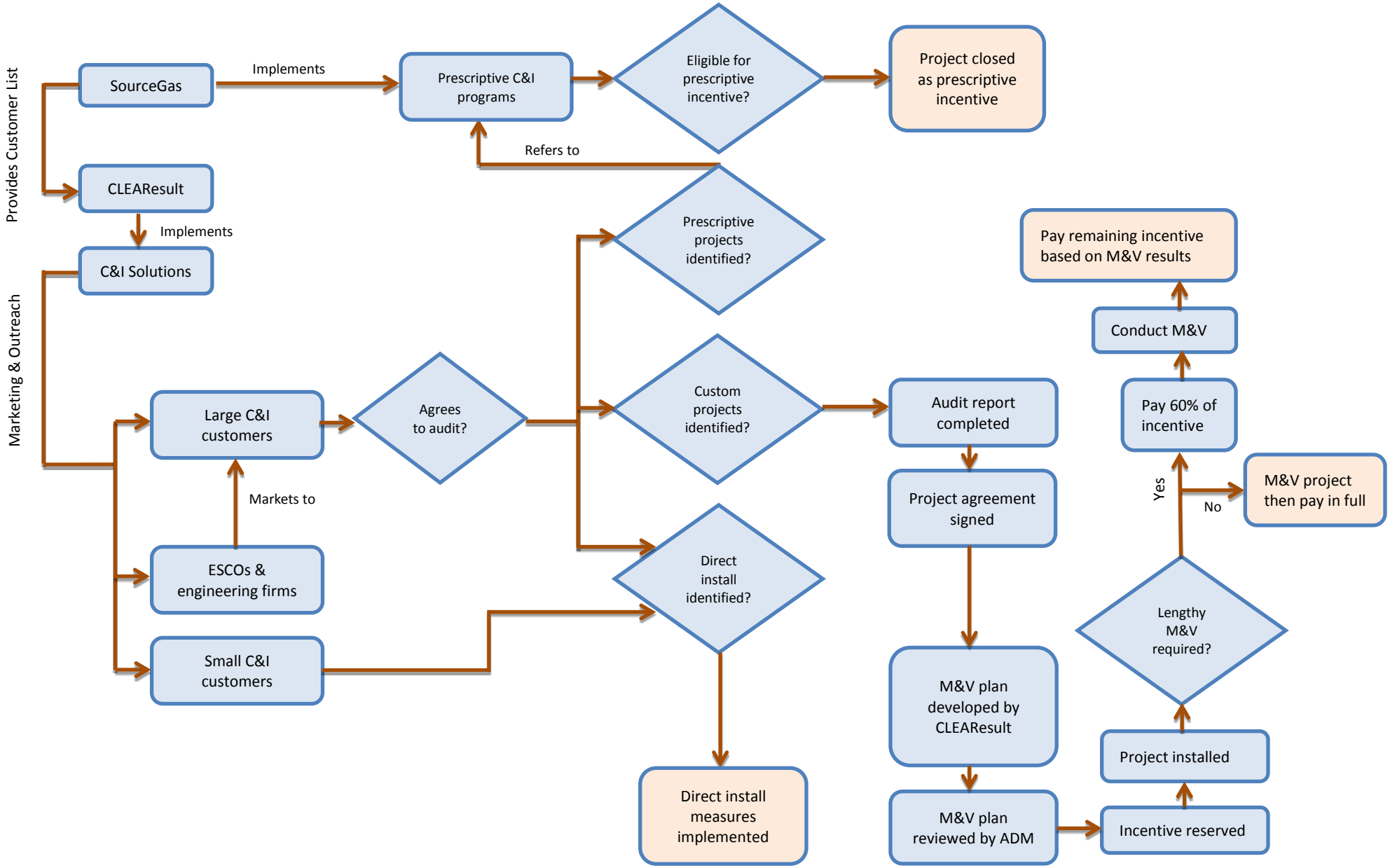

Figure 7-5 C&I Solutions Process Flow

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7.2.2.4 Program Marketing & Outreach Efforts

The C&I Solutions Program is designed to achieve savings through Direct Install and through custom projects. The two primary channels through which custom projects are developed are:

- *Energy Audits*. This provided the bulk of the program savings. These projects are those developed through CLEAResult initiating customer contact. The customer received an audit, measure recommendations, and is shown proposed incentives.
- *Program Referral*. There are instances of CLEAResult receiving program referral from SourceGas' prescriptive commercial programs. An example of this is customers with process loads applying for a prescriptive incentive. When SourceGas determines that a prescriptive boiler application serves a process load, the customer is informed that their measure is not covered by the prescriptive program and the application is referred to CLEAResult for M&V.

In addition, CLEAResult held multiple facility manager training sessions in 2012. The evaluators had engineering staff in attendance at one of these sessions in order to assess the content of the training sessions. It was found that the training sessions were thorough and the participants were engaged and interested in the content provided. Much of the presentation content focused on common gas-saving measures, including heat recovery systems, boiler controls, and steam line insulation.

7.2.2.5 Tracking Data Review

The evaluators had several comments regarding the C&I Solutions tracking data in the 2011 program year, much of which was incorporated in 2012 in improving program tracking. Direct install tracking data had often lacked a point of contact name, adding difficulty to EM&V efforts. This has since been added and the data organized in a more streamlined fashion. Further, CLEAResult has added unique rebate IDs to each project.

One area that is still problematic however is that the calculation portion of the tracking data differs slightly across the three AR gas utilities. It was found that measure names and excel formulas differed slightly, making comparison across the three gas utilities more difficult. Essentially, this required the evaluators to develop three different data quality-control protocols, adding time and expense to the evaluation. Further, the program tracking data does not include peak therms, which are a reporting requirement for AR gas utilities.

In the monthly custom progress reports, the evaluators still found some issues. These reports could be more useful to CLEAResult, SourceGas, and Evaluator staff if they included more information on the source and status of current projects. The monthly progress reports (MPRs) from CLEAResult list the customers, proposed projects, and initial savings estimates. CLEAResult should add a field to this report that identifies a project as being initiated from a program audit, from being suggested or proposed by a

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customer, or coming from a program Trade Ally. This would enable SourceGas and the evaluators to identify projects that require closer oversight. Further, this allows this C&I Solutions Program to be effectively judged in terms of determining to what extent the program audits are driving participation.

7.2.2.6 QA/QC Process Review

After reviewing the QA/QC process in place for the C&I Solutions Program, the evaluators found that:

1. All custom projects are subject to full M&V. This process was integrated with evaluation, with each project having savings estimates determined through IPMVP protocols.
2. Direct-install projects are often post-inspected several months after installation. Staff at CLEAResult conducted their own QA/QC post inspections of direct install projects, resulting in revisions of savings estimates in instances where it was found that equipment was removed.

Based on this, the evaluators concluded that the QA/QC processes in place for the C&I Solutions Program would adequately ensure measure installation and retention.

7.2.3 Direct Install Survey Response

The evaluators surveyed 26 respondents from the direct install component. These respondents represented 46 participating facilities. The survey sample for the direct install component is summarized in Figure 7-6, represented in terms of percent of the survey population.

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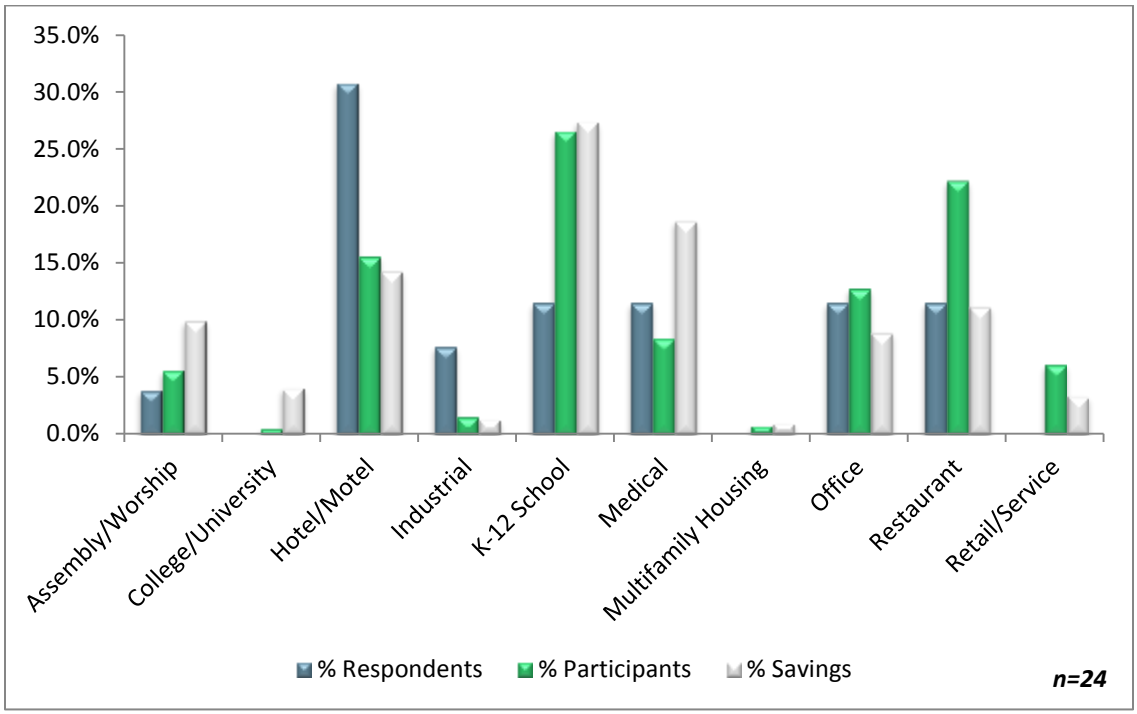

Figure 7-6 C&I Solutions Direct Install Sample Summary

7.2.3.1 C&I Decision-Making Processes

Respondents are first asked what policies or procedures are in place regarding energy efficiency at their facility. These results are summarized in Table 7-6.

Table 7-6 C&I Solutions DI Participant Energy Efficiency Policies

Does your organization have policies & procedures in place….	***% Indicated***	***Types of Policies Indicated***	***% Indicated***
Yes (n=9)	58.3%	Energy management plan	22.2%
		Energy manager/Staff focused on EE	55.%
		Corporate policies supporting EE	22.3%
No (n=15)	41.7%		
n=24			

Among the respondents, 81.8% indicated that decisions on equipment replacements are made by one or two key people. 18.2% stated that decisions are made by a group or committee.

7.2.3.2 Marketing & Outreach

Respondents were asked how they became involved with the C&I Solutions program. Figure 7-7 summarizes the sources of awareness indicated by program participants. Most respondents learned of the program through direct outreach from program staff.

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One respondent indicated learning of the program through direct contact from staff that manages the SourceGas program. This respondent was the decision-maker for a chain of hotels throughout Arkansas and has participated in multiple utilities' programs.

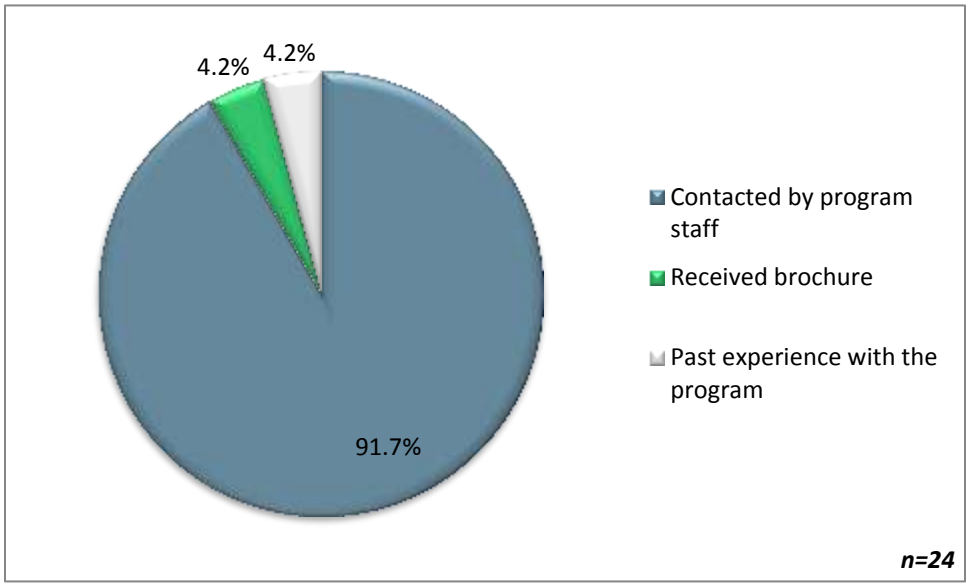

Figure 7-7 C&I Solutions Source of Program Awareness

Respondents were then asked what sources of information they most value when deciding on an energy efficiency project. A list of potential sources were read off, with respondents rating the sources on a scale of 1-5, with 1 meaning "Not influential at all" and 5 meaning "Very influential". Table 7-7 summarizes the scoring of sources of information by respondents.

Table 7-7 C&I Solutions DI - Value of Sources of Information

Source of Information	***Mean Score***
SourceGas Representative	4.75
SourceGas Website	2.21
Brochures or Advertisements	2.50
Trade associations or business groups you belong to	2.33
Trade journals or magazines	1.91
Friends & colleagues	3.13
An architect, engineer, or energy consultant	3.00
Equipment vendors	2.15
Contractors	2.50
CLEAResult staff	4.17
n=24	

Highest value was placed on information received by SourceGas and CLEAResult staff, who are the primary marketers of the program. Other sources of information presented were not valued highly, with most respondents indicating preference sources that

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generate one-on-one contact rather than requiring background research of third-party sources of information.

Respondents were then asked to rate a number of factors in importance to their decision making processes, rating 1-5, with a 1 meaning "Not important at all" and 5 meaning "Very important". These ratings are summarized in Table 7-8.

Table 7-8 C&I Solutions DI – Importance of Factors in Decision-Making

Source of Information	***Mean Score***
Incentive payments from SourceGas	4.55
Past experience with energy efficient equipment	3.30
Your organization's policies	3.33
Advice or recommendations from SourceGas	4.00
Advice or recommendations from equipment vendors	3.21
Energy cost savings	4.65
Promoting company image as environmentally friendly	3.95
Productivity benefits / reduced waste	4.13
n=24	

Factors listed as most important by the respondents included energy cost savings, productivity benefits, promoting company image as environmentally friendly, and incentive payments from SourceGas. Hotel/Motel facilities were more likely to list promoting their image as environmentally friendly as a very important factor in their decision-making.

7.2.3.3 Non-Participant Interest

The evaluators surveyed 210 respondents as part of a general population survey addressing issues related to program interest and awareness. 19.8% of respondents indicated awareness of SourceGas programs, 0% of respondents indicated specific awareness of the C&I Solutions program. Non-participants were asked to rate their interest in receiving free direct-install aerators and spray valves on a scale of 1-10, with 1 meaning "not at all interested" and 10 meaning "very interested". The results are summarized in Figure 7-8.

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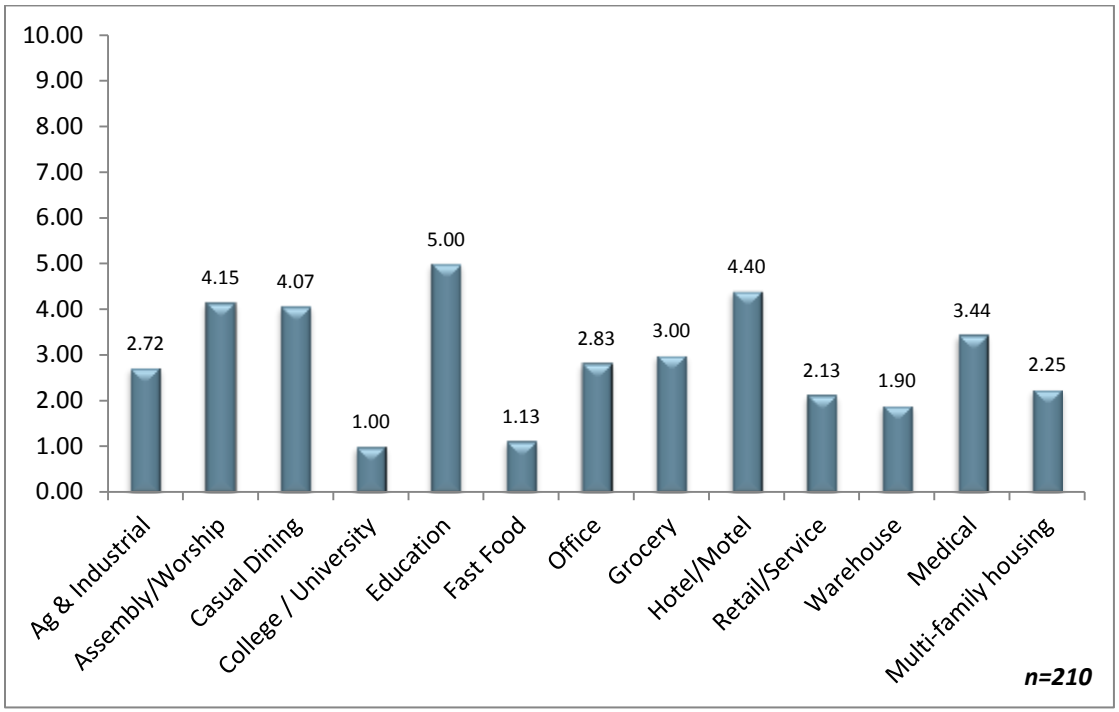

Figure 7-8 Rated Interest Level in Direct Install by Facility Type

Interest is highest among Assembly/Worship, Education, Casual Dining, and Hotel/Motel facilities. This corresponds with the types of participants observed in the program in 2012.

7.2.3.4 Program Satisfaction

Participants were asked to rate their satisfaction on a scale of 1-5, with 1 meaning "Very Dissatisfied" and 5 meaning "Very Satisfied" on a range of items related to their program experience. Table 7-9 tabulates the satisfaction results.

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Table 7-9 C&I Solutions Direct Install Satisfaction Levels

Element of Program Experience	Very Satisfied	Somewhat Satisfied	Neither Satisfied or Dissatisfied	Somewhat Dissatisfied	Very Dissatisfied	Don't Know	Mean Score
The performance of the equipment	62.5%	208%	12.5%	0%	0%	4.2%	4.52
The savings on your monthly gas bill	41.7%	12.5%	16.7%	0%	0%	29.2%	4.35
The effort required to apply for the program	58.3%	29.2%	4.2%	4.2%	0%	4.2%	4.48
Information provided by installer	54.2%	16.7%	20.8%	0%	4.2%	4.2%	4.22
Information provided by SourceGas	58.3%	20.8%	4.2%	0%	8.3%	8.3%	4.32
Information provided by CLEAResult	66.7%	16.7%	4.2%	0%	4.2%	8.3%	4.55
Overall program experience	58.3%	20.8%	16.7%	0%	0%	4.2%	4.43

Overall satisfaction with the C&I Solutions direct install program is very high. Respondents indicated markedly high satisfaction levels with most factors

On the operational side, customers indicated high satisfaction levels with information provided by CLEAResult, performance of equipment installed, and the application process, with mean scores of 4.55, 4.52, and 4.48, respectively.

7.2.4 Custom Project Survey Response

The evaluators conducted interviews with the three decision-makers responsible for the four completed custom projects in the C&I Solutions program in 2012. Given the small number of interviews, reporting data in terms of percent response by question does not adequately present the participant response to the program. The evaluators opted to present the results in terms of individual case studies, rather than aggregated survey responses.

SGA-CIS2012-001: The participant is a manufacturing facility that received an audit and incentives through the C&I Solutions Program. In this audit, recommendations were made regarding the facility's heating system in a warehouse area. The space was heated by a boiler, which was oversized for the application and had exceedingly high EFLH due to the space's high ceiling and outside air intake.

The system was replaced with a series of localized infrared heaters, which would have longer runtime but significantly lower consumption. The evaluators conducted pre- and post-inspection of the equipment, verifying the operating parameters of the boiler system that had been in place. Savings for this project were estimated through pre- and post-retrofit billing analysis which was weather-normalized to TMY data.

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It was the evaluators' finding that the facility was aware of possible savings from infrared heating but had not ever attempted to quantify them. The project-scoping and incentives were found to be key in inducing the project, as the company had very strict payback criteria. The program incentives were written into the project bid that plant staff submitted to upper management, which was identified as a needed component to get project approval.

SGA-CIS-2012-002, SGA-CIS-2012-003: This respondent was a decision-maker for two manufacturing facilities that participated in the C&I Solutions Program. These facilities received audits from CLEAResult, from which recommendations were made to fabricate custom insulated dross-well covers for the facility's aluminum melt furnace. The exposed wells emitted large amounts of waste heat, with retractable caps identified as an easy solution that would not interfere with furnace operation and maintenance.

The evaluators found that the furnace capping was not planned prior to the audit. Further, it was found that the actual cost of cap fabrication was 48% of the amount CLEAResult initially listed as the expected cost. Based on the high rate of return of the measure, the evaluators determined that though it was unlikely that the projects required the program incentive, the projects were indicated and uncovered via the program funded-audit and therefore were not free-riders.

SGA-CIS-2012-004: This participant is a manufacturing facility that participated in the C&I Solutions Program. This facility received an audit from CLEAResult, from which recommendations were made to fabricate custom insulated recirculation well-pump covers for the facility's aluminum melt furnace. The exposed wells emitted large amounts of waste heat, with retractable caps identified as an easy solution that would not interfere with furnace operation and maintenance.

The evaluators found that the furnace capping was not planned prior to the audit. Further, it was found that the actual cost of cap fabrication was 35% of the amount CLEAResult initially listed as the expected cost. Based on the high rate of return of the measure, the evaluators determined that though it was unlikely that the projects required the program incentive, the projects were indicated and uncovered via the program funded-audit and therefore were not free-riders.

7.2.5 &I Partial-Participant Survey Response

As part of the Commercial and Industrial Solutions Program evaluation, the evaluators conducted a survey with partial participant customers. Partial participants were defined as commercial customers who applied for and received a facility audit, but did not proceed to receive rebates for the energy efficiency improvements that were recommended during the audit. ADM conducted surveys with 11 partial participants, all of whom had received at least one energy efficiency recommendation through the facility audit. The pool of available partial participants to speak with was small, so this 11 represents an aggregation of AOG, SourceGas, and CenterPoint partial participants.

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The objective of this partial participant survey was to gain insight into partial participant decision making and identify any participation barriers that may prevent these customers from completing energy efficiency projects through the program. Additionally, the survey sought to determine whether these customers had proceeded with the recommended energy efficiency improvements outside of the program rather than applying for available rebates.

7.2.5.1 Motivations & Awareness

In order to gain insight into their decision making and perspective on energy efficiency, respondents were asked what motivated them to initially participate in the Commercial and Industrial Solutions Program. Customers provided a range of responses, and the most common response was that the facility operators were interested in saving money on their utility bills. Five of the respondents reported that they had specific efficiency improvements in mind when they applied to participate in the program, such as improving boiler efficiency or upgrading furnaces. Two respondents mentioned that CLEAResult had contacted them directly, providing information about the program and offering to perform the initial audit. Specific partial participant comments related to initial motivations include:

> *"We were looking to reduce our use to save money on our bills. We have been implementing small changes for a while now and wanted to hear about more options."*
>
> *"We thought it would be possible to gain furnace savings, and wanted to hear about the options available for doing that."*
>
> *"We had started [projects] on the lighting side… and we received our check from those projects and wanted to look at the gas side as well. A lot of our plants were doing the same thing."*

These results suggest that while some partial participants had specific projects in mind when they first interacted with the program, the primary motivation for these customers was to identify options for energy efficiency in order to reduce the facility's utility bills.

When asked whether they had previously been aware of the energy efficiency improvements that were recommended during the facility audit, seven of the 11 respondents reported that they had already been aware of these options for reducing energy use. Two of these seven respondents explained that while they had been aware of the general approaches to saving energy, such as improving boiler efficiency or performing weatherization, they did not know the specific steps needed to make these improvements until they participated in the Commercial and Industrial Solutions Program audit. These results suggest that while the majority of respondents were aware of and interested in specific energy saving improvements, the audit was an informative

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tool in partial participants' understanding of the specific actions they would need to take in order to most effectively reduce their energy loads.

7.2.5.2 Implementation of Recommended Improvements

In order to determine partial participants' actions since the facility audits were performed, respondents were asked whether they had implemented with any of the energy efficiency recommendations that had resulted from the inspection process. Only two (18%) of the partial participant respondents indicated that they had proceeded with implementing the recommended improvements.

When asked why they had not implemented these improvements through the incentive program, both of these respondents explained that they had only partially implemented the recommendation and that the work they had done thus far would not likely qualify for a rebate. For example, one of the respondents who received a recommendation for reducing steam pressure mentioned that the facility had initially reduced the pressure to recommended levels, but later had to increase it in order to meet the facility's operational needs. Both respondents stated that they may continue to implement the full scope of recommended improvements in the future, but that there are currently no structured plans to do so.

These findings indicate that while partial participants may have implemented minor recommendations or partial energy efficiency projects, the majority have not proceeded with any recommended improvements that would qualify for program rebates. Additionally, both of the respondents who reported that they had at least partially proceeded with a recommended improvement also stated that they would not have made those changes without the information provided during the audit process. It is possible that these partial participants may fully proceed with the recommended projects in the future, at which point the savings would be attributable to the Commercial and Industrial Solutions Program.

The remaining nine respondents were asked why they had not proceeded with implementing any of the recommendations they received during the facility audit. These respondents provided a wide range of responses, but the most common statement was that the initial cost of the energy efficiency improvements was the main barrier in the implementation process. Respondents reported that while the available incentives would be useful in partially offsetting the costs of the recommended projects, current funds did not allow for the facility to move forward with projects at the current time.

Three of the respondents also explained that some of the recommendations were not compatible with their facility due to specific operational needs or equipment types. For example, one customer stated that the facility would not be able to make the recommended oven efficiency improvements because the oven is an old model that would require several difficult modifications in order to allow for this change. Another

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respondent mentioned that the facility's operational schedule and system set-up would not allow the customer to shut off the boilers during warm weather. Examples of individual comments include:

> *"The oven system we have is an old system, and it has quite a few safeguards. It would be cantankerous to change what they wanted us to change. The upfront cost of the insulation did not justify the purchase."*
>
> *"It comes down to money. We didn't get the funding that we were looking for when this whole thing started."*
>
> *"We knew that if we insulated the furnace it could save some energy, but the cost of that improvement was too high."*

Another three respondents reported that they are still considering implementing the recommended improvements, but are currently prioritizing other projects such as lighting improvements. These customers stated that they would have to wait for more capital to be available before moving forward with the audit recommendations.

Partial participants were then asked how likely they would be to implement the recommended measures in the future, as shown in Table 7-10. The majority of respondents stated that they were at least somewhat likely to proceed with the recommended improvements in the future, and none of the respondents reported that they were very unlikely to do so. When asked how long it would be before the improvements could be made, nearly all of the respondents who reported being somewhat or very likely to implement the efficiency improvements stated that the projects may occur within one year. Two of the respondents indicated that the timing of implementation is uncertain, and that it may either be less than one year or more than two years before the projects can be completed

Table 7-10 Likelihood to Implement Recommended Measures

	Response	***(N = 11)***
How likely are you to implement [EQUIPMENT/MEASURE] in the future?	Very likely	45%
	Somewhat likely	18%
	Neither likely nor unlikely	9%
	Somewhat unlikely	27%
	Very unlikely	-

These findings indicate that partial participants are fairly likely to proceed with the recommended improvements, and that many of them currently have plans to implement projects as soon as they have the necessary funds.

All but one of the partial participant respondents reported that at least one of the audit recommendations was a viable energy saving improvement for their facility. This single

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respondent explained that while the recommended measures would save some energy over time, it would not be enough to justify the initial equipment costs.

7.2.5.3 Participation Barriers and Overall Program Experience

In order to identify any remaining barriers to participation or opportunities for program modifications, partial participants were asked what, if anything, could have enabled them to proceed with the recommended energy efficiency improvements. The majority of respondents restated that cost had been the main barrier, and that only additional funds would have allowed them to proceed with the recommendations. Two respondents explained that they may have been able to implement projects if their existing workload was reduced, as their facilities have to prioritize projects based on available time and resources. Additionally, one respondent stated that if utility costs increased significantly, it may motivate the facility to more closely review its opportunities for gas saving improvements. Specific comments related to these participation barriers include:

> *"If gas prices were higher we would possibly be more motivated to consider such projects. Right now it just doesn't make sense for us."*
>
> *"If we had more funding to go out and spend, we might consider investing in an air damper, but right now it isn't a possibility."*
>
> *"It all just comes down to time and resources."*

When asked whether there is anything that CLEAResult or the utility could have done to enable the customer to proceed with the recommended projects, respondents generally stated that their reasons for not proceeding with the recommendations were internally-based rather than related to the utility or implementation contractor. None of the respondents mentioned any specific actions that CLEAResult or utility staff could have taken in order to enable project implementation. Additionally, several respondents stated that CLEAResult staff had been very helpful during the audit process, and that the audit and overall program had been very informative. Individual comments include:

> *"[CLEAResult] did their part by making us aware of the program."*
>
> *"[CLEAResult] was very helpful and provided us with the affirmation that we needed to replace the doors and maybe do some more weather stripping."*
>
> *"[CLEAResult was] very professional. It was just our particular situation that stopped us."*
>
> *"Everyone has been very helpful. We appreciated the audit and information received. We wanted to implement the least expensive avenue*

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first and see how it goes. If energy bills are still high, we will take another look."

Additionally, respondents provided further commentary regarding their program experiences. These comments were very positive and complimentary in nature, and indicate that partial participants highly value the information and recommendations they received through the facility audit. After the survey was completed, several respondents mentioned that they planned to contact CLEAResult or their utility in order to follow-up on the audit process and gain further information regarding how to proceed with the recommended improvements.

The general partial participant survey findings suggest that these customers may be likely to implement their recommended energy efficiency improvements in the future. As these respondents generally indicated that the facility audits were useful and informative, and that they may not have known which projects to implement if they had not participated in the program, the energy savings resulting from these future projects would likely be attributable to the Commercial and Industrial Solutions Program

7.2.6 C&I Non-Participant Response

The evaluators interviewed C&I customers from market segments that could potentially participate in the custom component of the C&I Solutions Program. For the purposes of this analysis, a subset of the overall survey population was selected from more-likely custom participants, including:

- Agriculture & Industrial (A&I);
- Medical;
- Warehouses; and
- Hotel/Motel.

The average interest of respondents (rated on a scale of 1-10) is summarized in Figure 7-9.

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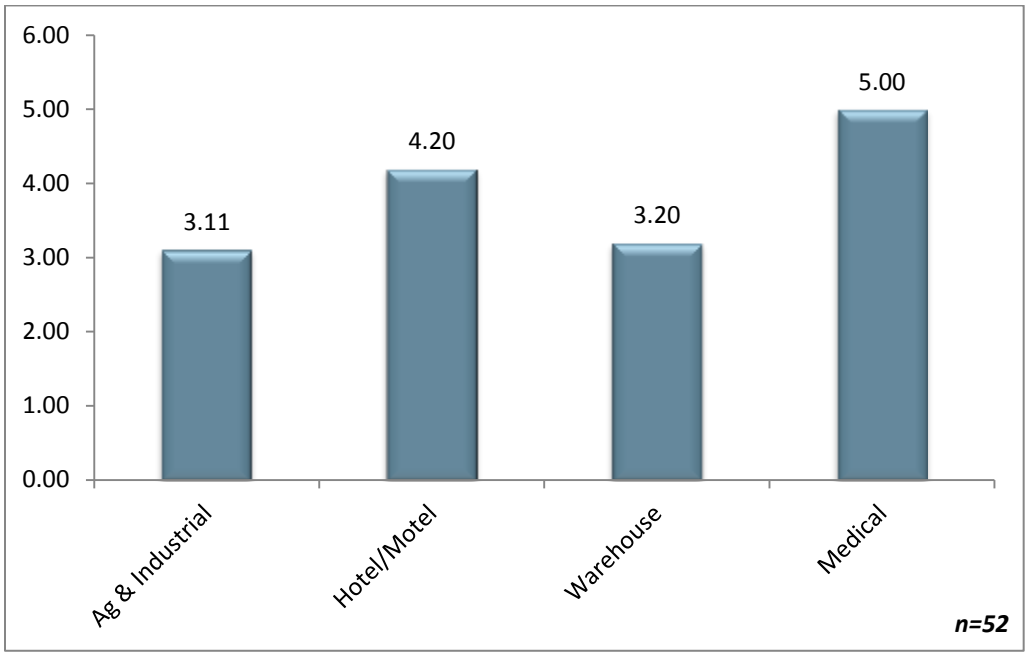

Figure 7-9 Average Interest in C&I Solutions Custom

When reviewing low scores indicated by A&I customers (the primary target of the program), the evaluators found that:

- Twelve percent indicated the difficulties in meeting upfront costs as the primary barrier to installing energy efficiency improvements. Forty-two percent indicated that they do not need to replace any equipment in the foreseeable future. A significant number (9.6%) stated that they do not consume enough gas to warrant retrofits. A further issue was that 5.7% lease the facility and are thus limited in the changes they can or are willing to make. One large industrial stated that their company as a matter of policy does not let outside auditors in out of concerns of protection of intellectual property.
- Many agricultural customers stated that they have high consumption on heating systems from chicken coops. These were mentioned as the highest or second highest load from 25% of the Agriculture & Industrial respondents. These respondents were also more likely to indicate interest in the custom component.
- Eight percent of the respondents in these market segments indicated that they are likely to replace a piece of equipment at their facility within the next three years.

7.2.7 Program Development & Outlook

The C&I Solutions Program is designed to reach SourceGas large C&I customers by identifying and incentivizing custom measure opportunities. Though the direct install component of the program has been rather successful, thus far, the custom component

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has not met savings and participant goals. In 2012, the evaluators assisted in the review of M&V plans for a fair number of projects that would not install until the 2013 program year. The evaluators identified projects totaling over 1,200,000 in expected therms savings that are considered likely to install in 2013. Based on surveys with full and partial participants, it was concluded that more patience is needed for the development of this program. Reasons for this include:

1. **The targeted participants are often capital-constrained.** The target market for natural gas custom incentives largely focuses on industrial customers. This market is acutely capital-constrained and requires very quick payback for measure approval
2. **Targeted projects often affect key systems.** There are added complexities when identifying and closing projects that affect the production of an industrial facility. Equipment in these end-uses is treated with greater caution due to their crucial contribution to facility operations. Projects affecting these systems are seen as riskier by facility decision-makers and often require long periods of internal review before uptake.
3. **Projects often require multiple levels of approval.** For many of the industrial customers, a project that affects equipment used in production requires multiple levels of technical and financial review. Approvals are often sent to corporate headquarters that have to enter the project into a long queue of pending proposals. Many survey respondents indicated that obtaining a capital request can take a year or longer. CLEAResult has identified ways to work around these issues at times, such as breaking up projects into small enough phases to where the upfront cost does not require higher-level approval, and the rebate from the first phase can be used to fund the second phase. Many projects cannot be broken up into smaller pieces, however, in that the types of projects recommended in C&I Solutions audits often call for the replacement of one piece of equipment or the installation of one set of controls.
4. **Gas projects compete with electric projects for time and funding.** Many interviewees indicated that their higher priority for energy efficiency improvements are on the electric side, particularly in lighting retrofits. These retrofits pay back quicker and do not affect key systems, so industrial customers are more receptive. Interviewed partial participants often indicated that they would not examine gas saving opportunities until after they have completed the “low-hanging fruit” on the electric side first.

Given these factors, the evaluators would suggest that more patience is warranted, as the C&I Solutions program has been in operation for roughly 15 months, which is widely considered quite young for a custom industrial program.

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7.2.8 Program Best Practices Assessment

The evaluators reviewed the program operations and compared them to best practices for residential and non-residential HVAC programs as listed in the Energy Efficiency Best Practices Self-Benchmarking Tool. On this basis, the Commercial & Industrial Solutions Program was found to adhere to program best practices in most respects. Particularly, the C&I Solutions Program adheres to best practices in:

1. **Technical activities are administered by well-qualified engineering staff.** The evaluators found the staff administering the C&I Solutions program to be well-qualified for the tasks at hand. CLEAResult has distinct teams for electric versus natural gas auditing, ensuring that natural gas programs are served by engineers with experience in measures for this fuel type.
2. **Custom projects are subject to rigorous QC and M&V processes.** At present time, CLEAResult is pursuing full M&V on a census of custom projects, owing to the uncertainty and uniqueness of each project entering the program and the relatively small number of projects overall. As such, the program savings estimates are considered very reliable. At the same time, rigor levels are adjusted as needed to be appropriate for the project size and risk levels.
3. **Direct install projects receive QC inspections.** Though CLEAResult is conducting the direct install themselves, they post-inspect participants one to two months after installation to ensure measure retention. Removed equipment is then factored out of savings claims.
4. **Program staff is endeavoring to shorten M&V periods where possible.** Initially, the evaluators found that the program implementation staff was proposing overly-rigorous M&V procures requiring lengthy data collection periods. They have been responsive to recommendations to shorten these procedures using accepted methodologies that do not require long periods of billing data.
5. **The program attempts to filter known free-riders.** Program staff has worked with Evaluators arranging to have free-ridership assessments performed at the early stages of a project, so SourceGas can make decisions to disallow projects as-needed. This prevents the use of ratepayer funds on large incentives that do not produce net benefits.
6. **The program uses outreach methods that mitigate free-ridership.** Most of the participation is driven through direct install and onsite audits. Both of these delivery methods have a documented history of providing higher NTGRs.
7. **Incentive levels are capped according to project incremental costs.** Individual project costs are reviewed before issuing an incentive check in order to verify that incentive payments do not exceed incremental cost.

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8. **Participation processes are simple for a program of this type.** The paperwork requirements to participate are much simpler than typically observed for a C&I custom program.
9. **Marketing is targeted to the appropriate segments.** The evaluators found that the outreach by program staff and resulting participation coincided with the findings of the non-participant survey in gauging potential interest in the program. Program staff members are accurately targeting segments most likely to find the program offerings appealing and applicable.
10. **The program engages in outreach and education.** CLEAResult has held multiple facility manager training sessions where they educate participants about the program offerings and about specific energy-saving technologies. Further, CLEAResult provides onsite audits and audit reports to program participants to educate about specific improvements for their facility.
11. **Evaluation is incorporated into the program improvement process.** SourceGas and CLEAResult have expressed a desire to obtain feedback from regular process evaluation and quickly incorporate such findings into their program implementation. The program process flow is flexible to the extent that adjustments can be made as-needed as issues are uncovered during real-time evaluation.

Areas where the C&I Solutions Program falls short of best practices include:

1. **The program has not successfully engaged trade allies.** The program has no formal trade ally network to speak of, and generally relies upon program staff working directly with program participants. A trade ally network for certain end-uses could bolster participation.
2. **Custom project tracking does not show project origin.** As stated in the tracking data review, the tracking data reports for the custom program do not identify what projects originated from an audit versus from a contractor or customer, making it more difficult for the evaluators to target projects for extra scrutiny.
3. **Some program actions deviate from program theory.** The initial program theory is that the direct install measures could be used as an introductory teaser to induce custom project participation. The evaluators found that for some participants, the direct install component is the terminal point of participation in that the facility lacks custom savings opportunities. However, the program does also work to induce participation in SourceGas prescriptive programs, which can serve end uses present in small to medium commercial facilities that participate in the C&I Solutions direct install component. The evaluators would suggest that rather than alter the program actions, staff should alter the program theory to record this development

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7.3 C&I Solutions Impact Evaluation

The impact evaluation of the C&I Solutions Program included the following:

- *Custom Project M&V*. The evaluators conducted project-specific M&V on a census of custom projects completed through the C&I Solutions program. Each project included an M&V plan and project-specific report. The reports are provided in Appendix A.
- *Direct Install M&V*. The evaluators conducted verification inspection for direct-install Faucet Aerators and Pre-Rinse Spray Valves (PRSVs). This was conducted at a stratified random sample of participating facilities. The realization rate was developed at the stratum level based upon the rate of verification during on-site inspection. This realization rate was then extrapolated to other facilities within the same stratum.
- *Free-Ridership Estimation.* A free-ridership rate for DI participants was estimated through participant surveying. Respondents were asked a series of questions related to their past experience with the appropriate measures, whether they had ever installed similar equipment at the participating premise or at other premises within their organization, and whether they knew of the potential savings from the DI measures prior to participating. Given the types of measures covered by the DI component, the free-ridership rate is essentially focused on to what extent participating organizations had policies in place to install such equipment anyway. If such policies were not in place, then the installation of the equipment is generally considered to be program-induced.
- *Participant Spillover*. Spillover was addressed for two customer classes: Participants and Partial Participants. Participants were surveyed for free ridership and process evaluation, and over the course of that survey are asked a series of questions addressing whether the C&I Solutions Program induced them to install other energy efficient equipment without program incentive. Additionally, the evaluators asked these customers for an estimate of savings that they expect from these measures. This was supplemented with Partial Participant Surveying. Partial Participants are defined as those which received a facility audit and measure recommendations (with associated savings estimates). Samples of these participants were interviewed, and over the course of these interviews were asked if they installed any measures recommended through the program without having singed a Project Application or receiving an incentive.
- *Partial Participant Spillover*. The evaluators define Partial Participants as those that received a facility audit but did not complete any projects through the C&I Solutions Program. Further, they must be considered “cold leads” by CLEAResult; there are many participants who receive an audit that have not installed measures, but are still in regular contact with CLEAResult. Such participants were not contacted for this interview effort in that the evaluators did

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not want to interfere with what are considered by implementation staff to be ongoing projects. The "cold leads" interviewed were asked a variety of questions regarding their reason for not following through with any of the recommended measures. Additionally, they were asked if they did in fact install any of the recommended measures from their audit without having participated. If the customer indicated having learned of the measure from their audit, the installation was then credited to the program as spillover.

7.3.1 C&I Solutions Direct Install Impact Evaluation

7.3.1.1 Energy Savings Calculations

The TRM Version 2.0 added commercial faucet aerators and pre-rinse spray valves, and the evaluation of the C&I Solutions program incorporated these deemed values. They are detailed in the subsections to follow.

Faucet Aerators

CLEAResult provided DI faucet aerators to a wide range of facility types. Deemed savings calculations for these aerators were based upon:

- Rated flow of installed aerators;
- Usage by facility type; and
- Water temperature setting by facility type.

Savings are calculated as follows:

$$Annual\ Therms\ = [(F_B * U_B) - (F_P * U_P) * Days * (T_H - T_C) * C_H * C_G / Eff_G]$$

$$Peak\ Therms\ = P * [(F_B * U_B) - (F_P * U_P) * (T_H - T_C) * C_H * C_G / Eff_G]$$

The inputs for this equation are defined in Table 7-11[24].

Table 7-11 DI Aerator Savings Calculation Parameters

Parameter	Description	Value
F_B	Baseline Flow Rate (GPM)	2.2
F_P	Post Flow Rate (GPM)	0.5 or 1.0
Days	Annual operating days for the facility[25]	
	Prison	360

[24] Arkansas TRM V2.0, Volume 2. Pg. 226-228

[25] For facilities that operate year round: conservatively assume operating days of 360/year;

For schools open weekdays except summer: 360 x (5/7) x (9/12) = 193

For dormitories with few occupants in the summer: 360 x (9/12) = 270

For normal commercial buildings: 360 x (5/7) = 257

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	Hospital, Nursing Home	360
	Dormitory	270
	Multifamily	360
	Hospitality	360
	Commercial	257
	School	193
T_C	Average supply (cold) water temperature (deg F)	61
T_H	Average mixed hot water temperature (deg F)	105
U_B	Baseline water Usage Duration	
	Prison	30 min/day/unit
	Hospital, Nursing Home	3 min/day/unit
	Dormitory	30 min/day/unit
	Multifamily	3 min/day/unit
	Hospitality	3 min/day/unit
	Commercial	30 min/day/unit
	School	30 min/day/unit
U_P	Post Water Usage Duration (assumed)	= U_B
C_H	Unit Conversion: 8.33 BTU/Gallons/deg F	8.33
C_G	Unit Conversion: 1 Therm/100,000 BTU	1/100,00
Eff_G	Efficiency of Gas Water Heater	.8
P	Hourly Peak Demand as a percent of Daily Demand for the following applications	
	Prison	6.51%
	Hospital, Nursing Home	8.91%
	Dormitory	6.51%
	Multifamily	5.63%
	Hospitality	8.91%
	Commercial	11.08%
	School	11.35%

These values translate into per-faucet savings values by facility type, detailed in **Error! eference source not found.**[26].

Table 7-12 DI Aerators Savings by Facility Type

	0.5 GPM		***1.0 GPM***	
Facility Type	***Annual Therms***	***Peak Therms***	***Annual Therms***	***Peak Therms***
Prison	84.12	.015	59.38	.011
Hospital / Nursing Home	84.1	.002	5.94	.001
Dormitory	63.09	.005	44.53	.011
Multifamily	8.41	.001	5.94	.001
Hospitality	8.53	.01	6.02	.001
Commercial	60.05	.026	42.39	.018
School	45.10	.027	31.83	.019

[26] Arkansas TRM V2.0, Volume 2. Pg. 226-228

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Pre-Rinse Spray Valves (PRSVs)

Low-flow pre-rinse spray valves PRSVs were also direct-installed at a wide range of facility types with food service applications. The savings per unit for these were calculated as follows:

$$Annual\ Therms = [(F_B * U_B) - (F_P * U_P)] * Days * (T_H - T_C) * C_H * C_G / Eff_G$$

$$Peak\ Therms = P * [(F_B * U_B) - (F_P * U_P)] * (T_H - T_C) * C_H * C_G / Eff_G$$

Table 7-13 presents the definition of these parameters[27].

Table 7-13 Pre-Rinse Spray Valves Savings Calculation Parameters

Parameter	Description	Value
F_B	Baseline Flow Rate (GPM)	2.25
F_P	Post Flow Rate (GPM)	1.28
Days	Annual operating days for the facility[28]	
	Fast Food Restaurant	360
	Casual Dining Restaurant	360
	Institutional	360
	Higher Education	270
	School / K-12	193
T_C	Average supply (cold) water temperature (deg F)	61
T_H	Average mixed hot water temperature (deg F)	120
U_B	Baseline water Usage Duration	
	Fast Food Restaurant	45 min/day/unit
	Casual Dining Restaurant	105 min/day/unit
	Institutional	210 min/day/unit
	Higher Education	210 min/day/unit
	School / K-12	105 min/day/unit
U_P	Post Water Usage Duration (assumed)	= U_B
C_H	Unit Conversion: 8.33 BTU/Gallons/deg F	8.33
C_G	Unit Conversion: 1 Therm/100,000 BTU	1/100,00
Eff_G	Efficiency of Gas Water Heater	.8
P	Hourly Peak Demand as a percent of Daily Demand for the following applications	
	Fast Food Restaurant	6.81%
	Casual Dining Restaurant	17.36%
	Institutional	8.91%
	Higher Education	17.36%
	School / K-12	11.35%

[27] Arkansas TRM V2.0, Volume 2. Pg. 322-325

[28] For facilities that operate year round: conservatively assume operating days of 360/year;

For schools open weekdays except summer: 360 x (5/7) x (9/12) = 193

For dormitories with few occupants in the summer: 360 x (9/12) = 270

For normal commercial buildings: 360 x (5/7) = 257

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In 2012, CLEAResult conducted pre- and post-installation flow testing of PRSVs, applying these values instead of the deemed GPM reduction. However, the rest of the algorithm inputs used TRM V2.0 values (hours per day, days per year, etc.).

7.3.1.2 Direct Install Field Inspection Findings

The evaluators conducted field inspections at 23 participating facilities as part of the M&V of the direct install component. Sampling for the C&I Solutions DI projects was done on a quarterly basis. In each quarterly batch sample, sites were selected in order to capture the maximum variance in savings while minimizing sample size. This was achieved through stratified random sampling, in which larger sites are sampled with certainty and the remaining population is divided in to lower strata based on expected Therms savings. These batches were aggregated into a full-year sample. The summary sample and strata boundaries are presented in Table 7-14.

Table 7-14 C&I Solutions Direct Install Full-Year Sample

	Stratum 1	***Stratum 2***	***Stratum3***	***Stratum 4***	***Stratum 5***	***Totals***
Strata boundaries (Therms)	<400	400-750	750-1,500	1,500-5,000	>5,000	
Number of sites	237	83	52	37	3	412
Total Therms Savings	49,981	46,861	54,089	84,364	43,409	277,705
Average Therms Savings	207	565	1,040	2,280	14,470	674
Standard deviation of Therms savings	101	115	236	825	11,560	1,579
Coefficient of variation	.49	.20	.12	.36	.80	2.34
Final sample	6	4	4	6	3	23

The field visits were used to verify that the measures listed were installed and retained by the participant, and that the end-use value was appropriately selected. Table 7-15 summarizes the verification rates by stratum, in terms of the therms savings expected and therms savings verified as installed. These rates are then extrapolated tot the total savings of the stratum.

Table 7-15 Direct Install Verification Rates

Stratum	***Verification Rate***	***Verified Gross Savings***
5	100%	43,409
4	98.2%	82,863
3	100%	54,089
2	100%	46,861
1	100%	48,981
Total	99.8%	27,203

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Two participating facilities had some measures fail verification. One facility was a retail facility and the other was a hotel. The evaluators found some faucet aerators removed in restrooms in these facilities.

In addition to the evaluators' field findings, CLEAResult engaged in their own post inspection as part of the quality control process. This was typically performed on large facilities and a random selection of smaller facilities one to two months after installation. In these visits, they would document any equipment removals they observed and discount project claimed savings accordingly. Site-level results are not extrapolated to non-sampled sites in these visits, however

7.3.1.3 Direct-Install Free-Ridership Methodology

The methodology for DI Free-Ridership was focused on the participants' past experiences with the appropriate equipment and whether they had organizational policies in place to install such equipment. Respondents were asked:

DI-1 Prior to participating in the C&I Solutions Program, had you ever installed any low-flow faucet aerators or pre rinse spray valves at company facilities?

- ❑ Faucet Aerators
- ❑ Spray Valves
- ❑ None
- ❑ Don't Know

Thirteen percent of respondents indicated that at some point in the past they had installed low flow aerators or spray valves at their facility.

DI-2 Prior to participating in the C&I Solutions Program, were you aware of the energy savings available from low flow faucet aerators or spray valves?

- ❑ Faucet Aerators
- ❑ Spray Valves
- ❑ None
- ❑ Don't Know

The respondents that indicated past installation of low flow devices also stated that they were aware of the savings potential from such equipment.

DI-3 If the C&I Solutions program did not provide faucet aerators, how likely would you have been to install this equipment anyway? Would you say… [READ, STOP WHEN ANSWER INDICATED]

- ❑ Definitely would have installed
- ❑ Probably would have installed

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- Probably would not have installed
- Definitely would not have installed
- Don't know [DON'T READ]

25.0% stated that they "probably would have installed". 41.6% indicated that they "probably would not have installed", and 29.2% stated that they "definitely would not have installed" the low flow equipment.

The answers from these questions are then compiled in determining the free-rider score for this measure at this facility. In accordance with TRM guidelines, respondents are scored either as a 0 or a 1 in free-ridership, with this value determined by whether the respondent would have installed the same equipment within one year in the absence of the program. Figure 7-10 summarizes the scoring procedure for Direct Install free-ridership.

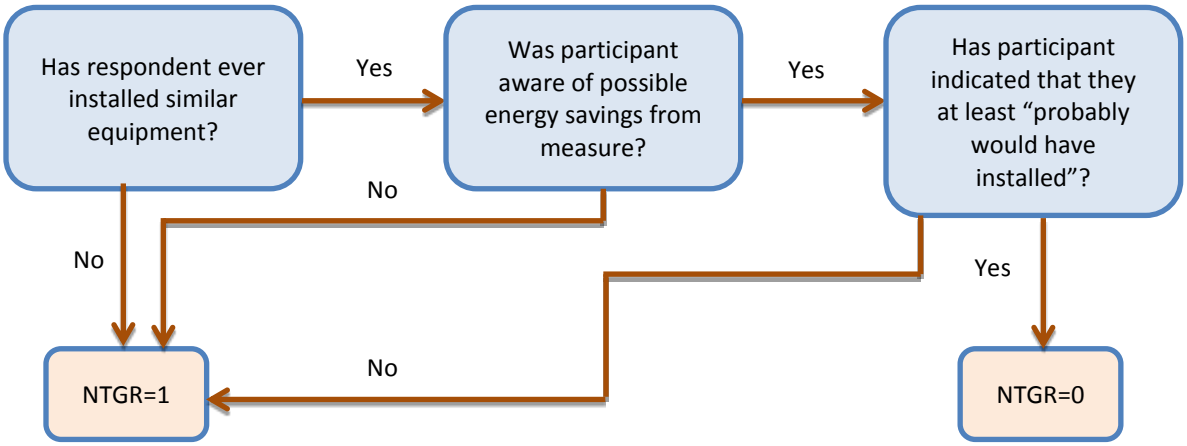

Figure 7-10 C&I Solutions Direct Install Free-Ridership Diagram

The NTGR for the DI component was then weighted by the Therms represented by the facility. Table 7-16 summarizes the results.

Table 7-16 C&I Solutions DI Free-Ridership Scoring

Respondent	Facility Type	Expected Savings	NTGR	Weight
SGA-DI-1	Industrial	3,268	100%	.059693
SGA-DI-2	Hotel/Motel	722	0%	.013188
SGA-DI-3	Medical	665	100%	.012147
SGA-DI-4	Medical	717	100%	.013097
SGA-DI-5	Industrial	646	100%	.011800
SGA-DI-6	Hotel/Motel	403	100%	.077361
SGA-DI-7	K-12 School	3,166	100%	.057830
SGA-DI-8	Hotel/Motel	1,812	100%	.033098
SGA-DI-9	Office	618	100%	.011288
SGA-DI-10	University	8,199	100%	.149762

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SGA-DI-11	Hotel/Motel	399	100%	.007288
SGA-DI-12	Hotel/Motel	390	100%	.007124
SGA-DI-13	Restaurant	606	100%	.011069
SGA-DI-14	Office	298	100%	.005443
SGA-DI-15	Restaurant	634	100%	.011581
SGA-DI-16	K-12 School	163	100%	.002977
SGA-DI-17	K-12 School	792	100%	.014467
SGA-DI-18	Hotel/Motel	214	100%	.003909
SGA-DI-19	Restaurant	209	100%	.003818
SGA-DI-20	Hotel/Motel	167	0%	.003050
SGA-DI-21	Office	52	100%	.000950
SGA-DI-22	Assembly/Worship	69	100%	.001260
SGA-DI-23	Hotel/Motel	2,728	100%	.049829
SGA-DI-24	Medical	27,810	100%	.507973
			Weighted Average NTGR:	98.4%

7.3.2 C&I Solutions Custom Project Impact Evaluation

The evaluators opted for a census of custom projects in order to capture the full variability associated with these projects; the measures are often unique with idiosyncratic issues, and as such extrapolation from the M&V of other projects would be inappropriate. The table summarizes the custom projects completed and evaluated in 2012. In this table, "Reserved Savings" are the savings used to determine the amount of incentive funds reserved for the project at the time of signing a Project Agreement. 60% of this amount is paid at the time of verification of installation, with the remaining held in reserve until the M&V of the project is complete. "Expected Savings" is the value calculated by CLEAResult after M&V. "Verified Savings" is the savings calculation completed by the evaluators.

Table 7-17 SourceGas C&I Solutions Custom Project Summary

Facility Type	***Project ID***	***Measure***	***Reserved Savings***	***Expected Savings***	***Verified Savings***	***M&V Protocol***
Manufacturing	SGA-CIS2012-001	Infrared Heating	20,000	63,211	58,420	Option A
Manufacturing	SGA - CIS2012-002	Dross Well Covers	28,427	41,283	46,574	Option A
Manufacturing	SGA - CIS2012-003	Dross Well Covers	85,282	96,931	108,247	Option A
Manufacturing	SGA - CIS2012-004	Pump Well Covers	65,026	67,454	75,630	Option A

Individual site reports detailing these analyses are provided in Appendix A. All custom projects were post-inspected with M&V as described the site-level analyses.

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7.3.2.1 Projects Installed and not Claimed

Two custom projects were installed in 2012 but are not claimed under this report. These projects are HVAC projects that are still in the commissioning phase. At the end of 2012, the equipment in these projects was still not operating according to the parameters set out in the project plan, and as such SourceGas and CLEAResult opted to push them to 2013.

7.3.2.2 Custom Project Free-Ridership Methodology

The custom project free-ridership methodology is more complicated than that of the DI participants, owing to the more complex nature of the projects and the effects of the facility audit and project incentive. The methodology used by the evaluators in determining the free-ridership rates for custom projects examined the following factors:

- *Knowledge gained from program outreach*. If the project originated from program outreach (which may include program-sponsored training courses or facility audits), the respondent is asked if they had prior knowledge of the energy-saving opportunity recommended and eventually installed. If the respondent learned of the measure through the program audit or program–sponsored training, then they are considered to not have been free-riders, in that in the absence of the program, the likelihood of the facility receiving a similarly detailed audit are low. Questions used in evaluating this criteria include:

FI-1 Prior to participating in the C&I Solutions Program, did your organization install any equipment similar to [EQUIPMENT/MEASURE] at your facility without financial incentives or rebates?

- ❑ Yes
- ❑ No

FI-1a Did you learn of this measure through your participation in the Commercial & Industrial Solutions Program?

- ❑ Yes [IF YES, ASK FI-1b] Do you recall how you learned of the measure?
- ❑ No

- *Prior plans for a similar measure*. This component is examined in instances where the respondent knew of the measure prior to receiving and technical assistance through the C&I Solutions Program. Respondents are asked a series of questions related to whether they had plans for installing this equipment prior to having learned of the available financial incentives from the C&I Solutions program. Questions used in this component include:

FI-1 Prior to participating in the C&I Solutions Program, did your organization install any equipment similar to [EQUIPMENT/MEASURE] at your facility without financial incentives or rebates?

- ❑ Yes
- ❑ No

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FI-2 Did you have plans to install the [EQUIPMENT/MEASURE] that was upgrades through C&I Solutions before participating in the program?

- ❑ Yes
- ❑ No

If Yes: FI-2a Would you have gone ahead with this planned installation without the program rebates?

- ❑ Yes
- ❑ No

FI-2b Would this installation have included the same equipment without the program rebates?

- ❑ Yes
- ❑ No

- *Analysis of measure payback*. Respondents are asked to indicate what their require payback period is for energy efficiency improvements. This value is compared against the measure payback with and without the program incentive. If the financial incentive brings the project from over the threshold to under the threshold, then the project is considered to have been sufficiently influenced by the program incentive. This includes the following questions:

DM-5 Does your organization require a specific payback period in order to implement energy efficiency improvements?

- ❑ Yes [ASK DM-5A]
- ❑ No [SKIP TO DM-6]
- ❑ Don't know [DON'T READ]

DM-5a What **payback** *length of time* do you normally require in order to consider an energy investment cost effective?

___ Years

- ❑ Don't know

The stated payback requirement by the respondent is then compared against the payback of the recommended project with and without the program incentive.

- *Modification of the project*. Respondents are asked a series of questions addressing whether they modified the project as a result of their program participation. This includes changes in equipment quantity and/or efficiency level (where appropriate for the measure) and a change in project timing. Questions used to analyze this component include:

FI-5 If the C&I Solutions through C&I Solutions Program were not available, would you have installed the…

- ❑ Same quantity of energy efficient equipment,
- ❑ A lower quantity, or

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- ❑ No energy efficient equipment at all?

  [IF FI-5 = "Lower Quantity"]: FI-5a: By percentage, how much lower?

FI-6 If the C&I Solutions program were not available, would you have installed …

- ❑ The same equipment with the same efficiency level,
- ❑ The same equipment with a lower energy efficiency level, but still above minimum code, or
- ❑ standard efficiency equipment?

[IF FI-6 = "Lower efficiency level, but still above minimum code"]: FI-6a: By percentage, how much lower?

FI-7 Did the C&I Solutions rebate allow you to install [EQUIPMENT/MESURE] sooner than you otherwise would have?

- ❑ Yes

🡻

IF YES: FI-7a When would you otherwise have installed the equipment? (READ IF NEEDED)

- ❑ In less than 6 months later
- ❑ In 6-12 months later
- ❑ In 1-2 years later
- ❑ In 3-5 years later
- ❑ In more than 5 years later
- ❑ No, did not affect timing of purchase and installation

These results are then applied in the manner displayed in the following figure.

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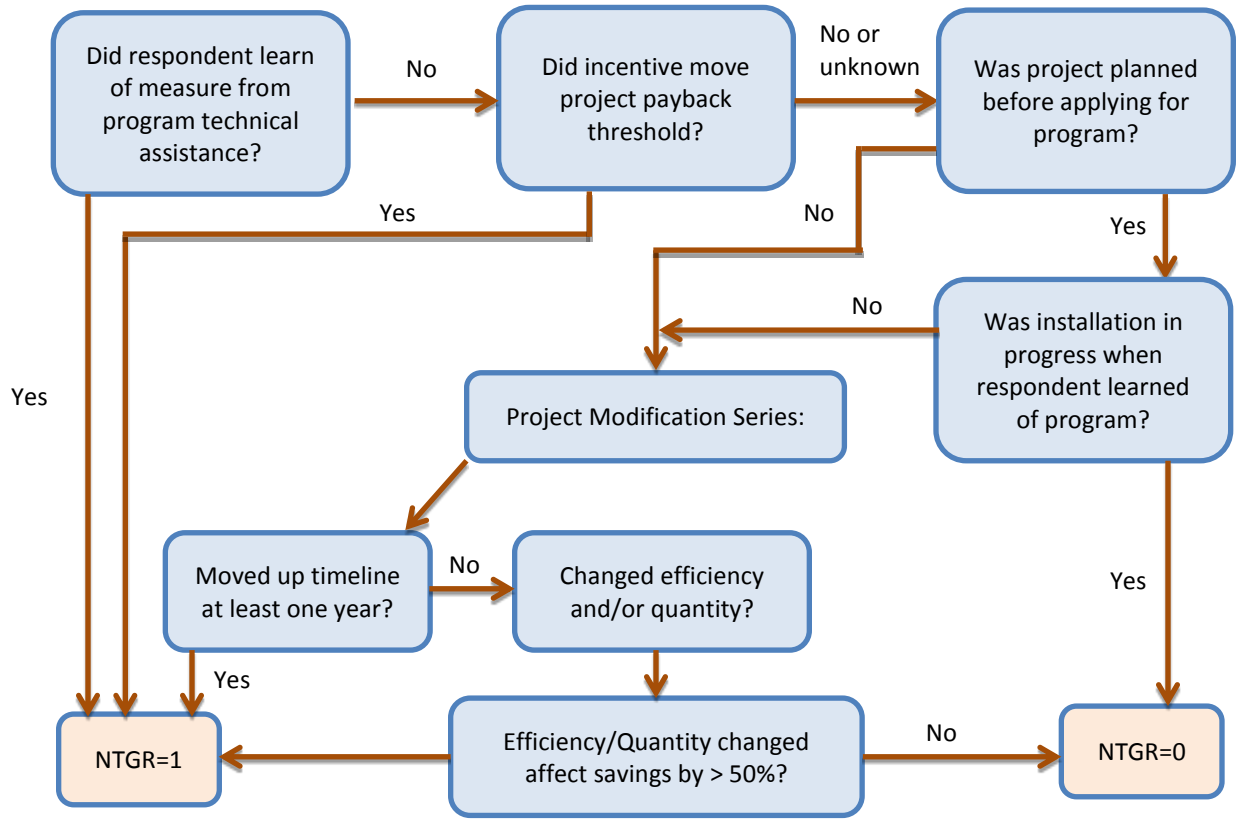

Figure 7-11 C&I Solutions Custom Project Free-Ridership Diagram

The resulting NTGRs by project are presented in Table 7-18.

Table 7-18 SourceGas C&I Solutions Custom Project Free-Ridership Results

Facility Type	***Project ID***	***Measure***	***Gross Savings***	***Net-to-Gross Ratio***
Manufacturing	SGA-CIS2012-001	Infrared Heating	58,420	100%
Manufacturing	SGA -CIS2012-002	Dross Well Covers	46,574	100%
Manufacturing	SGA -CIS2012-003	Dross Well Covers	108,247	100%
Manufacturing	SGA -CIS2012-004	Pump Well Covers	75,360	100%
		Overall Gross Savings:	288,871	100%
		Overall Net Savings:	288,871	100%

Given the small number of participants, the free-rider assessments were a series of case studies as opposed to an extrapolated survey. The individual free-rider assessments are contained within the survey narrative responses detailed in Section 7.2.4.

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7.3.2.3 Participant Spillover

Participant spillover is defined as savings from program participants that was not incentivized by the SourceGas programs. During participant surveying, both DI and Custom participants are asked questions addressing whether their participation had led to the installation of equipment that was not rebated by SourceGas. The estimated savings from these projects are tallied and added to the program savings as Participant Spillover.

OS-3 Has your organization's participation in the C&I Solutions Program led you to buy any energy resulted in the installation of additional efficient equipment for which you did not apply for a financial incentive?

- ❑ Yes
  ➓
  If Yes: OS-3a What type of equipment? _____
- ❑ No
- ❑ Don't know [DON'T READ]

The Elevators did not identify any participant spillover.

7.3.2.4 Partial-Participant Spillover

Partial-participant spillover are savings coming from projects that were recommended to recipients of audits through the C&I Solutions program that were completed without filing for program incentives. Respondents are asked:

> Have you since implemented any of the recommendations from your facility audit?
>
> a. If Yes: Why didn't you install these measures through the available incentive program?

It is then clarified as to whether the respondent installed the project as specified in the audit or made modifications to the project. This is combined in providing an estimate of non-incentivized savings, which constitutes the Partial Participant Spillover.

The evaluators did not identify any partial-participant spillover.

7.3.2.5 Overall Program NTGR

The overall program NTGR for the C&I Solutions Program is defined as:

$$Program\ NTGR = \frac{Net\ DI\ Savings + Net\ Custom\ Sasvings + Particpant\ Spillover + PartialParticipant\ Spillover}{Gross\ DI\ Savings + Gross\ Custom\ Savings}$$

Based on this, the C&I Solutions Program NTGR is 99.8%.

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7.4 Verified Savings

Table 7-19 presents the gross savings results of the evaluation of the 2012 C&I Solutions Program. Total Gross Savings summarizes the savings calculations performed by TRM protocols for direct install measures as well as the project-specific M&V of custom measures.

Table 7-19 C&I Solutions Verified Therms Savings

Component	Measure	Expected Therm Savings	Verified Therms Savings	EUL	Lifetime Therms Savings	Peak Therms
Direct Install	Faucet Aerators	245,554	240,247	10	2,405,470	63.0
	Pre Rinse Spray Valves	32,151	31,456	5	157,280	5.1
Custom	Varies	268,879	288,871	Varies	4,625,125	1,645.5
	Total Gross Savings	546,584	560,574	-	7,184,875	1,713.6

Net savings for the C&I Solutions Program were calculated using survey data of direct install and custom participants. The resulting net savings are presented in Table 7-20.

Table 7-20 C&I Solutions Net Savings Summary

Facility Category	Free-Ridership Rate		Net Annual Savings		Net Realization Rate	Net Lifetime Therms Savings	Net Peak Therms
	Ex Ante	Ex Post	Ex Ante	Ex Post			
Direct Install	20%	1.63%	222,164	262,274	120.3%	2,518,026	66.9
Custom	20%	0%	215,103	288,271	134.3%	4,625,125	1,645.5
Overall:	20%	.08%	437,267	556,145	127.2%	7,143,151	1,712.4

7.5 Conclusions & Recommendations

7.5.1 Conclusions

The evaluators have found that:

1. **Satisfaction with the program operation is very high.** 21 of 24 direct-install respondents and all custom participants indicated high satisfaction with the program.
2. **The program goals will likely be easier to obtain going forward as momentum is gained.** The types of projects rebated through the C&I Solutions Program have long implementation horizons and the evaluators found that many audits performed in 2011 and 2012 are likely to yield 2013 projects.
3. **The direct-install component is utilized both as a terminal point of savings as well as an introductory "teaser".** The direct install component is meant to provide free-of-charge high saving measures to SourceGas C&I customers. The

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logic of this is that they can serve as an introduction to CLEAResult and energy efficiency opportunities, so that they may later be induced to install a custom project. However, this process is only practical for a certain subset of the market that is both a large consumer of gas but also has a large number of faucets to be retrofitted (such as hospitals or hotels). Industrial customers (who make up the bulk of custom projects) do not generally participate in the direct install component, and do not have much of an opportunity to save energy by participating in it. Small commercial customers (such as restaurants and schools) have savings potential from direct install, but opportunities beyond that are more likely to fall under prescriptive programs rather than the audit and custom options from C&I Solutions.

4. **Customers are largely satisfied with DI measures.** The evaluators found 98.4% verification of direct install measures at visited sites. This was following efforts by CLEAResult to assess equipment retention levels and make internal adjustments to their savings estimates.
5. **Tracking for the C&I Solutions program is not organized in a systematic fashion.** The program is implemented across all three Arkansas gas utilities, with CLEAResult providing the tracking data. Despite this, there are inconsistences in tracking data between the three utility companies. This includes inconsistencies in measure naming, facility type indicators, measure savings calculators, and reporting of customer information. Though each of the individual systems was workable, the differences between the three required three separate efforts on the part of the evaluators to parse the data and recreate savings calculations.
6. **The program is successfully mitigating free-ridership.** Through the use of direct install, program-funded audits, and free-rider screening, the C&I Solutions Program is working to provide high NTGR and mitigating free-ridership risk.
7. **Measure cost estimates for furnace well covers are consistency overstated.** The evaluators found that on average, cost estimates for furnace well covers were overstated by 2.5 times over. This should be kept in mind going forward when developing cost estimates for this type of equipment.

7.5.2 Recommendations

The evaluators' recommendations for C&I Solutions Program are as follows:

1. **The program should select popular measures to be trade ally-driven.** Some measures occur repeatedly and could benefit from outreach and marketing by trade allies. SourceGas and CLEAResult should investigate the use of trade allies for measure categories with relatively predictable savings and short post-inspection procedures. Viable candidates for this would include linkless controls for process boilers and steam line insulation.

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2. **Track the source of a project in the monthly progress reports.** The monthly progress reports (MPRs) from CLEAResult list the customers, proposed projects, and initial savings estimates. CLEAResult should add a field to this report that identifies a project as being initiated from a program audit, from being suggested or proposed by a customer, or coming from a program trade ally. This would enable SourceGas and the evaluators to identify projects that require closer oversight. Further, this allows this C&I Solutions program to be effectively judged in terms of determining to what extent the program audits are driving participation.
3. **Impose consistent tracking and calculation formats between the gas utilities.** The tracking data between the three Arkansas gas utilities differed in significant ways. CLEAResult should develop a consistent measure-naming and savings calculation framework across all three gas utilities for whom they implement the C&I Solutions program.
4. **Include peak therms calculations in program tracking data.** Tracking data updates from CLEAResult did not include peak therms, which is a reporting requirement for SourceGas as set out by the APSC. The framework for calculating peak therms is straightforward and should be a part of regular reporting.
5. **Shorten post-installation procedures where possible.** The M&V process for custom projects rebated through the C&I Solutions Program often requires a lengthy post-installation data collection period. In many instances, it has been CLEAResult's suggestion to wait for one year of post-retrofit data to accumulate. Though this philosophy of erring on the side of rigorous is commendable in providing precise project-level estimates, it is the evaluators' conclusion that they are needlessly lengthier than program best practices would require. Precision versus pacing is a trade-off; lengthier M&V processes ensure more precise savings estimates at the expense of the turnover of completed projects and additional burden on the part of participants and program staff. The evaluators are working continuously with SourceGas and CLEAResult staff to refine M&V procedures for projects that can be completed in a timelier manner, allowing participants to collect the full value of their rebate checks in a shorter timeframe. This has had marked success with some of the more commonly recommended measures, such as steam line insulation.
6. **Research other direct install measures.** Some possibilities include low flow showerheads and steam traps. C&I Solutions has installed low flow showerheads in multifamily housing complexes run by housing authorities on an ad-hoc basis elsewhere in Arkansas. This should be included as a regular component of the program.

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7. **Incorporate costs from past projects into future cost estimates.** Cost estimates are generally developed by CLEAResult's Core Engineering team in Austin, Texas. They should be provided the actual cost of projects as they are completed so that they may more accurately estimate costs for similar projects going forward. This will help ensure that cost estimates reflect local market conditions.

The issues and recommendations are summarized in Table 7-21.

Table 7-21 Commercial & Industrial Solutions Summary of Issues & Recommendations

Issue	***Consequences***	***Recommendation***	***Basis for Recommendation***
Limited DI options	Reduced savings opportunities	Add low flow showerheads as a permanent component of C&I Solutions Research viability of other DI measures, including steam traps	Showerheads were installed on an *ad hoc* basis for other AR utilities in 2012 and could be expanded as a standard program offer. Steam traps are high return measures with little to no uptake.
Post-installation M&V procedures being lengthier than necessary	Excess wait-times for incentives. Unnecessarily burdensome data collection.	Continue the ongoing effort in providing feedback for development of M&V procedures for custom projects that shorten the M&V process while maintaining rigor.	Review of post inspection and M&V procedures accepted in other programs.
Direct Install databases lacking sufficient project data	Repeated data requests to SourceGas and CLEAResult, more costly Evaluation.	CLEAResult has made some of the recommended changes, including adding of unique project identification numbers.	Project summary spreadsheets still often do not include a contact name and number. Additionally, no email addresses are included.
Program is not used by trade allies	Outreach focused on efforts by SourceGas and CLEAResult staff	Work to develop trade allies to implement popular measures such as linkless controls or steam line insulation.	
Some project cost estimates overstated	May discourage otherwise viable projects.	Provide actual costs from projects to CLEAResult Core Engineering so that they may incorporate these estimates into their project costing going forward.	The evaluators conducted a systematic cost comparison of measures at the time of recommendation versus actual costs of installation.
Direct Install databases lacking peak therms calculations	Failure to adhere with ASPC reporting requirements	Add peak therms calculations as per TRM V2.0 guidelines	ASPC reporting requirements
Tracking data is inconsistent across three AR gas utilities	Added oversight & evaluation costs	Impose standard facility and measure names in savings calculators, built by one project team and disseminated to the other AR utilities	

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8. Commercial Cooking Equipment Rebates

The Commercial Cooking Equipment Rebates Program provides incentives for a range of food service measures. Eligible high efficiency measures include:

- Broilers;
- Char Broilers;
- Combi Ovens;
- Convection Ovens;
- Conveyor Ovens;
- Fryers;
- Rotating Rack Ovens;
- Rotisseries;
- Salamander Broilers; and
- Pasta Cookers.

Incentives range from $200 to $1,050 for eligible equipment, with an additional $50 dealer/installer incentive.

8.1 Program Overview

The Commercial Cooking Equipment Program is intended to be primarily vendor-driven program, with the marketing targeted at food service equipment distributors. In 2012, the program had $69,808 allocated. Table 8-1 summarizes the historical performance of the Commercial Cooking Equipment Rebates Program.

Table 8-1 Commercial Cooking Equipment Rebates Historical Performance against Goals

Program	# Participants		Budget		Net Therms	
Year	Actual	Goal	Spent	Allocated	Achieved	Goal
2010	-	-	$39,779	$93,934	-	-
2011	0	34	$28,632	$56,642	0	36,420
2012	5	52	$41,445	$69,808	1,839	53,320

8.1.1 Participation Summary

In 2012, the Commercial Cooking Equipment Rebates Program had five rebates. This included:

- 4 Convection ovens; and
- 1 Infrared broiler.

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8.2 Commercial Cooking Equipment Rebates Process Evaluation

The Commercial Cooking Equipment Rebates program had two participants receive rebates for five pieces of equipment in 2012. As such, the evaluators' activities were limited. The evaluators documented program history and interviewed program staff in order to assess possible improvements for the program in 2013. The program was internally implemented by SourceGas until September of 2012, at which point CLEAResult was brought on as the implementation contractor. They did not begin full implementation of the program until October of 2012, and as such there has not been sufficient time to assess program performance under their implementation.

8.2.1 Data Collection Activities

The process evaluation of the Commercial Cooking Equipment Rebates Program included the following data collection activities:

- *Program Actor In-Depth Interviews*. The evaluators conducted in-depth interviews program implementation staff. These interviews covered a range of topics, including marketing efforts, feedback on program delivery, an assessment of barriers to program implementation and success, and recommendations for program improvement. Program Actors interviewed include:
  - *SourceGas Program Staff*. The evaluators interviewed staff at SourceGas involved in the administration of the program. These interviews built upon interviews conducted during the 2011 Limited Process Evaluation, in which the evaluators collected initial background information on program history and implementation. These interviews captured any operational changes on SourceGas' side, as well as informing the evaluators as to any new developments in the program.
  - *CLEAResult Program Staff.* The evaluators conducted interviews with CLEAResult staff to obtain a preliminary assessment of their intended approach to implementing the program.
- *Program Marketing Materials Review*. The evaluators collected marketing materials used by the Commercial Cooking Equipment Rebates Program. This included customer mailers, audit reports, and a review of the SourceGas program website. This was compared against marketing materials from successful programs run in other territories in informing marketing improvements.
- *Non-Participant Surveys.* The evaluators conducted non-participant surveys to gauge potential interest in the program.

Table 8-2 summarizes the data collection for this process evaluation effort. This includes the titles, role, sample sizes, timeframe of data collection.

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Table 8-2 Commercial Cooking Equipment Rebates Data Collection Summary

Target	Component	Activity	N	Role
SourceGas Program Staff	Manager – Energy Efficiency Programs	Interview	1	Overall administration of SGA DSM programs. This manager is involved in the larger strategic decisions associated with the DSM portfolio, and is involved with the Commercial Cooking Equipment Rebates Program in the overall coordination of utility resources.
CLEAResult Program Staff	Energy Engineer	Interview	1	The Energy Engineer oversees technical aspects of the program, including review of equipment offerings and savings calculations. The Energy Engineer also engages in outreach to commercial customers.
	Program Coordinator	Interview	1	The program coordinator handles day-to-day administration, including scheduling of quality control inspections, application review, and marketing and outreach.
Non-Participants	C&I Non-Participants	Survey	210	The evaluators surveyed a sample of C&I non-participants has part of a general population survey to gauge program awareness, interest, and barriers to participation.
Marketing & Outreach	Marketing Materials	Literature Review	-	The full scope of paper and electronic marketing materials used in implementation for the C&I Boiler Equipment Rebates Program was reviewed by the evaluators.
Evaluation History	Prior Evaluation Reports	Literature Review	1	Findings from the Limited Process Evaluation conducted in 2011 were reexamined to determine to what extend recommendations were implemented
	Comparative Review	Literature Review	-	Evaluation reports of similar programs conducted elsewhere were examined in order to provide recommendations for improvement based upon lessons learned elsewhere.

8.2.2 Process Findings & Results

This section will present the results and key findings from the data collection activities. These findings are based upon interviews with program staff.

8.2.2.1 Program Theory & Design

The Commercial Cooking Equipment Rebates Program was designed to provide vendors a means to increase sales of high efficiency commercial kitchen equipment. The program provides a pre-set menu of equipment offerings and rebates, enabling it to be straightforward to use.

8.2.2.2 Program Administration

The Commercial Cooking Equipment Rebates Program is overseen by SourceGas' Manager of Energy Efficiency. This staff member is responsible for oversight of

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program third-party implementation contractors, general mass-marketing efforts, and overall program administration.

8.2.2.3 Program Implementation and Delivery

As a fully-prescriptive program, The Commercial Cooking Equipment Rebate Program receives applications for already-purchased equipment (no measures require pre-screening). There is a pre-prescribed menu of accepted equipment types, without the option for a custom component. The steps involved include:

- *Purchase of Equipment*. The customer has selected and purchased the commercial cooking equipment. The rebate form is generally filled out at this time by the equipment dealer, which helps to ensure accurate information recorded in the application.
- *Application Submittal*. Applications need to be submitted within 90 days of purchase or at December 31 of the calendar year of purchase, whichever comes first. Information in the application includes full Customer and Dealer information (names, contact information, gas account number, and dealer information) specifications of the equipment (type, BTU, manufacturer, model #, and serial #), a copy of the purchase invoice, and the preferred method of contact for follow-up. The application is available in paper and .pdf form. The application uses multiple-choice selections for most key inputs (such as facility and system type), minimizing errors associated with application submittal. Additionally, areas required in order for rebates to be processed are highlighted in yellow, with bold-print warnings and reminders as to needed information and filing deadlines.
- *Application Review*. Staff at CLEAResult reviews all incoming applications to ensure that the account number is served by SourceGas and that the equipment model qualifies for the program. At this time, any discrepancies are sorted out with the customer, and if necessary the application may be resubmitted. The applications are then entered into a database tool that is capable of exporting specialized MS Excel-based reports.
- *Rebate Payment*. Rebate payment occurs 6-8 weeks after receipt of the accepted application. Rebates are paid solely to the end-use customer listed in the application; the customer cannot sign over their rebate to a third party (such as a vendor or Trade Ally).

8.2.2.4 Program Marketing & Outreach Efforts

The program is being marketed through direct customer contact and outreach to food service equipment vendors. Thus far this has been with limited success, and at the time of interview, marketing strategies were not yet fully developed. This will be revisited during the 2013 evaluation.

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8.2.2.5 Tracking Data Review

The tracking data did not contain the needed data for savings calculations. The tracking data should have the following changes:

- Add a facility type that corresponds to TRM V2.0;
- Add a point of contact name for commercial projects;
- Indicate whether the efficiency level being used is combustion or thermal;
- Add a field for weather zone; and
- Include the EFLH used in calculating energy savings.

8.2.2.6 Application Review

After reviewing the program application, the evaluators found it to be straightforward and easy to understand. One area of suggested improvement would be to collect a facility primary point of contact.

8.2.2.7 QA/QC Process Review

CLEAResult conducted QA/QC inspections of all participants in 2012. As the program grows, they intend to develop a sampling strategy for conducting such inspections. This will be revisited in evaluation of the 2013 program year.

8.2.3 Non-Participant Survey Response

Though no formal participant survey was conducted in this evaluation due to the low participation level, the evaluators surveyed 210 commercial & industrial non-participants in a general-population survey.

11.4% of respondents indicated that their food service equipment is the largest consumer of gas in their facility. 4.3% indicated that it is the second highest load in their facility. The evaluators separated out facility types likely to participate in a food service rebate program and summarized their responses in Figure 8-1.

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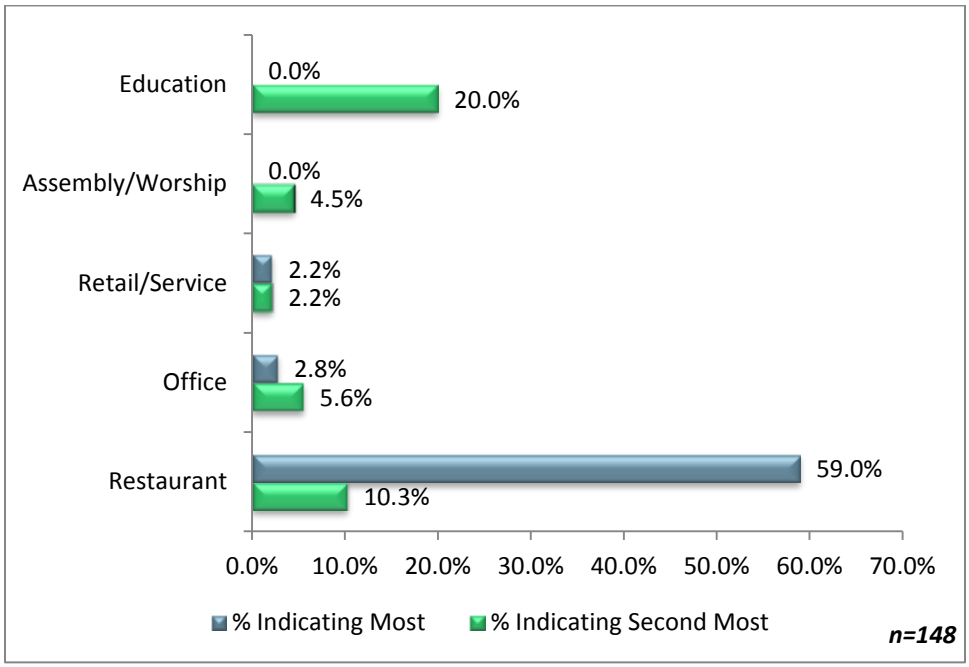

Figure 8-1 Percent of Facilities with Food Service as Highest Load

15.5% of respondents indicated having heard something about SourceGas' energy efficiency programs. 0% indicated specific awareness of SourceGas' available incentives for commercial cooking equipment. Respondents were also asked to rate their interest on a scale of 1-10 in SourceGas' programs (with "1" meaning "Not interested at all" and "5" meaning "Very interested"), based on brief descriptions of what the program offers. Average non-participant interest in the Commercial Cooking Equipment Rebates Program was 3.88 out of 10. The evaluators then subset these responses by facility type, with the average scores presented in Figure 8-2

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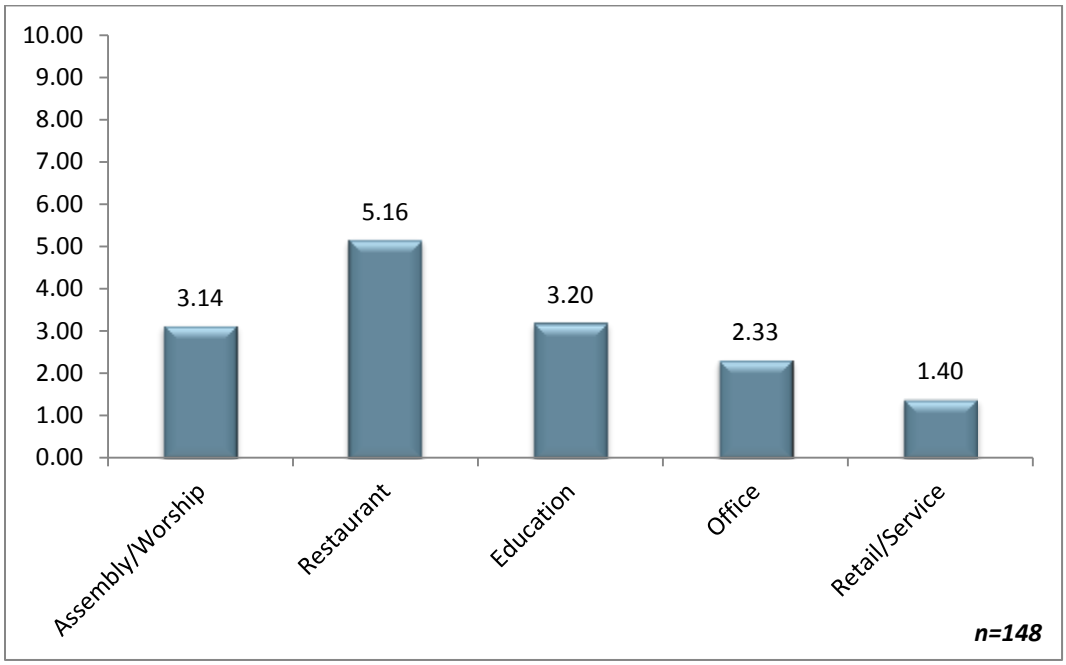

Figure 8-2 Non-Participant Interest in Heating Equipment Rebates Program

Interest was highest among Restaurant, Education, and Assembly/Worship facilities, though quite low overall. However, based on the non-participant survey, the Assembly/Worship category would appear to be one where more outreach might be warranted. Many of these facilities run commercial kitchens for schools or for charity purposes and as a result indicated some interest level in the available incentives.

8.2.4 Program Development & Outlook

The Commercial Cooking Equipment Rebates Program is designed to transform the market by reaching out to market actors that have the opportunity to affect the decision-making processes of end-users. Through education, outreach, and incentivizing of higher-level market actors, the program will then affect the resulting transactions for food service equipment. There have been multiple developments over the 2011-2012 program years that have affected program outlook.

8.2.4.1 Changes in Measure Eligibility

TRM V1.0 contained several measures which had not been tested by ENERGY STAR® or the FSTC. TRM V2.0 sought to move away from these measures, promoting only measures that have gone through rigorous testing. However, measures outside of ENERGY STAR® or the FSTC have been kept in the TRM in a miscellaneous category. These miscellaneous measures include:

- Infrared boilers;
- Salamander broilers;
- Pasta cookers;

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- Char broilers; and
- Rotisserie ovens.

Measures in the TRM with savings based on FSTC and ENERGY STAR® guidelines include:

- Convection ovens;
- Combi ovens;
- Conveyor ovens;
- Rotating rack ovens; and
- Fryers.

To keep the program within industry best-practice, SourceGas should consider restricting participation to measures tested by FSTC or ENERGY STAR®. Savings estimates for the miscellaneous measures do not have the same reliability rigor supporting them. Given the push to move food service to FSTC/ENERGY STAR® guidelines, the evaluators reviewed the incentive levels presently offered for these measures.

8.2.4.2 Measure Assessments

After reviewing the FSTC measures, the evaluators' findings per measure are as follows[29]:

- **Convection Ovens:** SourceGas should attempt to collect the type of equipment an installed high efficiency convection oven is replacing, as if it is replacing a deck oven or rack oven, the savings increase markedly. Presently, by the evaluators' estimates the program incentive covers 58.3% of the measure incremental cost and by TRM V2.0 savings guidelines incentivize at $2.13 per therm.
- **Combi Ovens:** By combining an oven and a steamer, a combi oven will reduce the range of equipment needed by a commercial kitchen, while also significantly increasing efficiency. These are higher cost measures, and are more commonly installed in educational facilities. This has been due to federal requirements to improve the health of school meals, requiring schools to move away from fryers and griddles to more healthy cooking methods. The SourceGas incentive covers 49.4% of measure incremental cost and by TRM V2.0 savings guidelines incentivizes at:
    - $1.31 for ovens < 15 pans;
    - $.93 per therm for ovens with 15-28 pans; and

[29] Incremental cost values for measures in this section are derived from the Ohio TRM and from the Food Service Technology Center database.

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  - $.66 per therm for ovens with 28 or more pans.

- **Conveyor Ovens:** Conveyor ovens have limited application but elsewhere in Arkansas have shown fair amounts of uptake. The SourceGas incentive covers 64.1% of measure incremental cost and by TRM V2.0 savings guidelines incentivizes at $.93 per therm.
- **Rack Ovens:** This is a high-saving measure, with exceedingly high upfront cost and limited applicability. Presently, the program incentive covers 18.7% of incremental cost and by TRM V2.0 guidelines is incentivized at:
  - $.52 per therm for single rack ovens; and
  - $.26 per therm for double rack ovens.
- **Fryers:** The program incentive covers 60% of measure incremental cost and by TRM V2.0 savings guidelines incentivize at $1.35 per therm.

When reviewing the incentive levels, SourceGas should focus increased incentives on measures that are either:

- Measures that have high upfront cost in absolute terms, preventing uptake; or
- Measures that provide a high enough return to justify paying down more of the incremental cost than typically done for other measures in the program.

On this basis, SourceGas should consider the following rebate amendments:

- For rack ovens, the cost being paid per Therm is quite low, and the incremental costs are high enough to where this would be a significant barrier. PG&E (the primary supporter of the FSTC) pays an incentive of $2,000 per unit for double rack ovens, owing to the high savings and high incremental cost associated with these units. SourceGas may want to consider a tiered incentive of $1,000 for single rack and $2,000 for double rack ovens.
- For combi ovens, there is again an issue of incentives being fixed regardless of equipment size. For units greater than 28 pans, the incentive rate per Therm drops precipitously. If SourceGas is amenable to tiered incentives, they should consider increasing the incentive for large combi ovens, owing to the increased savings and higher upfront cost.

8.2.4.3 New Measure Development

TRM V2.0 added deemed savings for new measure categories in food service which the SourceGas could add to their program. At present time, SourceGas is intending to refrain from measure additions until the next program cycle (beginning with the 2015 program year). Measures added to the TRM include:

- **Griddles.** These measures have relatively low savings when compared against other food service equipment. TRM V2.0 guidelines indicate annual savings of 46 therms for a high efficiency, ENERGY STAR-qualified griddle. The evaluators

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reviewed assessments of incremental cost for griddles from other programs and found very wide ranges, with the ENERGY STAR® commercial kitchen calculator indicating $60[30] and the Ohio TRM listing $2,090[31]. Given this wide range of values, this measure would need guidance from the IEM on incremental cost. PG&E offers an incentive of $125 per unit for a high efficiency gas griddle. With TRM V2.0 guidelines deeming 46 therms per linear foot, this could possibly be a cost-effective addition at an incentive level similar to the current PG&E offering.

- **Steam Cookers.** Steam cookers are higher cost and high saving, and have been successfully implemented in other programs. Further, survey respondents and participating vendors have indicated that they would be very interested in this as an addition to the program. This would come with some caveat, however, in that the range of models covered by FSTC and considered to by high efficiency is limited. School districts in particular make use of this equipment as they move towards healthier meals (as seen by combi oven uptake). TRM V2.0 has deemed savings of 2,680 and 3,215 for 5- and 6-pan steam cookers, respectively. Examples of this being incentivized include Nicor Gas at $950 and PG&E at $2,000 per unit. Incremental cost values vary widely, and would require further research. However, given the savings values, an incentive as high as $2,400 would be in line with costs per therm observed in other SourceGas measures. Further, this equipment could be marketed on the basis of significant water and sewer savings, estimated at $1,000 per year[32]
- **Dishwashers.** TRM V2.0 added deemed savings estimates for low temperature and high temperature commercial dishwashers. Savings potential for high efficiency dishwashers are high (deemed range from 47 therms for Under Counter Low Temperature to 1,534 for High Temperature with Multiple Tank Conveyor), but the market structure for dishwashers largely precludes their inclusion and uptake in a traditional DSM programs. Based on interviews with current participating equipment vendors, most commercial dishwashers are leased used rather than sold new. Any participation in this segment is likely to center on smaller, under counter units.

8.2.4.4 Impact Changes in Per-Unit Savings Levels

The per-unit savings associated with measures covered by the Commercial Cooking Equipment Rebates Program have changed dramatically from TRM V1.0 to V2.0. For example, using TRM V1.0 guidelines, the average fryer rebated in the 2011 Commercial

[30] *www.energystar.gov/calc/commercial_kitchen_equipment_calculator.xls*

[31] *State of Ohio Energy Efficiency Technical Reference Manual.* Vermont Energy Investment Corporation, 2010.

[32] *Putting Energy into Profits; ENERGY STAR® Guide for Restaurants.* EPA. January 2012

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Food Service CIP run by CenterPoint saved 1,628 therms[33]. In 2012, using FSTC values in TRM V2.0, the average fryer saves 415 therms. The new values use best practices with greater acceptance in established programs, but the goals faced by the Commercial Cooking Equipment Rebates Program were established with TRM V1.0 savings levels in mind. In 2012, the program goals are for 2012 are 52 participants and 66,650 gross therms. This would require 1,281 therms per participant (denominated in terms of single units of rebated equipment). As presently deemed, none of the FSTC-based measures can meet this rate of savings. This then either requires that the program participant goal or the program savings goal to be in line with the average savings per participant (418 therms in 2012 in SourceGas' program).

This can have a negative effect on program implementation going forward in that program activities were directed towards obtaining a participant goal established under the assumption of significantly higher savings per-unit. With savings values in place that are unlikely to need further revision (as they are based on up-to-date and accepted industry guidelines) this is not likely to be the case going forward.

8.2.4.5 Other Avenues for Potential Food Service Savings

Beyond equipment rebates, there is potential for savings in food service through education operation & maintenance (O&M) of food service equipment. There are preexisting documents detailing proper O&M procedures for food service equipment produced by the Environmental Protection Agency[34].

[33] ADM Associates, Inc. *Evaluation of CenterPoint Energy Arkansas 2012 DSM Portfolio. March, 2012*

[34] *Putting Energy into Profits; ENERGY STAR® Guide for Restaurants.* EPA. January 2012

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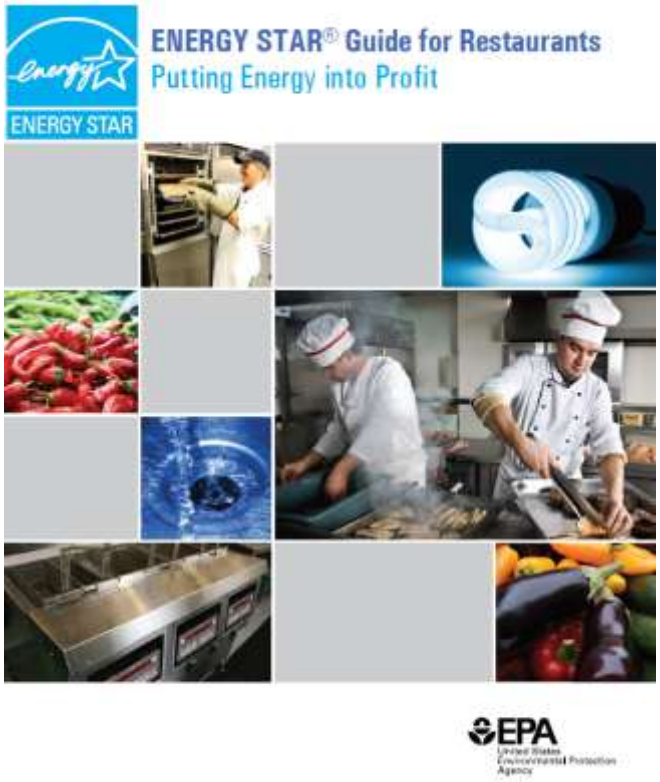

This guide lists operational changes that have quantifiable savings through ENERGY STAR® calculators. Behaviors listed include:

- 33 therms from fryers by cutting one hour of idle time per day;
- 44 therms from griddles by cutting one hours of idle time per day; and
- 46 therms from steamers by cutting one hour of idle time per day.

Dissemination of these materials along with the quantified dollar savings could potentially bring behavioral savings that can be verified through participant interviewing.

Beyond this, the Commercial Cooking Equipment Rebates Program should attempt to capture equipment switches where possible. This would include instances of a customer changing equipment classes, rather than just moving from standard to high efficiency within-class. This could occur when a customer goes from a standard efficiency steamer to a combi oven, for example. Some effort was made to capture these effects in 2012 using legacy savings calculations from TRM V1.0. This could continue going forward, using the base case from one measure category and the post case from another measure category for equipment listed in TRM V2.0.

8.2.4.6 Outreach to Rebate Consultancies

Much of the participation in DSM programs by corporate chain restaurants (non-franchised) is driven through the use of rebate consultancies. These consultancies are

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used by corporate chains to research available rebates and prioritize installations accordingly, and then to handle the necessary paperwork and facilitation of EM&V on behalf of the corporate client. This business model requires that the utility program allow third-party sign-over of the incentive, so that the paperwork can be done by outside staff instead of staff at the corporate client. Presently, SourceGas programs do not allow for third-party sign-over, which would preclude participation by these consultancies. SourceGas could potentially encourage participation in this segment by allowing third-party sign-over and reaching out to the rebate consultancies and informing them of this change in program operation. A small handful of firms handle the bulk of this market, and as such the outreach efforts would be limited and likely cost-effective.

8.3 Commercial Cooking Equipment Rebates Program Impact Evaluation

Due to the limited participation, the impact evaluation was constrained to:

1. Documentation review to ensure savings were calculated according to TRM V2.0 protocols; and
2. Application of the stipulated 80% NTGR.

8.3.1 Verified Savings

Table 8-3 presents the gross savings results of the evaluation of the 2012 Commercial Cooking Equipment Rebates Program. Total Gross Savings summarizes the savings calculations performed by TRM protocols for each measure category.

Table 8-3 Commercial Cooking Equipment Rebates Program Verified Therms Savings

Measure Category	Expected Therm Savings	Verified Therms Savings	Gross Realization Rate	EUL	Lifetime Therms Savings	Peak Therms
Convection Oven	1,216	1,126	100%	12	14,592	3.32
Infrared Broiler	1,083	1,083	100%	12	12,996	3.39
Total Gross Savings	2,299	2,299	100%	-	27,588	6.29

Net savings for the Commercial Cooking Equipment Rebates Program were calculated using deemed protocols and the stipulated 80% NTGR. The resulting net savings are presented in Table 8-4

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Table 8-4 Commercial Cooking Equipment Rebates Net Savings Summary

Free-Ridership Rate		Net Annual Savings		Net Realization Rate	Net Lifetime Therms Savings	Net Peak Therms
Ex Ante	Ex Post	Ex Ante	Ex Post			
20%	20%	1,783	1,783	100%	21,396	5.03

8.4 Conclusions & Recommendations

8.4.1 Conclusions

Based on the Evaluator's review of the Commercial Cooking Equipment Rebates the evluators have concluded the following:

1. **The program has not developed an active trade ally network.** At the time of reporting the program marketing efforts were not fully-developed. There was not an active trade ally network. The program marketing will be reassessed in 2013.
2. **The program participant goals are not in line with savings goals.** The participant goals and savings goals are set such that each unit would have to save roughly 1,300 therms, exceeding the deemed savings for TRM V2.0 food service measures. Either savings or participant goals need to be adjusted to align with the expected savings from TRM V2.0 values.

8.4.2 Recommendations

1. **Add FSTC-approved measures from TRM V2.0 to the program.** The TRM V2.0 added dishwashers, griddles, and steam cookers. These measures have been tested by the FSTC and can provide reliable savings. Further, for steam cookers in particular, interest in the equipment has been expressed by both participants and vendors.
2. **Remove measures not tested or approved by FSTC.** This would impose a level of consistency in rigor behind the savings estimates for program offerings, and would make SourceGas' eligibility list consistent with CenterPoint's.
3. **Established tiered incentives for combi and rack ovens.** The evaluators reviewed the incentives offered by measure category in terms of percent of incremental cost and cost per therm. Combi ovens greater than 28 pans and double rack ovens both have markedly high incremental costs and savings, and having the incentive to increase for units this size would be appropriate. If SourceGas were to add steam cookers and dishwashers to the program, tiered incentives would be applicable for these equipment categories as well.
4. **Attempt to capture savings from changes in equipment type.** The program can still capture savings from retrofits between equipment classes by using base

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case values from one class and efficient unit values from another (capturing savings form going from a steamer to a combi oven, for example).

5. **Use ENERGY STAR® in program branding.** The SourceGas marketing materials effectively convey the program offerings in a straightforward manner. However, use of the ENERGY STAR® logo in program marketing could assist in program branding and association.
6. **Provide materials educating on proper O&M practices to optimize energy consumption.** There are documented values from FSTC data on the energy savings associated with behavioral changes in reducing the idle time of equipment. Providing the necessary educational materials that have been developed by the EPA for ENERGY STAR® may produce viable and evaluable behavioral energy savings.
7. **Add quantifiable water cost savings estimates in the marketing for applicable measures.** High efficiency combi ovens, steam cookers, and dishwashers all provide significant water savings. Use existing FSTC values and local water rates to provide estimates of extra cost savings from water and sewer bills associated with these equipment classes.
8. **Provide vendors with equipment stickers that identify rebate-eligible equipment.** SourceGas could use the showroom floors of participating vendors for marketing by providing stickers indicating that a unit is eligible for a program incentive. It should be ensured that these stickers use an adhesive that does not leave a residue.
9. **Allow third-party sign-over of rebates.** The program does not allow for third-party sign-over, which precludes participation by rebate consultancies that handle applications on behalf of many corporate chain restaurants. This is because these consultancies fill out program paperwork on behalf of corporate clients, and the corporate clients will not engage in the participation process with their own staff. SourceGas should allow third-party sign-over (at the very least to paperwork processors and rebate consultancies, if not to vendors) in order to enable participation from this segment.

These issues and recommendations are summarized in Table 8-5.

Table 8-5 Summary of Recommendations for Commercial Cooking Equipment Rebates Program

Issue	***Consequences***	***Recommendation***	***Basis for Recommendation***
Program does not fully utilize ENERGY SAR® branding	Lack of national brand support and lost opportunity to tie program into EPA marketing	Incorporate ENERGY STAR® logo into program marketing materials	Program best-practices as set out by the EE Best Practices Self-Benchmarking Tool
Program does not cover full list of FSTC-approved measures	Lost opportunities for savings	Incorporate steam cookers, griddles, and dishwashers into the program	Review of program offerings by PG&E, SCE, & SoCal Gas
Program misses opportunities for behavioral change savings	Lost opportunities for savings	Provide existing EPA materials on O&M of equipment along with program marketing materials	Process evaluation of FSTC education offerings
Lack of participation from corporate chain restaurants	Large segment not served by the program	Allow third-party rebate sign-over and engage in outreach to rebate consultancies to inform them of the program change	Review of client listings and prior interviews of rebate consultancies discussing their participation process in DSM programs
Program savings goals do not correspond to participant goals	Inconsistent measurement of program performance, increased difficulty in planning and forecasting	Either reduce the savings goal to be in line with the participant goal, or increase the participant goal and budget to be in line with the savings goal	Calculation of per-unit savings by TRM V2.0 guidelines Comparison of TRM V1.0 to V2.0 per-unit savings
Program does not advertise water & sewer bill savings associated with high efficiency options	Lost marketing opportunity Undersold program benefits	Add estimates of annual water cost savings for combi ovens. Add similar metrics for steam cookers and dishwashers if they are incorporated into the program	ENERGY STAR® CFS Program Best Practices guidelines
Incentives do not always align with measure incremental costs and/or savings	Lower uptake of higher-cost measures	Develop tiered incentive structure, increasing incentives for > 28 pan combi ovens and double sized rack ovens. Develop similar guidelines for steam cookers and dishwashers if they are added to the program, with higher incentives for steam cookers with 5 or more pans and tank conveyor dishwashers	Calculation of $/Therm of current incentive structure against TRM V2.0 savings guidelines Secondary research of measure incremental cost estimates

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9. Home Energy Reports

The Home Energy Reports Program is an educational program run by OPower, a third party implementer for SourceGas. The program provides educational materials to a sample of SourceGas' residential customers, in which their usage is compared against similar households. The program is designed to encourage behavioral change and program participation on the part of the recipients of the Home Energy Report.

9.1 Program Overview

The Home Energy Reports Program has $187,585 in budget allocated. Table 9-1 summarizes the Home Energy Reports historical performance against goals.

Table 9-1 Home Energy Reports Program Historical Performance against Goals

Program	# Participants		Budget		Net Therms	
Year	Actual	Goal	Spent	Allocated	Achieved	Goal
2011	25,000	25,00	$131,840	$135,587	22,430	70,390
2012	25,000	25,000	$190,885	$187,585	254,48	262,350

9.1.1 Participation Summary

The Home Energy Reports Program began in October 2011. The program is designed to generate quantifiable behavioral savings that cannot be feasibly attained through standard DSM efforts. The program implementer, Opower, asserts that their program differs from standard energy conservation marketing efforts in that it provides unique reports to each customer, comparing their gas bills against those of similar-sized homes in their neighborhood. The comparison against their neighbors is intended to have a jarring effect; when informed that their usage is above average, the program theory would assert that they are then driven to engage in conservation behaviors. In 2012, there was a population of 25,221 report recipients.

9.2 Home Energy Reports Process Evaluation

In addition to the common researchable issues listed in Section 2.2.3, issues researched in the process evaluation of the Home Energy Reports Program included:

- To what extend are the Home Energy Reports driving participation in other SourceGas programs?
- What difficulties will the program face as it is scaled to meet increased savings and participant goals in 2013 and beyond?
- What is the theory and logic behind the investigated alternative delivery schedule put forth in winter 2012? Will the program be changed to this delivery schedule?

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- What behaviors are the Home Energy Reports producing that could potentially be attained from other customers through SourceGas DSM programs?
- To what extent is the impact due to the general marketing aspect of the Home Energy Reports versus the comparison-against-neighbors component?
- Are the recipient and non-recipient groups sufficiently similar to warrant comparison? Is the sample for the study representative of SourceGas' overall population?

9.2.1 Data Collection Activities

The process evaluation of the Home Energy Reports program included the following:

- *Program Actor In-Depth Interviews*. The evaluators conducted in-depth interviews with a series of program actors. These interviews covered a range of topics, including the scalability of the program, feedback on program delivery, an assessment of barriers to program implementation and success, and recommendations for program improvement. Program Actors interviewed include:
  - *SourceGas Program Staff*. The evaluators interviewed staff at SourceGas involved in the administration of the Home Energy Reports Program. This effort was intended to address any issues in the interactions between SourceGas and third party implementation staff.
  - *Third Party Implementation Staff Interviews.* The evaluators conducted interviews with OPower involved with the HER Program. These interviews addressed issues surrounding the planned scaling of the program to meet increased savings goals, as well as the logic and theory behind Opower's investigation of an alternative report delivery schedule.
- *Program Marketing Materials Review*. The evaluators collected sample reports sent by OPower to the recipient group. These reports were reviewed for content and clarity.
- *Review of Program Quality Control Procedures*. The evaluators reviewed the QC procedures in place for the Home Energy Reports Program. This included review of the billing data compilation process and testing of the validity of the control group.
- *Recipient Surveying*. The evaluators surveyed a sample of the recipient group. These surveys were used to collect feedback on the customer perception of the report, as well as to collect qualitative information on what energy efficient behaviors or technologies may have been implemented in the home. The collected data was not used to modify savings calculations; the value calculated from regression analysis and double-counting correction was taken as final.

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However, this did serve to inform the evaluators and SourceGas as to what the sources of the calculated energy savings were.

- *Non-Recipient Surveying.* A sample of the Non-Recipient Group was surveyed to collect comparative data on awareness of SourceGas rebate programs and of any energy efficient behaviors or technologies implemented by the respondent in the past year. In this survey, it was important that the evaluators make no mention of the Home Energy Reports program, so as to maintain the validity of the control group. The survey was delivered to the Non-Recipients as a general marketing survey done on behalf of SourceGas.

Error! Reference source not found. summarizes the data collection for this process valuation effort. This includes the titles, role, sample sizes, timeframe of data collection.

Table 9-2 SourceGas Home Energy Data Collection Summary

Target	Component	Activity	N	Role
SourceGas Program Staff	Director of Energy Efficiency	Interview	1	Overall administration of SourceGas DSM programs. This manager is involved in the larger strategic decisions associated with the DSM portfolio, and is involved with the HER Program in the overall coordination of utility resources.
OPower	Engagement Manager	Interview	1	Management of the SourceGas program.
Residential Customers	Recipients	Survey	300	-
	Non-Recipients	Survey	300	-
Marketing & Outreach	Home Energy Report	Literature Review	Literature Review	The evaluators reviewed sample Home Energy Reports, addressing the quality and clarity of the information and message provided.
Evaluation History	Prior Evaluation Reports	Literature Review	Literature Review	Findings from the Limited Process Evaluation conducted in 2011 were reexamined to determine to what extend recommendations were implemented
	Comparative Review	Literature Review	Literature Review	Evaluation reports of similar programs conducted elsewhere were examined in order to provide recommendations for improvement based upon lessons learned elsewhere.

9.2.2 Process Results & Findings

This section will present the results and key findings from the data collection activities. These findings are based upon interviews with utility staff, implementation staff, surveys with participants, and thorough and in-depth literature review.

9.2.2.1 Program Theory & Design

The Home Energy Reports Program is designed to provide a focused message to SourceGas residential customers on the value of conservation and a comparison of a

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customer's usage to similar homes in Arkansas. The theory of the program is that through showing what neighbors are using, customers will be driven to conserve by a sentiment that they are "outside the norm", producing a mix of behavioral-based savings and possible installation of energy efficient equipment.

9.2.2.2 Program Administration

The Home Energy Reports Program is overseen by the Manger of Energy Efficiency at SourceGas. This manager oversees Opower's implementation efforts and keeps track of program performance milestones. Further, this manager worked with Opower at the outset of the program in refining the home energy report, ensuring that the messaging is consistent with SourceGas' broader marketing.

Beyond this, staff interaction with the program is limited to the SourceGas call center who at times receives phone calls from report recipients in which either:

1. The recipient wants to learn more about SourceGas' programs; or
2. The recipient is upset at having received the report and does not want to receive another.

Instances of the latter are quite rare; the program has had fewer than 100 opt-outs since inception. When recipients inquire about SourceGas programs, the call center staff informs the caller where they can find out more online or transfer them to the appropriate staff member at SourceGas.

At Opower, the contract is administered by an Engagement Manager. This manager handles the day-to-day operations of the program, including interactions with SourceGas staff and all needed billing, logistics, and reporting. The Engagement Manager is supported by Opower's analytics team, who conduct analysis throughout the year to provide quarterly updates to SourceGas. This allows SourceGas to adjust other program participation and savings targets in response to over- or under-performance of the Home Energy Reports Program.

9.2.2.3 Program Implementation & Delivery

The sample for the HER is developed through the following process:

- *Random Draw from SourceGas Population.* The initial group of was drawn through a simple random sample of SourceGas current accounts. This is done as a simple random sample, in order to ensure full representativeness of the population as a whole. The sample size is sufficiently large to overcome issues of skewness, kurtosis, and heteroskedasticity in the population while maintaining the program precision requirements.
- *Splitting the Random Draw into Recipient and Non-Recipient Groups.* This group of 100,000 is then randomly split into two groups with one group designated as the recipients. This group is to receive regular Home Energy Reports, comparing their usage against their neighbors' over the prior year.

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According to updated best practices for this program type by the Department of Energy, these two steps should be completed by an independent third party. However, the program was already undergoing implementation when the evaluators were brought on board, and this best practice update had not been released at the time of program inception. As such, the evaluators conducted due diligence on the sampling and subsequent splitting of the sample, ensuring that all procedures were done according to industry standards.

- *Identification of Similar Homes.* With the recipient group specified, OPower then begins the process of identifying similar homes for the billed usage comparison. These homes are identified on the basis of neighborhood and square footage. From these subsets, average usage values for homes of each size and neighborhood category are developed, and are used as the basis of comparison in the tailored reports.
- *Report Development.* With the comparison homes identified, OPower then develops the tailored reports. These reports show the customer's usage against that of their similarly-sized neighbors. The program theory would assert that this will provide a positive impact on both above-average and average users, in that:
  - Recipients who find that their usage is the average for homes of their size in their neighborhood will feel positive reinforcement and affirmation of any energy conservation efforts they have undertaken prior to having received the report, and may be encouraged to continue doing so to a greater extent than they otherwise would have.
  - Recipients who find that their usage is higher than the average for homes of their size in their neighborhood will find the effect jarring, in that without having had a basis for comparison, they may have never given a second thought to the volume of their usage.
  - In both cases, the customers are provided with information on what behaviors they can immediately implement to conserve energy (changing thermostat or water heater temperature settings, greater diligence in shutting off appliances or taking shorter showers, etc.) as well as information on the available rebate programs offered by SourceGas.
- *Report Delivery.* The Home Energy Reports are then mailed to the Recipient Group. The delivery schedule is set to begin in the middle of autumn, shortly before the winter heating season and to extend until the beginning of spring. The idea of delivering in such a manner is to have the idea of gas conservation fresh in the recipient's minds shortly before the peak season for gas usage begins.
- *Report Follow-Up.* After receiving the reports, some customers then seek out SourceGas for follow-up information. Through the entire process, OPower is never listed as the point of contact for the recipients. Their operation of the program is behind the scenes, with SourceGas' name being the only one seen in

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materials received by customers. Customers contact SourceGas for two reasons:

- Most contact is asking for further information on what the customer can do to conserve energy. SourceGas then follows up in providing more detailed program materials.
- Some customers contact SourceGas and request to be removed from the recipient list. There is a small set of recipients that do not appreciate being compared to their neighbors in such a manner. They are removed from the delivery list and do not see another report. However, the billing data is still incorporated into the program regression modeling.

The evaluation of the 2012 program factors in opt-outs and drop-outs, defined as:

- Opt-Outs: These are recipients that contact SourceGas and ask to no longer receive the home energy report. This comes from dissatisfaction with the report or discomfort with the use of their billing data.
- Drop-Outs: These are recipients that drop out of the program due to relocation or account disconnection.

9.2.2.4 Program Marketing & Outreach Efforts

This factor is not applicable to the Home Energy Reports program, as it is a mass-market messaging program that does not engage in recruiting.

9.2.2.5 Tracking Data Review

The evaluators received database updates from Opower at mid-year and at the end of the year. Along with the billed usage, this included customer account number, an Opower participant ID, and an identifier as to whether the customer was in the recipient or control group. This was cross-referenced with SourceGas' customer list to populate the database with names and phone numbers to allow for recipient and control group surveying.

The evaluators found the tracking data to be complete and comprehensive.

9.2.2.6 Home Energy Report Review

The evaluators requested and received a sample report from Opower that would be delivered to recipient. This report included a comparison in the last month and of the last year of usage. Figure 9-1 represents a sample message included in a Home Energy Report.

The report was delivered in February and is for a customer that uses more natural gas than their comparable neighbors. The report presents a clear picture of the customer's usage relative to all of their neighbors as well as the top 20% most efficient neighbors, along with a cost estimate of how much more they spent on their bill due to their usage.

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Their neighbors are defined as approximately 100 nearby homes of similar square footage.

Their prior-month usage is presented at the top of the report in a bar graph, along with a line graph showing their prior rolling 12-month usage comparison. Finally, they are presented with their usage in absolute and relative terms when compared to their neighbors.

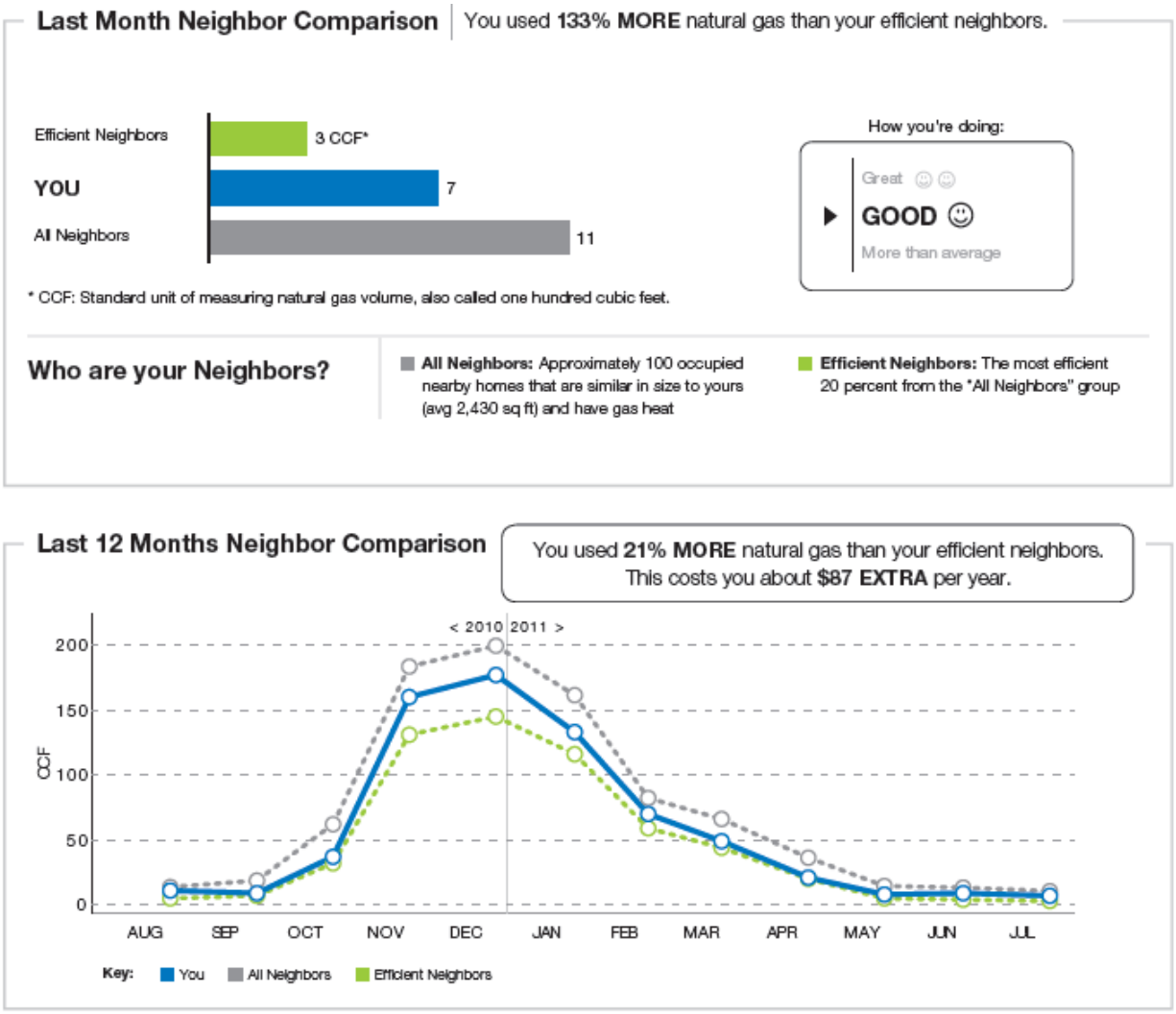

Figure 9-1 Sample Home Energy Report Content

On the report's second page, recommendations for quick energy savings as well as for investments in energy efficient equipment are made. The recommendations include:

- Visiting the SourceGas website for more conservation tips;
- Washing clothes in cold water; and
- Installing a high efficiency storage tank water heater.

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Further, one specific program is highlighted in the report. This report highlighted the Water Heating Equipment Rebates Program, presenting SourceGas' offering of up to $500 in savings for the installation of high efficiency water heaters.

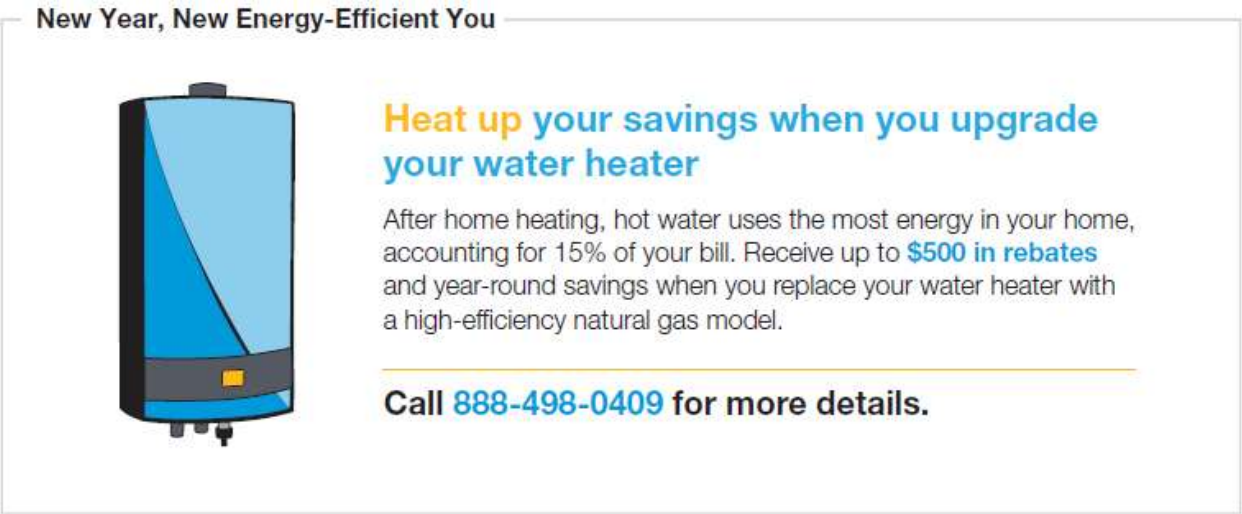

Figure 9-2 Rebate Program Content from Home Energy Report

9.2.1 Survey Response

The evaluators conducted surveys with 240 recipients and non-recipients to test differences in self-perception of energy use and in engaging in energy conservation behaviors.

9.2.1.1 Self-Perception of Consumption & Efficiency

Respondents were first asked how they felt their natural gas usage compared to other homes of similar size. They are then asked how efficient they perceive their household is in terms of energy use.

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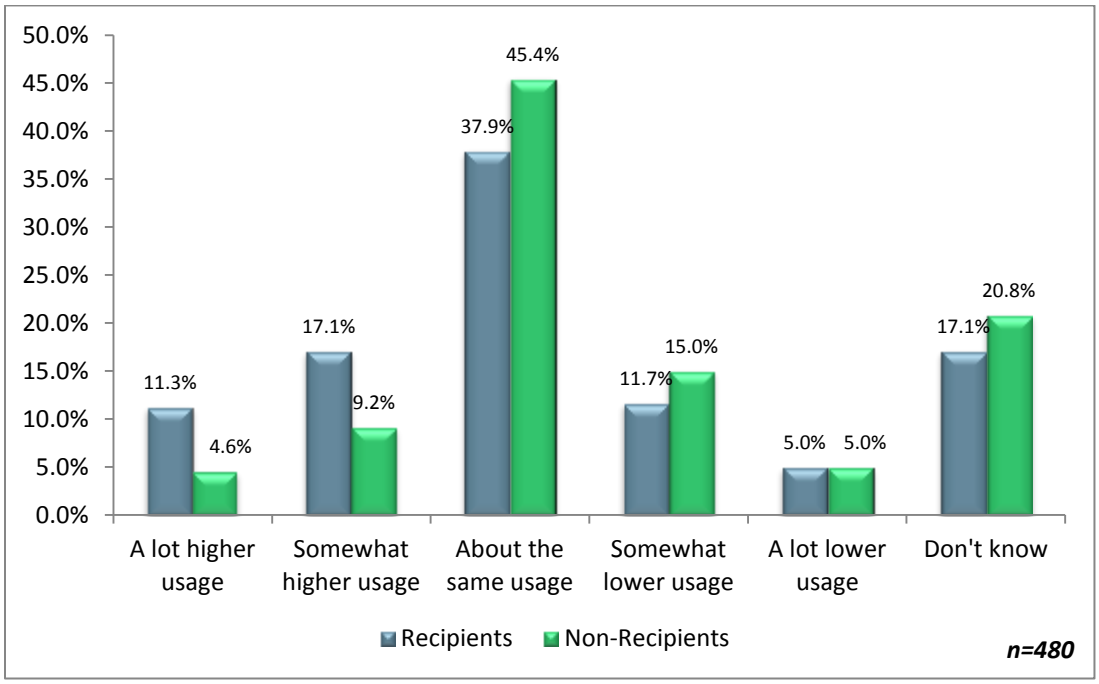

Figure 9-3 Self-Perception Usage Compared to Similar Homes

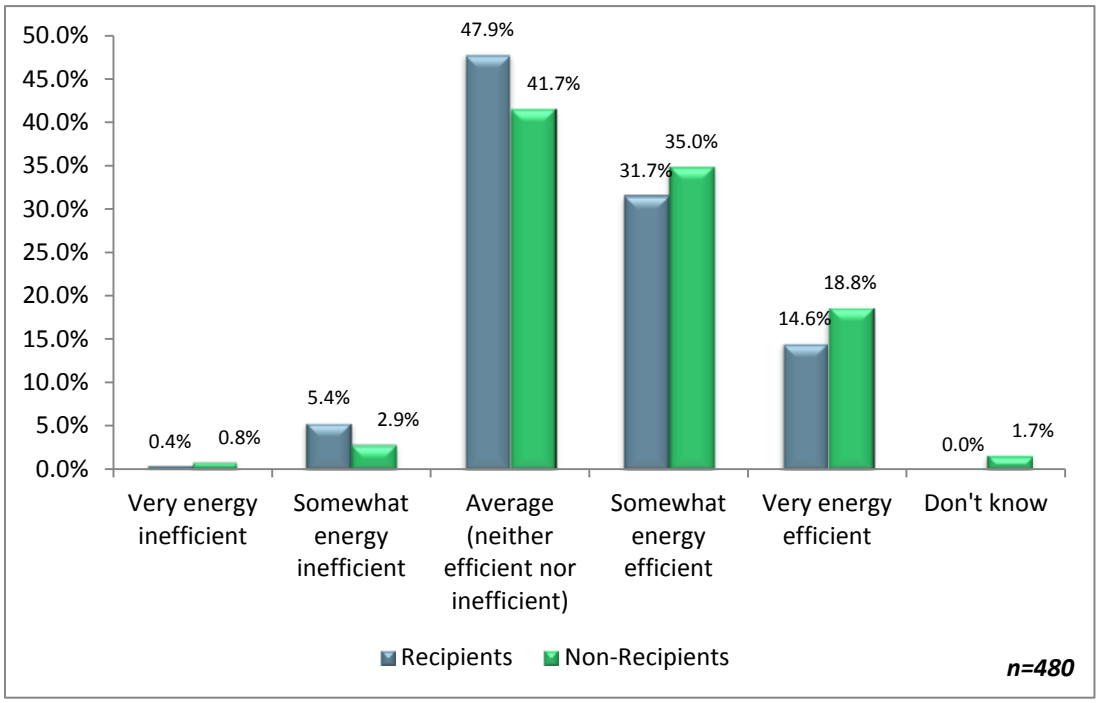

Figure 9-4 Self-Perception of Efficiency Level Compared to Similar Homes

What is most telling in these responses is the increased self-awareness of the Home Energy Report recipients. Twenty-one percent of the control group respondents "don't know" how their usage compares to similar homes, versus 17.1% of recipients. Though it would at first glance seem unusual that so many recipients would be unaware of their

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comparison of use against neighbors after having received a report, it is possible that not every household that receives a report cares to open it or take in its contents. Further, some recipients may read the report but not share the contents with other heads of household, for example. Despite this, the level of self-awareness among the recipients increases in a significant fashion. This is further seen in how many recipients consider their usage to be "much higher than other homes of similar size"; 11.3% of recipients indicated so, compared to only 4.6% of the control group. Forty-five percent of the control group considers their usage and 41.7% consider their efficiency level as being "Average", as opposed to 37.9% and 47.9%, respectively.

9.2.1.2 Response to Energy Efficiency Messaging

Respondents are then asked if they have received any messages in the past year regarding energy efficiency. Seventy-seven percent of report recipients and 42.9% of the control group indicated having heard a message regarding energy efficiency within the past year. Figure 9-5 summarizes the types of messages recalled by the recipients and control groups. Respondents could list multiple messages so percentages exceed 100%.

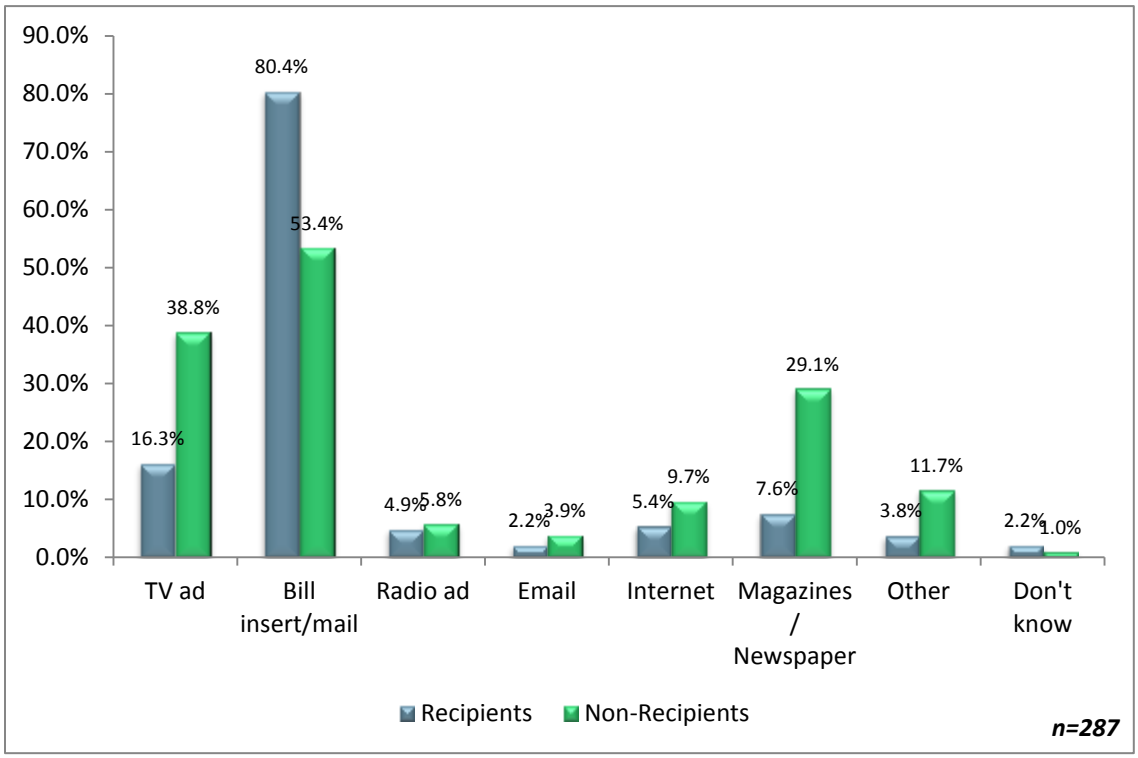

Figure 9-5 Types of Energy Efficiency Messages Recalled by Recipient & Control Groups

Most recipients recall receiving a bill insert. This is also the most commonly indicated message by the control group, though only 53.4% of control group respondents that received a message regarding energy efficiency recall receiving a bill insert as opposed to 80.4% of the recipient survey respondents. Eighty-four percent of recipients

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surveyed said they found the messaging they received to be useful, whereas 91.9% of the control group respondents stated the message was useful. This likely speaks to the differences in messages, in that the control group respondents would have received general energy efficiency messaging (such as advertisements for a rebate program) rather than specifics on their own consumption. When reviewing qualitative responses from report recipients as to why they did not find the messaging useful, there was a portion of respondents that gave unprompted negative feedback about the report. Two percent of report recipients (25.0% of those that did not find the messaging useful) stated that they did not believe the comparison in the report or that comparing them to their neighbors was useful.

9.2.1.3 Conservation Behaviors

Respondents in both groups were asked a battery of questions addressing energy conservation behaviors they engaged in within the past year. It was found that 3.0% of recipients and 2.9% non-recipient respondents had participated in an energy efficiency program. The differences were not statistically significant.

Table 9-3 summarizes the differences in gas-conserving behavior among the recipient and control group respondents. The evaluators found statistically significant differences in behavior among the recipient group in adjusting their thermostat at night. Other specified behaviors did not register as statistically significant.

Table 9-3 Differences in Behavior among Recipient and Control Group

Behavior	*Recipients*	*Control Group*	*Statistically Significant (95% Confidence)?*
Adjusted thermostat at night or when gone	21.3%	14.6%	Yes
Cleaned or changed furnace filters	2.9%	3.3%	No
Ran full loads in dishwasher	.8%	.4%	No
Used cold water for washing clothes	3.3%	3.8%	No
Turned down water heater setpoint	.4%	0%	No
Reduced use of gas fireplace	.8%	0%	No

9.2.1.4 Report Satisfaction

Following the questions regarding general energy use, report recipients were asked questions specifically relating to their having received a Home Energy Report. Table 9-4 summarizes the results.

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Table 9-4 Recipient Satisfaction with Report Content

Element of Program Experience	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied	Mean Score	Don't Know
Information provided in your report	33.8%	25.0%	32.1%	3.3%	1.7%	3.90	4.2%
The savings on your monthly gas bill	22.1%	22.1%	35.8%	5.4%	2.5%	3.64	12.1%
The energy saving tips on your report	31.7%	29.6%	31.3%	2.1%	1.7%	`3.91	3.8%
The level of detail provided in your report	32.5%	27.5%	28.8%	4.6%	1.7%	3.89	5.0%

Most respondents indicated neutral satisfaction with the report content. A program such as Home Energy Reports is likely to have less satisfaction than a typical rebate program due to the outreach to residential customers that may in general be unreceptive to energy efficiency. Further, since no specific incentive is provided, participants are more likely to perceive the program as not providing a tangible benefit when compared against those that receive a rebate check from SourceGas.

9.2.2 Program Development & Outlook

Based on a review of actions in a similar program implemented by SourceGas, the evaluators concluded that the Home Energy Reports Program could be scaled if that were desired. If it is scaled, the evaluators recommend scaling it using a 2:1 ratio of recipients versus control group households, in order to ensure continuing validity of the control group.

9.2.3 Program Best Practices Assessment

The Home Energy Reports program adheres to best practices for educational programs in nearly all respects. The program provides a clear, actionable message for the recipient group. The one area where the program deviates from best practices is in that the sample groups were developed by the implementer. Ideally, these would be developed by a third party, but implementation began before the evaluators were brought under contract. Since the control group passed validity testing, this is not an issue going forward.

9.3 Home Energy Reports Impact Evaluation

The impact evaluation effort of the Home Energy Reports Program included the following:

- *Validity Testing of Comparison Group.* The evaluators conducted statistical significance testing of the recipient and control group for observations prior to the delivery of the first reports. This was done to ensure that the control group provided a valid basis for comparison.

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- *Billing Regression Analysis with Experimental Design*. The evaluators conducted billing analysis of the recipient and non-recipient group, encompassing a period of one year before receiving their first Home Energy Report and through December 2012. This methodology is analytically rigorous and has the advantage of inherently accounting for free-ridership and spillover; the results of the difference-in-difference estimate between the two groups provides a net savings estimate.
- *Double-Counting Correction*. After totaling the savings derived through billing-analysis, the evaluators cross-checked the recipient and non-recipient populations against SourceGas' overall participant pool. The Double Counted Savings was calculated as the difference Other Program Savings of the Recipient Group minus that of the Non-Recipient Group. This ensures that savings for the SourceGas DSM portfolio are not double-counted.

9.3.1 Control Group Validity Testing

The evaluators tested the two waves of the Home Energy Reports program independently to ensure validity of the comparison. Tests were performed on monthly consumption for the pre-delivery period. Table 9-5 summarizes the statistical validity testing.

Table 9-5 Control Group Statistical Validity Testing

Observation	Recipient Group Consumption		Control Group Consumption		Difference	PR > T
	Mean	SE	Mean	SE		
January 2010	241.30	.5436	241.27	.6153	.0366	.964
February 2010	192.71	.4253	192.14	.4769	.5617	.381
March 2010	156.39	.3681	156.53	.4158	-.1298	.815
April 2010	81.69	.2417	81.51	.1645	.182	.599
May 2010	34.76	.1784	34.56	.1887	.2043	.431
June 2010	20.68	.1280	20.61	.1497	.0724	.713
July 2010	18.42	.1063	18.35	.141	.0725	.657
August 2010	15.24	.0855	15.15	.0961	.0963	.454
September 2010	18.20	.1249	18.17	.1481	.0308	.873
October 2010	23.42	.1338	23.44	.1467	-.0128	.949
November 2010	54.26	.1795	53.91	.2017	.3491	.196
December 2010	137.99	.3862	137.26	.4349	.7391	.208
January 2011	215.85	.4520	215.74	.5109	.122	.856
February 2011	198.60	.4196	198.52	.4730	-.4559	.471
March 2011	115.15	.2689	115.57	.3016	-.4164	.303
April 2011	86.68	.2172	86.74	.2428	-.0534	.870
May 2011	47.24	.1652	47.20	.1922	.0434	.864
June 2011	25.94	.1516	26.09	.1884	-.1483	.540
July 2011	18.21	.1078	18.02	.1146	.1944	.217
August 2011	14.21	.0806	14.10	.0918	.1108	.365
September 2011	19.59	.1340	19.44	.1440	.1588	.419
October 2011	24.76	.1414	24.55	.1499	.2189	.288
November 2011	60.26	.2146	59.83	.2336	.4381	.167

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From these tests, the evaluators confirmed that the two groups are statistically valid for comparison. No observations had P-values lower than .05, and as such the comparisons are valid at the 95% confidence level.

9.3.2 Savings Calculation Methodologies

Savings from the Home Energy Reports program are calculated as a "Difference-in-Difference", defined as:

$$Savings = \left(Therms_{pre} - Therms_{post}\right)_{part} - \left(Therms_{pre} - Therms_{post}\right)_{non-part}$$

Through this, the differences after delivery of the reports are calculated for the participant and non-participant groups, capturing the impact of naturally occurring changes in consumption of those that do not receive the report. The baseline and post Therms values are estimated through regression modeling, with the basic model defined as:

$$\begin{aligned} Therms/Day = &\propto_0 + \alpha_1 Post + \alpha_2 Treatment + \alpha_3 Treatment * Post + \beta_0 HDD \\ &+ \beta_1 Treatment * HDD + \beta_2 Post * HDD + \beta_3 Post * Treatment * HDD \end{aligned}$$

In this model, the savings associated with the program are calculated using the following variables:

α_3Treatment*Post, β_3Post*Treatment*HDD

9.3.3 Home Energy Report Peak Savings

To estimate peak therms, the evaluators split savings into two categories:

- Weather Sensitive; and
- Non-Weather Sensitive

From this used the ratio of peak to annual therms for residential furnaces and water heaters for weather-sensitive and non-weather sensitive (respectively) from the TRM version 2.0. These multipliers are defined in Table 9-6 below.

Table 9-6 Home Energy Reports Peak-to-Annual Multipliers

Savings Type	Zone 6	Zone 7	Zone 8	Zone 9
Weather-Sensitive	.02449	.01791	.01814	.01521
Non-Weather-Sensitive	.0024	.0024	.0024	.0024

9.3.4 Home Energy Report Net Savings

The HER program uses a randomized control trial, comparing recipients to non-recipients. As a result, the savings estimates from the model are net savings estimates, and no further deduction of free-ridership is taken.

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9.3.5 Model Output Results

Error! Reference source not found. provides the model coefficients for the regression f customer billing data in the analysis of the Home Energy Reports program. As stated prior, parameters that include Treatment are used in estimating savings.

Table 9-7 Home Energy Reports Model Coefficients

Parameter	Definition	Estimate	Standard Error	T-Value
Intercept	Constant	15.308050	.11404	134.23
Post	Observation occurs after November 2011	-5.118160	.20483	-24.99
Treatment	Dummy for receiving a home energy report	.862900	.12866	6.70
Post_Treatment	Post * Treatment	-.071070	.23202	-.31
HDD	Heating Degree Days, using 65 degree base	.173720	.000201	864.19
Treatment_HDD	Treatment * HDD	-.000164	.000228	-.72
Post_HDD	Post * HDD	.018670	.000464	40.23
Post_Treatment_HDD	Post * Treatment * HDD	-.002950	.000531	-5.56
			R-Square:	.7727

These values were applied to all months 2012 months. The resulting calculations are presented in Table 9-8.

Table 9-8 Home Energy Reports Savings Summary

Month	HDD				Monthly Weather-Sensitive Savings	Monthly Non-Weather Sensitive Savings
	Zone 6	Zone 7	Zone 8	Zone 9		
Total Recipients	0	262	7,050	17,909		
January	537.5	576.1	615.3	745.8	52,644	1,792.5
February	458.6	467.9	504.5	617.9	43,499	1,792.5
March	164.2	146.4	173.7	259.8	17,451	1,792.5
April	123.6	97.7	85.3	164.6	10,546	1,792.5
May	30.9	10.8	15.6	57.5	3,371	1,792.5
June	5.1	2.5	3.8	16.7	963	1,792.5
July	0	0	0	.2	11	1,792.5
August	3.4	.2	.4	7.8	421	1,792.5
September	34.8	16.2	12.8	45.3	2,672	1,792.5
October	234.4	207.5	207.4	321.2	21,443	1,792.5
November	427.6	426.6	413.1	513.7	36,061	1,792.5
December	479.7	530.6	608.6	718.5	51,027	1,792.5
Total:	2499.8	2482.5	2640.5	3469.0	240,107	1,792.5
					Annual Therms	261,674
					Peak Therms	3,921.4

The difference in consumption between the two groups is observable when presented graphically. **Error! Reference source not found.** presents the monthly differences in onsumption between the two groups. Reports were first delivered in November of 2011,

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and at that point the magnitude of difference in consumption spikes. This persists until the end of the heating season, where there is less gas usage for a customer to curtail. The difference is then seen to grow again as the heating season of 2012 sets in.

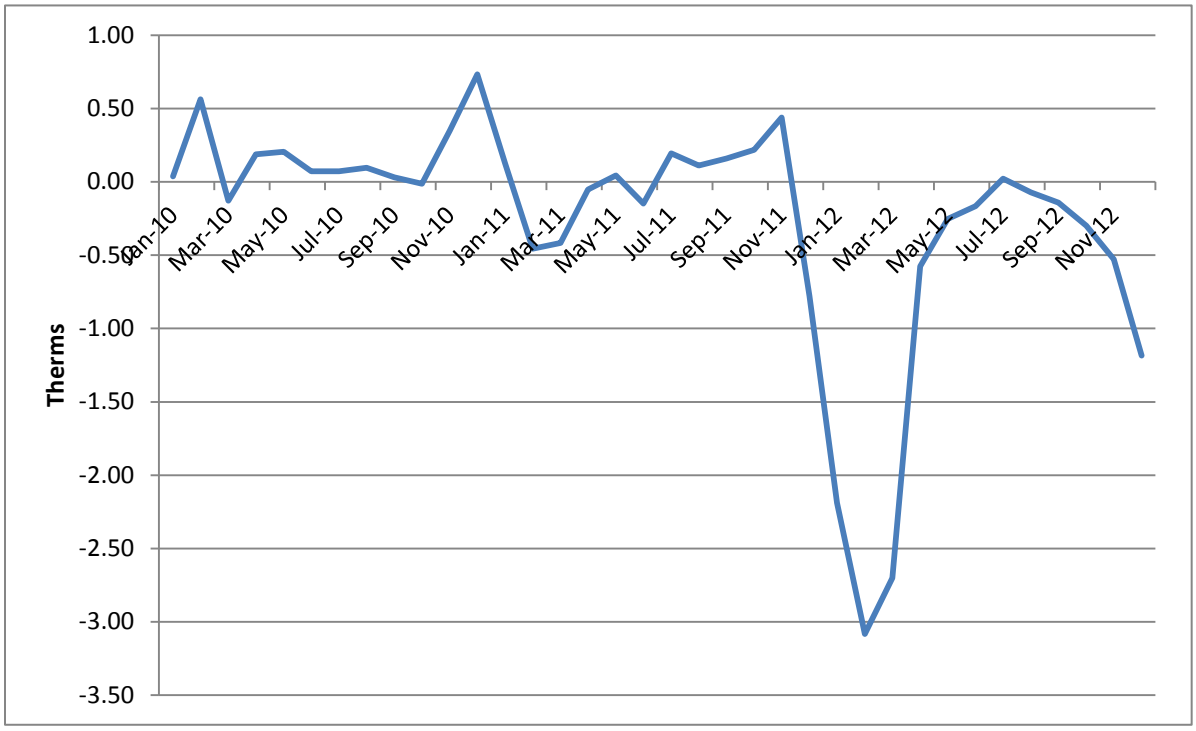

Figure 9-6 Difference in Monthly Consumption between Recipient & Control Group

9.3.6 Double Counting Analysis

Protocol J of the TRM V2.0 specifies double-counting as the difference in savings for all recipients versus all control group members. The evaluators found that this specification overlooked issues of having a larger recipient group than control group. If a program has more recipients than non-recipients in the analysis, then taking the straight sum of savings from other-program-participation would dramatically inflate the double-counting effect. The evaluators addressed this with IEM staff and they concurred that is more appropriate to evaluate double counting on the basis of the difference in per-participant savings. When comparing all of the other-program-participation, the evaluators found:

- .072505 therms per participant for the recipient group; and
- .044338 therms per participant for the control group.

This difference was multiplied by the total participant group to obtain the following double count value:

$$Double\ Count = (.72505 - .044338) \times 24{,}387 = 6{,}869\ Therms$$

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The program savings were discounted by this amount. The difference in savings was attributable to the Water Conservation Kits program. SourceGas included information about this program in one of the Opower messages because program participation was far projections. This induced a spike in participation for this program. The evaluators found that the control group had 10 participants in this program whereas the recipient group had 228.

9.3.7 Verified Savings

With the model output results and double count analysis, the Home Energy Reports Program has:

- 254,805 annual therms savings; and
- 3,906 peak therms.

Per customer, this averages to a 1.061% reduction in annual gas consumption when compared to the annual usage of the control group.

9.4 Conclusions & Recommendations

9.4.1 Conclusions

1. **The Home Energy Reports Program is providing statistically significant behavioral change.** The evaluators identified quantifiable savings at the 95% confidence level for the recipients of Home Energy Reports. When asked to name specific energy conservation behaviors, report recipients displayed statistically significant differences incidence of identifying thermostat setback and reduced gas fireplace usage, and joint significance in the aggregation of hot water conserving behaviors (shortening showers, washing clothes in cold water, etc.).
2. **The program is scalable.** The evaluators found that Wave 2 was also providing statically significant savings, and that their inclusion in the model did not modify the per-customer savings in a meaningful manner. SourceGas can scale the program further if desired, most likely with a 2:1 ratio of added recipients versus control group households.
3. **Customer perception of the usefulness of the report is mixed.** Some survey respondents indicated that they did not find the use in being compared, or did not believe the validity of the comparison. In reviewing narrative answers, there were instances of this being a valid concern (for example, one respondent stated that they have a greenhouse on their property), but by and large it is a matter of respondents not perceiving themselves as higher users.
4. **The report dramatically increases self-awareness of consumption levels.** 26% of control group survey respondents stated that they don't know how their usage compares to other similar homes, compared to 14.7% of recipient survey respondents. 18.0% of recipients perceive themselves as high energy users,

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compared to only 7.7% of control group respondents. Further, 47.3% believe their use is "average", compared to 31.7% of the recipient group. These factors all tested as statistically significant at the 95% confidence level.

5. **The program has only generated extra participation in no-cost programs.** The evaluators found significant participation in the Water Conservation Kit program driven by the Home Energy Report. However programs that require purchase of equipment did not see a significant increase in participation among report recipients.

9.4.2 Recommendations

The Evaluator's recommendations for the Home Energy Reports program are as follows:

1. **When scaling the program, attempt to maintain a 2:1 recipient to control group account ratio.** This was maintained in a Wave 2 expansion by CenterPoint in 2012, and proved viable as a path for expansion. SourceGas should attempt to maintain this ratio should they choose to scale the program. If a second wave of participants is added, ensure that the pre-period contains at least one full year of bills.
2. **Investigate the use of messaging regarding gas fireplaces.** In CenterPoint's Home Energy Reports Program, the evaluators found a statistically significant difference in respondents indicating curtailing the usage of their natural gas fireplace. This was not found in the SourceGas survey respondents (nor was not a message included in the Opower reports), but could be a behavior to encourage. If it is possible to subdivide the message based on housing type, this should be limited to single family homes.

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10. Water Heating & Conservation – Low Flow Kits

The Water Heating & Conservation program combines prescriptive equipment incentives and low flow mailer kits. This chapter will encompass the EM&V of the mailer kit component, which will be referred to as the Water Conservation Program.

The Water Conservation Program provides no-cost mailer kits to SourceGas residential customers. These kits contain:

- One 1.5 gallons per minute (GPM) low flow showerhead, in a chrome finish
- Two 1.0 GPM bathroom aerators
- One 1.5 GPM kitchen aerator (differing from the bathroom aerator in having a swivel head and shutoff valve).

The Water Conservation Program began in 2010. The program is designed to provide no-cost kits containing low flow showerheads and faucet aerators to SourceGas residential customers. These kits are then self-installed. In 2012, the Water Conservation Program provided kits to 392 residential customers. 98 of these were a bulk order by a participating municipal housing authority to be installed in low income housing.

10.1 Water Conservation Program Process Evaluation

The evaluators conducted the process evaluation of the Water Conservation Program with several researchable issues in mind. In addition to the general questions outlined in Section **Error! Reference source not found.** questions addressed by this evaluation ncluded:

- Does the equipment provided in the kits provide adequate performance to induce persistence?
- What specific causes are there for lack of installation or removal of equipment? Can these issues be overcome, or are they intractable issues for this program type?
- Does the no-cost kit serve as an adequate introduction to gas energy efficiency?

10.1.1 Data Collection Activities

The process evaluation of the Water Conservation Program included the following data collection activities:

- *SourceGas Program Staff Interviews*. The evaluators interviewed staff at SourceGas involved in the administration of the Water Conservation Program. These interviews built upon interviews conducted during the 2011 Limited Process Evaluation, in which the evaluators collected initial background information on program history and implementation. These interviews captured

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any operational changes on SourceGas' side, as well as informing the evaluators as to any new developments in the program.

- *Program Marketing Materials Review*. The evaluators collected marketing materials used by the Water Conservation Program. This included customer mailers, audit reports, and a review of the SourceGas program website. This was compared against marketing materials from successful programs run in other territories in informing marketing improvements.
- *Review of Program Quality Control Procedures*. The evaluators reviewed the QC procedures in place for the Water Conservation Program. This included review of processes in place to verify eligibility, along with the invoice review processes in place by SourceGas.
- *Participant Surveying*. The evaluators surveyed a sample of 80 participants in the Water Conservation Program. In addition to their use in providing impact parameters and developing free-ridership and spillover estimates, these surveys informed the process evaluation of the Water Conservation Program. These surveys addressed issues including participant satisfaction with the program offerings, demographics, and other contextual issues regarding the participation process.
- *Non-Participant Surveying.* The evaluators surveyed 300 non-participants as part of a general population survey to address program awareness, interest, and market barriers.

Table 10-1 summarizes the data collection for this process evaluation effort. This includes the titles, role, sample sizes, timeframe of data collection.

Table 10-1 Water Conservation Program Data Collection Summary

Target	Component	Activity	N	Role
SourceGas Program Staff	Manager – Energy Efficiency Programs	Interview	1	Overall administration of SGA DSM programs. This manager is involved in the larger strategic decisions associated with the DSM portfolio, and is involved with the Water Conservation Program in the overall coordination of utility resources.
Program Participants	Residential	Survey	80	This captured a sample of participants to develop estimates of installation and electric water heating rates.
Non-Participants	Residential	Survey	300	The evaluators conducted a general population survey of SGA residential customers to address program awareness, interest, and market barriers.
Marketing & Outreach	Marketing Materials	Literature Review	-	The full scope of paper and electronic marketing materials used in implementation for the program was reviewed by the evaluators.

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Evaluation History	Prior Evaluation Reports	Literature Review	1	Findings from the Limited Process Evaluation conducted in 2011 were reexamined to determine to what extend recommendations were implemented
	Comparative Review	Literature Review	--	Evaluation reports of similar programs conducted elsewhere were examined in order to provide recommendations for improvement based upon lessons learned elsewhere.

10.1.2 Process Evaluation Results & Findings

This section will present the results and key findings from the data collection activities. These findings are based upon interviews with utility staff, implementation staff, surveys with participants, and thorough and in-depth literature review.

10.1.2.1 Program Theory & Design

The Water Conservation Program is meant to provide cost-effective energy saving measures to any interested residential customer. Doing so provides savings for the SourceGas DSM portfolio as well as an introduction to energy efficiency for customers that may otherwise not begin to participate in energy efficiency programs.

By engaging in these activities, the program is to generate transactions that would not occur without program intervention. The intention is that program participations may investigate further energy-conserving behaviors.

10.1.2.2 Program Administration

The Water Conservation Kit program overseen by SourceGas' Manager of Energy Efficiency. This staff member provides oversight to program operations and handles program marketing efforts. The kits themselves are assembled and delivered by staff at Niagara Water Conservation Company.

Kit orders are received by SourceGas staff who then forwards them along to Niagara. Niagara verifies program eligibility, ensuring that:

(1) The customer is an active SourceGas residential account; and

(2) The customer has not already received a kit at that address.

10.1.2.3 Program Implementation & Delivery

The Water Conservation Program provides no-cost direct-install kits to SourceGas residential customers. The participation process is as follows:

- *Application Submittal*. Applications are submitted via mail or through an online portal accessible through SourceGas' website.
- *Application Review*. Staff at Niagara verifies that the account number is served by SourceGas and assembles the kit. SourceGas cannot distinguish whether a

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customer has electric or gas water heating; some minority of customers have a gas account (for space heating and/or appliances) but electric water heating.

- *Kit Assembly & Delivery*. Kits are assembled according to specifications on the application. Further, the kits contain SourceGas program marketing materials, Teflon tape, and installation instructions. The kits are delivered 6-8 weeks after receipt of a valid application

10.1.2.4 Program Marketing & Outreach Efforts

SourceGas has two primary channels for program marketing:

- **Bill Inserts.** SourceGas mails bill inserts to residential customers that contain program information.
- **Internet Marketing.** Alternatively, customers can sign up for the program through a web portal on the SourceGas website. The application process is analogous to the postcard process with the same quality control procedures.

In 2012, SourceGas had attempted to restrict the ordering system to be online-only. Based on the drivers of participation in AOG's territory nearby, the evaluators concluded that this restricted participation. SourceGas should consider including a pre-paid postcard in the bill insert that lets a customer order a kit.

10.1.2.5 Tracking Data Review

The evaluators found that the tracking data provided for this program contained almost all needed information to calculate savings and conduct surveying. The only component missing was weather zone, which was added via a lookup table.

10.1.2.6 QA/QC Procedure Review

Applications are reviewed by staff at Niagara to verify that the customer is an active residential account that has not yet participated in the program. The kits are then assembled and delivered after eligibility is verified. Though the evaluators found no instances of kits being delivered to ineligible accounts, 6.7% of survey respondents indicated not receiving all items listed in the kit. As such, it was concluded that the QA/QC procedures in place at the point of kit assembly may need to be reexamined to ensure that all applicants receive the appropriate kit contents.

10.1.3 Participant Survey Response

The evaluators completed 80 surveys with residential program participants in the Water Conservation Program. The survey addressed a variety of impact and process-related issues, including program awareness, reasons for participation, free-ridership and spillover, and program satisfaction. Further, the evaluators collected demographic information on the respondents during the survey. The respondent demographics are summarized in Figure 10-1 through Figure 10-3.

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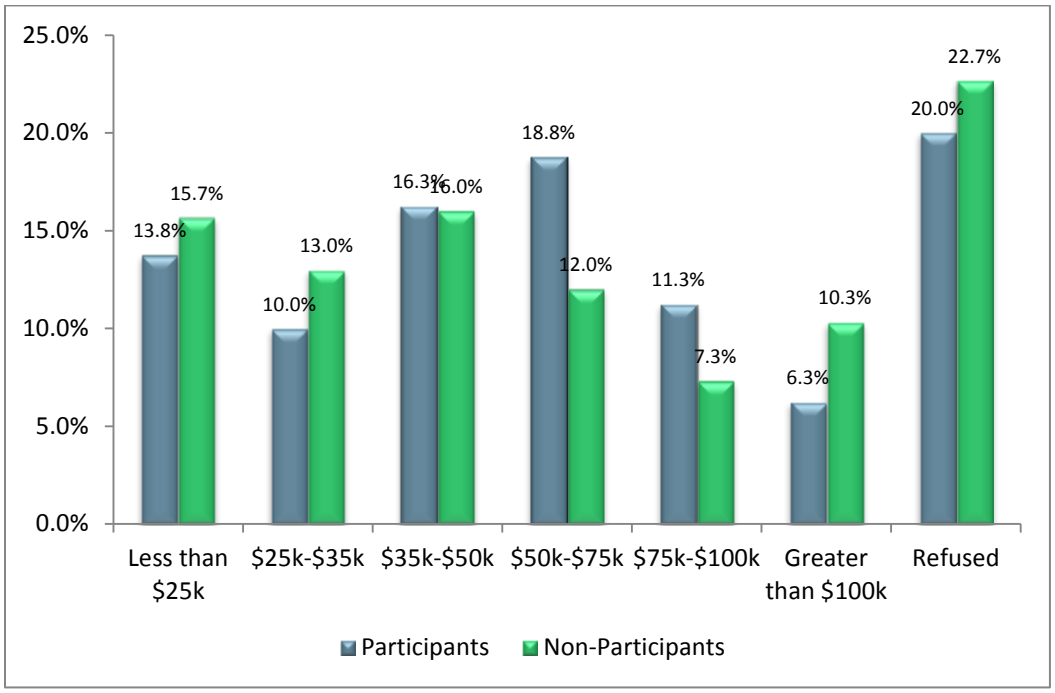

Figure 10-1 Differences in Income between Participants and Non-Participants

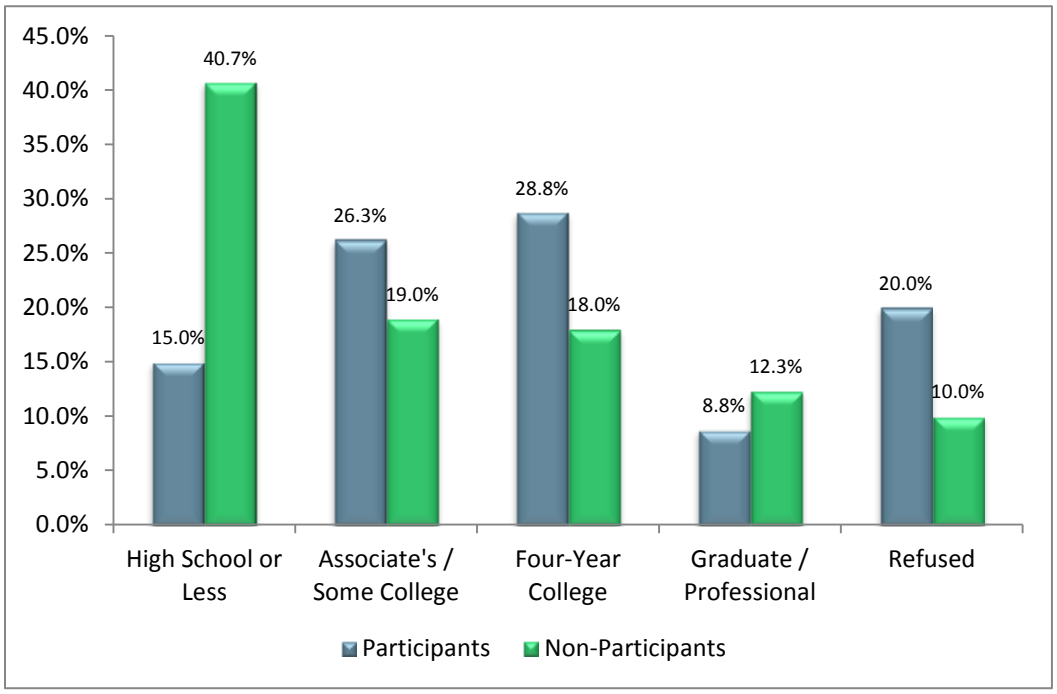

Figure 10-2 Differences in Education between Participants and Non-Participants

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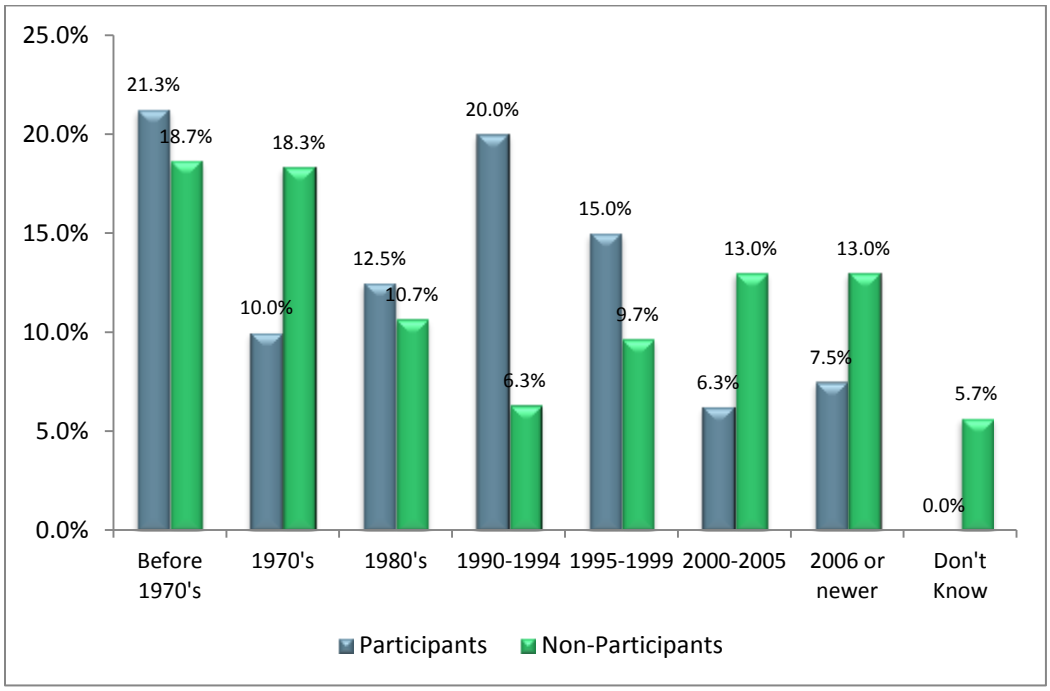

Figure 10-3 Differences in Housing Age between Participants & Non-Participants

Additionally, based on a review of program tracking data, the evaluators found that 3.8% of participants live in multifamily housing, with 96.2% living in single family housing. From survey responses, the evaluators found that 88% of participants own the residence that received the kit. The evaluators found that the typical participant has a higher education level (significant at the 90% level) but a similar income level as non-participants. This contrasts with the mix of participants observed in AOG's and CenterPoint's programs, where the income level of participants is significantly lower on average than non-participants. The evaluators conclude from this that the program marketing efforts are not reaching the target audience that is most likely to participate. This may be attributable to the program's reliance on internet marketing rather than direct mail, which was used heavily by AOG and CenterPoint in inducing participation among lower income households that do not as often participate in DSM programs.

10.1.3.1 Program Awareness

SourceGas' marketing of the Water Conservation Program is driven through multiple channels, including both customer-direct outreach and marketing through contractors. Fifty-five percent of residential respondents surveyed indicated having learned of the program from SourceGas bill inserts. Other commonly indicated sources of program awareness included word of mouth from friends and relatives (9%), SourceGas brochures (9%), and from information in the mail (6%). The sources of awareness for the Water Conservation Program are summarized in Table 10-2.

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Table 10-2 Water Conservation Program Sources of Program Awareness

Source of Awareness	***% Indicated***
Newspaper or magazine article/ad	3%
Word of mouth/friends & relatives	9%
TV ad	1%
Radio ad	1%
SourceGas bill insert	55%
SourceGas website	3%
SourceGas brochure	9%
Mail	7%
Contractor	2%
Don't Know	7%
Other	3%
N	80

Most participants learned of the program through bill inserts developed by SourceGas marketing staff. These bill inserts were often included with the Home Energy Report sent to 25,000 SourceGas customers. Overall, 79% of respondents indicated having learned of the program through a SourceGas marketing channel, including TV ads, print ads, and direct emails from SourceGas.

When interviewing residential non-participants, the evaluators found that 3.33% of non-participating residential customers were aware of the Water Conservation Program, with roughly equal distribution in awareness across SourceGas' three districts.

10.1.3.2 Reasons for Participation

Respondents were asked a series of questions addressing their reasons for participating in the program. Figure 10-4 summarizes the reasons given by residential survey respondents. The respondents were asked an open-ended question where they would list their reasons for participation, with the interviewers logging each reason indicated. The most common reasons indicated were saving on the gas bill, because participation is good for the environment, and saving money on the electric bill. Items listed under "other" initially included the "To try the program" and "To conserve water", but enough respondents indicated these answers that the evaluators opted to recode these entries.

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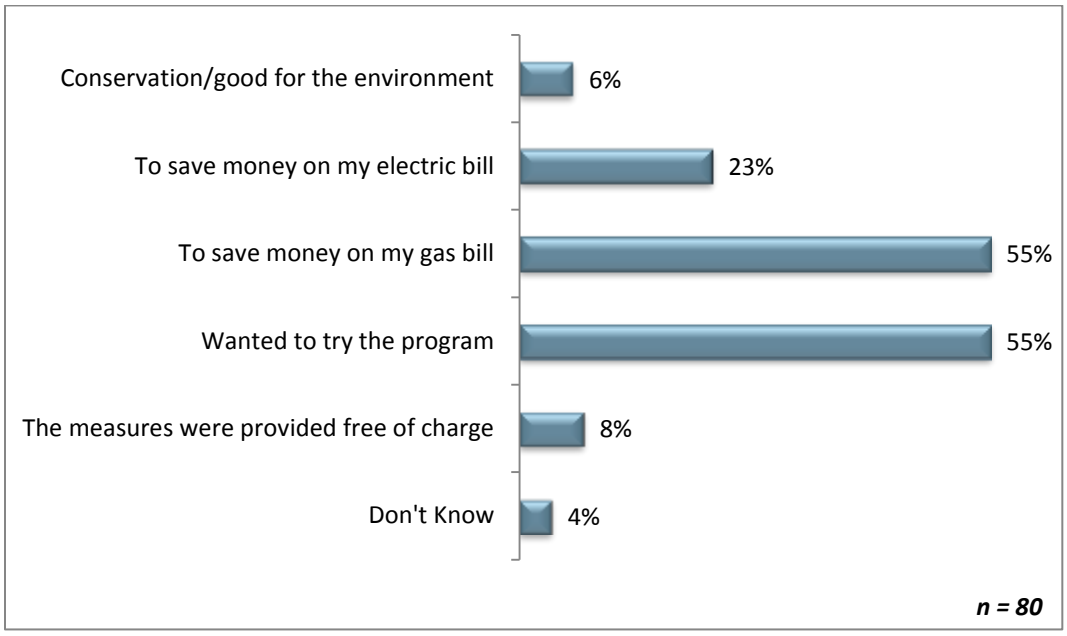

Figure 10-4 Water Conservation Program Reasons for Participating

10.1.3.3 Measure Use & Retention

Respondents were also asked questions related to their use of the items received in the kit. This included collection of data for installation rate and reasons for lack of installation.

Low Flow Showerheads

All customers received one chrome 1.5 GPM low flow showerhead. The evaluators found an installation arte of 75% for this equipment. Respondents that did not install the showerhead were asked two separate questions:

1) What were the reasons for not installing the showerhead at all?
2) What were the reasons for removing a showerhead after installation?

Responses to these questions are summarized in Figure 10-5.

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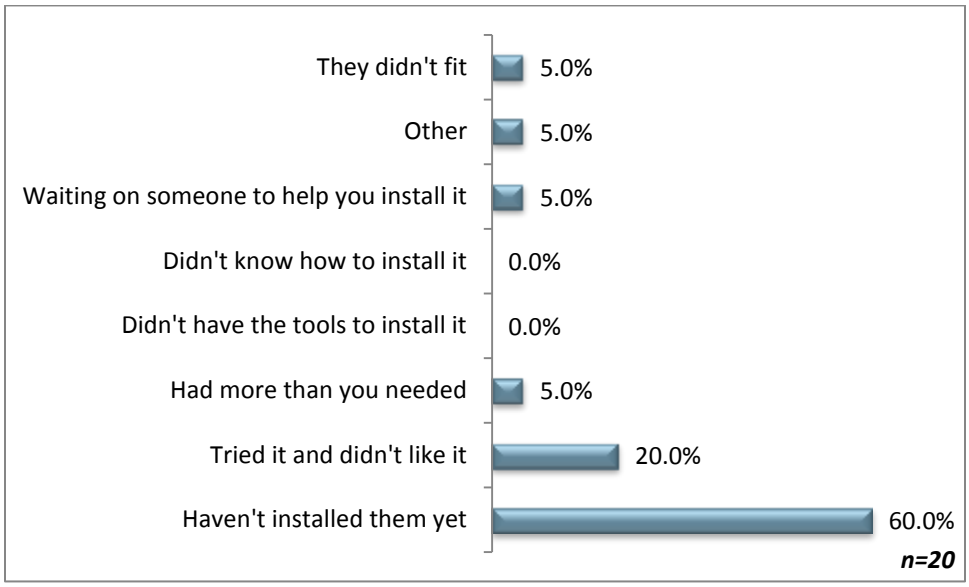

Figure 10-5 Reasons for Not Installing Low Flow Showerheads

Six respondents stated that they also removed a showerhead because of leakage. An additional three stated that they installed a showerhead but removed it due to insufficient flow.

Faucet Aerators

Fifty-eight percent of respondents installed the kitchen aerator included in the kit. Of the two bathroom aerators distributed with each kit, a total of 40% were installed.

As with low flow showerheads, customers that received faucet aerators were asked their reasons for not installing and for removing installed aerators. These are summarized in Figure 10-6 and **Error! Reference source not found.**.

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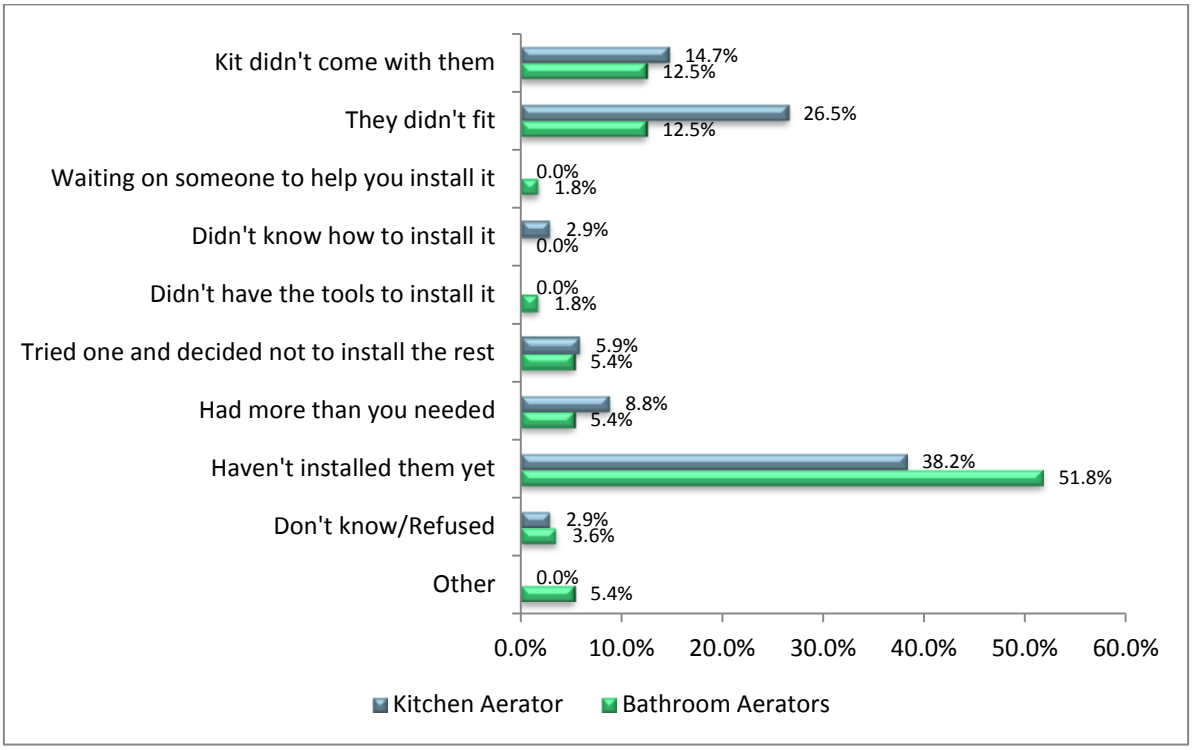

Figure 10-6 Reasons for Not Installing Faucet Aerators

Additionally, some participants removed units they had installed. This included:

Kitchen Aerators:

- Three respondents stating that the unit failed. This was typically due to hard-water buildup.
- Three participants removed the kitchen aerator due to insufficient flow.

Bathroom Aerators:

- One respondent stating that the unit failed due to hard-water buildup.
- Three participants removed the bathroom aerator due to insufficient flow.

10.1.3.4 Satisfaction with Equipment

Further, the evaluators asked participants to rate their satisfaction with the equipment included in the kit. The satisfaction scores by component are presented in Table 10-3.

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Table 10-3 Satisfaction Levels with Kit Equipment

Element of Program Experience	Low Flow Showerheads	Kitchen Aerators	Bathroom Aerators
Appearance of the equipment	4.47	4.50	4.70
Amount of flow	4.02	4.20	4.53
Ability to adjust the spray	3.94	3.97	3.93
Ease of Installation	4.74	4.80	4.79
The way it works compared to the old one	4.14	4.28	4.53
N	60	46	40

10.1.3.5 Issues in Measure Installation & Retention

What is most telling in Figure 10-5 and Figure 10-6 is the extent to which lack of installation is attributed to lack of follow-through on the part of the respondents. Overall, 60% of respondents that did not install all of their showerheads and 55.4% that did not install aerators indicated that they either "Don't Know" why they have not or that they just "Haven't gotten around to it". This would imply that perhaps automated email reminders to customers to install their showerheads and aerators may be helpful in increasing the overall installation rate. This would need to be limited so as to not negatively affect customer sentiment towards the program, but one reminder timed to occur 6-8 weeks after receiving the kit could possibly help in this while mitigating the risk of aggravating participants. Based on the survey results, the evaluators did find that the installation materials provided with the kit are sufficient, as not a single respondent indicated failure to install being due to a lack of tools or instructions.

Some of the respondents that indicated having removed a showerhead or aerator after installing gave reasons that are likely insurmountable. All showerhead and aerator removals and were attributable directly to performance-related issues (insufficient flow or spray, equipment failure, etc.). Reasons offered under "Other" included a desire for a wider showerhead or equipment leaking when shut off. During interviews with program implementation staff, it was revealed that some performance issues are due to the model of kitchen aerator used in this kit having a shut-off valve. This valve allows the user to shut off the flow while retaining a build-up of hot water; this may allow the user to cut off water while washing dishes, but still have hot water available when they need to rinse their next dish. The program indicated that this is often a little-used feature in kitchen aerator applications, but that the addition of this shut-off valve increases the rate of equipment failure. As such, SourceGas may want to consider a 1.5 GPM kitchen aerator that does not have a shut-off valve.

Further, the evaluators found several problems in kit quality assurance. 14.7% of respondents stated that their kit did not include a kitchen aerator and 12.5% stated that it did not come with a faucet aerator. There is the possibility that these were lost by the

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participants. However, given the high number of respondents indicating this issue, SourceGas should investigate the QA/QC procedures in place at Niagara and ensure that the kits are including all intended equipment.

10.1.3.6 Free-Ridership

Free-ridership estimates for residential participants in the Water Conservation Program were developed through scoring of the survey respondents. This section will detail the questions and answers from the participant survey that contributed to the participant response portion of the program free-rider scoring.

The contributing questions are divided into three subcategories:

Inducement to Install:

Q-9 [If Q-2a > 0 else Q-10] Would you have installed the low flow showerheads without the kit?

- ❑ Yes [ASK Q-9a]
- ❑ No [SKIP TO Q-10]

Q-9a How soon would you have installed the low flow showerheads?

- ❑ Less than 6 months
- ❑ 6-12 months
- ❑ 1-2 years
- ❑ More than 2 years
- ❑ Never

A variant of this question is also asked for faucet aerators. Fifty-seven of respondents indicated that they would not install low flow showerheads in the absence of the program.

Table 10-4 Stated Intent to Install Without Program

Measure	Low Flow Showerheads	Faucet Aerators
Yes	30.0%	22.4%
No	58.3%	69.0%
Don't Know	11.7%	8.6%
n	60	58

For those that indicate they would install without the program, they are then asked when such an installation would occur. Table 10-5 tabulates the timing results.

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Table 10-5 Timing of Installation in the Absence of the Program

Measure	***Low Flow Showerheads***	***Faucet Aerators***
< 6 months	38.9%	30.8%
6-12 months	38.9%	23.1%
1-2 years	5.6%	15.4%
More than 2 years	-	0%
Never	-	7.7%
Don't Know	16.7%	23.1%
n	18	13

By and large, the Water Conservation Program does not significantly move up the timeline of installation for participants. This is intuitive in that the equipment distributed through the program is relatively low-cost. As such, in most instances the program either induces a transaction that would not have otherwise occurred (no free-ridership at all) or process a transaction that was soon to occur (full-free-ridership); there are few instances of the program moving up the timeline of an otherwise deferred transaction.

Q-11 Before you received the kit did you have low flow showerheads or faucet aerators in your home?

- ❑ Yes [SKIP TO Q-12]
- ❑ No [ASK Q-11a]
- ❑ Other: ___

Q-11a Would you have been financially able to install low flow showerheads or faucet aerators without SourceGas' program?

- ❑ Yes
- ❑ No
- ❑ Other: ___

The financial ability of program participants is assessed by first asking whether they had any pre-existing aerators or low flow showerheads in their home. If they have pre-existing equipment, they are presumed to have been financially able to purchase the program equipment. If they do not have pre-existing equipment, they are then asked if they would have been able to do so. Twenty-five percent of participants already had some low flow equipment in their home. Of those that had no pre-existing equipment, 47.4% indicated that they would have been financially able to purchase the low flow equipment without the program. Forty-two percent indicated that they would not have been and 10.5% stated that they "don't know" if they would have been financially able.

The results of these questions are combined in determining a free-rider score for each survey respondent. Based upon their answers, the respondent is scored with 100% or 0% net-to-gross. The mean value of all respondents is then propagated to the program as a whole. The scoring framework is presented in Figure 10-7.

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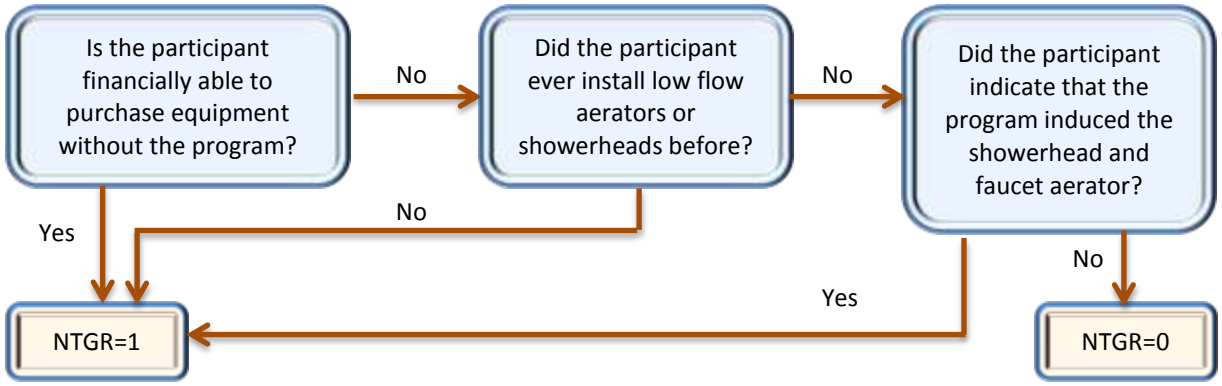

Figure 10-7 Low Flow Kit Free-Rider Scoring

Based on this scoring, the water conservation kit has a free-ridership score of 5.25%.

10.1.3.7 Participant Spillover

The residential participant survey addressed participant spillover. This was done through a battery of questions designed to:

1) Assess the behaviors taken by customers after their program participation where they installed energy efficient equipment; and
2) Get the respondent's self-reported value for how important they felt information from SourceGas was in inducing this non-incentivized behavior.

Of the 80 respondents, 16 indicated having implemented energy efficient technologies for which they did not receive an incentive. These respondents were then asked to rate on a scale of 1-10 how important the information from SourceGas was in influencing their decision to purchase this equipment. If the respondent rated information from SourceGas at 6 or higher, the savings associated with their installation were attributed to the program. Table 10-6 summarizes the savings from attributable spillover activities.

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Table 10-6 Water Conservation Kits Participant Spillover Summary

Measures	Number Installed	Number with Attribution Score > 5	Attributable Therms	Attributable kWh	Attributable kW
High efficiency gas storage tank water heater	3	2	18	0	0
Ceiling Insulation	1	0	0	0	0
High Efficiency Central AC	3	0	0	0	0
High Efficiency Refrigerator	2	0	0	0	0
Furnace	3	1	124	0	0
High Efficiency Dishwasher	3	0	0	0	0
High Efficiency Clothes Washer	2	0	0	0	0
High Efficiency Clothes Dryer	1	0	0	0	0
CFLs	3	0	0	0	0
Total	82	19	0	0	0
Per-Customer:			1.775	0	0

The spillover savings is focused in two categories: high efficiency water heaters and high efficiency furnaces. As found in other SourceGas programs, spillover from high efficiency water heater installation is again indicative of a lack of program awareness for water heating incentives. Based upon the analysis of survey responses, the evaluators determined per-participant spillover levels of 1.775 Therms.

10.1.3.8 Program Satisfaction

Participants were asked to rate their satisfaction on a scale of 1-5, with 1 meaning "Very Dissatisfied" and 5 meaning "Very Satisfied" on a range of items related to their program experience. Table 10-7 tabulates the satisfaction results.

Table 10-7 Water Conservation Program Satisfaction Levels

Element of Program Experience	Very Satisfied	Somewhat Satisfied	Neither Satisfied or Dissatisfied	Somewhat Dissatisfied	Very Dissatisfied	Don't Know	Mean Score
Wait time to receive the low flow showerheads and aerators	56.3%	15.0%	18.8%	5.0%	0%	50%	4.29
The effort required for the program application process	68.8%	17.5%	12.5%	0%	0%	1.3%	4.57
Savings on your monthly bill	30.0%	26.3%	27.5%	2.5%	3.8%	10.0%	3.85
Customer service from SourceGas staff	56.3%	16.3%	12.5%	0%	1.3%	13.8%	4.46
Overall program experience	61.3%	25.0%	12.5%	0%	1.3%	0%	4.45
n=100							

Overall satisfaction with the Water Conservation Program is high. Respondents indicated particularly high satisfaction with the service provided by SourceGas staff and

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the ease of the application process. Satisfaction was slightly lower, though still rather high, on wait times to receive the kit. Normal kit processing timeframes are 6-8 weeks. If SourceGas can refine their internal processes to the point where more expedited waiting periods are possible, this would help in two ways:

1) Customers would likely install a higher amount of equipment. Delays in kit processing may break the momentum of participant enthusiasm that develops when a customer signs up for the program. If the wait period is inordinately long, the customer may not have the same excitement for conservation.
2) Customer satisfaction with this aspect of the program and the program as a whole would increase.

Savings on monthly bills received the lowest satisfaction score of any element of program experience, with a mean score of 3.85. However 10.0% of respondents indicated that they "don't know" how satisfied they are with the savings they've observed from using low flow showerheads and faucet aerators, and 27.5% are "neither satisfied or dissatisfied"; only 6.3% overall indicated some degree of dissatisfaction with the savings they observed as a result of their participation. Savings from equipment such as low flow showerheads and faucet aerators are highly cost-effective, but the individual savings observed by a participant may not be readily visible in their bills; the savings are low relatively to overall household usage, particularly if the customer has gas appliances.

10.2 Water Conservation Kits Impact Evaluation

The impact evaluation effort of the Water Conservation Program included:

- *Telephone Verification*. The evaluators conducted telephone surveys with 80 program participants to establish impact evaluation parameters, including installation rates and water heater fuel type.
- *Free-Ridership Estimation.* Free-Ridership Rates were developed using detailed participant surveys, addressing the decision-making process to participate in the program. Topics contributing to the free-ridership analysis included evaluating the extent to which the program educated customers about new energy-saving opportunities and whether they had ever installed similar equipment, culminating in a determination of whether the participant would have installed the same or similar equipment within one year in the absence of the program.
- *Spillover Estimation.* Spillover was addressed for the program participants. Participants were surveyed for free ridership and process evaluation, and over the course of that survey are asked a series of questions addressing whether the program induced them to install other energy efficient equipment without program incentive. Additionally, the evaluators asked these customers for an estimate of savings that they expect from these measures

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10.2.1 Energy Savings Calculations

10.2.1.1 Faucet Aerators

Savings from the faucet aerators are based upon TRM V2.0 values. Savings for Faucet Aerators are calculated as follows[35]:

$$Energy\ Savings = \frac{\rho \times C_P \times V \times \left(T_{SetPoint} - T_{Supply}\right) \times \left(\frac{1}{EF}\right)}{Conversion\ Factor}$$

Where:

ρ = Water density, 8.33 lbs./gal.

C_P = Specific heat of water, 1 BTU/lb·°F

V = DHW gallons saved / yr. / faucet

V = gallons of hot water saved per year per faucet = $533 \times (2.2 - gpm)$ where gpm is the flow rate of the new aerator.

$T_{SetPoint}$ = Water heater set point (default value 120°F)[36]

T_{Supply} = Average supply water temperature (Water Main Temperature from Table 10-9)

EF = Energy factor of water heater, excluding standby losses (.95 electric / 0.7 Gas).

$Conversion\ Factor$ = 3,412 BTU/kWh for electric water heating or 100,000 BTU/Therm for gas water heating.

Table 10-8 Faucet Aerator Volume of Use

Parameter	Value
Faucet use gallons/person/day (baseline)	9.7
Faucet use gallons/person/day (1.5 GPM)	8.2
Faucet use gallons/person/day (1.0 GPM)	7.2
Occupants per home	2.69
Faucets per home	3.86
Gal./yr./faucet (Baseline)	2,467
Gal./yr./faucet (1.5 GPM)	2,094
Gal./yr./faucet (1.0 GPM)	1,828
% Hot water (pre)	69%
% Hot water (post)	64.8%
DHW gallons saved/yr./faucet for 1.5 GPM (V)	373
DHW gallons saved/yr./faucet for 1.5 GPM (V)	639

[35] Arkansas TRM V2.0, Volume 2. Pg. 87-91

[36] Note that the temperature of the water at faucet is likely to be lower, due to thermal losses in the water pipe system within the home, and tempering of the water temperature by the user.

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Table 10-9 Water Main Temperatures by Weather Zone

Measure	Fayetteville (Zone 9)	Fort Smith (Zone 8)	Little Rock (Zone 7)	El Dorado (Zone 6)
1.5 GPM Aerator Annual	65.6 °F	66.1 °F	67.8 °F	70.1 °F

The resulting savings per unit are summarized in Table 10-10[37].

Table 10-10 Residential Aerator Gas Savings Values

Measure	Savings	Fayetteville (Zone 9)	Fort Smith (Zone 8)	Little Rock (Zone 7)	El Dorado (Zone 6)
1.5 GPM Aerator	Annual	2.42	2.39	2.32	2.22
	Peak	.0081	.0080	.0077	.0074
1.0 GPM Aerator	Annual	4.14	4.10	3.97	3.80
	Peak	.0138	.0137	.0133	.0127

10.2.1.2 Low Flow Showerheads

Savings for low flow showerheads are detailed in Section 2.24 of the TRM Version 2.0. They are calculated in the same manner as faucet aerators, differing only in the volume of use estimates[38].

Table 10-11 Showerhead Volume of Use

Parameter	Value
Average Shower Duration (minutes)	8.3
Gallons/shower @ 2.5 GPM (baseline	20.7
Gallons/shower @ 2.0 GPM	16.5
Gallons/shower @ 1.5 GPM	12.4
Showers/person/day (baseline)	.69
Showers/person/day(post)	.72
Occupants per home	2.69
Showers/home/day (baseline)	1.88
Showers/home/day(post)	1.93
Showerheads per home	1.62
Showers per showerhead per day (baseline)	1.16
Showers per showerhead per day (post)	1.19
Gal./yr./showerhead @ 2.5 GPM (baseline)	8,763
Gal./yr./showerhead @ 2.0 GPM	7,186
Gal./yr./showerhead @ 1.5 GPM	5,390
% Hot water	73.7%
2.0 GPM showerhead DHW gallons saved/yr. (V)	1,162
1.5 GPM showerhead DHW gallons saved/yr. (V)	2,486

[37] Arkansas TRM V2.0, Volume 2. Pg. 87-91

[38] Arkansas TRM V2.0, Volume 2. Pg. 92-103

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The resulting savings for low flow showerheads are summarized in Table 10-12[39].

Table 10-12 Residential Showerhead Gas Savings Values

Measure	Savings	Fayetteville (Zone 9)	Fort Smith (Zone 8)	Little Rock (Zone 7)	El Dorado (Zone 6)
2.0 GPM Showerhead	Annual	7.52	7.45	7.22	6.90
	Peak	.0251	.0249	.0241	.0231
1.5 GPM Showerhead	Annual	16.09	15.95	15.44	14.76
	Peak	.0538	.0533	.0516	.0493

In addition, to account for the customers with electric water heating, the evaluators incorporated the TRM V2.0 values for low flow showerheads and faucet aerators. These values are presented in Table 10-13 and Table 10-14. Overall, 15% of customers were found to have electric water heating.

Table 10-13 Residential Faucet Aerator Electric Savings Values

Measure	Savings	Fayetteville (Zone 9)	Fort Smith (Zone 8)	Little Rock (Zone 7)	El Dorado (Zone 6)
1.5 GPM Aerator	Annual	52.2	51.7	50.1	47.9
	Peak	.0066	.0066	.0063	.0061
1.0 GPM Aerator	Annual	89.4	88.6	85.8	82.0
	Peak	.0114	.0113	.0109	.0104

Table 10-14 Residential Showered Electric Savings Values

Measure	Savings	Fayetteville (Zone 9)	Fort Smith (Zone 8)	Little Rock (Zone 7)	El Dorado (Zone 6)
2.0 GPM Showerhead	Annual	162.5	161.0	155.9	149.0
	Peak	.0206	.0204	.0198	.0189
1.5 GPM Showerhead	Annual	347.6	344.4	333.5	318.8
	Peak	.0441	.0437	.0424	.0405

10.3 Verified Savings

Table 10-15 summarizes the total gross and net savings for the Water Conservation Program.

Table 10-15 Water Conservation Program Verified Gross Therms Savings

Measure	Expected Therms Savings	Verified Therms Savings	Gross Realization Rate	EUL	Lifetime Therms Savings	Peak Therms
Showerheads	6,285	4,007	63.8%	10	40,070	13.39
Kitchen Aerators	944	461	48.9%	10	4,610	1.54
Bathroom Aerators	3,233	1,099	34.0%	10	10,990	3.67
Total Gross Savings	10,463	5,568	53.2%		55,670	18.61

[39] Ibid.

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Net savings for the Water Conservation Program were calculated using residential free-ridership and the addition of calculated spillover savings. The resulting net savings are presented in Table 10-16.

Table 10-16 Water Conservation Program Net Savings Summary

Measure	Free-Ridership Rate		Net Annual Savings		Net Realization Rate	EUL	Net Lifetime Therms Savings	Net Peak Therms
	Ex Ante	Ex Post	Ex Ante	Ex Post				
Kit Savings	20%	5.25%	8,370	5,275	63.0%	10	55,675	17.63
Spillover:	-	-	-	696	-	10	7,654	18.37
Overall:	20%	5.25%	8,370	5,971	71.3%	-	60,406	36.00

10.4 Conclusions & Program Recommendations

10.4.1 Conclusions

The evaluators have found that:

1. **Satisfaction with the program operation is very high.** Satisfaction with the program operation includes customers' interactions with SourceGas, satisfaction with wait times, savings realized from program participation, and ease of the application process. Participants found the process to be very straightforward, with most participants facing little difficulty in completing the documentation needed to participate.
2. **The kit is not matching the needs of a large number of participants.** SourceGas offers a fixed kit to all participants. This has resulted in many customers being mismatched in terms of equipment quantities and their available showerheads or faucets. Respondents indicated having an average of 2.03 showers per home, with 88.75% having more than one shower. Sending only one showerhead to all homes represents a lost opportunity for savings.
3. **Kit processing times could be expedited.** Fifty-six percent of survey respondents indicated being "Very Satisfied" with the wait time to receive the kit. Though satisfaction with this element of the program experience is still high, it was lower than other operational elements of the program. Generally, kits are delivered 6-8 weeks after receipt of the application. Many similar programs turn around kits in 4-6 weeks.
4. **Some kits may suffer from quality control issues.** 6.3% of participants overall indicated that either a kitchen aerator or bathroom aerator was missing from their kit. The evaluators do not know if this is an issue of participants losing items from the kit or if there are quality control issues at the kit assembler.

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5. **Many participating customers do not observe visible reduction in their bills as a result of program participation.** Thirty percent of participants were "very satisfied" with the savings observed on their bill as a result of participating, with an additional 26.3% indicating that they are "somewhat satisfied". Many respondents were either "neither satisfied nor dissatisfied" (7.52%) or stated that they "don't know" (10.0%) how satisfied they are. The monthly therms savings from the items included in the kit are sizable and highly cost-effective at the program-level, but when a customer views their bill they may be disguised in part by month-to-month fluctuations in their gas usage.
6. **Most instances of participants failing to install are seemingly the result of procrastination or inertia.** Sixty percent of respondents that did not install all showerheads that they received and 55.4% of those that did not install all faucet aerators they received indicated that either "haven't gotten around to it" or "don't know" why they have not yet installed the equipment.
7. **The outreach methods are not capturing the target market.** SourceGas limited application to online-only for most of the program year. This does not capture a large share of the types of participants seen in other similar programs run in Arkansas. Participation in the Water Conservation Program was significantly lower than see by other gas utilities. AOG, with a smaller service territory, achieved six times the participation level of SourceGas.
8. **The Water Conservation Program is largely inducing transactions that would not occur outside of the program.** The free-ridership rate for this program is markedly low. The program is inducing transactions that would not occur otherwise. There are few instances of deferred free-ridership; largely, participants indicate that in the absence of the program, they would not have installed low flow equipment at all, as opposed to delaying or deferring installation. This is intuitive given the relatively low cost of the equipment included in the kits.
9. **The Water Conservation Program provides a cost-effective introduction to energy efficiency to SourceGas residential customers.** As evident from the participant spillover, many participants in the program go on to install other energy efficiency improvements. 53.75% of respondents indicated installing other gas-saving measures after participating, which they attributed to information provided by SourceGas.

10.4.2 Recommendations

The evaluators' recommendations for the Water Conservation Program are as follows:

1. **Replace the kitchen aerator with a model that does not have a shut-off valve.** Based upon feedback from survey respondents, the evaluators found that there is little interest in or use of the shut-off feature of the kitchen aerator.

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Based upon interviews with the kit processing staff and secondary research, the evaluators found that this feature causes an increased failure rate, resulting in equipment removal on the part of program participants. Seven percent of respondents indicated having removed a kitchen aerator; of those, half indicated that they did so because of equipment failure.

2. **Modify the kit content.** The evaluators concluded that the kit is not meeting the needs of SourceGas customers in full. There are one of two suggestions the evaluators can make in this regard:

    a. **Kit customization.** CenterPoint's program in Arkansas allows participants to customize their kit with a selection of aerators and showerheads, receiving between 0-3 of each item. The evaluators found in that program that participants tend not to over-order, and the customization mitigates issues surrounding low installation rates.

    b. **Increased showerhead quantity.** If SourceGas does not want to move towards kit customization, then the evaluators would suggest adding a second showerhead to the kit. Eighty-nine percent of survey respondents had at least two showers in their home. AOG's program offers two showerheads and had an in-service rate of 52.1% (compared to SourceGas' 75%). This would represent a net-gain to the program in providing cost-effective savings.

3. **Send email reminders to participating customers.** The evaluators found that a large share of the failures to install is attributable to customers forgetting or procrastinating on installation. SourceGas could attempt to mitigate this issue by sending email reminders to kit recipients. With how much of their participation is online, SourceGas has email addresses for most participants. These participants could be sent an email that could remind them to install. The tone of the email does not need to be accusatorial (i.e., "Please install the items sent"); a message thanking the customer for participating could serve to remind them that they still may have items that they intend to install but have forgotten about. These messages could be timed 6-8 weeks after kit delivery, giving the customers adequate time to self-install before receiving a reminder.

4. **Deliver pre-paid post cards in bill inserts to induce participation.** The online-only application restricted participation levels in 2012. SourceGas should include a pre-paid postcard that a customer can fill out and return in the bill insert marketing. AOG had high success with this approach, with the postcards accounting for over 80% of their participation.

5. **Review the kit assembler's QC procedures.** The evaluators found that 6.7% of respondents indicated not having received all the items listed as included with the kit. It should be investigated further to determine if this is a problem at the kit assembly.

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6. **Develop a cross-fuel agreement with SWEPCO.** SourceGas has the most overlap with SWEPCO out of any of the electric utilities. They should examine the possibility of joint program implementation for the mailer kits. In this framework, SWEPCO could take credit for the kWh and kW savings from the program and pay a pro-rated share of costs to SourceGas. Further, this would allow for the expansion of the kits to include low-cost electric savings measures (CFLs, smart strips, etc.), allowing for greater cost-effectiveness of the program. Barring this, SourceGas could instead attempt to filter electric water heating customers in the application process.

The issues and recommendations are summarized in Table 10-17.

Table 10-17 Water Conservation Kits Summary of Issues & Recommendations

Issue	***Consequences***	***Recommendation***	***Basis for Recommendation***
Lengthy processing times for kits, often 6-8 weeks	Reduced participant satisfaction. Loss of enthusiasm for energy efficiency from program participants	Examine whether kit times can be expedited	Comparison of kit processing times from other evaluations
Some customers experienced equipment failures	Lost savings from removed/failed equipment. May reduce chances of further program participation.	Replace kitchen aerator with a model that does not have a shut-off valve.	Interviews with program implementation staff. Secondary research of failure rate.
Lack of cross-fuel coordination.	Reduced program TRC due to inefficient allocation of costs	Develop processes with SWEPCO to receive pro-rated payment based on evaluated findings of electric water heating rate. Work with program implementation staff in coordinating with the electric utilities to add CFLs to mailer kits.	Interviews with various implementation contractors indicating this as a common practice.
Some participants forget to install or procrastinate on installing distributed equipment	Reduced savings and cost-effectiveness	Develop an automated system to send thank-you emails to participating customers 6-8 weeks after receiving the kit, in order to remind the customer of their program participation.	Survey responses indicating that most customers “don’t know” why they did not install, or “haven’t gotten around to it”.
Kits are sometimes mismatched to participants’ needs	Lowered installation rates as well as lost opportunities in homes with more faucets/showers	Develop a kit customization process analogous to the process in place in CenterPoint’s program.	Comparison of install rates in CenterPoint’s program versus SGA’s program.
Respondents indicating equipment missing from their kit	Poor customer service. Lost savings.	Review the QC procedures in place at the kit assembler.	Evaluation best practices

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11. Researchable Issues for 2013

Having completed evaluation of the 2012 SourceGas DSM portfolio, the evaluators have the following recommendations for EM&V of the 2013 program year:

- **Limit residential rebate program process evaluation to a new construction market assessment & documentation of implementer strategies.** SourceGas' space heating and water heating programs over-performed against goals. The programs themselves are well-established with high satisfaction from participants and trade allies. As such, the evaluators would recommend that process evaluation for this market segment be limited to two areas:
    - Reviewing whether further measures or incentives could be offered to home builders. Home builders were not active participants in the Heating Equipment and Water Heating Equipment programs, and there also may be other avenues for savings through this pre-existing network.
    - Documenting the marketing and outreach strategies by CLEAResult. This was not done in full for 2012 as they had limited time to begin program implementation. These should be fully developed for 2013, however.
- **Reassess installation rates and quality control issues for water conservation kits.** Should SourceGas adopt recommendations from the 2012 evaluation report, the evaluators will reassess measure in-service rates in 2013 through participant surveying.
- **Conduct further research for boilers and food service.** These programs have underperformed in each year of operation. The evaluators concluded that the programs should be given a full year of implementation under CLEAResult before making a judgment as to their discontinuation, however. The evaluators intend to conduct process evaluation of these programs in 2013.
- **Limit the C&I Solutions process evaluation to the custom component.** The direct install component over-performed against goals and had no major issues in participation or measure retention. As such the evaluators would recommend limiting process evaluation to the custom component. It would be expected that with the time elapsed, the custom component would have the momentum to easily meet goals in 2013. Several projects are already reserved and in the works. However, these activities should be thoroughly documented.

The evaluators make these recommendations based on the current state of the programs and guidelines for savings. Should program offerings or external factors (such as efficiency standards) change in a significant manner, the recommended scope would be revised accordingly.

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12. Appendix A: Site Reports

This appendix contains the individual site reports for C&I Solutions.

Program C&I Solutions
Project ID SGA-CIS2012-001

Project Background

The participant is a manufacturing facility that received incentives from SourceGas for installing radiant tube heaters and a central control system for temperature setback during unoccupied hours. The radiant tube heaters run during the facility's heating season, October through March. The scope of the project was verified through review of invoices and documentation.

M&V Methodology

The M&V effort for this project follows the guidelines of the 2012 International Performance Measurement and Verification Protocol (IPMVP) – Option C "Whole Facility."

Heating degree days and consumption were used in a regression analysis to calculate pre-retrofit and post-retrofit energy use. Savings are calculated as follows:

Pre Retrofit Regression

Date	HDD	CCF
1/9/12	21	3630
1/10/12	23	3690
1/11/12	23	3870
1/12/12	40	4730
1/13/12	37	4240
1/14/12	-	-
1/15/12	-	-
1/16/12	5	3090
1/17/12	-	-
1/18/12	37	4730
1/19/12	24	4110
1/20/12	22	3940
1/21/12	30	3980
1/22/12	14	3780
1/23/12	-	-
1/24/12	22	4110
1/25/12	-	-
1/26/12	25	4130
1/27/12	25	4230
1/28/12	31	3950

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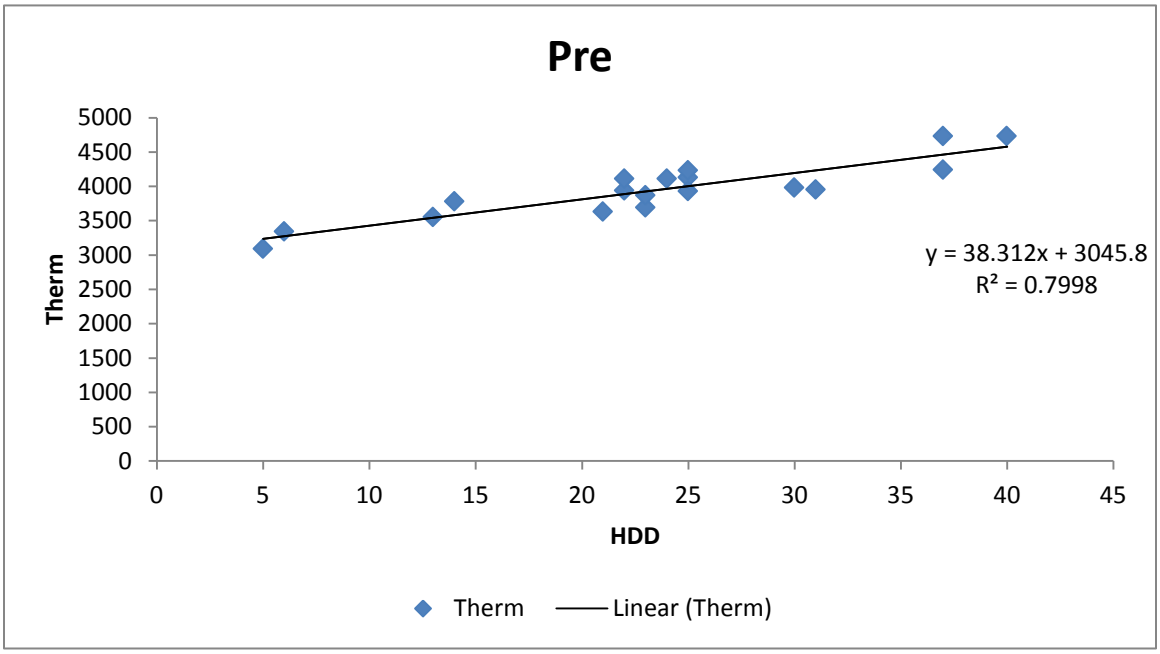
1/29/12	25	3930
1/30/12	13	3550
1/31/12	6	3340



Post Retrofit Regression

Date	*HDD*	*CCF*
1/9/13	13	2880
1/10/13	11	2870
1/11/13	10	3000
1/12/13	20	3190
1/13/13	40	3520
1/14/13	41	3580
1/15/13	40	3750
1/16/13	38	3450
1/17/13	31	3330
1/18/13	28	3130
1/19/13	19	3010
1/20/13	23	3070
1/21/13	33	3320
1/22/13	34	3320
1/23/13	-	-
1/24/13	25	3200
1/25/13	24	3270
1/26/13	-	-
1/27/13	13	2720
1/28/13	0	2800
1/29/13	7	2960
1/30/13	30	3480

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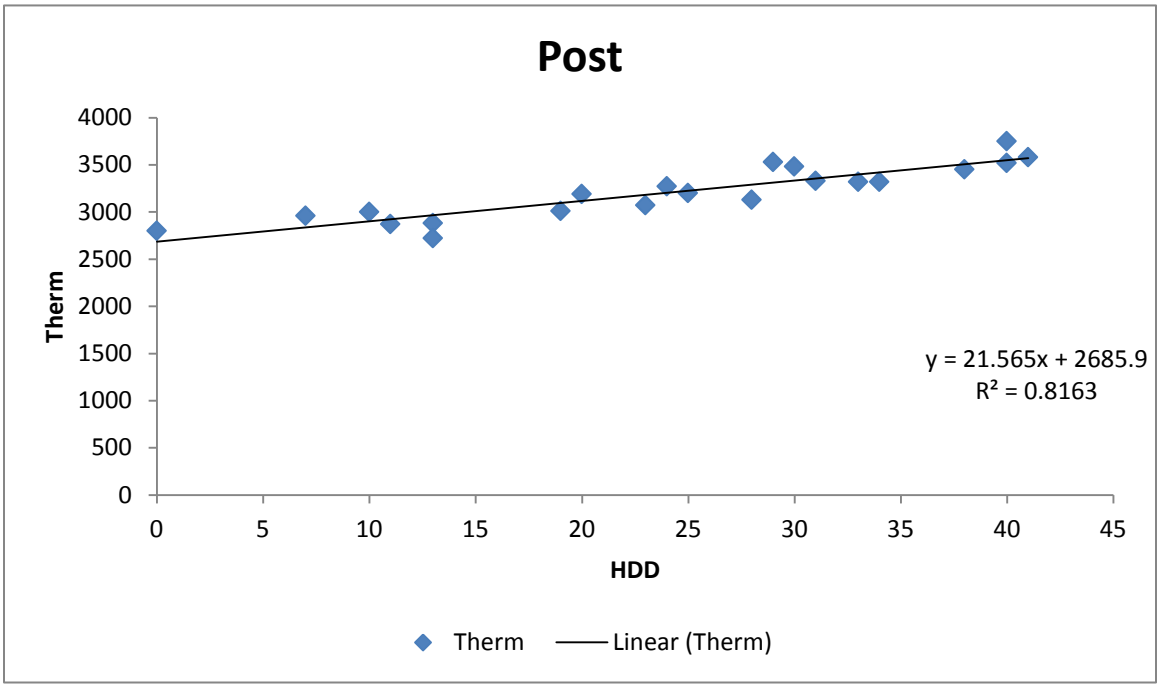
1/31/13	29	3530



Missing data points during the pre and post retrofit sample period were caused by facility maintenance and shut down of the plant.

Pre and post retrofit regression values are displayed in the table

Savings Values

	m	*b*	*HDD TMY3*
Pre	38.32	3,045.80	3,486.71
Post	21.57	2,685.90	

Savings were calculated using regression values and TMY3 weather data.

$$\boldsymbol{Total\ Savings = Pre\ Consumption - Post\ Consumption} \quad \text{eq. 1}$$

$$\boldsymbol{Pre - Retrofit\ Consumption = HDD_{TMY3} * 38.32} \quad \text{eq. 2}$$

$$\boldsymbol{Post - Retrofit\ Consumption = HDD_{TMY3} * 21.57} \quad \text{eq. 3}$$

Measure Life

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The EUL of this measure is 20 years.

Source: DEER 2008

Savings Results

The resulting values from the equations above and subsequent Therm savings are presented in the table

	m	*b*	*TMY3 HDD*	*Expected Savings (therm)*	*Realized Savings (therm)*	*Realization Rate*
Pre	38.32	3,045.80	3,486.71	63,211	58,419.8	92%
Post	21.57	2,685.90				

Realization rate for this project is 92%. Savings decreased due to differences in winter month heating degree day calculations. ADM gathered heating degree days using TMY3 weather data from Fayetteville, Arkansas.

Uncertainty

The evaluators conducted a propagation of uncertainty analysis for this project. The parameters and their uncertainty are summarized in the table

Parameter	*Value*	*Uncertainty*	*Sigma*
Baseline HDD	72.1%	+/- 10%	16,315
Post HDD	74.7%	+/- 10%	14,765

Uncertainty for Boiler Efficiency is from manufacturers' specifications of measurement error for the appropriate equipment.

The errors were propagated as follows:

$$\boldsymbol{Propogated\ Error} = \sqrt{(\boldsymbol{\sigma_{Pre\ HDD}})^2 + (\boldsymbol{\sigma_{Post\ HDD}})^2} = \mathbf{15,540.23}$$

With this propagated error, the savings estimate for this project as overall uncertainty of:

$$\boldsymbol{Uncertainty} = \frac{\mathbf{15,540.23}}{\mathbf{58,419.8}} = \mathbf{27}\%$$

Measure Cost, Incentive, & Payback

The evaluators reviewed the invoices associated with this project and verified an incremental cost of $142,000. Measure payback is summarized in the table

Annual Therms Savings	*Cost per Therm*	*Annual Energy Cost Savings*	*Incremental Cost*	*Base Incentive*	*Adjusted Incentive*	*Payback W/Incentive*	*Payback W/o Incentive*

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58,419.8	$.617	$36,045.02	$142,000	$30,000	$30,000	3.93 Years	3.10 Years

Program C&I Solutions
ID SGA-CIS-2012-002

Project Background

The participant is an aluminum die casting facility that received an incentive from SourceGas for installing an insulating well cap on one (1) aluminum pump well. The scope of the project was verified through review of invoices and on-site post-inspection.

The molten aluminum pumps at the facility keep the material circulating through the central melt furnace for the die casting process. The pump well is located indoors in the facility with an approximate average ambient temperature of 100°F. Facility personnel describe the furnace as being in operation 24 hours per day for the entire week at its prescribed set point temperature. The facility is shut down for approximately two weeks during the year for maintenance and cleaning. Facility personnel estimate melt furnace efficiency of 30%.

M&V Methodology

The M&V effort for this project follows the guidelines of the 2012 International Performance Measurement and Verification Protocol (IPMVP) – Option A "Retrofit Isolation: Key Parameter Measurement."

During the site visit, ADM staff verified installation of the insulating cap and took temperature measurements for use in calculations. Facility personnel were interviewed to determine the operating schedule and hours.

Table 1: Calculation Variables

Variable	Description	Units	Equation
$Q_{Total\ before}$	Total heat loss before insulation	Btu/hr	1
$Q_{Total\ after}$	Total heat loss after insulation	Btu/hr	1
Q_{Total}	Total heat loss by radiation and convection	Btu/hr	2
$Q_{convection}$	Heat loss by convection	Watt	2,3
$Q_{radiation}$	Heat loss by radiation	Watt	2,4
A	Surface area	Square meters	3,4,7
T_{film}	Film temperature to evaluate air properties	Celsius or Kelvin	
T_{air}	Ambient air temperature	Celsius	3,4,6
$T_{surface}$	Surface temperature (aluminum or cap)	Celsius	3,4,6

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h	Convection heat transfer coefficient	$W/m^2{}^\circ C$	3,5
ε	Emissivity	-	4
σ	Stefan-Boltzmann constant (5.67×10^{-8})	$W/m^2{}^\circ K^4$	4
α	Thermal diffusivity of air at T_{film}	m^2/s	8
υ	Kinematic viscosity of air at T_{film}	m^2/s	6,8
Pr	Prandtl Number	-	8,9,10
Gr	Grashof Number	-	6,9,10
Ra	Rayleigh Number	-	9
Nu	Nusselt Number	-	5,10
β	Expansion coefficient of air at T_{film}	1/°C	6
cl	Characteristic length	meter	5,6,7
P	Perimeter	meter	7
k	Thermal conductivity of air at T_{film}	$W/m^\circ K$	5

Table 2: Calculation Inputs

Variable	***CMF01***	***CMF02***	***CMF10***	***CMF12***	***CMF-03***
$T_{aluminum\ surface}$ weekday	721	700	703	699	704
$T_{aluminum\ surface}$ weekend	654	634	636	632	638
T_{air}	38	38	38	38	38
Well Length	1.0668	1.0668	1.0668	1.0668	0.914
Well Width	1.1684	1.016	1.0668	1.0668	0.914
Aluminum oxide emissivity	0.39	0.39	0.39	0.39	0.39
$T_{cap\ surface}$	127	160	141	149	149
Well cap emissivity	0.9	0.9	0.9	0.9	0.9
Annual weekday operating hours	6240	6240	6240	6240	6240
Estimated open cap hours	520	520	520	520	520
Annual weekend hours	2496	2496	2496	2496	2496

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Insulated cap savings are calculated as follows:

$$\boldsymbol{Total\ Annual\ Gas\ Savings(CCF)} = \frac{\boldsymbol{(Q_{Total\ before} - Q_{Total\ after})x\ Hours}}{\boldsymbol{30\%\ x\ 100,000}} \quad \text{eq. 1}$$

$$\boldsymbol{Q_{Total}} = \frac{Q_{convection} + Q_{radiation}}{0.293} \quad \text{eq. 2}$$

$$Q_{convection} = h * A * (T_{surface} - T_{air}) \quad \text{eq. 3}$$

$$Q_{radiation} = \sigma * A * \varepsilon * (T_{surface}^4 - T_{air}^4) \quad \text{eq. 4}$$

$$h = \frac{Nu * k}{cl} \quad \text{eq. 5}$$

$$Gr = \frac{g * \beta * (T_{surface} - T_{air}) * cl^3}{\upsilon^2} \quad \text{eq. 6}$$

$$cl = \frac{A}{P} \quad \text{eq. 7}$$

$$Pr = \frac{\upsilon}{\alpha} \quad \text{eq. 8}$$

$$Ra = Gr * Pr \quad \text{eq. 9}$$

If $Ra > 10^8$ then turbulent flow and Nusselt equation is:

$$Nu = 0.15 * (Gr * \mathrm{Pr})^{1/3} \quad \text{eq. 10}$$

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Data Collection Procedures

Data used in calculating savings with this project were collected as follows:

- Dimensions of well opening were measured
- Dimensions of insulating cap were measured
- Surface temperature of molten aluminum measured with infrared temperature gun
- Surface temperature of insulating cap measured with infrared temperature gun
- Ambient air temperature was estimated at an assumed to be constant temperature for calculations
- Operating hours determined from facility personnel estimation

Measure Life

The EUL of this measure is 15 years.

Source: Professional judgment of installers. This measure is non-standard and not found in existing EUL databases.

Savings Results

The resulting values from the equations above and subsequent Therms savings are presented in the table

Table 3: Results

	RG MF-03
$Q_{Total\ before}$ **(Btu/hr)**	193,784
$Q_{Total\ after}$ **(Btu/hr)**	19,305
$\boldsymbol{Total\ Annual\ Gas\ Savings(CCF)}$	46,574

Total Savings resulting from this project are:

- 46,574 Annual Therms
- 698,610 Lifetime Therms
- 127.6 Peak Therms

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Uncertainty

The evaluators conducted a propagation of uncertainty analysis for one selected similar aluminum pump well insulating cap project. The parameters and their uncertainty are summarized in the table

Table 4: Uncertainty

Parameter	Value	Uncertainty	Sigma	Variable
$\boldsymbol{Molten\ Aluminum\ Temp}\ (T_{surface}{}^{\circ}C)$	715	±150	4,899	σ_1
$\boldsymbol{Insulating\ Cap\ Temp}\ (T_{surface}{}^{\circ}C$	134	±75	540	σ_2
$\boldsymbol{Ambient\ Air\ Temp}\ (T_{air}{}^{\circ}C)$	38	±20	0.534	σ_3
$\boldsymbol{Aluminum\ Emissivity}\ (\varepsilon)$	0.39	±0.07	6.94	σ_4

Uncertainty in aluminum and insulating cap surface temperatures is based on evaluator's professional judgment due to variations in actual temperatures measured during data collection. Aluminum emissivity varies with temperature and amount of oxidation on top of well surface, therefore uncertainty is based on evaluator's professional judgment.

The errors were then propagated as follows:

$$\boldsymbol{Propagated\ Error} = \sqrt{{\sigma_1}^2 + {\sigma_2}^2 + {\sigma_3}^2 + {\sigma_4}^2}$$

$$\boldsymbol{Propagated\ Error} = 4{,}928$$

With this propagated error, the savings estimate for the similar selected project has an overall uncertainty as follows:

$$\boldsymbol{Uncertainty} = \frac{4{,}928}{62{,}600} = 7.9\%$$

Measure Cost, Incentive, & Payback

The evaluators reviewed the invoices associated with this project and verified an incremental cost of $4,286 Measure payback is summarized in the table

Table 5: Cost Savings Payback

Annual Therms Savings	Cost Per Therm	Annual Energy Cost Savings	Incremental Cost	Base Incentive	Adjusted Incentive	Payback W/Incentive	Payback W/o Incentive
46,574	$0.556	$25,895.14	$4,286	$22,741.60	$4,286	0 Years	.16 Years

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Program C&I Solutions
ID SGA-CIS-2012-003

Project Background

The participant is an aluminum die casting facility that received an incentive from SourceGas for installing insulating well caps on two (2) aluminum pump wells. The scope of the project was verified through review of invoices and on-site post-inspection.

The molten aluminum pumps at the facility keep the material circulating through the central melt furnaces for the die casting process. The pump wells are located indoors in the facility with an approximate average ambient temperature of 100°F. Facility personnel describe the furnaces as being in operation 24 hours per day for the entire week at their prescribed set point temperature. The facility is shut down for approximately two weeks during the year for maintenance and cleaning. Facility personnel estimate melt furnace efficiency of 30%.

M&V Methodology

The M&V effort for this project follows the guidelines of the 2012 International Performance Measurement and Verification Protocol (IPMVP) – Option A "Retrofit Isolation: Key Parameter Measurement."

During the site visit, ADM staff verified installation of the insulating cap and took temperature measurements for use in calculations. Facility personnel were interviewed to determine the operating schedule and hours.

Table 1: Calculation Variables

Variable	Description	Units	Equation
$Q_{Total\ before}$	Total heat loss before insulation	Btu/hr	1
$Q_{Total\ after}$	Total heat loss after insulation	Btu/hr	1
Q_{Total}	Total heat loss by radiation and convection	Btu/hr	2
$Q_{convection}$	Heat loss by convection	Watt	2,3
$Q_{radiation}$	Heat loss by radiation	Watt	2,4
A	Surface area	Square meters	3,4,7
T_{film}	Film temperature to evaluate air properties	Celsius or Kelvin	
T_{air}	Ambient air temperature	Celsius	3,4,6
$T_{surface}$	Surface temperature (aluminum or cap)	Celsius	3,4,6
h	Convection heat transfer coefficient	$W/m^2{}^\circ C$	3,5
ε	Emissivity	-	4
σ	Stefan-Boltzmann constant (5.67×10^{-8})	$W/m^2{}^\circ K^4$	4
α	Thermal diffusivity of air at T_{film}	m^2/s	8

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υ	Kinematic viscosity of air at T_{film}	m^2/s	6,8
Pr	Prandtl Number	-	8,9,10
Gr	Grashof Number	-	6,9,10
Ra	Rayleigh Number	-	9
Nu	Nusselt Number	-	5,10
β	Expansion coefficient of air at T_{film}	1/°C	6
cl	Characteristic length	meter	5,6,7
P	Perimeter	meter	7
k	Thermal conductivity of air at T_{film}	$W/m°K$	5

Table 2: Calculation Inputs

Variable	***CMF01***	***CMF02***	***CMF10***	***CMF12***	***CMF-03***
$T_{aluminum\ surface}$ weekday	721	700	703	699	704
$T_{aluminum\ surface}$ weekend	654	634	636	632	638
T_{air}	38	38	38	38	38
Well Length	1.0668	1.0668	1.0668	1.0668	0.914
Well Width	1.1684	1.016	1.0668	1.0668	0.914
Aluminum oxide emissivity	0.39	0.39	0.39	0.39	0.39
$T_{cap\ surface}$	127	160	141	149	149
Well cap emissivity	0.9	0.9	0.9	0.9	0.9
Annual weekday operating hours	6240	6240	6240	6240	6240
Estimated open cap hours	520	520	520	520	520
Annual weekend hours	2496	2496	2496	2496	2496

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Insulated cap savings are calculated as follows:

$$\boldsymbol{Total\ Annual\ Gas\ Savings(CCF)} = \frac{\boldsymbol{(Q_{Total\ before} - Q_{Total\ after})x\ Hours}}{\boldsymbol{30\%\ x\ 100,000}}$$ eq. 1

$$\boldsymbol{Q_{Total}} = \frac{Q_{convection} + Q_{radiation}}{0.293}$$ eq. 2

$$Q_{convection} = h * A * (T_{surface} - T_{air})$$ eq. 3

$$Q_{radiation} = \sigma * A * \varepsilon * (T_{surface}^4 - T_{air}^4)$$ eq. 4

$$h = \frac{Nu * k}{cl}$$ eq. 5

$$Gr = \frac{g * \beta * (T_{surface} - T_{air}) * cl^3}{\upsilon^2}$$ eq. 6

$$cl = \frac{A}{P}$$ eq. 7

$$Pr = \frac{\upsilon}{\alpha}$$ eq. 8

$$Ra = Gr * Pr$$ eq. 9

If $Ra > 10^8$ then turbulent flow and Nusselt equation is:

$$Nu = 0.15 * (Gr * \mathrm{Pr})^{1/3}$$ eq. 10

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Data Collection Procedures

Data used in calculating savings with this project were collected as follows:

- Dimensions of well opening were measured
- Dimensions of insulating cap were measured
- Surface temperature of molten aluminum measured with infrared temperature gun
- Surface temperature of insulating cap measured with infrared temperature gun
- Ambient air temperature was estimated at an assumed to be constant temperature for calculations
- Operating hours determined from facility personnel estimation

Measure Life

The EUL of this measure is 15 years.

Source: Professional judgment of installers. This measure is non-standard and not found in existing EUL databases.

Savings Results

The resulting values from the equations above and subsequent Therms savings are presented in the table

Table 3: Results

	FV MF-03	***FV MF-04***
$Q_{Total\ before}$ **(Btu/hr)**	189,865	249,771
$Q_{Total\ after}$ **(Btu/hr)**	18,863	15,253
$\boldsymbol{Total\ Annual\ Gas\ Savings(CCF)}$	45,646	62,600

Total Savings resulting from this project are:

- 108,246 Annual Therms
- 1,623,690 Lifetime Therms
- 296.56 Peak Therms

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Uncertainty

The evaluators conducted a propagation of uncertainty analysis for this project. The parameters and their uncertainty are summarized in the table

Table 4: Uncertainty

Parameter	Value	Uncertainty	Sigma	Variable
$\boldsymbol{Molten\ Aluminum\ Temp}\ (T_{surface}{}^{\circ}C)$	715	±150	4,899	σ_1
$\boldsymbol{Insulating\ Cap\ Temp}\ (T_{surface}{}^{\circ}C$	134	±75	540	σ_2
$\boldsymbol{Ambient\ Air\ Temp}\ (T_{air}{}^{\circ}C)$	38	±20	0.534	σ_3
$\boldsymbol{Aluminum\ Emissivity}\ (\varepsilon)$	0.39	±0.07	6.94	σ_4

Uncertainty in aluminum and insulating cap surface temperatures is based on evaluator's professional judgment due to variations in actual temperatures measured during data collection. Aluminum emissivity varies with temperature and amount of oxidation on top of well surface, therefore uncertainty is based on evaluator's professional judgment.

The errors were then propagated as follows:

$$\boldsymbol{Propagated\ Error} = \sqrt{{\sigma_1}^2 + {\sigma_2}^2 + {\sigma_3}^2 + {\sigma_4}^2}$$

$$\boldsymbol{Propagated\ Error} = 4{,}928$$

With this propagated error, the savings estimate for this project has an overall uncertainty as follows:

$$\boldsymbol{Uncertainty} = \frac{4{,}928}{62{,}600} = 7.9\%$$

Measure Cost, Incentive, & Payback

The evaluators reviewed the invoices associated with this project and verified an incremental cost of $8,572. Measure payback is summarized in the table

Table 5: Cost Savings Payback

Annual Therms Savings	Cost Per Therm	Annual Energy Cost Savings	Incremental Cost	Base Incentive	Adjusted Incentive	Payback W/Incentive	Payback W/o Incentive
108,246	$0.556	$60,184.77	$8,572	$68,225.60	$8,572	0 Years	.14 Years

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Program C&I Solutions
ID SGA-CIS-2012-004

Project Background

The participant is an aluminum die casting facility that received incentives from SourceGas for installing insulating well caps on five (5) aluminum pump wells. The scope of the project was verified through review of invoices and on-site post-inspection.

The molten aluminum pumps at the facility keep the material circulating through the central melt furnaces for the die casting process. The pump wells are located indoors in the facility with an approximate average ambient temperature of 100°F. Facility personnel describe the furnaces as being in operation 24 hours per day for the five day work week at their prescribed set point temperatures. During the weekends the furnace temperature set point is decreased by 120°F. The facility is shut down for approximately two weeks during the year for maintenance and cleaning. Facility personnel estimate melt furnace efficiency of 30%.

M&V Methodology

The M&V effort for this project follows the guidelines of the 2012 International Performance Measurement and Verification Protocol (IPMVP) – Option A "Retrofit Isolation: Key Parameter Measurement."

During the site visit, ADM staff verified installation of the insulating caps and took temperature measurements for use in calculations. Facility personnel were interviewed to determine the operating schedule and hours.

Table 1: Calculation Variables

Variable	Description	Units	Equation
$Q_{Total\ before}$	Total heat loss before insulation	Btu/hr	1
$Q_{Total\ after}$	Total heat loss after insulation	Btu/hr	1
Q_{Total}	Total heat loss by radiation and convection	Btu/hr	2
$Q_{convection}$	Heat loss by convection	Watt	2,3
$Q_{radiation}$	Heat loss by radiation	Watt	2,4
A	Surface area	Square meters	3,4,7
T_{film}	Film temperature to evaluate air properties	Celsius or Kelvin	
T_{air}	Ambient air temperature	Celsius	3,4,6
$T_{surface}$	Surface temperature (aluminum or cap)	Celsius	3,4,6
h	Convection heat transfer coefficient	$W/m^2{}^\circ C$	3,5
ε	Emissivity	-	4

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σ	Stefan-Boltzmann constant (5.67×10^{-8})	$W/m^{2\circ}K^4$	4
α	Thermal diffusivity of air at T_{film}	m^2/s	8
υ	Kinematic viscosity of air at T_{film}	m^2/s	6,8
Pr	Prandtl Number	-	8,9,10
Gr	Grashof Number	-	6,9,10
Ra	Rayleigh Number	-	9
Nu	Nusselt Number	-	5,10
β	Expansion coefficient of air at T_{film}	1/°C	6
cl	Characteristic length	meter	5,6,7
P	Perimeter	meter	7
k	Thermal conductivity of air at T_{film}	$W/m^{\circ}K$	5

Table 2: Calculation Inputs

Variable	***CMF01***	***CMF02***	***CMF10***	***CMF12***	***CMF-03***
$T_{aluminum\ surface}$ weekday	721	700	703	699	704
$T_{aluminum\ surface}$ weekend	654	634	636	632	638
T_{air}	38	38	38	38	38
Well Length	1.0668	1.0668	1.0668	1.0668	0.914
Well Width	1.1684	1.016	1.0668	1.0668	0.914
Aluminum oxide emissivity	0.39	0.39	0.39	0.39	0.39
$T_{cap\ surface}$	127	160	141	149	149
Well cap emissivity	0.9	0.9	0.9	0.9	0.9
Annual weekday operating hours	6240	6240	6240	6240	6240
Estimated open cap hours	520	520	520	520	520
Annual weekend hours	2496	2496	2496	2496	2496

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Insulated cap savings are calculated as follows:

$$\boldsymbol{Total\ Annual\ Gas\ Savings(CCF)} = \frac{(\boldsymbol{Q_{Total\ before}} - \boldsymbol{Q_{Total\ after}})\boldsymbol{x\ Hours}}{\boldsymbol{30\%\ x\ 100,000}} \quad \text{eq. 1}$$

$$\boldsymbol{Q_{Total}} = \frac{Q_{convection} + Q_{radiation}}{0.293} \quad \text{eq. 2}$$

$$Q_{convection} = h * A * (T_{surface} - T_{air}) \quad \text{eq. 3}$$

$$Q_{radiation} = \sigma * A * \varepsilon * (T_{surface}^4 - T_{air}^4) \quad \text{eq. 4}$$

$$h = \frac{Nu * k}{cl} \quad \text{eq. 5}$$

$$Gr = \frac{g * \beta * (T_{surface} - T_{air}) * cl^3}{\upsilon^2} \quad \text{eq. 6}$$

$$cl = \frac{A}{P} \quad \text{eq. 7}$$

$$Pr = \frac{\upsilon}{\alpha} \quad \text{eq. 8}$$

$$Ra = Gr * Pr \quad \text{eq. 9}$$

If $Ra > 10^8$ then turbulent flow and Nusselt equation is:

$$Nu = 0.15 * (Gr * \mathrm{Pr})^{1/3} \quad \text{eq. 10}$$

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Data Collection Procedures

Data used in calculating savings with this project were collected as follows:

- Dimensions of well opening were measured
- Dimensions of insulating cap were measured
- Surface temperature of molten aluminum measured with infrared temperature gun
- Surface temperature of insulating cap measured with infrared temperature gun
- Ambient air temperature was estimated at an assumed to be constant temperature for calculations
- Operating hours determined from facility personnel estimation

Measure Life

The EUL of this measure is 15 years.

Source: Professional judgment of installers. This measure is non-standard and not found in existing EUL databases.

Savings Results

The resulting values from the equations above and subsequent Therms savings are presented in the table

Table 3: Results

	CMF01		CMF02		CMF10		CMF12		CMF-03	
	M-F	Sa-Su	M-F	Sa-Su	M-F	Sa-Su	M-F	Sa-Su	M-F	Sa-Su
$Q_{Total\ before}$ (Btu/hr)	112,754	84,619	90,277	66.982	95,824	70,863	94,442	69,793	70,678	52,478
$Q_{Total\ after}$ (Btu/hr)	40,456	31,384	23,330	19,003	33,369	25,898	43,306	33,141	21,959	17,353
$Annual\ Gas\ Savings(CCF)$	18,214		16,756		15,649		12,799		12,211	

Total Savings resulting from this project are:
Total Savings resulting from this project are:

- 75,630 Annual Therms
- 1,134,450 Lifetime Therms
- 207.21 Peak Therms

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Uncertainty

The evaluators conducted a propagation of uncertainty analysis for the aluminum pump well insulating cap project. The parameters and their uncertainty are summarized in the table

The evaluators conducted a propagation of uncertainty analysis for this project. The parameters and their uncertainty are summarized in the table

Table 4: Uncertainty

Parameter	Value	Uncertainty	Sigma	Variable
$\boldsymbol{Molten\ Aluminum\ Temp}\ (T_{surface}°C)$	715	+150	22608	σ_1
		-150	-17710	
$\boldsymbol{Insulating\ Cap\ Temp}\ (T_{surface}°C$	134	+75	-2688	σ_2
		-75	2148	
$\boldsymbol{Ambient\ Air\ Temp}\ (T_{air}°C)$	38	+20	30	σ_3
		-20	-30	
$\boldsymbol{Aluminum\ Emissivity}\ (\varepsilon)$	0.39	+0.07	9717	σ_4
		-0.07	-9710	

Uncertainty in aluminum and insulating cap surface temperatures is based on evaluator's professional judgment due to variations in actual temperatures measured during data collection. Aluminum emissivity varies with temperature and amount of oxidation on top of well surface, therefore uncertainty is based on evaluator's professional judgment.

The errors were then propagated as follows:

$$\boldsymbol{Propagated\ Error} = \sqrt{{\sigma_1}^2 + {\sigma_2}^2 + {\sigma_3}^2 + {\sigma_4}^2}$$

$$\boldsymbol{Propagated\ Error_{Upper}} = 24{,}702$$

$$\boldsymbol{Propagated\ Error_{Lower}} = 20{,}375$$

With this propagated error, the savings estimate for this project has an overall uncertainty as follows:

$$\boldsymbol{Uncertainty_{Upper}} = \frac{24{,}702}{62{,}600} = 39.5\%$$

$$\boldsymbol{Uncertainty_{Lower}} = \frac{20{,}375}{62{,}600} = 32.5\%$$

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Measure Cost, Incentive, & Payback

The evaluators reviewed the invoices associated with this project and verified an incremental cost of $17,225. Measure payback is summarized in the table

Table 5: Cost Savings Payback

Annual Therms Savings	Cost Per Therm	Annual Energy Cost Savings	Incremental Cost	Base Incentive	Adjusted Incentive	Payback W/Incentive	Payback W/o Incentive
75,360	$0.49	$38,926	$17,225	$53,963	$17,225	0.31 Years	0 Years

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7.0 Appendix B: ADM Associates, Inc. – AWP Evaluation Report

Evaluation of 2012 Arkansas Weatherization Program

Submitted to:

Arkansas Community Action Agencies Association
Arkansas Oklahoma Gas Corporation
CenterPoint Energy
Oklahoma Gas and Electric
American Electric Power – Southwestern Electric Power Company
Empire District Electric Company
Entergy
SourceGas Arkansas

March 2013

Final Report

Prepared by:

ADM Associates, Inc.

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1. Executive Summary

This report is to provide a summary of the evaluation effort of the 2012 Arkansas Weatherization Program. This report provides verified gross savings estimates for the evaluated program, as well as a process and documentation review.

1.1 Summary of Arkansas Weatherization Program

In 2012, the Arkansas Weatherization Program (AWP) provided residential energy audits and energy efficiency installations to customers within the following gas and electric utility service territories:

- American Electric Power – Southwestern Electric Power Company (AEP-SWEPCO);
- Empire District Electric Company (EDEC);
- Entergy;
- Oklahoma Gas and Electric (OG&E);
- Arkansas Oklahoma Gas Corporation (AOG);
- CenterPoint Energy (CenterPoint); and
- SourceGas Arkansas (SGA).

Participating homes were evaluated in order to determine potential energy efficiency measures that would improve overall building efficiency and reduce energy usage. The AWP is designed to use both gas utility and electric utility funds to assist customers with the costs of the in-home audit and installation of energy efficiency improvements. Under the AWP, customers are responsible for a portion of the audit cost, as well as a portion of resulting equipment or measures to be installed in the home. The program is offered in conjunction with the Department of Energy (DOE) Weatherization Assistance Program (WAP), which provided federal assistance to fund the customer co-payment in the AWP for income-qualified households. Customers are able to pay their own co-payment or, if eligible for the WAP, receive these federal funds for the energy efficiency improvements in their homes.

In order to qualify for the AWP, customer homes must meet specific criteria indicating that the residence is severely energy-inefficient. The AWP is designed based on the “whole home” approach to residential energy efficiency, where energy efficiency measures are chosen and implemented based on total cost and energy savings rather than focusing on a specific fuel type or measure category.

Local community action agencies work with customers to enroll in the program and determine AWP and WAP eligibility. After the customer is approved and the in-home

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audit is performed, optimal energy efficiency measures for AWP (and WAP, for eligible customers) are identified through the use of National Energy Audit Tool (NEAT) or Mobile Home Energy Audit (MHEA) software. The local agencies then use their internal crews or hire contractors to install these measures in the home. Resulting savings are calculated and recorded for the purposes of EM&V and cost-effectiveness testing.

Table 1-1 identifies core program stages and includes key activities performed throughout the program process.

Table 1-1 Key Activities and Program Stages

Program Stage	*Key Activities*
Program Design Planning	• ACAAA, CADC and utilities discuss program delivery and make design changes. • Necessary modifications made to program structure and operations. • Key parties meet to discuss program expectations and goals.
Training and Implementation Planning	• Community action agencies, contractors, and other program operations staff attend program-relevant training sessions. • ACAAA, CADC, and local agencies discuss implementation and program updates.
Program Promotion	• Community action agencies market the program to local customers. • Utility representatives may cross-promote the AWP with other programs.
Program Participation	• Customers apply for the AWP and home eligibility is determined. • WAP eligibility is determined. • Participants receive in-home audits and measures are identified. • Contractors install measures that are either stipulated based on NEAT or MHEA software or are agreed upon with the customer (depending on whether or not WAP funds are used for the co-pay).
Data Processing and Monitoring	• Measures and associated savings are calculated and recorded. • Agencies update CADC, ACAAA, and utilities with participation data throughout the year. • Utilities, ACAAA, CADC,, and local agencies continue to communicate regarding program progress and participation.

1.2 Evaluation Objectives

The evaluation of the 2012 Arkansas Weatherization Program (AWP) consisted of several objectives and tasks. These evaluation objectives were related to program savings verification, savings analysis, and process review. Specifically, the objectives of this evaluation include:

- Documentation review of deemed savings calculations. The Evaluators reviewed all savings calculations for measures included in the Technical Reference Manual, Versions 2.0 and 1.0, (TRM), in order to ensure that measure savings were properly calculated according to TRM protocols.

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- Tracking database and documentation review. The Evaluators conducted a tracking database review according to the guidelines defined in Protocol A of the TRM. Additionally, post-implementation field forms and other program materials were reviewed for completeness, accuracy, and overall structure.

- Participant survey. A sample of participants from the 2012 program year was given a survey in order to provide feedback related to their experience with the Arkansas Weatherization Program. This survey addressed topics including customer satisfaction, decision making, and energy efficiency preferences.

- On-site field verification. The Evaluators scheduled and conducted site visits to participant homes in order to verify complete and proper measure installation, to conduct post-implementation measurements, and to follow-up with participants regarding their experience with the program.

- Community Action Agency Interviews. The Evaluators conducted interviews with the local community action agencies responsible for promoting the program, interacting with customers, and coordinating program implementation tasks. These interviews provided insight into overall program processes and characteristics of the target customer segments.

- Program staff interviews. Interviews were conducted with utility staff and third party implementation staff (members of ACAAA). These interviews provided insight into recent program changes, specific program processes, potential future improvements to program operation, and overall program performance.

1.3 Summary of Findings

Table 1-2 and Table 1-3 present net savings for electric utilities and gas utilities, respectively. Table 1-4 presents the net impact by measure. Due to program design factors, target customer segment characteristics, and lack of participant spillover, the net-to-gross ratio for the Arkansas Weatherization Program is 1 for the 2012 program year.

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Table 1-2 Net Verified Savings by Electric Utility

Electric Utility	*# of Homes*	*Realization Rate*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*
AEP-SWEPCO	59	71%	24.46	85,310	892,550
EDEC	4	106%	1.54	8,357	87,174
Entergy	445	95%	272.4	981,539	12,061,252
OG&E	45	86%	12.12	76,898	980,086
Total	553	92%	310.52	1,152,105	14,021,063

Table 1-3 Net Verified Savings by Gas Utility

Gas Utility	*# of Homes*	*Realization Rate*	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*	*Lifetime Savings (Therms)*
AOG	26	83%	4,864	103.6	62,434
CenterPoint	436	69%	172,709	3,055.33	2,466,857
SGA	32	91%	9,957	170.31	152,729
Total	494	70%	187,530	3,329.24	2,682,020

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Table 1-4 Net Verified Savings by Measure Type – Overall

Measure	*Realization Rate*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*	*Realization Rate*	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*	*Lifetime Savings (Therms)*
AC Tune-Up	100%	3.06	7,035	35,173	-	-	-	-
Air Infiltration	102%	126.96	370,776	3,707,762	101%	103,877	2,617.80	1,038,766
Ceiling Insulation	60%	114.26	225,641	4,512,819	74%	27,860	452.32	557,203
Central AC Replacement	141%	9.70	21,966	329,490	-	-	-	-
Floor Insulation	100%	-	29,234	584,673	100%	7,838	113.49	156,758
Gas Furnace Replacement	-	-	-	-	61%	6,918	132.13	138,369
Gas Furnace Tune-Up	-	-	-	-	100%	504	10.72	1,511
Heat Pump Replacement	100%	5.69	41,378	620,670	-	-	-	-
Lighting	117%	36.50	349,952	2,274,688	-	-	-	-
Low Flow Showerhead	100%	0.10	1,140	11,400	100%	93	0.10	933
Refrigerator Replacement	100%	11.85	87,162	1,656,078	-	-	-	-
Storm Windows	100%	-	20	394	100%	126	-	2,520
Water Heater Insulation	100%	0.27	3,638	47,294	111%	294	0.52	3,822
Water Heater Replacement	-	-	-	-	100%	161	1.26	1,771
Water Pipe Insulation	100%	1.37	4,312	56,056	100%	942	0.90	10,358
Window AC Replacement	100%	0.76	1,011	12,840	-	-	-	-
Window Replacement	100%	-	8,332	166,636	100%	38,084	-	761,680
Window Sealing	9%	-	509	5,090	1%	833	-	8,330
Total	92%	310.52	1,152,105	14,021,063	70%	187,530	3,329.24	2,682,020

The Arkansas Weatherization Program was evaluated for overall effectiveness, performance, and design, and the Evaluators developed conclusions with consideration of the seven comprehensiveness factors developed by the Arkansas Public Service Commission. Following a review of present program offerings and interviews with utility staff, community action agency staff, and participating customers, the Evaluators found that:

- The AWP has made efforts to provide education, training, and marketing in order to reduce barriers to increased energy efficiency. The Arkansas Community Action Agencies Association (ACAAA) has promoted the program and provided informative outreach to contractors and customers through the use of training sessions and educational courses. However, as the agencies are able to determine their own level of program involvement, the current promotion and outreach strategies may not effectively reduce barriers to energy efficiency in all regions. Individual community action agencies that have not engaged the program or have been involved to a lesser degree likely represent an existing

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barrier to customer program involvement in their local areas. As federal Weatherization Assistance Program (WAP) funding levels have a significant bearing on agency ability and resources, recent and future funding reductions may further strengthen barriers to program-generated energy efficiency.

- Based on the Commission's Order in docket no. 13-002-U, all of the utility EE programs, including the AWP, will be revised through the Collaborative process outlined in the Order. In addition, the WAP is in the process of being transferred from the Department of Human Services to the Arkansas Energy Office. With this transfer, the WAP may be modified in ways that can enhance program delivery. However, the agencies that have been highly active in the program have reported that they plan to continue recruiting participants or appealing to customers who are able to provide their own co-payment for program services. Further success of the program will likely be significantly influenced by the utilities' and agencies' responses to potentially decreased or absent federal funding levels and any agency-level reorganization. If WAP-eligible participation becomes difficult to obtain, program funding and design modifications may be necessary in order to further appeal to non-WAP-eligible customers.
- The offerings through the AWP have continued to cover all typical and available end-uses. Equipment offered within the program includes lighting, HVAC, water heating, and a full complement of building envelope measures including insulation, air sealing, ENERGY STAR® windows and appliances, and others. In addition to providing full weatherization services, the program involves a wide range of residential measures which are directed towards general energy efficiency. The "whole house" approach to participant home improvements is conducive to providing a comprehensive set of measures in each home.
- The AWP is effectively addressing the comprehensive needs of its targeted residential customers. The program is designed to identify the lowest-cost, highest-efficiency measures and provide them to customers where the measures will be most effective. The AWP targets severely inefficient homes and accurately select the most effective measures from a wide range of options. This minimizes "cream skimming", as the measures are typically chosen on behalf of the customer based on specific customer needs, cost, and resulting energy savings. The program operates in conjunction with the statewide Weatherization Assistance Program (WAP) to minimize or completely offset costs to WAP-eligible customers. Additionally, participating customers may experience non-energy benefits, such as increased ability to pay their utility bills, improved comfort and overall living space, and information regarding how to properly operate their equipment.
- While the agencies have successfully engaged a substantial portion of the target customer market, some segments may not be fully served by the program. As specific agencies covering individual regions may be less active in the program

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due to preference or resources, customers in those areas may not have equal opportunity to participate in the program. Additionally, participation by customers not receiving WAP federal funding has been very limited thus far, and it appears that the program is having difficulty engaging customers who are financially able to pay for a portion of their home weatherization. This is likely due to the fact that non-WAP-eligible customers who are able to provide a co-payment may not believe that they are the target market for the program. If the AWP seeks to recruit substantial participation from private co-pay customers, it is likely that the promotional structure of the program will have to be modified. Upcoming program design changes implemented by the collaborative for 2015-2017 may include additional financing mechanisms to further encourage non-WAP-eligible customer participation.

- The AWP enables the delivery of cost-effective energy efficiency to utility customers throughout Arkansas. The program is designed to identify and implement the most cost-effective and energy efficient measures available for customer residences, and leverages federal funding for energy efficiency projects. However, the extensive waiting list for customers receiving WAP funding has substantially decreased the potential for higher participation rates and increased implementation timeliness. Community action agency resources correlate with WAP funding levels, and these factors have a significant influence on operational efficiency and overall AWP performance due to the inherent connection between the two programs. At present, current AWP resources and operational methods are sufficient for delivering cost-effective, steady energy efficiency over time, but program potential may be limited by statewide resources.
- The existing EM&V procedures within the AWP are fairly sufficient in allowing for support of the implementation process and calculation of energy savings. Community action agencies and contractors collected sufficient inputs and measurements for the majority of program measures. The post-implementation verification process conducted by the agencies has been beneficial in ensuring that reported data are accurate and reliable. There were some issues with data collection and tracking information, particularly with regard to inputs for specific measures. With the implementation of new TRM protocols, it will be necessary to modify the data collection process by collecting additional on-site information as specified in the TRM 2.0 and TRM 3.0. If implementation and measurement are not fully completed according to TRM protocols, it is possible that savings will not be accurately estimated for certain measures. Additionally, there appear to be some organizational or consistency issues with the tracking database, resulting in mismatched data or missing fields. It is crucial to resolve these issues prior to the program year end, as they may have a bearing on claimed savings, on-site verification, and overall evaluation results.

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During the savings verification process, the Evaluators conducted on-site verification visits to participant homes in order to collect ex post measurements of implemented measures. Although the information collected was valuable in supporting the gross savings calculations, additional information would further support the verification process. The Evaluators propose performing the following data collection activities during the evaluation process in future program years:

- Evaluator-conducted baseline air infiltration measurements for a small sample of participant homes prior to the implementation work being performed. This would provide the Evaluators with verified baseline values for some homes, which could be incorporated into the ex post verification process and serve as a comparison to contractor baseline values.
- Additional questions added to the Evaluators' field visit questionnaire regarding whether the customer has made any changes to their building envelope, or taken any actions that may potentially alter the leakage rates in their homes. This would assist in identifying homes where the customer has taken specific actions that may cause energy usage to differ from expected levels.

Additionally, the Evaluators make the following recommendations in order to improve program operations and overall performance for future program years:

- **Make efforts to align the goals and objectives of the various parties involved in administering and implementing the AWP**. While the overall program has a clear set of objectives and goals, the level of interest and involvement in the program varies across and among the agencies and utilities. While some agencies operate the AWP as a high priority, others view it as a supplementary component of the WAP, and plan their resources based on WAP funding. This causes their involvement in AWP promotion and recruitment to be dependent on WAP funding availability rather than AWP resources. If a future program objective is to obtain participation from non-WAP customers, it may be necessary to modify the program promotion strategy or consult with the local agencies to determine the most optimal method of coordinating AWP and WAP-based objectives. For example, promoting the AWP as an important component of a utility's portfolio of energy efficiency programs may emphasize the fact that the AWP is not exclusively for WAP-eligible customers.
- **Continue improving overall understanding of TRM protocols and database software in order to reduce inconsistencies in savings expectations and ensure that collected data are sufficient.** As TRM specifications are updated over time, agencies may be required to collect additional measure inputs and it is important to clarify these requirements as early as possible in the program year. During the 2012 program year, some data were not included in the Frontier database because these data were either not collected by the agencies or were not submitted to Frontier for processing. In order to avoid delays in the savings

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calculation and verification process, data collected from agencies should be reviewed regularly and any errors or missing data should be resolved as soon as possible. Real-time consistency and completeness checks using the stipulated TRM as a guideline will serve to standardize the methods used by the agencies and their contractors, and result in more complete savings estimates.

- **Standardize measure terminology with TRM language.** Some measure names listed in the AWP database were not consistent with TRM nomenclature, such as “Vented Space Heater” (AWP tracking) vs. “Direct Vent Heater” (TRM 2.0). Although the Evaluators and utility staff were able to match the tracking data measures with items in the TRM, standardizing the terminology would reduce the likelihood for calculation errors and increase the overall efficiency of this process.
- **Ensure that the AWP is cost-effective for both WAP-eligible and non-WAP participants**. As private co-pay participants are able to select which measures to install, there is risk of implementing projects in these homes that do not meet cost-effectiveness targets. It is important that the program maintains its whole-house, high-priority energy efficiency focus in order to remain consistent with AWP design structure and goals. This may involve encouraging or requiring private co-pay participants to implement the most cost-effective measures first before selecting specific improvements that may not be as beneficial to the program.
- **Take upcoming WAP and regulatory environment changes and trends into consideration when planning future AWP operational and promotional strategies.** The currently structured AWP functions in the context of community action agency resources and statewide funding levels. Reorganization of the statewide program or local agencies has the potential to significantly affect AWP operation and performance. If WAP-eligible customers continue to comprise the bulk of participation then funding reductions for the statewide program may directly correlate to reduced AWP savings. Program potential should be evaluated in the context of these external factors, and anticipating changes in the statewide environment may provide valuable insight when planning future AWP goals and expectations.
- **Ensure that data are available as needed from all parties involved in the AWP.** Throughout the program year, there were several updates, revisions, and corrections to the Frontier savings database, utility tracking data, and agency implementation data. As there are many parties involved in administering and evaluating the AWP, it is necessary to keep records of all previous data and keep it available for review. In the 2012 program year, there were instances where installation data at the agency level were only available in hardcopy format, which increased the data transfer lead time and created inefficiencies in the review process. Community action agencies, utilities, and the database provider should all maintain electronic copies of program data in order to minimize these

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data transfer difficulties. This will allow for all parties to review crucial program data, and decrease the effort required to provide additional information when it is requested.

1.4 Report Organization

The report is organized as follows:

- Chapter 2 presents the impact findings and discusses the methods used for, and the results obtained from, estimating gross savings for the program;
- Chapter 3 presents the key findings from in-depth interviews with utility staff members, ACAAA, and individual community action agencies;
- Chapter 4 summarizes the results from the customer telephone survey conducted with 2012 AWP participants;
- Chapter 5 presents and discusses the methods used for, and results obtained from, the process review of the program; and
- Chapter 6 presents key conclusions and recommendations from the evaluation of the program.
- Chapter 7 presents an appendix containing the instrument used to conduct the participant survey effort.

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2. Impact Findings

This section presents the results of the gross savings verification and savings calculation review for the Arkansas Weatherization Program (AWP) in the 2012 program year.

2.1 Glossary of Terms

As a first step to detailing the evaluation methodologies, the Evaluators provide a glossary of terms to follow:

- *Ex Ante* – A program parameter or value used by implementers/sponsoring utilities in estimating savings before implementation
- *Ex Post* – A program parameter or value as verified by the Evaluators following completion of the evaluation effort
- *Deemed Savings* – A savings estimate for homogenous measures, in which an assumed average savings across a large number of rebated units is applied
- *Gross Savings* – Energy savings as determined through engineering analysis, statistical analysis, and/or onsite verification
- *Gross Realization Rate* – Ratio of Ex Post Savings / Ex Ante Savings
- *Free-Ridership* – Percentage of participants who would have implemented the same energy efficiency measures in a similar timeframe absent the program.
- *Spillover* – Savings generated by a program that are not incentivized. Examples of this include a customer that is introduced to energy efficiency through one rebated project and due to this undertakes other projects for which they do not apply for a program incentive.
- *Net Savings* – Gross savings factoring off free-ridership and adding in spillover.
- *Net-to-Gross-Ratio (NTGR)* = (1 – Free-Ridership % + Spillover %), also defined as Net Savings / Gross Savings
- *Ex Ante Net Savings* = Ex Ante Gross Savings x Ex Ante Free-Ridership Rate
- *Ex Post Net Savings* = Ex Post Gross Savings x Ex Post Free-Ridership Rate
- *Net Realization Rate* = Ex Post Net Savings / Ex Ante Net Savings

2.2 Summary of Ex Ante Savings

The Arkansas Weatherization Program is designed to use both electric and gas utility funds to assist customers with the cost of the in-home audit and energy efficient measures. Table 2-1 presents the overall ex ante savings by measure.

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Table 2-1 Ex Ante Savings by Measure Type - Overall

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*	*Lifetime Savings (Therms)*
AC Tune-Up	3.06	7,035	35,173	-	-	-
Air Infiltration	126.53	363,209	3,632,089	103,353	2,602.15	1,033,526
Ceiling Insulation	245.05	378,372	7,567,431	37,636	29.01	752,716
Central AC Replacement	6.90	15,541	233,115	-	-	-
Floor Insulation	-	29,234	584,673	7,838	113.49	156,758
Gas Furnace Replacement	-	-	-	11,295	217.39	225,908
Gas Furnace Tune-Up	-	-	-	504	10.72	1,511
Heat Pump Replacement	5.69	41,408	621,120	-	-	-
Lighting	32.99	299,968	1,949,792	-	-	-
Low Flow Showerhead	0.10	1,140	11,400	93	0.10	933
Refrigerator Replacement	11.85	87,162	1,656,078	-	-	-
Storm Windows	-	20	394	126	-	2,520
Water Heater Insulation	0.27	3,638	47,294	265	0.47	3,450
Water Heater Replacement	-	-	-	161	1.26	1,771
Water Pipe Insulation	1.37	4,312	56,056	942	0.90	10,358
Window AC Replacement	0.76	1,011	12,840	-	-	-
Window Replacement	-	8,332	166,636	38,084	-	761,680
Window Sealing	-	5,418	54,176	67,069	-	670,685
Total	434.58	1,245,798	16,628,267	267,365	2,975.49	3,621,814

2.2.1 Ex Ante Savings for Electric Utilities

The participating electric utilities are AEP-SWEPCO, EDEC, Entergy, and OG&E. Table 2-2 presents the savings results of the evaluation of the 2012 AWP for electric utilities. Table 2-3 through Table 2-6 summarize the ex ante savings by measure for each electric utility.

Table 2-2 Ex Ante Savings by Electric Utility

Electric Utility	*# of Homes*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*
AEP-SWEPCO	59	61.69	120,318
EDEC	4	2.57	7,890
Entergy	445	347.33	1,028,130
OG&E	45	22.99	89,459
Total	553	434.58	1,245,798

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Table 2-3 Ex Ante Savings by Measure Type – AEP-SWEPCO

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*
AC Tune-Up	-	-
Air Infiltration	17.55	33,168
Ceiling Insulation	40.10	48,057
Central AC Replacement	-	-
Floor Insulation	-	4,174
Gas Furnace Replacement	-	-
Gas Furnace Tune-Up	-	-
Heat Pump Replacement	-	-
Lighting	2.86	26,291
Low Flow Showerhead	-	-
Refrigerator Replacement	1.01	7,430
Storm Windows	-	-
Water Heater Insulation	0.01	68
Water Heater Replacement	-	-
Water Pipe Insulation	0.17	528
Window AC Replacement	-	-
Window Replacement	-	455
Window Sealing	-	147
Total	61.69	120,318

Table 2-4 Ex Ante Savings by Measure Type - EDEC

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*
AC Tune-Up	-	-
Air Infiltration	0.42	653
Ceiling Insulation	1.48	1,314
Central AC Replacement	-	-
Floor Insulation	-	264
Gas Furnace Replacement	-	-
Gas Furnace Tune-Up	-	-
Heat Pump Replacement	-	-
Lighting	0.45	4,085
Low Flow Showerhead	-	-
Refrigerator Replacement	0.20	1,486
Storm Windows	-	-
Water Heater Insulation	-	-
Water Heater Replacement	-	-
Water Pipe Insulation	0.03	88
Window AC Replacement	-	-
Window Replacement	-	-
Window Sealing	-	-
Total	2.57	7,890

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Table 2-5 Ex Ante Savings by Measure Type - Entergy

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*
AC Tune-Up	2.55	6,083
Air Infiltration	105.25	311,967
Ceiling Insulation	188.61	304,194
Central AC Replacement	6.60	14,908
Floor Insulation	-	20,806
Gas Furnace Replacement	-	-
Gas Furnace Tune-Up	-	-
Heat Pump Replacement	5.47	39,376
Lighting	27.72	251,454
Low Flow Showerhead	0.05	570
Refrigerator Replacement	9.23	67,844
Storm Windows	-	16
Water Heater Insulation	0.21	2,890
Water Heater Replacement	-	-
Water Pipe Insulation	1.01	3,168
Window AC Replacement	0.64	861
Window Replacement	-	1,055
Window Sealing	-	2,939
Total	347.33	1,028,130

Table 2-6 Ex Ante Savings by Measure Type – OG&E

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*
AC Tune-Up	0.51	952
Air Infiltration	3.32	17,421
Ceiling Insulation	14.86	24,807
Central AC Replacement	0.30	633
Floor Insulation	-	3,990
Gas Furnace Replacement	-	-
Gas Furnace Tune-Up	-	-
Heat Pump Replacement	0.22	2,032
Lighting	1.97	18,138
Low Flow Showerhead	0.05	570
Refrigerator Replacement	1.41	10,402
Storm Windows	-	4
Water Heater Insulation	0.05	680
Water Heater Replacement	-	-
Water Pipe Insulation	0.17	528
Window AC Replacement	0.13	150
Window Replacement	-	6,822
Window Sealing	-	2,331
Total	22.99	89,459

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Table 2-7 presents the ex ante electric savings that were not associated with any AWP utility provider, although the source and context of these savings is unclear. The ex ante savings may be attributable to municipal utilities or co-op utilities, although the specific entities are not identified within the tracking data. This table is a reflection of the non-program ex ante electric savings that are claimed within the tracking system, and these savings are not applicable to any specific service provider.

Table 2-7 Ex Ante Savings by Measure Type – Non-Program (Electric)

Measure	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*
AC Tune-Up	0.60	1,176
Air Infiltration	28.48	38,218
Ceiling Insulation	54.01	56,582
Central AC Replacement	1.51	3,300
Floor Insulation	-	1,528
Gas Furnace Replacement	-	-
Gas Furnace Tune-Up	-	-
Heat Pump Replacement	-	-
Lighting	5.81	52,776
Low Flow Showerhead	0.05	570
Refrigerator Replacement	1.55	11,391
Storm Windows	-	4
Water Heater Insulation	0.02	204
Water Heater Replacement	-	-
Water Pipe Insulation	0.11	352
Window AC Replacement	-	-
Window Replacement	-	2,988
Window Sealing	-	691
Total	92.13	169,781

2.2.2 Ex Ante Savings for Gas Utilities

The participating gas utilities are AOG, CenterPoint, and SourceGas. Table 2-8 presents the savings results of the evaluation of the 2012 AWP for gas utilities. Table 2-9 through Table 2-11 summarize the ex ante savings by measure for each gas utility.

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Table 2-8 Ex Ante Savings by Gas Utility

Gas Utility	*# of Homes*	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*
AOG	26	5,848	96.58
CenterPoint	436	250,543	2,730.41
SGA	32	10,974	148.50
Total	494	267,365	2,975.49

Table 2-9 Ex Ante Savings by Measure Type - AOG

Measure	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*
AC Tune-Up	-	-
Air Infiltration	3,294	80.69
Ceiling Insulation	1,406	1.06
Central AC Replacement	-	-
Floor Insulation	181	2.61
Gas Furnace Replacement	612	11.10
Gas Furnace Tune-Up	58	1.04
Heat Pump Replacement	-	-
Lighting	-	-
Low Flow Showerhead	8	0.01
Refrigerator Replacement	-	-
Storm Windows	-	-
Water Heater Insulation	-	-
Water Heater Replacement	-	-
Water Pipe Insulation	62	0.06
Window AC Replacement	-	-
Window Replacement	126	-
Window Sealing	101	-
Total	5,848	96.58

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Table 2-10 Ex Ante Savings by Measure Type - CenterPoint

Measure	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*
AC Tune-Up	-	-
Air Infiltration	95,606	2,426.91
Ceiling Insulation	33,635	26.03
Central AC Replacement	-	-
Floor Insulation	4,435	67.07
Gas Furnace Replacement	10,223	198.50
Gas Furnace Tune-Up	445	9.68
Heat Pump Replacement	-	-
Lighting	-	-
Low Flow Showerhead	8	0.01
Refrigerator Replacement	-	-
Storm Windows	126	-
Water Heater Insulation	235	0.42
Water Heater Replacement	161	1.03
Water Pipe Insulation	805	0.77
Window AC Replacement	-	-
Window Replacement	37,921	-
Window Sealing	66,941	-
Total	250,543	2,730.41

Table 2-11 Ex Ante Savings by Measure Type – SourceGas

Measure	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*
AC Tune-Up	-	-
Air Infiltration	4,452	94.55
Ceiling Insulation	2,595	1.92
Central AC Replacement	-	-
Floor Insulation	3,222	43.81
Gas Furnace Replacement	460	7.78
Gas Furnace Tune-Up	-	-
Heat Pump Replacement	-	-
Lighting	-	-
Low Flow Showerhead	76	0.08
Refrigerator Replacement	-	-
Storm Windows	-	-
Water Heater Insulation	30	0.05
Water Heater Replacement	-	0.23
Water Pipe Insulation	75	0.07
Window AC Replacement	-	-
Window Replacement	38	-
Window Sealing	26	-
Total	10,974	148.50

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Table 2-12 presents the ex ante gas savings that were not associated with any AWP utility provider, although the source and context of these savings is unclear. As there are few non-program gas utility providers in the state of Arkansas, the "non-program" ex ante gas savings may represent propane customers or possibly tracking database errors that claim gas savings for homes that are not serviced by a gas utility. Therefore, Table 2-12 is a reflection of the non-program ex ante gas savings that are claimed within the tracking system, and these savings are not applicable to any specific service provider.

Table 2-12 Ex Ante Savings Values by Measure Type – Non-Program (Gas)

Measure	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*
AC Tune-Up	-	-
Air Infiltration	13,480	335.85
Ceiling Insulation	3,897	3.05
Central AC Replacement	-	-
Floor Insulation	605	9.16
Gas Furnace Replacement	891	18.39
Gas Furnace Tune-Up	24	0.59
Heat Pump Replacement	-	-
Lighting	-	-
Low Flow Showerhead	8	0.01
Refrigerator Replacement	-	-
Storm Windows	76	-
Water Heater Insulation	10	0.02
Water Heater Replacement	26	0.13
Water Pipe Insulation	66	0.06
Window AC Replacement	-	-
Window Replacement	11,996	-
Window Sealing	14,389	-
Total	45,468	367.25

2.3 Gross Savings Calculation Methodology

For equipment and retrofits rebated through the 2012 program, calculation methodologies were performed as described in the applicable TRM. Table 2-13 identifies the sections in the applicable TRM that were used for verification of measure-level savings under the AWP.

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Table 2-13 TRM Sections by Measure Type

Measure	*TRM Version*	*Section in TRM*
AC Tune-Up	1.0	3.1
Air Infiltration	2.0	2.2.9
Ceiling Insulation	2.0	2.2.2
Central AC Replacement	2.0	2.1.6
Floor Insulation	2.0	2.2.4
Gas Furnace Replacement	2.0	2.1.3
Gas Furnace Tune up	1.0	2.4
Heat Pump Replacement	2.0	2.1.8
Lighting	2.0	2.5.1
Low Flow Showerhead	2.0	2.3.5
Refrigerator Replacement	1.0	2.27
Water Heater Insulation	2.0	2.3.2
Water Heater Replacement	1.0	2.20
Water Heater Pipe	1.0	2.22
Window AC Replacement	2.0	2.1.10
Window Replacement	2.0	2.2.7

Three measures accounted for the majority of the gross savings for the AWP: air infiltration reduction, ceiling insulation, and the replacement of incandescent lamps with compact fluorescent lamps (CFLs). The calculation methodologies for these measures are detailed in the following sections. In these examples, energy units are expressed in kWh.

2.3.1 Air Infiltration Reduction Savings Calculations

The deemed savings values for air infiltration reduction were developed through EnergyGauge, a simulation software program. Multiple equipment configurations were simulated in each of the four Arkansas weather zones in developing savings values denominated in deemed savings per CFM_{50} of air leakage rate reduction. Table 2-14 summarizes the deemed savings values for Weather Zone 7 (from TRM V2.0).

Table 2-14 Deemed Savings Values for Air Infiltration Reduction, Zone 7

Equipment Type	*kWh Savings / CFM50*	*kW Savings / CFM50*	*Therm Savings / CFM50*	*Peak Therms / CFM50*
Electric AC with Gas Heat	0.2387	0.0002171	0.0790	0.001853
Gas Heat Only (no AC)	0.0565	n/a	0.0790	0.001853
Elec. AC with Resistance heat	1.7891	0.0001584	n/a	n/a
Heat Pump	1.1295	0.0001584	n/a	n/a

The following example considers a residence in Weather Zone 7 with electric AC and gas heat. If the residence had a leakage rate of 16,100 CFM_{50} before air infiltration

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reduction and a leakage rate of 7,220 CFM_{50} after, then the residence would have an annual gross savings of 2,120 kWh.

$$Air\ Infiltration\ Savings = 0.2387 \frac{kWh\ Savings}{CFM_{50}} \cdot \left(16{,}100\ CFM_{50\ pre} - 7{,}220\ CFM_{50\ post}\right)$$

$$Air\ Infiltration\ Savings = 2{,}120\ kWh$$

It should be noted that as the air infiltration calculation is based on whole house leakage reduction, this calculation accounts for leakage reductions from a wide range of building shell improvements. These improvements include door sweeps, structural repairs, and window sealing measures. Although window sealing was performed on many homes that received overall air infiltration work, this air infiltration calculation inherently includes the leakage reduction resulting from the window sealing measure. Therefore, homes that claimed ex ante savings for both the air infiltration and window sealing measures only received verified gross savings for the air infiltration measure.

2.3.2 Ceiling Insulation Savings Calculations

The deemed savings values for ceiling insulation were developed through EnergyGauge, a simulation software program. Multiple equipment configurations were simulated in each of the four Arkansas weather zones in developing savings values denominated in deemed savings per square footage of ceiling area. Table 2-15 summarizes the deemed savings values for Weather Zone 8 (from TRM V2.0).

Table 2-15 Deemed Savings Values for Ceiling Insulation, Zone 8

Ceiling Insulation Base R- Value	*AC/Gas Heat kWh/sq ft*	*Gas Heat (no AC) Therms/sq ft*	*AC/Electrical Resistance kWh/sq ft*	*Heat Pump kWh/sq ft*	*AC Peak Savings kW/ sq ft*	*Peak Gas Savings Therms/sq ft*
0 to 4	1.53	0.145	4.8	2.83	0.00115	0.00244
5 to 8	0.756	0.0841	2.65	1.53	0.00038	0.00140
9 to 14	0.451	0.0547	1.68	0.969	0.00029	0.00090
15 to 22	0.28	0.0359	1.1	0.629	0.00013	0.00059

The following example considers a residence in Weather Zone 8 with a heat pump, and a pre-retrofit R-value of ceiling insulation in the range of 9 to 14. If the residence has a ceiling area of 1,200 sq. ft., then the residence would have an annual gross savings of 1,163 kWh.

$$Ceiling\ Insulation\ Savings = 0.969 \frac{kWh}{ft^2} \cdot (1{,}200\ ft^2) = 1{,}163\ kWh$$

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Upon conducting savings verification for the ceiling insulation measures, the Evaluators found that the calculations used in the Frontier database to estimate measure savings were not performed in accordance with the TRM ceiling insulation formula. Further discussion of this issue suggested that the ceiling insulation ex ante savings values presented in the database were actually calculated by using the TRM formula for attic knee wall insulation. This caused the ex ante savings for ceiling insulation to be inflated above the appropriate levels. Therefore, the verified savings and realization rates for ceiling insulation were lower than initially reported.

2.3.3 Compact Fluorescent Lamps (CFLs) Savings Calculations

The deemed savings for compact fluorescent lamps can be calculated by using the following equation.

$$kWh_{savings} = \left(kW_{pre} - kW_{post}\right) x\ AOH\ x\ ISR\ x\ IEF_E$$

The inputs, which assume the following prerequisite knowledge, can be found in Section 2.5.1 of TRM V2.0:

- The quantity and wattages of both pre and post fixtures;
- Whether or not the retrofits were indoor or outdoor; and
- Whether or not the space is air conditioned.

For example, if an air-conditioned residence replaced (5) indoor 75W incandescent lamps with (5) 23W CFLs, then the residence would have an annual gross savings of 188.7 kWh.

$$CFLs\ Savings = (5 \cdot 0.075 - 5 \cdot 0.0023)kW\ \cdot\ 803.6hr\ \cdot 0.86\ \cdot\ 1.05 = 188.7\ kWh$$

2.4 Net Savings Determination

The Evaluators assessed the Arkansas Weatherization Program's overall design, operation, and customer base to identify the likelihood for free-ridership and savings spillover during the 2012 program year. Feedback obtained from customers, community action agencies, and utility staff indicates that the likelihood for program free-ridership is very low. As a high percentage of AWP participants qualified for and participated in the income-qualified statewide Weatherization Assistance Program (WAP), they are unlikely to be candidates for free-ridership in the AWP. The promotional structure of the AWP targets customer groups who would be very unlikely to pursue these weatherization projects in the absence of the program, and who would likely not seek out an energy audit at their own cost.

Additionally, participants who were visited by Evaluator field staff were asked a series of questions related to program savings spillover, and none of these customers identified any potential spillover savings. The Evaluators conclude that the most appropriate net-to-gross ratio to apply to the Arkansas Weatherization Program for the 2012 year is 1, indicating that there are no significant levels of free-ridership or spillover savings.

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2.5 On-site Verification Procedure

In addition to TRM verification, the Evaluators conducted on-site field verification of a sample of participant homes. This process involved reviewing tracking information and inspecting the completeness and accuracy of the implemented measures. Collected field data were incorporated into the gross savings analysis.

2.5.1 Verification Sampling Methodology

The Evaluators conducted a simple random sample of participants for the ex-post verification process. The sample size for verification surveys is calculated to meet 90% confidence and 10% precision (90/10). The sample size to meet 90/10 requirements is calculated based on the coefficient of variation of savings for program participants. Coefficient of Variation (CV) is defined as:

$$CV(x) = \frac{Standard\ Deviation\ (x)}{Mean(x)}$$

Where x is the average Therms or kWh savings per participant. Without data to use as a basis for a higher value, it is typical to apply a CV of .5 in residential program evaluations. The resulting sample size is estimated at:

$$n_0 = \left(\frac{1.645 * CV}{RP}\right)^2$$

Where,

1.645 = Z Score for 90% confidence interval in a normal distribution

CV = Coefficient of Variation

RP = Required Precision, 10% in this evaluation

With 10% required precision (RP), this calls for a sample of 68 for programs with a sufficiently large population. However, for programs with lower levels of participation, a finite population correction is used to maintain cost-effective verification while meeting precision goals. For the AWP, the Evaluators applied a finite population correction factor as follows:

$$n = \frac{n_0}{1 + {}^{n_0}/_{N}}$$

Where

n_0 = Sample Required for Large Population

N = Size of Population

n = Corrected Sample

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The AWP had a total of 641 participants for the 2012 program year. After applying the population correction factor, the program calls for a sample size of 61 participants.

In total, the Evaluators scheduled 65 on-site verification visits to customer homes. As some participants cancelled appointments or were unavailable during the scheduled appointment time, the Evaluators were able to visit and verify measures in 54 of these homes. In order to collect verification data for the remaining residences, the Evaluators conducted telephone verification with 10 additional participant homes in order to verify that all recorded measures had been installed and were functioning properly.

2.5.2 Verification Procedure

The primary goal of field verification was to ensure that the reported measures were installed and operating correctly in participant homes. Participants were given VISA gift cards for their time; these were in the amount of either $25 or $50 depending on the estimated length of the visit. During the on-site visits, the Evaluators' field technicians accomplished the following:

- Verified the implementation status of the measures; verified that the measures were indeed installed, that they were installed correctly, and were functioning properly. Photographs were taken of most of the installed measures.
- Data collected at each site focused on obtaining more specific information regarding the characteristics of the home where the measures were implemented.
- Interviewed customers to obtain additional information on customer satisfaction with the measures as well as information related to potential spillover savings.

2.6 Verified Savings by Measure

After reviewing the tracking data and inputs for savings calculations, the Evaluators provided verified gross savings according to TRM protocols. Savings from the following measures were verified and matched the calculations provided by Frontier Associates:

- AC Tune Up;
- Air Infiltration;
    - The post CFM_{50} measurements from the Evaluator's on-site data collection effort were considered when calculating savings.
- Floor Insulation;
- Gas Furnace Tune Up;
- Heat Pump Replacement;
- Refrigerator Replacement;

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- Water Heater Replacement; and
- Window AC.

The savings calculated in this evaluation differed from Frontier Associates' calculations for several items in the applicable TRM. The Evaluators verified measure-level savings according to the applicable TRM guidelines and obtained results that differed from Frontier Associates' calculations for the following measures:

- Ceiling Insulation
  - According to TRM V2.0, savings are calculated by multiplying a deemed value (which is dependent on the weather zone, the initial R-value, and the heating and cooling equipment types) with the square feet of insulated ceiling space. However, the Evaluators were unable to reproduce the savings provided by Frontier Associates. By multiplying all possible combinations of deemed values with the reported square feet of ceiling space, the Evaluators explored the possibility of a Frontier Associates' savings values being a result of a simple lookup error, but this does not appear to be the case. The Evaluators calculated savings by applying the methodology outlined in Section 2.2.2 of TRM V2.0.
- Central AC Replacement
  - Frontier Associates provided sufficient data to calculate savings according to Section 2.1.6 of TRM V2.0. However, the Evaluators were not able to reproduce the majority of the savings reported by Frontier Associates. The savings calculated by Frontier Associates appear to include an error and are underestimating savings.
- Gas Furnace Replacement
  - Frontier Associates provides a field "GC_Efficiency" that designates the efficiency of the new gas furnace as 90% AFUE, 95% AFUE, none, or below Energy Star. According to Section 2.1.3 of TRM V2.0, "Equipment must, at a minimum, meet the ENERGY STAR efficiency levels to be eligible. Current ENERGY STAR levels require the AFUE, as reported by AHRI, to be 90 percent or higher." Frontier Associates reported savings for participants with gas furnace efficiencies that were not compliant with the aforementioned requirement. The Evaluators did not apply savings for these participants.
- Lighting
  - Originally, TRM V1.0 assumed 2.28 hours of use per day (as shown in section 2.28). However, this value has since been updated for TRM 1 to 2.20 hours of use per day. Frontier Associates used TRM V1.0, but used the outdated value of 2.28 hours of use per day in their calculations of

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savings for CFLs. The Evaluators used TRM V2.0 to calculate savings and assumed all retrofits were performed indoors in air-conditioned spaces.

- Water Heater Insulation
  - Frontier Associates initially mislabeled Therms savings as Peak Therms and Peak Therms savings as Therms savings. In section 2.3.2, TRM V2.0 presents deemed savings values which are a function of tank size and jacket thickness. Given the inputs provided in the tracking data, there were several instances of claimed savings referencing an incorrect deemed value.
- Water Pipe Insulation
  - Frontier Associates initially aggregated Therms savings and kWh savings into a single column mislabeled as kWh savings. As a result, no Therms savings were claimed for this measure until a final database correction occurred after the end of the program year. When calculating savings, the Evaluators disaggregated Therms savings from kWh savings as appropriate.

Savings for some of the measure types could not be verified due to a lack of information within the tracking data received or within the TRM. These measures include:

- Low-Flow Showerheads
  - Savings could not be verified due to a lack of information within the tracking data received. Section 2.24 of TRM V1.0 provides tables with savings based on the quantity of showerheads installed and the number of showers present in the residence - this information was not available in the tracking data. However, the Evaluators applied Frontier Associates savings to the gross realized savings totals because the values were within the bounds of what could be calculated from TRM V1.0 and because the measure only accounts for 0.099% of the overall claimed kWh savings and 0.050% of the overall claimed Therms savings.
- Storm Windows, Window Sealing
  - These measures are not detailed in the TRM. The Storm Windows measure only accounts for 0.002% of the overall claimed kWh savings and 0.047% of the overall claimed Therms savings. The Window Sealing measure accounts for 0.435% of the overall claimed kWh savings and 25.085% of the overall claimed Therms savings. However, the Evaluators determined that most of the claimed Window Sealing savings were already accounted for under the Air Infiltration measure. The Evaluators only attributed savings to the Window Sealing measure for homes that did not also perform the Air Infiltration measure.

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- Window Replacement
  - In section 2.2.7, TRM V2.0 provides savings based on weather zone, equipment type, and whether the window is single or double paned. The tracking data received by the evaluators did not include the square footage of windows or information regarding whether the windows were single or double paned. The evaluators assumed double paned windows, but square footage was not available. This measure accounts for 0.669% of the overall claimed kWh savings and 14.244% of the overall claimed Therms savings.

Table 2-16 presents the savings results of the evaluation of the 2012 Arkansas Weatherization Program, by measure. Total savings summarizes the savings calculations performed as per TRM protocols for the AWP. As discussed above, the net-to-gross ratio for the 2012 program year is 1.

Table 2-16 Net Verified Savings by Measure Type – Overall

Measure	*Realization Rate*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*	*Realization Rate*	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*	*Lifetime Savings (Therms)*
AC Tune-Up	100%	3.06	7,035	35,173	-	-	-	-
Air Infiltration	102%	126.96	370,776	3,707,762	101%	103,877	2,617.80	1,038,766
Ceiling Insulation	60%	114.26	225,641	4,512,819	74%	27,860	452.32	557,203
Central AC Replacement	141%	9.70	21,966	329,490	-	-	-	-
Floor Insulation	100%	-	29,234	584,673	100%	7,838	113.49	156,758
Gas Furnace Replacement	-	-	-	-	61%	6,918	132.13	138,369
Gas Furnace Tune-Up	-	-	-	-	100%	504	10.72	1,511
Heat Pump Replacement	100%	5.69	41,378	620,670	-	-	-	-
Lighting	117%	36.50	349,952	2,274,688	-	-	-	-
Low Flow Showerhead	100%	0.10	1,140	11,400	100%	93	0.10	933
Refrigerator Replacement	100%	11.85	87,162	1,656,078	-	-	-	-
Storm Windows	100%	-	20	394	100%	126	-	2,520
Water Heater Insulation	100%	0.27	3,638	47,294	111%	294	0.52	3,822
Water Heater Replacement	-	-	-	-	100%	161	1.26	1,771
Water Pipe Insulation	100%	1.37	4,312	56,056	100%	942	0.90	10,358
Window AC Replacement	100%	0.76	1,011	12,840	-	-	-	-
Window Replacement	100%	-	8,332	166,636	100%	38,084	-	761,680
Window Sealing	9%	-	509	5,090	1%	833	-	8,330
Total	92%	310.52	1,152,105	14,021,063	70%	187,530	3,329.24	2,682,020

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2.7 Verified Savings for Electric Utilities

The Arkansas Weatherization Program is designed to use both electric and gas utility funds to assist customers with the cost of the in-home audit and energy efficient measures. The participating electric utilities are AEP-SWEPCO, EDEC, Entergy, and OG&E. Table 2-17 presents the savings results of the evaluation of the 2012 AWP for electric utilities. Table 2-18 through Table 2-21 summarize the savings by measure for each electric utility.

Table 2-17 Net Verified Savings by Electric Utility

Electric Utility	*# of Homes*	*Realization Rate*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*
AEP-SWEPCO	59	71%	24.46	85,310	892,550
EDEC	4	106%	1.54	8,357	87,174
Entergy	445	95%	272.4	981,539	12,061,252
OG&E	45	86%	12.12	76,898	980,086
Total	553	92%	310.52	1,152,105	14,021,063

Table 2-18 Net Verified Savings by Measure Type – AEP – SWEPCO

Measure	*Realization Rate*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*
AC Tune-Up	-	-	-	-
Air Infiltration	102%	17.61	33,859	338,595
Ceiling Insulation	9%	2.09	4,466	89,313
Central AC Replacement	-	-	-	-
Floor Insulation	100%	-	4,174	83,484
Gas Furnace Replacement	-	-	-	-
Gas Furnace Tune-Up	-	-	-	-
Heat Pump Replacement	-	-	-	-
Lighting	131%	3.58	34,331	223,149
Low Flow Showerhead	-	-	-	-
Refrigerator Replacement	100%	1.01	7,430	141,170
Storm Windows	-	-	-	-
Water Heater Insulation	100%	0.01	68	884
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	100%	0.17	528	6,864
Window AC Replacement	-	-	-	-
Window Replacement	100%	-	455	9,092
Window Sealing	-	-	-	-
Total	71%	24.46	85,310	892,550

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Table 2-19 Net Verified Savings by Measure Type – EDEC

Measure	Realization Rate	Peak Demand Savings (kW)	Annual Savings (kWh)	Lifetime Savings(kWh)
AC Tune-Up	-	-	-	-
Air Infiltration	102%	0.42	667	6,666
Ceiling Insulation	44%	0.34	579	11,571
Central AC Replacement	-	-	-	-
Floor Insulation	100%	-	264	5,280
Gas Furnace Replacement	-	-	-	-
Gas Furnace Tune-Up	-	-	-	-
Heat Pump Replacement	-	-	-	-
Lighting	129%	0.55	5,274	34,279
Low Flow Showerhead	-	-	-	-
Refrigerator Replacement	100%	0.20	1,486	28,234
Storm Windows	-	-	-	-
Water Heater Insulation	-	-	-	-
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	100%	0.03	88	1,144
Window AC Replacement	-	-	-	-
Window Replacement	-	-	-	-
Window Sealing	-	-	-	-
Total	106%	1.54	8,357	87,174

Table 2-20 Net Verified Savings by Measure Type – Entergy

Measure	Realization Rate	Peak Demand Savings (kW)	Annual Savings (kWh)	Lifetime Savings (kWh)
AC Tune-Up	100%	2.55	6,083	30,413
Air Infiltration	102%	105.60	318,467	3,184,667
Ceiling Insulation	70%	108.38	212,522	4,250,444
Central AC Replacement	143%	9.40	21,333	319,995
Floor Insulation	100%	-	20,806	416,116
Gas Furnace Replacement	-	-	-	-
Gas Furnace Tune-Up	-	-	-	-
Heat Pump Replacement	100%	5.47	39,376	590,640
Lighting	114%	29.87	286,388	1,861,521
Low Flow Showerhead	100%	0.05	570	5,700
Refrigerator Replacement	100%	9.23	67,844	1,289,036
Storm Windows	100%	-	16	318
Water Heater Insulation	100%	0.21	2,890	37,570
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	100%	1.01	3,168	41,184
Window AC Replacement	100%	0.64	861	10,935
Window Replacement	100%	-	1,055	21,104
Window Sealing	5%	-	161	1,610
Total	95%	272.40	981,539	12,061,252

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Table 2-21 Net Verified Savings by Measure Type – OG&E

Measure	*Realization Rate*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*
AC Tune-Up	100%	0.51	952	4,760
Air Infiltration	102%	3.33	17,783	177,835
Ceiling Insulation	33%	3.45	8,075	161,491
Central AC Replacement	100%	0.30	633	9,495
Floor Insulation	100%	-	3,990	79,793
Gas Furnace Replacement	-	-	-	-
Gas Furnace Tune-Up	-	-	-	-
Heat Pump Replacement	99%	0.22	2,002	30,030
Lighting	132%	2.50	23,960	155,739
Low Flow Showerhead	100%	0.05	570	5,700
Refrigerator Replacement	100%	1.41	10,402	197,638
Storm Windows	100%	-	4	76
Water Heater Insulation	100%	0.05	680	8,840
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	100%	0.17	528	6,864
Window AC Replacement	100%	0.13	150	1,905
Window Replacement	100%	-	6,822	136,440
Window Sealing	15%	-	348	3,480
Total	86%	12.12	76,898	980,086

Table 2-22 presents the electric savings that were not associated with any AWP utility provider, although the source and context of these savings is unclear. The savings may be attributable to municipal utilities or co-op utilities, although the specific entities are not identified within the tracking data. This table is a reflection of the non-program electric savings that are claimed within the tracking system, and these savings are not applicable to any specific service provider.

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Table 2-22 Net Verified Savings by Measure Type – Non-Program (Electric)

Measure	*Realization Rate*	*Peak Demand Savings (kW)*	*Annual Savings (kWh)*	*Lifetime Savings (kWh)*
AC Tune-Up	100%	0.60	1,176	5,880
Air Infiltration	102%	28.57	39,015	390,145
Ceiling Insulation	56%	21.35	31,645	632,901
Central AC Replacement	146%	2.18	4,814	72,210
Floor Insulation	100%	-	1,528	30,562
Gas Furnace Replacement	-	-	-	-
Gas Furnace Tune-Up	-	-	-	-
Heat Pump Replacement	-	-	-	-
Lighting	116%	6.41	61,469	399,549
Low Flow Showerhead	100%	0.05	570	5,700
Refrigerator Replacement	100%	1.55	11,391	216,429
Storm Windows	100%	-	4	88
Water Heater Insulation	100%	0.02	204	2,652
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	100%	0.11	352	4,576
Window AC Replacement	-	-	-	-
Window Replacement	100%	-	2,988	59,762
Window Sealing	1%	-	8	76
Total	91%	60.84	155,164	1,820,531

2.8 Verified Savings for Gas Utilities

The Arkansas Weatherization Program is designed to use both electric and gas utility funds to assist customers with the cost of the in-home audit and energy efficient measures. The participating gas utilities are AOG, CenterPoint, and SourceGas. Table 2-23 presents the savings results of the evaluation of the 2012 AWP for gas utilities. Table 2-24 through Table 2-26 summarize the savings by measure for each gas utility.

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Table 2-23 Net Verified Savings by Gas Utility

Gas Utility	*# of Homes*	*Realization Rate*	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*	*Lifetime Savings (Therms)*
AOG	26	83%	4,864	103.6	62,434
CenterPoint	436	69%	172,709	3,055.33	2,466,857
SGA	32	91%	9,957	170.31	152,729
Total	494	70%	187,530	3,329.24	2,682,020

Table 2-24 Net Verified Savings by Measure Type – AOG

Measure	*Realization Rate*	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*	*Lifetime Savings (Therms)*
AC Tune-Up	-	-	-	-
Air Infiltration	101%	3,311	81.18	33,109
Ceiling Insulation	69%	975	16.31	19,509
Central AC Replacement	-	-	-	-
Floor Insulation	100%	181	2.61	3,622
Gas Furnace Replacement	22%	132	2.40	2,646
Gas Furnace Tune-Up	100%	58	1.04	174
Heat Pump Replacement	-	-	-	-
Lighting	-	-	-	-
Low Flow Showerhead	100%	8	0.01	85
Refrigerator Replacement	-	-	-	-
Storm Windows	-	-	-	-
Water Heater Insulation	-	-	-	-
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	100%	62	0.06	678
Window AC Replacement	-	-	-	-
Window Replacement	100%	126	-	2,512
Window Sealing	10%	10	-	100
Total	83%	4,864	103.60	62,434

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Table 2-25 Net Verified Savings by Measure Type – CenterPoint

Measure	*Realization Rate*	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*	*Lifetime Savings (Therms)*
AC Tune-Up	-	-	-	-
Air Infiltration	101%	96,091	2,441.50	960,911
Ceiling Insulation	75%	25,193	410.81	503,867
Central AC Replacement	-	-	-	-
Floor Insulation	100%	4,435	67.07	88,702
Gas Furnace Replacement	63%	6,439	124.00	128,776
Gas Furnace Tune-Up	100%	445	9.68	1,336
Heat Pump Replacement	-	-	-	-
Lighting	-	-	-	-
Low Flow Showerhead	100%	8	0.01	85
Refrigerator Replacement	-	-	-	-
Storm Windows	100%	126	-	2,520
Water Heater Insulation	111%	261	0.46	3,389
Water Heater Replacement	100%	161	1.03	1,771
Water Pipe Insulation	100%	805	0.77	8,857
Window AC Replacement	-	-	-	-
Window Replacement	100%	37,921	-	758,412
Window Sealing	1%	823	-	8,230
Total	69%	172,709	3,055.33	2,466,857

Table 2-26 Net Verified Savings by Measure Type – Source Gas

Measure	*Realization Rate*	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*	*Lifetime Savings (Therms)*
AC Tune-Up	-	-	-	-
Air Infiltration	101%	4,475	95.12	44,746
Ceiling Insulation	65%	1,691	25.20	33,827
Central AC Replacement	-	-	-	-
Floor Insulation	100%	3,222	43.81	64,433
Gas Furnace Replacement	75%	347	5.73	6,947
Gas Furnace Tune-Up	-	-	-	-
Heat Pump Replacement	-	-	-	-
Lighting	-	-	-	-
Low Flow Showerhead	100%	76	0.08	763
Refrigerator Replacement	-	-	-	-
Storm Windows	-	-	-	-
Water Heater Insulation	110%	33	0.06	433
Water Heater Replacement	-	-	0.23	-
Water Pipe Insulation	100%	75	0.07	823
Window AC Replacement	-	-	-	-
Window Replacement	100%	38	-	756
Window Sealing	-	-	-	-
Total	91%	9,957	170.31	152,729

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Table 2-27 presents the gas savings that were not associated with any AWP utility provider, although the source and context of these savings is unclear. As there are few non-program gas utility providers in the state of Arkansas, the "non-program" gas savings may represent propane customers or possibly tracking database errors that claim gas savings for homes that are not serviced by a gas utility. Therefore, Table 2-27 is a reflection of the non-program gas savings that are claimed within the tracking system, and these savings are not applicable to any specific service provider.

Table 2-27 Net Savings by Measure Type – Non-Program (Gas)

Measure	*Realization Rate*	*Annual Savings (Therms)*	*Peak Demand Savings (Therms)*	*Lifetime Savings (Therms)*
AC Tune-Up	-	-	-	-
Air Infiltration	101%	13,549	337.87	135,488
Ceiling Insulation	77%	2,995	50.01	59,902
Central AC Replacement	-	-	-	-
Floor Insulation	100%	605	9.16	12,096
Gas Furnace Replacement	57%	512	9.73	10,237
Gas Furnace Tune-Up	100%	24	0.59	71
Heat Pump Replacement	-	-	-	-
Lighting	-	-	-	-
Low Flow Showerhead	100%	8	0.01	85
Refrigerator Replacement	-	-	-	-
Storm Windows	100%	76	-	1,520
Water Heater Insulation	117%	12	0.02	154
Water Heater Replacement	100%	26	0.13	286
Water Pipe Insulation	100%	66	0.06	726
Window AC Replacement	-	-	-	-
Window Replacement	100%	11,996	-	239,912
Window Sealing	7%	963	-	9,634
Total	68%	30,831	407.58	470,111

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3. In-Depth Interview Findings

As part of the evaluation of the 2012 Arkansas Weatherization Program, the Evaluators conducted in-depth interviews with utility staff members involved in managing and operating the program, as well as ACAAA representatives and community action agency directors. These interviews were designed to explore various aspects of program performance, including overall design, operational efficiency, and opportunities for future improvement.

As the evaluation of the 2011 program year provided details regarding program operation and design, the 2012 evaluation interviews are intended to explore any changes in the program and any new developments over the past year. The 2012 evaluation seeks to follow-up on key issues and draw comparisons between program years where appropriate.

This section presents key findings and issues identified through these interviews.

3.1 Utility Staff and ACAAA Interviews

3.1.1 Data Quality and Availability

Utility staff mentioned that there were some delays in the reporting process, and that Frontier reports had been received two to three months after the implementation work had been completed. Interviewed staff explained that this was likely due to one of several factors including agency reporting delays, savings calculation lead times, or the post-implementation verification process. Utility staff indicated that it was difficult to manage expectations for program performance because at any given time it was unclear how many homes had been serviced under the AWP. Some utility members reported that there had been times when they did not have access to the Frontier database.

Additionally, reports received from Frontier were not always consistent in terms of the data fields included, where some reports did not contain savings values or the correct number of homes. However, utility staff reported that these issues had been improved since the 2011 program year, and that the modifications to the Frontier database had been positive. For example, previous issues such as apparent negative savings numbers, absent measure types, and mislabeling of project details had been for the most part resolved.

3.1.2 Community Action Agency Involvement

Utility staff indicated that working with the agencies had been fairly similar to the 2011 year, in that there were variations in their ability or willingness to participate in the AWP. Some agencies expressed concern over future federal funding availability, as they typically use these funding expectations to plan for future weatherization activity. Utility

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staff also mentioned that some agencies declined to actively participate in the program due to the specific requirements of the AWP. As the AWP uses different documentation and data collection procedures than the statewide WAP, some agencies were reluctant to take on these new tasks or modify their implementation and verification methods.

Utility staff commentary indicated that ACAAA had made efforts to provide outreach to agencies who were not actively participating in the AWP. These outreach activities included holding informational meetings and consulting with the agencies to determine whether they required assistance with any specific aspect of the program. Other utility staff reported that the community action agencies in their service territory had remained fairly active in the AWP throughout the program year; these staff members generally attributed this high level of activity to agency resources, staffing, and past knowledge and experience with the program.

3.1.3 Recruiting Private Co-payment Customers

When asked about the presence of AWP participants who are not eligible for WAP-funding, the majority of utility staff members explained that there were existing barriers to participation for these customers. These barriers included the AWP eligibility requirements, the method currently used to promote the program through the agencies, and the customer perspective that the AWP is not intended for use by customers who are able to provide a private co-payment for services. Utility staff reported that many customers likely believe that the AWP is an income-qualified program due to its strong connection with the income-qualified WAP. Other utility staff members indicated that even if private co-payment customers decide to participate in the program, there are issues with the fact that they are able to determine which measures to install in their homes. This is because a private co-payment customer may elect to implement a measure that does not meet a sufficient savings-to-investment ratio or is not necessarily as cost-effective as the full set of measures recommended by NEAT or MHEA. This would result in lower cost-effectiveness for the program as a whole. Utility staff reported that it would be difficult to manage the participation of these private co-pay customers because they would not fall into the same program structure and set of rules.

Another issue mentioned by the utilities was that agency equipment cannot be used for projects that are outside of the federal program. This requires renting equipment or using CADC equipment that may not be located near the project location. Overall, utility staff members stated that they would like to achieve increased participation from private co-payment customers, but that these existing barriers are well-established and difficult to reduce. Obtaining significant participation from non-WAP customers may require modifications to core aspects of program structure, such as cost-effectiveness requirements for non-WAP customers, program eligibility requirements, equipment allocation, or how the program is presented to customers.

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3.1.4 Program Efficiency and Performance

When asked about the overall performance of the program and its progress in meeting its goals, the majority of utility staff members noted that they had not met their participation or savings targets for the 2012 program year. Interviewed staff explained that this was likely due to several factors related to program design and operation. One of the commonly cited factors contributing to lower than expected participation rates was the current availability and future uncertainty of federal funding for the community action agencies from the WAP.

Utility staff explained that while the AWP is a separate entity from the federally-funded WAP, the success of the AWP is somewhat dependant on WAP activity and performance. Utility staff stated that many agencies prioritize the WAP over the AWP, and that they typically elect to use available federal funding before seeking out AWP-specific projects. Additionally, interviewed staff mentioned that the agencies had been strongly encouraged to expend ARRA funds before AWP funds in order to meet statewide WAP ARRA production targets. Utility staff explained that there appear to be bottlenecks in several areas of program operation, including wait list times, agency implementation, data transfers, savings calculations, and data reporting. While some of these issues have been partially resolved since prior program years, utility staff indicated that operational efficiency has continued to present a challenge for all parties in the AWP.

3.1.5 Communication and Collaborative Efforts

Interviewed utility staff members commonly reported that communication throughout the AWP had been somewhat limited and unclear over the past year. As the TRM requirements are changing and there have been modifications to the data collection and savings calculation processes, the 2012 program year has required utilities and agencies to coordinate their efforts in meeting the new guidelines. However, utility staff explained that it is difficult to determine which parties are aware of the most current requirements and future plans for the AWP, which causes difficulties in working as a cohesive group of utilities and agencies. It appears that each entity may have a different interpretation of the current program requirements or market environment, and communicating all relevant program details has been a challenge.

Utility staff members noted that with such a large number of organizations working on the AWP, there have been periods where program leadership was somewhat undefined. Interview respondents indicated that some individuals are making efforts to coordinate all relevant parties and maintain program consistency, but that this is difficult due to the various organization types involved. Although CADC and ACAAA are able to coordinate many of the agencies' efforts, the parties working within the AWP may perceive an overall lack of program-wide coordination. These findings suggest that one of the most beneficial and realistic improvements to the program may be to ensure that all parties understand the interests, goals, and operational processes of each other

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agency and utility, and to have a central information resource that presents each party with the same set of relevant program requirements, program performance and planned operational changes.

3.2 Community Action Agency Interviews

In order to gain insight into the implementation-level operation and management of the program, the Evaluators conducted interviews with community action agencies located within the service territories of participating AWP utilities. These interviews were designed to address several topics related to program administration, and to provide agencies with an opportunity to submit feedback regarding their experiences with the AWP. Specifically, topics addressed during these interviews included:

- Overall level of engagement with the AWP, and forecasted level of engagement in future years;
- Specific methods used in promoting the program, interacting with customers, performing measure installations, and conducting verification procedures;
- Status of the regulatory environment and its effects on agency operation in the context of the program;
- Perceived customer awareness of Arkansas Weatherization Program and its measure offerings; and
- Agency satisfaction with elements of program operation such as communicating with utilities, program structure, and past and future program changes.

In total, the Evaluators conducted interviews with nine of the 15 currently active community action agencies. This section presents the results of these interviews, highlighting key trends and findings among respondents.

3.2.1 Participant Recruitment Process

Agency staff members provided information related to how they promote the AWP and work with customers throughout the application and participation process. Overall, agency staff indicated that they provide several types of services to local residents and have community assistance programs in addition to their weatherization services. As many of these customers are in need of financial assistance, they are typically strong candidates for the income-qualified WAP funding component. The majority of interviewed agencies explained that they perform the implementation work on customer homes without knowing whether they will receive utility funds through the AWP. The agencies send their implementation documentation for processing by the utilities and CADC, and are reimbursed if the project qualifies for AWP funds. This suggests that the agencies' primary concern when deciding whether to perform a project is their existing level of non-AWP funds. If they have the work performed prior to knowing whether the cost will be reimbursed by the AWP, the agencies must have sufficient funds to

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complete the project. This may reduce agency reliance on AWP funds and the AWP overall, as they appear primarily focused on the availability of Low Income Home Energy Assistance Program (LIHEAP), Department of Energy (DOE), and American Recovery and Reinvestment Act (ARRA) funds.

Several agency staff members explained that their current marketing and promotion of the program is very minimal or non-existent due to the substantial wait list for WAP funds. In terms of wait list structure, agencies reported that potential participants are prioritized based on a set of criteria including income level and number of residents in the home. A point system established by the state is applied to all wait listed customers, and customers receive an additional point for every six months that they have been on the list. Some agencies reported that the waiting time was up to one year, while other agencies cited a lead time of two to three years. One agency director reported that the agency had stopped promoting the program early in 2012 because the wait list was longer than expected. Another agency director stated that they were no longer referring customers to the WAP because the majority of customers are not interested in the program when they learn of the wait time.

3.2.2 Agency Involvement with AWP

The interviewed agencies varied in their level of involvement with the AWP. Some of the agencies had completed more than 100 homes under the program, while others had serviced fewer than 10 homes. One agency director explained that their agency had not participated in the AWP, but planned to become involved in the program during the 2013 program year.

Agencies with lower AWP participation rates stated several reasons for these lower activity levels. Two of the agencies reported that the AWP has different requirements than the WAP in terms of data collection, which has caused challenges in the implementation process. Several agencies mentioned that the AWP had originally been more complex and that it had required more effort in administration. However, these agencies indicated that the program's requirements had become more standardized, and that these challenges had been partially or fully resolved. One agency director cited recent improvements in program operation, for example mentioning that the reimbursement process had been streamlined in the past year.

Several agencies indicated that they already conduct weatherization services in customer homes outside of the AWP by using DOE and LIHEAP funding, and that adding the AWP component would require them to take on additional staff members and equipment. These agencies explained that federal funding levels are not fully specified for the upcoming year, and it would be difficult to hire additional staff without a reliably steady source of funds. These responses suggest that some agencies do not have sufficient resources to fully engage the AWP, which may serve as a barrier to participation in the future. This is likely primarily related to the program environment and funding levels, as well as potential reorganization of agencies.

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Several agencies explained that after they had received funding through the American Recovery and Reinvestment Act (ARRA), they had focused on expending this funding along with DOE and LIHEAP funds. Agency staff mentioned that due to the structure of ARRA funding, it was most efficient to first use ARRA funds and service homes outside of the AWP before focusing on the co-pay structure of the utility-sponsored program. Agencies who had serviced few or no homes under the AWP in 2012 explained that they had been weatherizing homes using only federal funding, and that they would be more likely to engage in the AWP if those funding levels are diminished.

3.2.3 Measure Implementation Process

Agency staff members provided details related to the methodologies and tasks involved in providing services to customer homes. All of the interviewed agencies stated that they have staff members who are able to conduct some or all of the program services, while the majority of agencies indicated that they typically hire subcontractors for specific needs. Agency staff explained that bids are received from contractors on an annual basis, and that specialty contractors are used for work such as equipment tune-ups and some building shell measures.

Interviewed agency staff also mentioned that a home may be visited on multiple occasions during the participation process; this occurs due to the structure of the implementation and audit crews. For instance, a residence is first visited by an audit crew in order to take baseline measurements and record data for NEAT or MHEA software processing. An implementation crew arrives during a separate appointment to install the specified measures, but a third crew may be required depending on the scope of services needed. Agencies reported that after the work has been completed, the subcontractors typically take their own ex-post measurements for reporting purposes. Interviewed staff reported that agency representatives also visit residences after the work has been completed in order to conduct verification measurements and administer the customer satisfaction survey. This suggests that many residents are visited multiple times before the work has been completed. Participant survey results do not indicate that this has caused negative impacts on customer satisfaction, although ideally the implementation process would be structured to minimize the number of home visits required.

3.2.4 Collaborative Working Relationships

When asked about the quality of communication among the parties involved in the AWP, agency staff typically stated that communication had been most effective between the agencies and ACAAA, or between the agencies and their respective utility. Agency staff explained that program-wide communication occurs regularly but that these meetings are generally focused on overall program planning rather than coordination between the relevant parties. The majority of agency staff members reported that their communication with the utilities typically consisted of periodic updates regarding

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program performance. Few agency staff members reported having regular communication with other community action agencies throughout the program year.

Additionally, interviewed agency staff explained that the interests and goals of the local agencies, the relevant government organizations (such as the Department of Energy), and the utilities do not always align, and that it is somewhat difficult to coordinate these objectives into a single program. For example, it would be challenging to incorporate a change into the program design structure unless all involved parties were to agree, which is difficult to accomplish in a timely manner. These comments suggest that the current collaborative structure is sufficient for operating the program as it is designed, but that it would likely be difficult to implement specific improvements or take the ideas and interests of each party into consideration.

3.2.5 Future Program Changes

When asked about their intentions to continue participating in the Arkansas Weatherization Program, several of the interviewed agencies stated that they were not certain whether federal funding levels would remain stable and sufficient in future years. Several agency directors explained that as the fiscal year ends in March, details regarding the future funding of weatherization services will likely be unclear for the first few months of the year. While the federal funding for weatherization is not a direct component of the AWP, it does have significant bearing on the activity levels and abilities of each community action agency and on the ability to provide the required AWP co-pay for WAP-eligible customers. According to interviewed staff members, none of the agencies received indication of a DOE allocation for the upcoming year, and ARRA distributions ended in 2012. Two agency directors mentioned that LIHEAP funds are one of the main reasons that the agencies are able to continue conducting weatherization services.

Additionally, agency staff members were uncertain how organizational changes for the statewide WAP would impact the operation of the AWP. Agency directors explained that the agencies view their weatherization abilities from a funding perspective, and that any change to funding or organizational structure in either the AWP or WAP is likely to have an effect on their overall operation. Several agencies indicated that they continually analyze their resources and plan their weatherization activities based on specific funding availability; this could result in exclusively weatherizing non-AWP homes and only using federal funds, or exclusively using AWP utility funds if federal funding is not available.

Agency staff members were asked whether they had strategies for operating weatherization services if federal funding levels are significantly reduced. Several agency directors indicated that they would like to seek out additional private co-pay participants, but that this had been difficult given the structure of the program. As the majority of current participants are eligible for the income-qualified federal

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weatherization program, they are unlikely to have the ability or desire to expend their own funds for whole house energy efficiency improvements.

The majority of interviewed agencies discussed the possibility of a statewide reorganization and reduction in the number of agency offices. Agency directors reported that they expected to either be incorporated into another agency or become responsible for a wider service territory. This would likely concentrate the available funds into a few offices rather than 15 separate entities, but it is unclear how this would affect overall program operation. Overall, agency staff members indicated that several structural changes will likely occur over the course of the next year, which is expected to have significant effects on implementation structure, collaborative efforts, and program administration.

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4. Participant Survey Findings

This chapter presents findings from participant surveys for the 2012 program year of the Arkansas Weatherization Program (AWP). The surveys were administered individually to program participants over the phone, and each program participant was given the same survey. The survey was designed to illuminate key aspects of customers' experiences with the program, including their motivations for participating, prior knowledge of energy efficiency measures, perspectives on saving energy, and satisfaction with the program. Additionally, customers were asked to provide demographic data. In total, 227 program participants responded to the survey.

The data collected from this survey provides insight into participants' overall program experience, specifically addressing:

- Customer motivations and awareness of the program;
- Customer familiarity with energy efficiency;
- Decision making behaviors;
- Customer satisfaction; and
- Customer demographics.

The charts, tables, and graphs will be described throughout this chapter of the report, and implications of the findings will also be discussed as they relate to the program's functioning.

4.1 Participant Motivations and Familiarity with Energy Efficiency

This section details findings related to how participants learned about the Arkansas Weatherization Program and discovering the extent of their prior experience with energy efficiency practices. Table 4-1 illustrates that the majority of participants (61%) heard about the program through "word-of-mouth" from friends, family, or other personal acquaintances. This suggests that the program has great traction within the respective communities, and is likewise being talked about with high praise. This is in agreement with the high levels of participant satisfaction, as discussed later in this chapter. It appears that indirect marketing rather than formal promotional materials is the most influential factor in informing customers about the AWP. Direct marketing approaches such as letters in the mail, newspaper and magazine ads, and contact with the local community action agency make up 25% of the responses, and can therefore be recognized as effective in marketing the program.

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Table 4-1 How Participants Learned of the Program

	Response	*Percentage of Respondents (N = 227)*
How did you learn of the Arkansas Weatherization Program?	Information that came in the mail	7%
	Newspaper or magazine article/ad	6%
	Contractor	2%
	Word of mouth from friends, relatives, or others	61%
	TV ad	3%
	Radio ad	0%
	Utility bill message	0%
	Utility website	0%
	Retailer / in store	0%
	Local community action agency	12%
	Other	10%
	Don't know	2%

Respondents were able to provide more than one response for this question. Percentages displayed are percentages of respondents rather than percentages of responses. Therefore, the total exceeds 100%.

Participants were then asked about their reasons for participating. As shown in Table 4-2, the majority of program participants were primarily interested in reducing their utility bills or receiving the improvements at no cost. This is aligned with the design and purpose of the AWP, as the primary objective is to provide services to customers who are in need of significant energy reduction. Additionally, as nearly all AWP participants are eligible for Weatherization Assistance Program (WAP) funds, they are unlikely to have the ability to make these improvements on their own. Several respondents providing responses of “other” reported that they participated in order to have specific equipment or a portion of their home (such as caulking) repaired.

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Table 4-2 Most Important Factors for Participation

	Response	*Percentage of Respondents (N = 227)*
Which was the most important factor in your decision to participate in this program?	To reduce my monthly electric bill	22%
	To reduce my monthly gas bill	19%
	Save energy	16%
	AWP paid for some or all of the improvements	17%
	Recommendation from a friend, relative, neighbor	1%
	It is the right thing to do	1%
	Help save the environment	0%
	Contractor recommendation	0%
	Community Action Agency Recommended	2%
	Other	15%
	Don't know	7%

In order to further understand participants' reasons for participating in the AWP, the survey asked a series of questions relating to their understanding of the concept of energy efficiency prior to participation in the program. For these questions, participants responded on a scale of 1 to 5, where "5" is very familiar, "1" is very unfamiliar, and "3" is neutral, i.e. neither familiar or unfamiliar.

The findings suggest that the majority of participants had some familiarity with energy efficient improvements prior to the start of the program. Table 4-3 shows that just over half of the respondents (52%) stated that they were at least somewhat familiar with the installation of various energy efficiency home improvements while Table 4-4 shows that the vast majority of program participants (67%) were at least somewhat familiar with various household energy saving activities, such as washing clothes with cold water, changing light bulbs, and adjusting heating systems. While this does not necessarily indicate that these participants engaged in these purchases or behaviors, they likely have an understanding of what would be required to incrementally reduce their energy use. A greater percentage of respondents reported being familiar with energy saving activities rather than energy saving purchases, which may suggest that these customers are more likely to take no-cost or low-cost actions when attempting to reduce their energy consumption.

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Table 4-3 Participants' Past Familiarity with EE

	Response	*Percentage of Respondents (N = 227)*
How would you rate your past familiarity with the benefits of installing various energy efficiency *improvements* similar to those offered by the Arkansas Weatherization Program prior to having the audit performed?	Very Familiar	36%
	Somewhat Familiar	16%
	Neither Familiar or Unfamiliar	19%
	Somewhat Unfamiliar	7%
	Very Unfamiliar	11%
	Don't Know	11%

Table 4-4 Participants' Familiarity with Energy Savings Activities

	Response	*Percentage of Respondents (N = 227)*
How would you rate your past familiarity with various household energy saving *activities* such as washing with cold water, reducing your use of light fixtures, and adjusting heating system settings prior to having the audit performed?	Very Familiar	42%
	Somewhat Familiar	25%
	Neither Familiar or Unfamiliar	17%
	Somewhat Unfamiliar	5%
	Very Unfamiliar	3%
	Don't Know	8%

Table 4-5 provides a comparison to the previous two tables by asking participants about their familiarity with energy efficiency as a result of the AWP. The results suggest that the AWP has successfully increased customer familiarity with energy efficiency and energy efficiency options. Compared to responses related to pre-program knowledge, a lower percentage of respondents reported being somewhat or very unfamiliar with energy efficiency options after participating in the AWP. Similarly, 70% of respondents reported that they were somewhat or very familiar with energy efficiency options and practices as a result of their AWP participation. These results suggest that the AWP increased the general awareness regarding energy efficiency, which may lead to additional energy saving behaviors over time.

Table 4-5 Current Familiarity with Energy Efficiency as a Result of AWP

	Response	*Percentage of Respondent (N = 227)*
How would you rate your current familiarity with energy efficiency and energy efficient options for your home as a result of your participation in the Arkansas Weatherization Program?	Very Familiar	56%
	Somewhat Familiar	24%
	Neither Familiar or Unfamiliar	5%
	Somewhat Unfamiliar	2%
	Very Unfamiliar	4%
	Don't Know	9%

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4.2 Participant Involvement with and Future Perspectives on Energy Efficiency

Upon establishing a baseline of understanding about participants' familiarity with energy efficiency, the survey then asked participants about their previous, current and potential future involvement with implementation of energy efficiency improvements in their homes. Table 4-6 shows that 56% of respondents claimed to be performing energy-saving activities. Of those that claimed to be performing energy saving activities, most stated that they washed with cold water or replaced light bulbs. Other less common responses included changing air filters and using less hot water.

Table 4-6 Participants' Prior Energy Saving Activities

	Response	*Percentage of Respondents (N = 227)*
Prior to the audit, did you perform any common household energy saving activities?	Yes	56%
	No	43%
	Don't Know	1%

Participants were then asked whether they had purchased and installed any energy efficient equipment in the past year without receiving a financial incentive; Table 4-7 shows those results. The vast majority (88%) claimed that they had not installed any such equipment. Those who had replaced equipment stated that they replaced refrigerators, air conditioners, heaters, and stovetops, most commonly because their previous equipment was failing.

Table 4-7 Participants' Prior Installation of Energy Saving Equipment

	Response	*Percentage of Respondents (N = 227)*
In the past year, have you installed any energy efficient equipment in your home, besides those installed through the AWP that you have not received an incentive for?	Yes	12%
	No	88%

Participants were then asked about their likelihood to use energy efficiency techniques and implement energy efficiency measures in the future. As shown in Table 4-8, 91% of program participants stated that they now take additional action to save energy in their homes. When asked to elaborate on these activities, participants primarily cited common, low-cost improvements such as installing CFL light bulbs, washing clothes in cold water, and adjusting their heating system. Alternatively, some people stated that they are taking shorter showers, using less hot water, and unplugging devices when they are not in use.

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Table 4-8 Participants' Likelihood to Employ Energy-Saving Activities post-AWP

	Response	*Percentage of Respondents (N = 227)*
As a result of your experience with the program, do you now take additional action to save energy in your home?	Yes	91%
	No	7%
	Don't Know	2%

Respondents were then asked if they would buy energy efficient measures in the future, even if incentives were not offered. The majority (87%) of participants stated that they would be likely to do this. It is unclear which actions participants will specifically take in the future, but based on their other survey responses and the target participant segment for the AWP, these customers are likely to continue purchasing low-cost measures and making minor efficiency improvements.

Table 4-9 Likelihood to Purchase Energy Efficiency Measures Without Incentive

	Response	*Percentage of Respondents (N = 227)*
As a result of your experience with the Arkansas Weatherization Program, would you buy energy efficient measures in the future, even if financial incentives were not offered?	Yes	87%
	No	9%
	Don't Know	4%

4.3 Participant Satisfaction

This section presents the findings from survey questions geared toward understanding participants' satisfaction with the program. Participants were asked about various elements of the program's functioning; the results can be found in Table 4-10. These elements include the information provided by the agency, the quality of installation work, the performance of the equipment installed, and the savings on utility bills. The vast majority of responses show that participants were very satisfied. The performance of the equipment installed received the highest percentage of "very satisfied" responses with 87%. This reflects positively on the installation contractors and verification work performed by the community action agencies.

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Table 4-10 Participant Satisfaction with Various Program Elements

Program Element	*Very satisfied*	*Somewhat satisfied*	*Neither satisfied nor dissatisfied*	*Somewhat dissatisfied*	*Very dissatisfied*	*Don't know*	*N*
Information provided by the community action agency	81%	10%	6%	0%	0%	2%	227
The quality of installation work by the contractor	81%	10%	7%	1%	1%	0%	227
The performance of the equipment installed	87%	9%	3%	-	1%	0%	227
The savings on your monthly utility bills	66%	12%	15%	0%	1%	5%	227
The effort required for the application process	74%	11%	12%	-	1%	3%	227
The wait-time to receive services	52%	19%	15%	7%	5%	2%	227
Information provided by utilities on how to reduce your utility bill	61%	17%	11%	1%	1%	8%	227
Improvement in home comfort	83%	10%	5%	0%	0%	1%	227
Usefulness of the energy audit	78%	9%	8%	-	1%	4%	227
Overall program experience	**85%**	**8%**	**4%**	**1%**	**1%**	**0%**	**227**

The program element with the lowest average satisfaction was wait time. Some customers stated that they were on the wait list for two to three years before they received an appointment with their respective agency. This is in agreement with commentary received from the participating agencies and utility staff, who commonly mentioned that the long wait times for weatherization appointments had a negative impact on customer satisfaction. Some participant responses suggest that they were not aware of the lead time involved in the AWP, and ensuring that prospective participants are informed of the time and effort required in the participation process may partially mitigate negative customer feedback in the future. Although some participants expressed dissatisfaction with individual program elements, 85% of respondents stated that they were very satisfied with their overall program experience, while another 8% stated that they were somewhat satisfied overall.

The table below provides an aggregation of overall program satisfaction by averaging the percent of responses for each individual program element. Taking all program elements into account, three-quarters of respondents stated they were very satisfied and 11% reported being somewhat satisfied.

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Table 4-11 Average Participant Satisfaction Levels across Program Elements

Average of Satisfactions with Program Elements	*Very satisfied*	*Somewhat satisfied*	*Neither satisfied nor dissatisfied*	*Somewhat dissatisfied*	*Very dissatisfied*	*Don't know*
	75%	11%	9%	1%	1%	3%

Overall, the levels of satisfaction with the program — taken for both individual program elements and the program overall – indicate that program participants were, in general, satisfied with the program. The number of customers claiming dissatisfaction is fairly minor given the scale of the program. The results suggest that the primary source of participant dissatisfaction with the program is related to the length of the appointment waiting list.

4.4 Participant Demographics

This section presents the results from survey questions intended to provide insight into the demographic data of participants. The survey also included questions related to participant residence characteristics; residence characteristics include the age, square footage, heating type, and water heating type of participating homes. Additionally, respondents were asked about the number of bedrooms, bathrooms, showers, and total residents in their homes.

Table 4-12 Home Construction Dates

	Response	*Percentage of Respondents (N = 227)*
When was your home built?	Before 1970	55%
	1970's	22%
	1980's	9%
	1990-1994	1%
	1995-1999	2%
	2000-2005	-
	Don't know	9%
	Refused	1%

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Table 4-13 Approximate Square Footages of Participant Homes

	Response	*Percentage of Respondents (N = 227)*
What is the approximate square footage of your home?	Less than 1,000	11%
	1,001 - 1,500	34%
	1,501 - 2,000	11%
	2,001 - 2,500	3%
	Greater than 2,500	3%
	Don't know	36%
	Refused	2%

Table 4-14 Number of Bedrooms in Participant Homes

	Response	*Percentage of Respondents (N = 227)*
How many bedrooms are there in your home?	1	1%
	2	29%
	3	59%
	4	10%
	Don't Know/Refused to Answer	1%

Table 4-15 Number of Bathrooms in Participant Homes

	Response	*Percentage of Respondents (N = 227)*
How many bathrooms are there in your home?	1	69%
	2	28%
	3	1%
	Don't Know/Refused	2%

Table 4-16 Number of Showers in Participant Homes

	Response	*Percentage of Respondents (N = 227)*
How many showers are there in your home?	0	5%
	1	76%
	2	17%
	3	0%
	Don't Know/Refused	2%

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Table 4-17 Number of Residents in Home Year-Round

	Response	*Percentage of Respondents (N = 227)*
How many people live in your home year round, including yourself?	1	41%
	2	38%
	3	8%
	4	7%
	5	4%
	7	0%
	Don't Know/Refused	1%

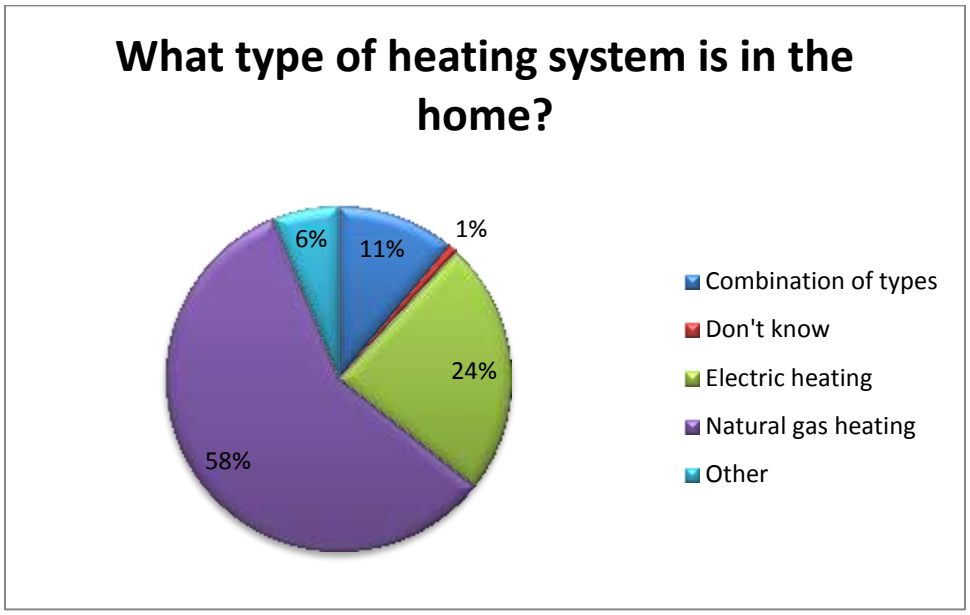

Figure 4-1 Types of Heating Systems in Participant Homes

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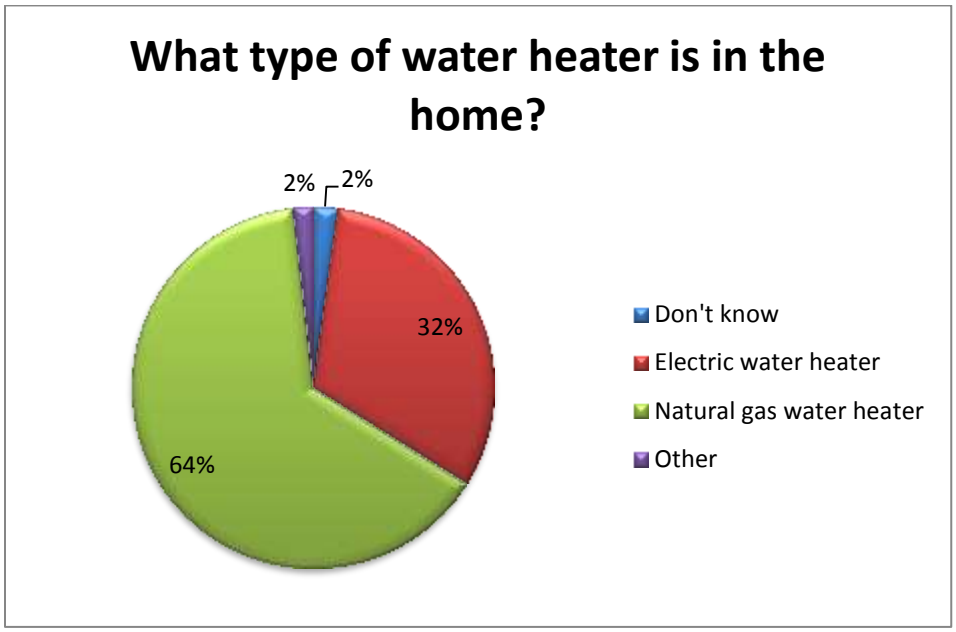

Figure 4-2 Types of Water Heaters in Participant Homes

Table 4-18 Income Ranges of Participants

	Response	*Percentage of Respondents (N = 227)*
Please indicate which range your total household income falls. Is the total annual income of your household:	Less than $25,000	60%
	$25,000 - $35,000	13%
	$36,000 - $50,000	1%
	$51,000 - $75,000	0%
	$76,000 - $100,000	0%
	Greater than $100,000	0%
	Don't Know/Refused to Answer	26%

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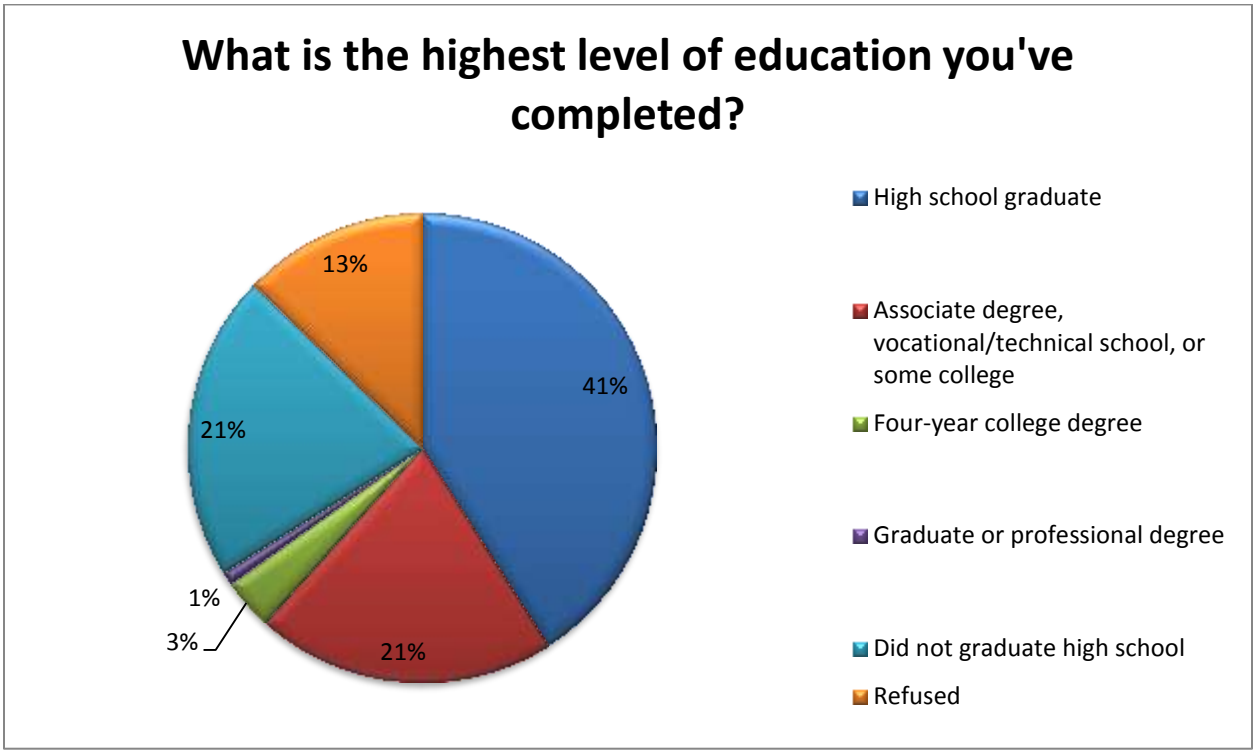

Figure 4-3 Reported Participant Education Levels

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5. Program Process Review

In 2012, the Arkansas Weatherization Program (AWP) provided residential energy audits and energy efficiency installations to customers within the following gas and electric utility service territories:

- American Electric Power – Southwestern Electric Power Company (AEP-SWEPCO);
- Empire District Electric Company (EDEC);
- Entergy;
- Oklahoma Gas and Electric (OG&E);
- Arkansas Oklahoma Gas Corporation (AOG);
- CenterPoint Energy (CenterPoint); and
- SourceGas Arkansas (SGA).

Participating homes were evaluated in order to determine potential energy efficiency measures that would improve overall building efficiency and reduce residential energy usage. The AWP provided funds for the installation of various measures, including:

- Ceiling, floor and wall insulation;
- Duct insulation and repair;
- Window sealing and replacement;
- Furnace, air conditioner, and heat pump tune-up and replacement;
- Water heater insulation and replacement;
- Lighting retrofits; and
- Low flow shower heads.

Program structure has remained fairly consistent between the 2011 and 2012 program years. As with prior years, customers who do not receive funding through the statewide income-qualified Weatherization Assistance Program (WAP) are responsible for a portion of the audit cost, as well as a portion of the resulting equipment or measures to be installed in the home.

In order to qualify for the AWP, customer homes must meet specific criteria indicating that the residence is severely energy-inefficient. Participants must be a residential customer of at least one utility that is involved in the AWP. The program is available

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only to residences built prior to 1997. Additionally, participant homes must meet three of the following seven criteria[1]:

- Ceiling insulation less than or equal to R-30;
- Wall insulation equal to R-0;
- Floor insulation equal to R-0;
- Single pane windows with no storm windows attached;
- Non-working heating system or heating system with less than 70% AUE;
- Non- working cooling system or cooling system with SEER of 8 or less; and
- Air infiltration problems identified through a) visual inspection of duct-work, walls, floors, ceilings, doors, and windows; or b) pre-blower door test.

In the 2012 program year, private co-pay customers paid between $50 and $200 for the audit upfront depending on how many participating utilities the customer had. For customers qualifying for WAP funding, the combined federal and utility sources fully cover the cost of the initial energy audit, and up to approximately $8,000 can be spent on associated energy efficiency measures. Energy efficiency measures for WAP and AWP participants are identified through the use of National Energy Audit Tool (NEAT) or Mobile Home Energy Audit (MHEA) software, which determines the most cost-effective and energy-saving measures for each home.

The AWP has continued to use a “whole home” approach to residential energy efficiency, where energy efficiency measures are chosen and implemented based on total cost and energy savings rather than focusing on a specific fuel type or measure category. Participating homes are serviced by one or more of the participating utilities, and may also be serviced by municipal co-ops. If the home has natural gas and electric service provided by participating utilities, or is all-electric, the participant receives the maximum funds through the program. In order to maintain cost-effectiveness, homes that are neither all-electric nor serviced by two participating utilities receive a lower level of assistance through the program.

Local community action agencies work with customers to enroll in the program and determine AWP and WAP eligibility. After the customer is approved and the in-home audit is performed, optimal energy efficiency measures for AWP (and WAP, for eligible customers) are identified through the use of NEAT or MHEA software. The local agencies then use their internal crews or hire contractors to install these measures in the home. Resulting savings are calculated and recorded for the purposes of EM&V and cost-effectiveness testing.

[1] Eligibility requirements are taken from AWP program design filed March 15, 2011 with the Commission. These can be found at: http://www.apscservices.info/pdf/07/07-079-tf_62_1.pdf. The Commission Order approving the design was order # 20 located at: http://www.apscservices.info/pdf/07/07-079-tf_76_1.pdf issued on June 30, 2011.

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5.1 Interview and Survey Data Collection Summary

The process evaluation of the 2012 Arkansas Weatherization Program included several sets of explorative interviews and surveys. These were designed to gain perspectives and insight from program staff, utility customers, and installation contractors regarding the performance and operation of the program. Specifically, the survey and interview tasks included:

- Participant survey. A sample of participants from the 2012 program year was given a survey in order to provide feedback related to their experience with the Arkansas Weatherization Program. This survey addressed topics including customer satisfaction, decision making, and energy efficiency preferences.

- Community Action Agency Interviews. The Evaluators conducted interviews with the local community action agencies responsible for promoting the program, interacting with customers, installing approved measures, and coordinating program implementation tasks. These interviews provided insight into overall program processes and characteristics of the target customer segments.

- Program staff interviews. Interviews were conducted with utility staff and third party implementation staff (members of ACAAA). These interviews provided insight into recent program changes, specific program processes, potential future improvements to program operation, and overall program performance.

Table 5-1 below summarizes the survey and interview data collection for this process evaluation effort, including data collection type, number of respondents, and additional details.

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Table 5-1 Interview and Survey Data Collection Summary

Target	*Component*	*Activity*	*N*	*Details*
Program Management Staff	Empire Electric Program Manager	Interview	1	The program manager and operational staff are responsible for coordinating program data, managing reimbursements to local agencies, planning for overall program activity and savings expectations, and communicating with utility and ACAAA staff as necessary throughout the program year.
	AOG Program Manager	Interview	1	
	OG&E Program Manager and Staff	Interview	3	
	SourceGas Program Manager	Interview	1	
	SWEPCO Program Manager and Staff	Interview	2	
	CenterPoint Program Manager	Interview	1	
	Entergy Program Manager	Interview	1	
ACAAA Staff	AWP Coordination Staff	Interview	2	The Energy Policy Coordinator and other ACAAA staff are responsible for coordinating efforts among the local agencies and providing information to the utility program managers.
Community Action Agency Directors	Black River Area Development Corp. (BRAD)	Interview	1	The community action agency directors are responsible for coordinating the audit and installation crews throughout the measure implementation process. Additionally, local agencies promote the program and reach out to customers who are potential participants in the AWP. Agency directors plan program operations and activity, and manage agency funding throughout the program year.
	Central Arkansas Development Council (CADC)	Interview	1	
	Community Action Program for Central AR Inc. (CAPCA)	Interview	1	
	Crowley's Ridge Development Council (CRDC)	Interview	1	
	Crawford-Sebastian Community Development Council, Inc. (C-SCDC)	Interview	1	
	Community Services Office, Inc. (CSO)	Interview	1	
	Southwest Arkansas Development Council, Inc. (SWADC)	Interview	1	
	Pine Bluff Jefferson County Economic Opportunities Commission, Inc. (PBJCEOC)	Interview	1	
	Ozark Opportunities, Inc. (OOI)	Interview	1	
Program Participants	2012 AWP Participants	Survey	227	This constituted a random sample of program participants who had received at least one measure through the Arkansas Weatherization Program.

5.2 Post-Implementation Verification Review

As per the February 8, 2012 Supplemental Guidance Regarding Evaluation Strategies memorandum, the evaluation includes an assessment of internal quality assurance and quality control procedures conducted by program operations staff. As per the memorandum, the goals of this QA/QC assessment include:

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- Identifying the goals for the inspection and verification of the Arkansas Weatherization Program;
- Determining the specific parameters used in the verification process and whether these parameters are appropriate for the program;
- Identifying the target and actual confidence and precision levels for the inspection and verification activities;
- Reviewing the internal M&V participant selection process and the sampling techniques employed by program implementation staff;
- Reviewing site inspection documents and findings, and evaluating any savings adjustments that were made; and
- Providing recommendations for the design and operation of future verification activities.

As part of the quality control process, community action agency staff members perform post-implementation verification and inspections on a sample of participant residences. The Evaluators conducted telephone calls with community action agencies including Central Arkansas Development Council (CADC), which has coordinated verification efforts among the local agencies. The discussion involved identifying the methodology and structure of the existing post-implementation verification process. The Evaluators reviewed the field forms used during this process in order to gain insight into the information gathered during verification, and to identify any opportunities for increasing the effectiveness and accuracy of the quality control procedures.

5.2.1 Overall Verification Methodology

Community action agency staff members conduct verification visits continually throughout the program year as projects are completed. Agency staff reported that they visit each site in order to ensure that the work has been performed correctly. Additionally, CADC staff visit the agencies in order to review documentation and visit a sample of participant homes which are randomly selected. This process is intended to ensure that all homes receive verification measurements and inspections, and that homes are inspected by both the post-implementation audit crew and an agency representative.

The objective during the verification visits is to verify that all recorded measures have been properly installed and are operational. The agency staff members perform a visual inspection of each measure and compare the implemented work to the reported measures in the field work form. If any issues are discovered with measure installation or if any measures are found to be missing from the home, the inspector notifies the installation crew or subcontractors in order to repair or replace a measure. Agency representatives reported that few errors or missing measures had been identified throughout the course of the verification visits, and that savings adjustments were not

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required because any errors are quickly resolved. This ensures that when a project is finalized, the reported installation data match the actual work that was performed.

5.2.2 Agency Verification Results

The interviewed community action agency weatherization directors explained that there had not been any systematic errors or inconsistencies in the work performed by subcontractors or agency installation crews. Additionally, although there had been occasional instances of damaged or improperly installed measures, these had significantly decreased in frequency over time. Agency staff attributed this to the fact that the installation crews and subcontractors had become more familiar with AWP requirements, standards, and implementation methodologies.

In addition to agency staff verification of measures, the subcontractors performing implementation work typically take their own post-installation measurements and inspect the measures to ensure that they are functioning properly. Agency staff reported that the installation contractors are aware of the post-implementation verification process, and understand that they will be required to revisit participant homes if an error or discrepancy is discovered.

The introduction of new TRM protocols has required the agencies to conduct additional measurement and verification procedures in order to satisfy the stipulated data requirements. Several agency directors reported that the continued introduction of new TRM requirements has increased overall administration and verification efforts, but that the process had become fairly streamlined in terms of data collection.

5.2.3 Overall Review Findings

Overall, the Evaluators conclude that the Arkansas Weatherization Program currently has sufficient internal verification procedures to provide accurate and complete implementation data. The current procedures involve conducting post-implementation verification on all participant homes, which allows the agencies to identify any outstanding discrepancies between contractor reports and actual implementation. As CADC typically reviews contractor and agency reports during visits to the agency offices, there are several quality control procedures in place to ensure that reported data are accurate and reliable.

In terms of data collection and transfer, it is crucial that the community action agencies and their subcontractors collect all data required by the applicable TRM. Tracking data reviewed for the 2012 year suggests that some inputs are not currently being collected, which creates difficulties during the third-party verification process. Additionally, it would be beneficial for the EM&V process for the agencies to submit all collected data and details to Frontier Associates or CADC for verification, processing, and record keeping. Supplementary implementation data such as specific measures implemented for air infiltration work, for example, may be beneficial during the ex-post verification process. As the TRM receives updates and revisions, data requirements may increase, and the

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agencies should be prepared to modify their verification procedures in order to meet any new guidelines.

5.3 Survey Documentation Review

As part of their internal record keeping and program evaluation, ACAAA and the local community action agencies administer surveys to customers who have participated in the AWP. The purpose of these surveys is to gather information regarding customer satisfaction, and general feedback from customers regarding their experience with the agencies and program as a whole.

In the 2011 program year, agencies used different survey instruments with variations in formatting and content. Starting in 2012, the agencies began to use more standardized survey instruments in order to maintain consistency among the organizations. In some cases the surveys have been slightly customized, but the overall content is fairly consistent across agencies.

The standardized survey has three distinct sections: customer information, satisfaction questionnaire, and write-in responses. The survey starts by asking meta-level questions to identify the customer and to provide descriptive information about the survey, such as the following: agency to which the customer is affiliated, date completed, customer name, job number, address and county. This is followed by the customer satisfaction component. Survey respondents answer questions on a scale of 1-4, where 1 represents “very dissatisfied” and 4 represents “very satisfied.” 2 and 3 are “dissatisfied” and “satisfied,” respectively. The questions address selected elements of the program experience, including:

- Were you satisfied with the information supplied in the energy audit?
- Were you satisfied with the material used for the weatherization work?
- Were you satisfied with the workmanship of the delivered service?
- Were you satisfied with the speed of delivered services?
- Were you satisfied with the Weatherization Program as a whole?

The majority of respondents indicated partial or high satisfaction with each element, and many customers rated all program elements with a rating of “very satisfied”. Very few respondents provided ratings indicating dissatisfaction.

Finally, the survey asks for three write-in responses. The first asks the respondent to explain any 1s or 2s (indicating dissatisfaction) from the previous section. The second asks for any additional comments or suggestions about the program and the last explains that signing the bottom page confirms that the work has been completed and asks if any measures were not properly installed. The majority of customers did not provide open-ended responses for any of these fields, and customers who did complete these sections typically provided positive commentary. Some customers explained that

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they were very thankful for the program's services or praised the work that had been completed by the implementation contractors. In a few cases, customers identified issues that they had experienced during their participation process. These responses typically conveyed some level of misunderstanding, such as when customers had expected more or different work to be performed on their homes.

Three of the community action agencies administered a prior version of the AWP survey form, which only addresses one satisfaction element. It is possible that these surveys were conducted prior to the standardization of survey forms across agencies.

Although the Evaluators conduct satisfaction and decision making surveys with a sample of AWP participants, it is recommended that the local agencies continue administering these surveys. This will provide an opportunity to monitor customer satisfaction over time, and identify any issues as they arise. Additionally, the surveys allow customers to provide feedback regarding their experiences with installation contractors and measure implementation, which is a valuable communication channel.

In terms of additions or modifications to the survey instrument, it may be beneficial to ask an additional question regarding how participants learned of the program. The survey instrument provided by CADC currently contains this question, and it would likely provide insight to agencies who are interested in the effectiveness of their promotional efforts. However, the survey should be limited to a few important questions rather than comprehensively covering all aspects of the program experience. Relatively brief surveys minimize time and effort burdens on customers, and may contribute to more accurate or complete results.

5.4 Training Session Activity Review

The Evaluators reviewed a list of training courses attended in 2012 by the community action agencies that participated in the Arkansas Weatherization Program. Training courses were held in a variety of locations including the cities of Bentonville, Little Rock, Jacksonville, Fort Smith, Springdale and Rogers.

In total there were 490 attendees at 209 training sessions, with between one and 32 attendees were per class. About half of the courses offered certificates and, in total, 334 certificates were awarded. The training sessions averaged nearly 14 hours in length and resulted in more than 6,500 person-hours of training. Training sessions were held throughout the year but nearly a third of the classes were held in the month of July.

Classes covered a wide variety of topics including courses on weatherization (e.g., weatherization in general, wall insulation, HVAC, and mobile home weatherization), health and safety issues (e.g., OSHA requirements, worksite safety), energy audits, and on the NEAT and MHEA software. A number of courses also pertained to more administrative topics such as teamwork, providing information to the public, procurement, and program administrative requirements.

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The training courses were sponsored by a number of groups including the community action agencies, a community and technical college, the Weatherization Assistance Program, the Department of Energy, and the Arkansas Community Action Agencies Association (ACAAA).

Training topics were similar to those covered in 2011. Moreover, the total number of hours spent on training declined somewhat from the prior year. This may reflect a decreasing need for training because a pool of trained staff has been developed during prior years' activity to administer and deliver the weatherization services. However, continued training is recommended to keep current staff informed of changes to program operations, new weatherization techniques, and to refresh previously taught content.

5.5 Waiting List and Deferral Records Review

In addition to the utility funding that partially offset the costs of in-home audits and measure installations, the majority of customers were eligible to receive federal funds through the Department of Energy Weatherization Assistance Program (WAP). This funding was available to customers who met specific socioeconomic criteria, and was used to cover the costs of the required AWP co-pay for audit and equipment installation and servicing. Due to the large number of applicants for the federal WAP funds, customers were assigned to waiting lists after working with local community action agencies to determine eligibility.

The Evaluators reviewed information related to the number of customers who were placed on waiting lists to receive WAP federal funding by community action agencies that participated in the AWP during 2012. At the end of the 2012 calendar year, there were more than 3,000 customers on the WAP waiting list for participating agencies. Participating agencies had between 52 and 1,053 prospective participants in the waiting list phase, suggesting that the 2013 program year will begin with many customers in the pipeline for AWP participation. As nearly all of the participants in the AWP have moved through WAP channels to receive federal funding, there is likely high potential for engaging customers who have a broader range of socioeconomic characteristics. Additionally, reductions in federal funding or other market factors may make it necessary to recruit customers who are able to participate in the AWP without assistance from the WAP.

Community action agencies that participated in the AWP during 2012 provided information related to the number of walk-aways / deferrals they have experienced with customers who were seeking to participate in the WAP. Walk-aways / deferrals typically occur when a residence is in a condition that the weatherization measures would not be cost effective. Such conditions include substantial roof leakage, otherwise damaged building structure, or other characteristics that prevent the home from satisfying program criteria. In 2012, 500 deferrals were made by agencies that participated in the

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AWP. When feasible, the agencies often seek alternative funds to assist in home repairs that would then make the home eligible for weatherization.

5.6 Arkansas Weatherization Program Logic Model

Figure 5-1 presents a logic model for the Arkansas Weatherization Program, divided into stages to represent the phases involved in administering and operating the program

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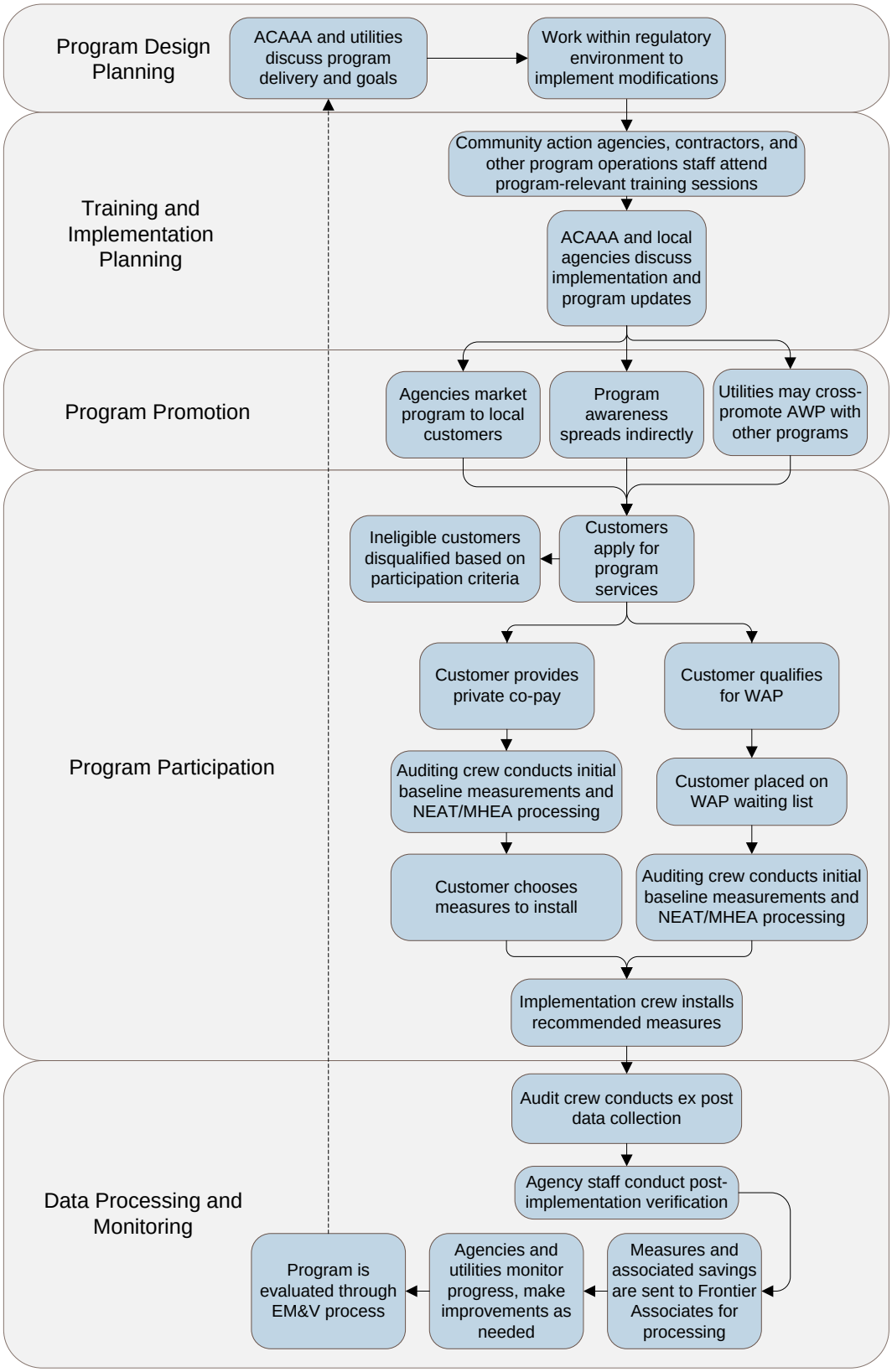

Figure 5-1 Arkansas Weatherization Program Logic Model

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5.7 Arkansas Weatherization Program 2012 Participation

In 2012, the Arkansas Weatherization Program serviced a total of 641 homes, which is a reduction from the 810 homes in the 2011 program year. Services provided to residences included in-home energy audits as well as the installation of various energy efficiency measures. The program was promoted and implemented through local community action agencies, which were responsible for communicating with potential participants and enrolling them in the program. Table 5-2 displays total participation disaggregated by the community agency associated with the participant.

Table 5-2 Total Participation by Community Action Agency

Agency Name	*Percentage of Participating Homes*
Central Arkansas Development Council	50%
Southwest Arkansas Development Council	11%
Universal Housing Development Council	10%
Crowley's Ridge Development Council	8%
Pine Bluff-Jefferson County Economic Opportunities Commission	6%
Crawford-Sebastian Community Development	6%
Community Action Program for Central Arkansas	3%
Community Services Office	3%
Office of Human Concern	2%
Ozark Opportunities	0.2%
N	641

The AWP is offered in all investor-owned utility service territories and is funded by participating gas utilities and electric utilities throughout Arkansas. Depending on the location of customers and the fuel sources used in their homes, services for each customer are funded by one gas utility, one electric utility, or both a gas and an electric utility. Table 5-3 cross-tabulates participation by the gas and/or electric utility associated with the participant. “N/A” represents projects performed in homes with only one utility source or with a utility service provider that is not part of the AWP.

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Table 5-3 Participation by Associated Utility

Electric Utility	Gas Utility			
	Arkansas Oklahoma Gas	*CenterPoint*	*Source Gas*	*N/A*
Entergy	-	322	2	122
OG&E	20	-	13	12
AEP-SWEPCO	3	41	2	13
Empire Electric	-	-	4	-
N/A	3	73	11	-

Figure 5-2 displays a comparison between 2012 and 2011 in terms of participation rates by month. Overall, the 2012 program year experienced less participation seasonality and lower participation rates than the 2011 year. Participation rates in 2012 were higher at the end of the year than in 2011, but the 2012 AWP experienced a slight decline in the summer months.

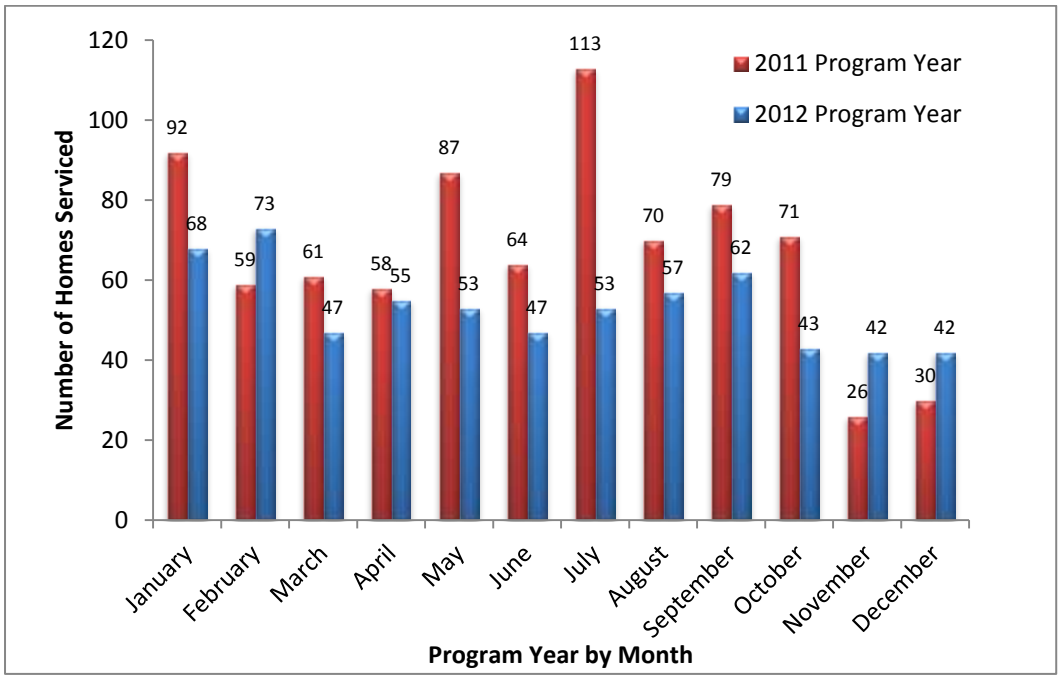

Figure 5-2 Participation Rates by Month, 2011 vs. 2012

A total of 3,690 separate measure installations were performed in the 2012 program year, as compared with 4,736 in the 2011 year. Table 5-4 displays the number of installations by measure type, arranged by the most commonly installed measures. CFL installations were the most common measure type, followed by air infiltration. Air conditioning and gas furnace tune-ups accounted for a small number of installations.

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Table 5-4 Total Installations by Measure

Measure	*Number of Installations*
CFL	601*
Air Infiltration	619
Water Heater Pipe	335
Ceiling Insulation	387
Window Replacement	327*
Water Heater Jacket	141
Gas Furnace Replacement	111
Energy Star Refrigerator	151
Floor Insulation	62
Low Flow Showerhead	21
Storm Windows	92*
Window AC Replacement	43
Foundation	2
Water Heater Replacement	33
Central AC Replacement	64
Central HP Replacement	34
AC Tune-Up	25
Gas Furnace Tune-Up	23
Window Sealing	270*
Vented Space Heater	205
Heat Pump Tune-up	1
Sill Box Insulation	5
Smart Thermostat	64

*Values are based on total number of projects rather than on total number of units installed.

The average square footage of participating residences was 1,273 while the median square footage was 1,214. Homes ranged from 264 square feet to 2,982 square feet.

5.8 Tracking Database Review

The Evaluators received a tracking database developed by Frontier Associates, a consulting firm working with the implementation contractor and participating utilities. This tracking database was evaluated for overall organization and content.

Frontier Associates develops and maintains a participant tracking database that includes a full list of all participants, the measures that were installed in their homes, and the kWh and Therms savings associated with each measure. The Evaluators

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received periodic tracking data updates as well as final tracking exports. These tracking files were evaluated for overall organization and content.

According per protocol A of the TRM V2.0, tracking data should be checked for:

- Participating Customer Information;
- Measure Specific Information;
- Vendor Specific Information;
- Program Tracking Information;
- Program Costs;
- Marketing & Outreach Activities; and
- Premise Characteristics;

Table 5-5 below summarizes the goals and activities of the Database Review of the Arkansas Weatherization Program.

Table 5-5 Database Review Goals & Activities

Category	*Activity*
Participating Customer Information	The dataset should contain unique customer identifiers and full customer contact information.
Measure Specific Information	The tracking data should identify all measures that were installed in each participant home, with associated energy savings.
Vendor Specific Information	The dataset should include the name of the installation contractor associated with each participant.
Program Tracking Information	If possible, the dataset needs to include the dates in which the installations, as well as the initial residential energy audit, were performed.
Program Costs	Not applicable. Cost summaries are recorded and separately reviewed by the utilities.
Marketing & Outreach Activities	In addition to information gathered during the tracking data review and program staff interviews, the Evaluators conducted participant surveys to gather information related to participant interaction with program marketing and outreach.
Premise Characteristics	The dataset should include all measure inputs needed for savings verification, including relevant square footage measurements.

Overall, the tracking data were found to contain sufficient information in most areas. Participant contact information was present for nearly all customers, and addresses were found to be accurate during the field verification process. The measure-specific information was fairly complete in the final version of the tracking data, although previous data exports showed incomplete measure inputs or did not include specific measures. Other project data were fairly complete, although initial versions of the data

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did not include installation dates or audit dates for many participants. This is likely an issue with how the report is requested from the database, as the Evaluators received several permutations of the same participant data. Additionally, some measure inputs were not included in the tracking data because they had not been provided to Frontier. This is more of an issue with the data collection and transfer methods used by the community action agencies; the newer TRM protocols require additional inputs that were not previously necessary. In the future, the EM&V process will be most efficient if all measure inputs necessary to calculate savings are included in the final tracking data.

Tracking data included information regarding which community action agency and which vendor, if any, had implemented the weatherization work. It would be beneficial to include agency and contractor contact information for evaluation purposes, although these details were obtained separately through requests to CADC.

The tracking data did not specifically include information related to program marketing and outreach. Results of internal participant surveys were obtained separately from ACAAA, and the tracking data contained information focused on the specific work performed rather than supplemental information. It is likely not necessary to include marketing and outreach information in the Frontier database, as the Evaluators and ACAAA are able to collect, record, and monitor these data in separate spreadsheets.

Premise characteristics were fairly complete, including square footage, residence type, and heating type. Some initial exports of the tracking data showed mislabeled heating types or utility providers, which required some error checking and revisions to the data. If the database is able to remain consistent in its labeling and categorization of these items, then the premise data will be sufficient in future program years.

5.8.1 Energy Savings Calculation Data

As discussed above, the tracking data was found to include sufficient information for the majority of the measures. However, the tracking data did not include sufficient information for the following measures:

- Low-flow Showerheads
  - TRM V1.0 presents savings values as a function of the number of low-flow showerheads installed and the number of showers per household. The tracking data did not present the number of showerheads installed or the number of showers per household.
- Window Replacement
  - The tracking data did not present the square footage of windows, which is a necessary input in the TRM V2.0 for savings calculation.
- Storm Windows, Window Sealing

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- These measures are not detailed in the TRM. Additionally, the Evaluators determined that most of the claimed Window Sealing savings were already accounted for under the Air Infiltration measure. The Evaluators only attributed savings to the Window Sealing measure for homes that did not also perform the Air Infiltration measure.

Several of the column headings are ambiguous. For instance, the column heading "Current_Rvalue" does not specify to which measure this is referring. In addition, the weather zone of each household is necessary for many of the savings calculations. This information was used by Frontier Associates to calculate savings; however, it was not presented in the tracking data.

Several measures did not contain ex ante savings values for the entirety of the 2012 program year. These measures included:

- Smart Thermostats
- Storm Windows
- Foundation Insulation
- Sillbox Insulation
- Vented Space Heater
- Window Sealing
- Heat Pump Tune up

The lack of savings values for these measures was primarily due to measure inputs that had not been provided to Frontier through CADC and the other community action agencies. Some of these measures were updated with ex ante savings values in March 2013, although the final tracking data contained instances of missing savings values for individual homes and measure types. However, multiple updates to the tracking data after the close of the 2012 program year caused delays in the savings finalization and utility annual reporting process.

The Evaluators recommend that the community action agencies ensure that all relevant and up-to-date implementation data are continually provided to the database management firm in order to minimize difficulties in data collection and savings calculation at the end of the program year. This may involve agreeing upon a data cut-off date in order to assemble all necessary data in time for savings processing and reporting.

In summary, the recommended changes to the tracking data include:

- Providing a complete set of necessary data;
- Considering a data transmission cut-off date for agencies to provide information to the database provider;

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- Providing column headings that limit the opportunity for ambiguity; and
- Providing the weather zone of each household.

5.9 Comprehensiveness Factors

The Arkansas Public Service Commission has in place a set of criteria in order to determine whether a DSM portfolio or program qualifies as "Comprehensive". These criteria are:

- ***Factor 1:*** *Whether the programs and/or portfolio provide, either directly or through identification and coordination, the education,* ***training****, marketing, or outreach needed to address market barriers to the adoption of cost-effective energy efficiency measures;*

The AWP has made efforts to provide education, training, and marketing in order to reduce barriers to increased energy efficiency. The Arkansas Community Action Agency Association (ACAAA) has promoted the program and provided informative outreach to contractors and customers through the use of training sessions and educational courses. However, as the agencies are able to determine their own level of program involvement, the current promotion and outreach strategies may not effectively reduce barriers to energy efficiency in all regions. Individual community action agencies who have not engaged the program or have been involved to a lesser degree likely represent an existing barrier to customer program involvement in their local areas. As funding levels have a significant bearing on agency ability and resources, recent and future funding reductions may further strengthen barriers to program-generated energy efficiency.

- ***Factor 2:*** *Whether the programs and/or portfolio, have adequate* ***budgetary****, management, and program delivery resources to plan, design, implement, oversee and evaluate energy efficiency programs;*

Based on the Commission's Order in docket no. 13-002-U, all of the utility EE programs, including the AWP, will be revised through the Collaborative process outlined in the Order. In addition, the WAP is in the process of being transferred from the Department of Human Services to the Arkansas Energy Office. With this transfer, the WAP may be modified in ways that can enhance program delivery. However, the agencies that have been highly active in the program have reported that they plan to continue recruiting participants or appealing to customers who are able to provide their own co-payment for program services. Further success of the program will likely be significantly influenced by the utilities' and agencies' responses to potentially decreased or absent federal funding levels and any agency-level reorganization. If WAP-eligible participation becomes difficult to obtain, program funding and design modifications may be necessary in order to further appeal to non-WAP-eligible customers.

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- ***Factor 3:*** *Whether the programs and/or portfolio, reasonably address all major* ***end-uses*** *of electricity or natural gas, or electricity and natural gas, as appropriate;*

The offerings through the AWP have continued to cover all typical and available end-uses. Equipment offered within the program includes lighting, HVAC, water heating, and a full complement of building envelope measures including insulation, air sealing, ENERGY STAR® windows and appliances, and others. In addition to providing full weatherization services, the program involves a wide range of residential measures which are directed towards general energy efficiency. The "whole house" approach to participant home improvements is conducive to providing a comprehensive set of measures in each home.

- ***Factor 4:*** *Whether the programs and/or portfolio, to the maximum extent reasonable, comprehensively address the needs of customers at one time, in order to avoid* ***cream-skimming*** *and lost opportunities*

The AWP is effectively addressing the comprehensive needs of its targeted residential customers. The program is designed to identify the lowest-cost, highest-efficiency measures and provide them to customers where the measures will be most effective. The AWP targets severely inefficient homes and accurately select the most effective measures from a wide range of options. This minimizes "cream skimming", as the measures are typically chosen on behalf of the customer based on specific customer needs, cost, and resulting energy savings. The program operates in conjunction with the statewide Weatherization Assistance Program (WAP) to minimize or completely offset costs to WAP-eligible customers. Additionally, participating customers may experience non-energy benefits, such as increased ability to pay their utility bills, improved comfort and overall living space, and information regarding how to properly operate their equipment.

- ***Factor 5:*** *Whether such programs take advantage of opportunities to address the comprehensive needs of* ***targeted customer sectors*** *(for example, schools, large retail stores, agricultural users, or restaurants) or to leverage non-utility program resources (for example, state or federal tax incentive, rebate, or lending programs)*

While the agencies have successfully engaged a substantial portion of the target customer market, some segments may not be fully served by the program. As specific agencies covering individual regions may be less active in the program due to preference or resources, customers in those areas may not have equal opportunity to participate in the program. Additionally, participation by customers not receiving WAP federal funding has been very limited thus far, and it appears that the program is having difficulty engaging customers who are financially able to pay for a portion of their home weatherization. This is likely due to the eligibility requirements and operational structure of the program, where customers who are able to provide a co-payment may not qualify

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for services or believe that they are the target market for the program. If the AWP seeks to recruit substantial participation from private co-pay customers, it is likely that either the promotional structure of the program or the eligibility requirements will have to be modified.

- ***Factor 6:*** *Whether the programs and/or portfolio enables the delivery of all achievable,* ***cost-effective*** *energy efficiency within a reasonable period of time and maximizes net benefits to customers and to the utility system;*

The AWP enables the delivery of cost-effective energy efficiency to utility customers throughout Arkansas. The program is designed to identify and implement the most cost-effective and energy efficient measures available for customer residences, and leverages federal funding for energy efficiency projects. However, the extensive waiting list for customers receiving WAP funding has substantially decreased the potential for higher participation rates and increased implementation waiting time for the AWP. Community action agency resources correlate with WAP funding levels, and these factors have a significant influence on operational efficiency and overall AWP performance due to the inherent connection between the two programs. At present, AWP resources and operational methods are sufficient for delivering cost-effective, steady energy efficiency over time, but program potential may be limited by statewide resources.

- ***Factor 7:*** *Whether the programs and/or portfolio, have evaluation, measurement, and verification "EM&V") procedures* ***adequate*** *to support program management and improvement, calculation of energy, demand and revenue impacts, and resource planning decisions.*

The existing EM&V procedures within the AWP are fairly sufficient in allowing for support of the implementation process and calculation of energy savings. Community action agencies and contractors collected sufficient inputs and measurements for the majority of program measures. The post-implementation verification process conducted by the agencies has been beneficial in ensuring that reported data are accurate and reliable. There were some issues with data collection and tracking information, particularly with regard to inputs for specific measures. With the implementation of new TRM protocols, it will be necessary to modify the data collection process by collecting additional on-site information as specified in the TRM 2.0 and TRM 3.0. If implementation and measurement are not fully completed according to TRM protocols, it is possible that savings will not be recognized for certain measures. Additionally, there appear to be some organizational or consistency issues with the tracking database, resulting in mismatched data or missing fields. In several instances, as noted in Section 2.6, there were difficulties in verifying savings estimates provided by Frontier Associates. It is crucial to resolve these issues prior to the program year end, as they may have a bearing on claimed savings, on-site verification, and overall evaluation results.

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6. Conclusions & Recommendations

Following a review of present program offerings and interviews with utility staff, community action agency staff, and participating customers, the Evaluators found that:

- The Arkansas Community Action Agencies Association (ACAAA) has promoted the program and provided informative outreach to contractors and customers through the use of training sessions and educational courses. However, as the agencies are able to determine their own level of program involvement, the current promotion and outreach strategies may not effectively reduce barriers to energy efficiency in all regions. Individual community action agencies that have not engaged the program or have been involved to a lesser degree likely represent an existing barrier to customer program involvement in their local areas. As funding levels have a significant bearing on agency ability and resources, recent and future funding reductions may further strengthen barriers to program-generated energy efficiency.
- Based on the Commission's Order in docket no. 13-002-U, all of the utility EE programs, including the AWP, will be revised through the Collaborative process outlined in the Order. In addition, the WAP is in the process of being transferred from the Department of Human Services to the Arkansas Energy Office. With this transfer, the WAP may be modified in ways that can enhance program delivery. However, the agencies that have been highly active in the program have reported that they plan to continue recruiting participants or appealing to customers who are able to provide their own co-payment for program services. Further success of the program will likely be significantly influenced by the utilities' and agencies' responses to potentially decreased or absent federal funding levels and any agency-level reorganization. If WAP-eligible participation becomes difficult to obtain, program funding and design modifications may be necessary in order to further appeal to non-WAP-eligible customers.
- The AWP is effectively addressing the comprehensive needs of its targeted residential customers. The AWP targets severely inefficient homes and accurately select the most effective measures from a wide range of options. This minimizes "cream skimming", as the measures are typically chosen on behalf of the customer based on specific customer needs, cost, and resulting energy savings. Additionally, participating customers may experience non-energy benefits, such as increased ability to pay their utility bills, improved comfort and overall living space, and information regarding how to properly operate their equipment.
- While the agencies have successfully engaged a substantial portion of the target customer market, some segments may not be fully served by the program. As specific agencies covering individual regions may be less active in the program

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due to preference or resources, customers in those areas may not have equal opportunity to participate in the program. Additionally, participation by customers not receiving WAP federal funding has been very limited thus far, and it appears that the program is having difficulty engaging customers who are financially able to pay for a portion of their home weatherization. If the AWP seeks to recruit substantial participation from private co-pay customers, it is likely that either the promotional structure of the program or the eligibility requirements will have to be modified.

- The AWP is designed to identify and implement the most cost-effective and energy efficient measures available for customer residences, and leverages federal funding for energy efficiency projects. However, the extensive waiting list for customers receiving WAP funding has substantially decreased the potential for higher participation rates and increased implementation waiting times for the AWP. At present, AWP resources and operational methods are sufficient for delivering cost-effective, steady energy efficiency over time, but program potential may be limited by statewide resources.
- The post-implementation verification process conducted by the agencies has been beneficial in ensuring that reported data are accurate and reliable, although there were some issues in tracking data accuracy and data collection timeliness. With the implementation of new TRM protocols, it will be necessary to modify the data collection process by collecting additional on-site information as specified in the TRM 2.0 and TRM 3.0. If implementation and measurement are not fully completed according to TRM protocols, it is possible that savings will not be recognized for certain measures. Additionally, there appear to be some organizational or consistency issues with the tracking database, resulting in mismatched data or missing fields. It is crucial to resolve these issues prior to the program year end, as they may have a bearing on claimed savings, on-site verification, and overall evaluation results.

Additionally, the Evaluators make the following recommendations in order to improve program operations and overall performance for future program years:

- **Make efforts to align the goals and objectives of the various parties involved in administering and implementing the AWP.** While the overall program has a clear set of objectives and goals, the level of interest and involvement in the program varies across and among the agencies and utilities. While some agencies operate the AWP as a high priority, others view it as a supplementary component of the WAP, and plan their resources based on WAP funding. This causes their involvement in AWP promotion and recruitment to be dependent on WAP funding availability rather than AWP resources. If a future program objective is to obtain participation from non-WAP customers, it may be necessary to modify the program promotion strategy or consult with the local agencies to determine the most optimal method of coordinating AWP and WAP-

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based objectives. For example, promoting the AWP as an important component of a utility's portfolio of Energy Efficiency programs may emphasize the fact that the AWP is not exclusively for WAP-eligible customers.

- **Continue improving overall understanding of TRM protocols and database software in order to reduce inconsistencies in savings expectations and ensure that collected data are sufficient.** As TRM specifications are updated over time, agencies may be required to collect additional measure inputs and it is important to clarify these requirements as early as possible in the program year. During the 2012 program year, some data were not included in the Frontier database because these data were either not collected by the agencies or were not submitted to Frontier for processing. In order to avoid delays in the savings calculation and verification process, data collected from agencies should be reviewed regularly and any errors or missing data should be resolved as soon as possible. Real-time consistency and completeness checks using the stipulated TRM as a guideline will serve to standardize the methods used by the agencies and their contractors, and result in more complete savings estimates.
- **Standardize measure terminology with TRM language.** Some measure names listed in the AWP database were not consistent with TRM nomenclature, such as "Vented Space Heater" (AWP tracking) vs. "Direct Vent Heater" (TRM 2.0). Although the Evaluators and utility staff were able to match the tracking data measures with items in the TRM, standardizing the terminology would reduce the likelihood for calculation errors and increase the overall efficiency of this process.
- **Ensure that the AWP is cost-effective for both WAP-eligible and non-WAP participants.** As private co-pay participants are able to select which measures to install, there is risk of implementing projects in these homes that do not meet cost-effectiveness targets. It is important that the program maintains its whole-house, high-priority energy efficiency focus in order to remain consistent with AWP design structure and goals. This may involve encouraging or requiring private co-pay participants to implement the most cost-effective measures first before selecting specific improvements that may not be as beneficial to the program.
- **Take upcoming WAP and regulatory environment changes and trends into consideration when planning future AWP operational and promotional strategies.** The currently structured AWP functions in the context of community action agency resources and statewide funding levels. Reorganization of the statewide program or local agencies has the potential to significantly affect AWP operation and performance. If WAP-eligible customers continue to comprise the bulk of participation then funding reductions for the statewide program may directly correlate to reduced AWP savings. Program potential should be evaluated in the context of these external factors, and anticipating changes in the

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statewide environment may provide valuable insight when planning future AWP goals and expectations.

- **Ensure that data are available as needed from all parties involved in the AWP.** Throughout the program year, there were several updates, revisions, and corrections to the Frontier savings database, utility tracking data, and agency implementation data. As there are many parties involved in administering and evaluating the AWP, it is necessary to keep records of all previous data and keep it available for review. In the 2012 program year, there were instances where installation data at the agency level were only available in hardcopy format, which increased the data transfer lead time and created inefficiencies in the review process. Community action agencies, utilities, and the database provider should all maintain electronic copies of program data in order to minimize these data transfer difficulties. This will allow for all parties to review crucial program data, and decrease the effort required to provide additional information when it is requested.

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7. Appendix A: Participant Survey Instrument

This section presents the instrument used in conducting telephone surveys with participants of the 2012 Arkansas Weatherization Program.

Arkansas Weatherization Program

Participant Telephone Survey

ID No. _____

Customer Name: _____

Date of interview: _____

Date data entered _____

.....

Hello. May I please speak with [CONTACT NAME]: _____)?

Hello. My name is _____ and I'm calling from Research America on behalf of the Arkansas gas and electric utilities about the Arkansas Weatherization Program your household participated in this year. Our records indicate that your home was weatherized by [AGENCY NAME], on or near [INSTALLATION DATE]. Are you the person who is most familiar with your household's participation in this program?
(IF NOT RIGHT PERSON) May I please speak to the person who would know the most about your household's participation in this program?
REPEAT INTRODUCTION AND CONTINUE
(IF RIGHT PERSON) We are conducting a study to evaluate the Arkansas Weatherization Program, known as the AWP. AWP and community agency staff will use the results of this evaluation to determine the effectiveness of the program and to make improvements. We would like to include your opinions about the program in our evaluation. The interview will take approximately 10 minutes. May I ask you some questions about the work performed? Your responses will remain completely confidential.

Q-1 Our records indicate that you participated in the Arkansas Weatherization Program this year by completing an energy audit and receiving several energy efficient measures installed in your home. Do you recall participating in this program?

- ❑ Yes [SKIP TO Q-4]
- ❑ No [GO TO Q-2]
- ❑ Don't know [GO TO Q-2]

Q-2 Is there anyone else in your household who may be familiar with your household's participation in the program?

- ❑ Yes [GO TO Q-3]

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- ❑ No [THANK RESPONDENT AND TERMINATE INTERVIEW]
- ❑ Don't know [THANK RESPONDENT AND TERMINATE INTERVIEW]

Q-3 May I speak with that person?

- ❑ Yes [RETURN TO Q-1 AND BEGIN QUESTIONS WITH NEW RESPONDENT]
- ❑ No [THANK RESPONDENT AND TERMINATE INTERVIEW]
- ❑ Don't know [THANK RESPONDENT AND TERMINATE INTERVIEW]

RESPONDENT BACKGROUND

As a reminder, your responses to this survey will be kept completely confidential. I'll begin with a few questions about your decision to participate in the program.

Q-4 How did you learn of the Arkansas Weatherization Program? [SELECT ALL THAT APPLY]

- ❑ Information that came in the mail
- ❑ Newspaper or magazine article/ad
- ❑ Contractor
- ❑ Word of mouth from friends, relatives, or others
- ❑ TV ad
- ❑ Radio ad
- ❑ Utility bill message *(Specify which utility)* _____
- ❑ Utility website *(Specify which utility)* _____
- ❑ Retailer / in store
- ❑ Local community action agency
- ❑ Other (*Specify*) _____
- ❑ Don't know [DO NOT READ]

Q-5 What is the main reason you decided to participate in the program? [SELECT ALL THAT APPLY]

- ❑ To reduce my monthly gas bill
- ❑ To reduce my monthly electric bill
- ❑ The AWP paid for some or all of the improvements
- ❑ Contractor recommendation
- ❑ Utility recommendation or information *(Specify which utility)* _____
- ❑ Recommendation from a friend, relative, neighbor
- ❑ Community action agency recommendation
- ❑ It is the right thing to do
- ❑ Help save the environment
- ❑ Save energy
- ❑ Other (*Specify*) _____

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Q-5A Of the things you mentioned, which was the most important?

- ❑ To reduce my monthly gas bill
- ❑ To reduce my monthly electric bill
- ❑ The AWP paid for some or all of the improvements
- ❑ Contractor recommendation
- ❑ Utility recommendation or information *(Specify which utility)* _____
- ❑ Recommendation from a friend, relative, neighbor
- ❑ Community action agency recommendation
- ❑ It is the right thing to do
- ❑ Help save the environment
- ❑ Save energy
- ❑ Other (*Specify*) _____

MEASURE INSTALLATION

Next, I have some questions about the work that was performed in your home through the Arkansas Weatherization Program.

Q-6 Since the work was performed, have you removed or replaced any of the equipment or energy efficiency improvements implemented in your home through the program?

- ❑ Yes *(Please specify which items have been removed or replaced):* _____ _____
- ❑ No
- ❑ Don't know

[IF CUSTOMER RECEIVED A REPLACEMENT APPLIANCE THROUGH THE PROGRAM, ASK Q-7, ELSE SKIP TO Q-8]:

Q-7 Our records indicate that you received one or more replacement appliances through the Arkansas Weatherization Program. Please indicate whether the following equipment was in good, fair, poor, or non-operational working condition at the time it was removed and replaced: [READ EACH APPLIANCE APPLICABLE TO SPECIFIC RESPONDENT AND REPEAT RESPONSE OPTIONS "good, fair, poor, or non-operational condition" IF NECESSARY]

- ❑ Refrigerator: _____
- ❑ Heating system: _____
- ❑ Air conditioner: _____
- ❑ Water heater: _____

OVERALL ENERGY EFFICIENCY DECISION MAKING

Q-8 In the past year, have you installed any energy efficient equipment in your home, besides those installed through the AWP, that you have not received an incentive for?

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- ❑ Yes [ASK Q-8A]
- ❑ No [SKIP TO Q-9]

Q-8A What type of equipment did you install?
List all indicated: _____

Q-8B What motivated you to install this equipment? [VERBATIM]
_____
_____
_____

Q-8C On a scale of 1-10, where 1 is "Not important at all" and 10 is "Very Important", how important was information you've received from utility staff or local community action agencies in your decision to install this equipment? [RECORD NUMBER] #_____

Q-8D Why didn't you apply for or receive financial assistance or incentives for those items?

- ❑ Didn't know about financial incentives
- ❑ Didn't know whether the measures qualified for financial incentives
- ❑ Financial incentive was insufficient
- ❑ No financial incentive was offered
- ❑ Other (please specify): _____

Q-8E Which, if any, of these energy efficiency improvements were recommended during the Weatherization Program energy audit? [VERBATIM]:
_____
_____

Q- 9 On a scale of 1 to 5, where "5" is very familiar and "1" is very unfamiliar, and a "3" is neutral, how would you rate your past familiarity with the benefits of installing various energy efficiency improvements similar to those offered by the Arkansas Weatherization Program prior to having the audit performed?

- ❑ 5: Very familiar
- ❑ 4: Somewhat familiar
- ❑ 3: Neither familiar nor unfamiliar
- ❑ 2: Somewhat unfamiliar
- ❑ 1: Very unfamiliar
- ❑ 99: Don't know

Q-9A On a scale of 1 to 5, where "5" is very familiar and "1" is very unfamiliar, and a "3" is neutral, how would you rate your past familiarity with various household energy saving activities such as washing with cold water, reducing your use of light fixtures, and adjusting heating system settings prior to having the audit performed?

- ❑ 5: Very familiar

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- ❑ 4: Somewhat familiar
- ❑ 3: Neither familiar nor unfamiliar
- ❑ 2: Somewhat unfamiliar
- ❑ 1: Very unfamiliar
- ❑ 99: Don't know

Q-9B Prior to the audit, did you perform any common household energy saving activities? If so, which activities?

- ❑ Yes *(please explain):* _____
  _____
- ❑ No
- ❑ Don't know

Q-10 On a scale of 1 to 5, where "5" is very familiar and "1" is very unfamiliar, how would you rate your current familiarity with energy efficiency and energy efficient options for your home as a result of your participation in the Arkansas Weatherization Program?

- ❑ 5: Very familiar
- ❑ 4: Somewhat familiar
- ❑ 3: Neither familiar nor unfamiliar
- ❑ 2: Somewhat unfamiliar
- ❑ 1: Very unfamiliar
- ❑ 99: Don't know

Q-11 As a result of your experience with the Arkansas Weatherization Program, would you buy energy efficient measures in the future, even if financial incentives were not offered?

- ❑ Yes
- ❑ No
- ❑ Don't know

Q-11A As a result of your experience with the program, do you now take additional action to save energy in your home, such as wash with cold water, reduce your use of light fixtures, and adjust heating system settings?

- ❑ Yes *(please explain):* _____
  _____
- ❑ No
- ❑ Don't know

PROGRAM SATISFACTION

Now I'd like to ask you about your satisfaction with several aspects of this program.

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Q-12 On a scale of 1 to 5, where "5" is very satisfied and "1" is very dissatisfied, and a "3" is neutral, how would you rate your satisfaction with the following? [RECORD AS '99' IF DON'T KNOW]

Element of Program Experience	*Very Satisfied* [5]	*Somewhat Satisfied* [4]	*Neither Satisfied or Dissatisfied* [3]	*Somewhat Dissatisfied* [2]	*Very Dissatisfied* [1]	*Don't Know* [99]
Information provided by the community action agency	❑	❑	❑	❑	❑	❑
The quality of installation work	❑	❑	❑	❑	❑	❑
The performance of the equipment installed	❑	❑	❑	❑	❑	❑
The savings on your monthly utility bills	❑	❑	❑	❑	❑	❑
The effort required for the application process	❑	❑	❑	❑	❑	❑
The wait-time to receive services	❑	❑	❑	❑	❑	❑
Information provided by utilities on how to reduce your utility bill	❑	❑	❑	❑	❑	❑
Improvement in home comfort	❑	❑	❑	❑	❑	❑
Usefulness of the energy audit	❑	❑	❑	❑	❑	❑
Overall program experience	❑	❑	❑	❑	❑	❑

Q-13 (If any item in Q-12 rated 2 or 1) Why were you dissatisfied with [Program Element]? [VERBATIM]:

_____

_____

_____

Q-14 Are there any changes or improvements you would like to see for the Arkansas Weatherization Program? [VERBATIM]:

_____

_____

_____

DEMOGRAPHICS

Finally, I have a few questions about your household. As a reminder, your responses will remain confidential.

Q-15 When was your home built? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF YEAR RANGES UNTIL RESPONDENT INDICATES ONE]

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- ❑ Verbatim____
- ❑ Before 1970's
- ❑ 1970's
- ❑ 1980's
- ❑ 1990-1994
- ❑ 1995-1999
- ❑ 2000-2005
- ❑ 2006 or newer
- ❑ Don't know [DON'T READ]
- ❑ Refused

Q-16 What is the approximate square footage of your home? [IF RESPONDENT DOES NOT GIVE VERBATIM ANSWER, READ OFF SIZE RANGES UNTIL RESPONDENT INDICATES ONE]

- ❑ Verbatim____
- ❑ Less than 1,000
- ❑ 1,001-1,500
- ❑ 1,501-2,000
- ❑ 2,001-2,500
- ❑ Greater than 2,500
- ❑ Don't know [DON'T READ]
- ❑ Refused

Q-17 How many bedrooms are there in your home?

- ❑ Quantity:____
- ❑ Don't know [DON'T READ]
- ❑ Refused

Q-18 What type of heating system do you have in your home?

- ❑ Natural gas heating
- ❑ Electric heating
- ❑ Combination of types *(Specify):*_____
- ❑ Other *(Specify):* _____
- ❑ Don't know [DON'T READ]

Q-19 What type of water heater do you have in your home?

- ❑ Natural gas water heater
- ❑ Electric water heater
- ❑ Other *(Specify):* _____
- ❑ Don't know [DON'T READ]

Q-20 How many bathrooms are there in your home?

- ❑ Quantity:____
- ❑ Don't know [DON'T READ]
- ❑ Refused

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Q-21 How many showers are there in your home?

- ❑ Quantity:____
- ❑ Don't know [DON'T READ]
- ❑ Refused

Q-22 Including yourself, how many people currently live in your home year-round?

- ❑ Quantity:____
- ❑ Don't know [DON'T READ]
- ❑ Refused

Q-23 I'm going to read off a list of income ranges, please indicate which range your total household income falls. Is the total annual income of your household:

- ❑ Less than $25,000
- ❑ $25,000 - $35,000
- ❑ $36,000 - $50,000
- ❑ $51,000 – $75,000
- ❑ $76,000 - $100,000
- ❑ Greater than $100,000
- ❑ Don't know [DON'T READ]
- ❑ Refused

Q-24 What's the highest level of education you've completed? [DON'T READ]

- ❑ Did not graduate high school
- ❑ High school graduate
- ❑ Associates degree, vocational/technical school, or some college
- ❑ Four-year college degree
- ❑ Graduate or professional degree
- ❑ Don't know
- ❑ Refused

Q-25 Do you have any other comments that you would like to relay to AWP staff about energy efficiency in residences or about these programs in general? [VERBATIM]

_____

_____

_____

Q-26. Would you be willing to allow the evaluator to visit your home in order to verify the installation of items through this program? This visit will take between 30 minutes and one hour. To thank you for your time, you will receive a Visa gift card for between $25 and $50 for your participation at the end of the visit.

- ❑ Yes *("Thank you, the evaluator will contact you within the next few weeks to set up a time and day to come by for this visit")*
- ❑ No

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This completes the survey. Your input is greatly appreciated and will be used to help improve the Arkansas Weatherization Program in the future. Thank you very much for your time!

8.0 Appendix C: Supplemental Documentation

- F1 - SGA EE Program Brochure

excessisout.com :: 800.563.0012

10 Easy Energy Saving Tips

no cost

#1 Lower your thermostat. And turn it down another 5° at night.

#2 In the winter, make the most of sunlight by opening window coverings on south-facing windows to help warm your home.

#3 Lower your water heater to 120° and you'll still have plenty of hot water.

#4 Do more loads of laundry with cold water and they'll get just as clean.

low cost

#5 Replace your furnace filter regularly. Furnace filters can easily be replaced monthly during heating season.

#6 Install low-flow showerheads and faucet aerators.

#7 Weatherize your home by weather-stripping doors and windows. That's where you're most likely to find cold air leaking in from the outside.

#8 Invest in a programmable thermostat that turns your heat down. You'll save energy, even when you're not home.

smart moves

#9 Add more insulation. The attic and basement are the easiest places to begin.

#10 Purchase a high-efficiency gas heating system and water heater. Check out the rebates available from SourceGas Arkansas Inc.

SourceGas

efficiency rebates are in
energy evaluations are in
and excess is out

SourceGas Arkansas Inc. has a host of programs to help you cut the excess including home energy audits and rebates. To choose a program that's right for you, see details inside and visit ExcessIsOut.com.

excess is out™
ExcessIsOut.com
1.800.563.0012

SourceGas

REBATES Inside >>

Excess Is Out.
Saving Is In.

Discover how to use less energy and save more money.

Lots more.

excess is out™

brought to you by

SourceGas

excess is out™

Saving energy has never been more rewarding.

ENERGY EFFICIENCY ARKANSAS

Spend some energy online.
Save some energy everywhere else.

Energy Efficiency Arkansas keeps you informed of the best ways to keep energy costs down. The information is unbiased, uninfluenced and invaluable. To learn how to save more energy, visit: **tightenuparkansas.org**

energy efficiency —education

The more you know, the less you need.

There are dozens of easy, low-cost steps you can take to get your energy usage in order. Visit **ExcessIsOut.com** and let the savings begin.

ARKANSAS weatherization —program

Keep the cold out of your house.
Keep the money in your bank account.

You may be eligible for the Arkansas Weatherization Program, where we perform an energy audit on your home and provide a whole host of weatherization services depending on your needs.

- Insulation of attics, walls, floors, foundations, sill boxes and/or duct work
- Duct sealing/repair
- Air infiltration reduction
- Storm windows
- Low-flow showerheads
- Furnace tune-up or replacement

To find your authorized Arkansas Weatherization Program (AWP) provider at **www.cadc.com.**

energy evaluation

There's big savings hidden in all that excess energy. We help companies find it.

The steps you take today will drastically change the bills you receive tomorrow. And we want to help. That means you can call us for a **commercial/industrial** energy efficiency audit of your natural gas space heating equipment, natural gas water heaters, natural gas food service equipment, make-up air equipment and building envelope opportunities.

Get started! Email **Lisa.Pfitzinger@SourceGas.com** or call **479-582-7852.**

SourceGas

reduce —and— rebate

Cutting excess energy use has never been easier. SourceGas Arkansas Inc. proudly offers rebates on qualifying heating, water-heating and commercial cooking equipment.

Here's how it works:

STEP 1: Schedule your energy-efficient heating, water heating and/or commercial cooking equipment installation with a local contractor.

STEP 2: Download and fill out a rebate form from ExcessIsOut.com, and mail it along with the paid invoice or receipt for your qualifying equipment to: **Excess Is Out / 3800 Watt Ave, Suite 105 / Sacramento, CA 95821**

STEP 3: Jump for joy when your rebate check arrives in the mail! That's it!

Below is a list of eligible equipment and their rebates.

EQUIPMENT	EFFICIENCY	INCENTIVE AMOUNT
Water Heating Equipment Rebates		
Storage Tank Water Heater	62% or higher	$50
Tankless Water Heater	82% or higher	$500
Heating Equipment Rebates		
Direct Vent Wall Furnace	80% or higher	$300
Natural Gas Forced-Air Furnace	90% to 94.9%	$400
Natural Gas Forced-Air Furnace	95% or higher	$600
Hydronic Heating System	82% or higher	$500
Commercial Cooking Equipment Rebates		
High Efficiency Broiler	Infrared, Upright	$650
High Efficiency Char Broiler	Infrared	$350
High Efficiency Combi Oven		$1050
High Efficiency Convection Oven		$550
High Efficiency Conveyor Oven		$800
High Efficiency Fryer	High EF/Infrared	$300
High Efficiency Rotating Rack Ovens		$550
High Efficiency Rotisserie Ovens	Infrared	$550
High Efficiency Salamanders		$200
High Efficiency Pasta Cooker		$250
Commercial/Industrial Heating Equipment Rebates		
High Efficiency Commercial Boiler	86% to 93.9%	$1600/MMBTU/Hr
High Efficiency Commercial Boiler	94% or higher	$4000/MMBTU/Hr
Burner Replacement *(6 step modulation or fully modulating)*		$1000/MMBTU/Hr
Boiler Reset Controls		$225
Boiler Cut Out Controls		$150
Boiler Vent Damper		$400

- F2 - SGA EE Program Brochure in Spanish

excessisout.com :: 800.563.0012

Diez sugerencias para ahorrar energía

sin costo

#1 Baje el termostato. Y bájelo otros 5° por la noche.

#2 Durante el invierno aproveche la luz del sol al abrir las ventana que dan al sur para que ayude a calentar su casa.

#3 Baje al calentador de agua a 120° y aun así tendrá suficiente agua caliente.

#4 Lave más tandas de ropa con agua fría y quedarán igual de limpias.

bajo costo

#5 Reemplace el filtro del calefactor regularmente. Puede reemplazar el filtro del calefactor fácilmente cada mes durante el tiempo frío.

#6 Instale un cabezal de duchas de bajo flujo y aireadores de llaves.

#7 Aísle su casa contra el frío con sellos en las puertas y ventanas. Es allí donde sea más probable encontrar fugas del aire frío de afuera.

#8 Compre un termostato programable que baje la calefacción. Ahorrará energía, incluso cuando no está en casa.

hechos inteligentes

#9 Agregue más aislamiento. El ático y el sótano son los lugares más fáciles para empezar.

#10 Compre un calentador de agua y un sistema de calefacción de gas de alta eficiencia. Infórmese sobre los descuentos disponibles de SourceGas.

SourceGas

los reembolsos de eficiencia están de moda
las evaluaciones de energía están de moda
y los excesos están fuera de moda

SourceGas tiene una serie de programas para ayudar a reducir el exceso mediante auditorías de energía doméstica y reembolsos. Para escoger un programa adecuado vea los detalles de este folleto y visite el sitio web: ExcessIsOut.com.

excess is out™
ExcessIsOut.com
1.800.563.0012

SourceGas

Vea los reembolsos adentro »

Los excesos están fuera de moda.

El ahorro está de moda.

Descubra cómo usar menos energía y ahorrar más dinero.

Mucho más.

excess is out™

presentado por

SourceGas

excess is out™

Ahorrar energía nunca ha sido tan gratificante.

ENERGY EFFICIENCY ARKANSAS
Gaste energía buscando en Internet. Ahorre energía en muchos otros lugares.
Energy Efficiency Arkansas le informará sobre las mejores maneras de mantener bajos los costos de energía. La información es imparcial, no influenciada e invaluable. Para aprender a ahorrar más energía, visite: **tightenuparkansas.org**

EDUCACIÓN DE EFICIENCIA ENERGÉTICA
Cuanto más sepa, menos necesita.
Hay muchos pasos fáciles y de bajos costos para poner su uso de energía en orden. Visite: **ExcessIsOut.com** empiece a ahorrar.

EVALUACIÓN ENERGÉTICA
Hay grandes ahorros escondidos en el exceso de energía. Ayudamos a las empresas a encontrarlos.
Los pasos que usted tome hoy cambiarán sus facturaciones drásticamente en el futuro. Y queremos ayudarle. Esto significa que puede llamarnos para una evaluación de eficiencia de energía comercial e industrial de sus equipos de calefacción de gas natural, calentadores de agua de gas natural, equipos de servicio de alimentos de gas natural, equipos de renovación de aire y sistemas de cerramiento de edificios.

¡No espere, empiece ya! Envíe un mensaje a **Lisa.Pfitzinger@SourceGas.com** o llame al **479-582-7852.**

SourceGas

PROGRAMA DE CLIMATIZACIÓN de Arkansas
Mantenga el frío fuera de su casa. Mantenga el dinero en su cuenta bancaria
Puede que califique para el Programa de Climatización de Arkansas, con la que hacemos una auditoría energética de su hogar y proporcionamos toda una serie de servicios climatización de acuerdo a sus necesidades.

- El aislamiento de áticos, paredes, pisos, bases, marcos (umbrales) y conductos
- Sellado y reparación de conductos
- La reducción de la infiltración de aire
- Ventanas contratormentas
- Cabezales de duchas de bajo flujo
- Ajuste o reemplazos de calefactores

Para encontrar a su proveedor autorizado del Programa de Climatización de Arkansas (AWP, siglas en inglés) visite: **www.cadc.com.**

REDUZCA Y RECIBA REEMBOLSOS

Cortar el uso excesivo de energía nunca fue tan fácil. SourceGas orgullosamente ofrece reembolsos para equipos de calefacción, de cocina comercial y calentadores de agua que califiquen.

Es así cómo funciona:

PASO 1: Programe la instalación de los equipos eficientes de calefacción, de calentar agua y/o cocina comercial con un contratista local.

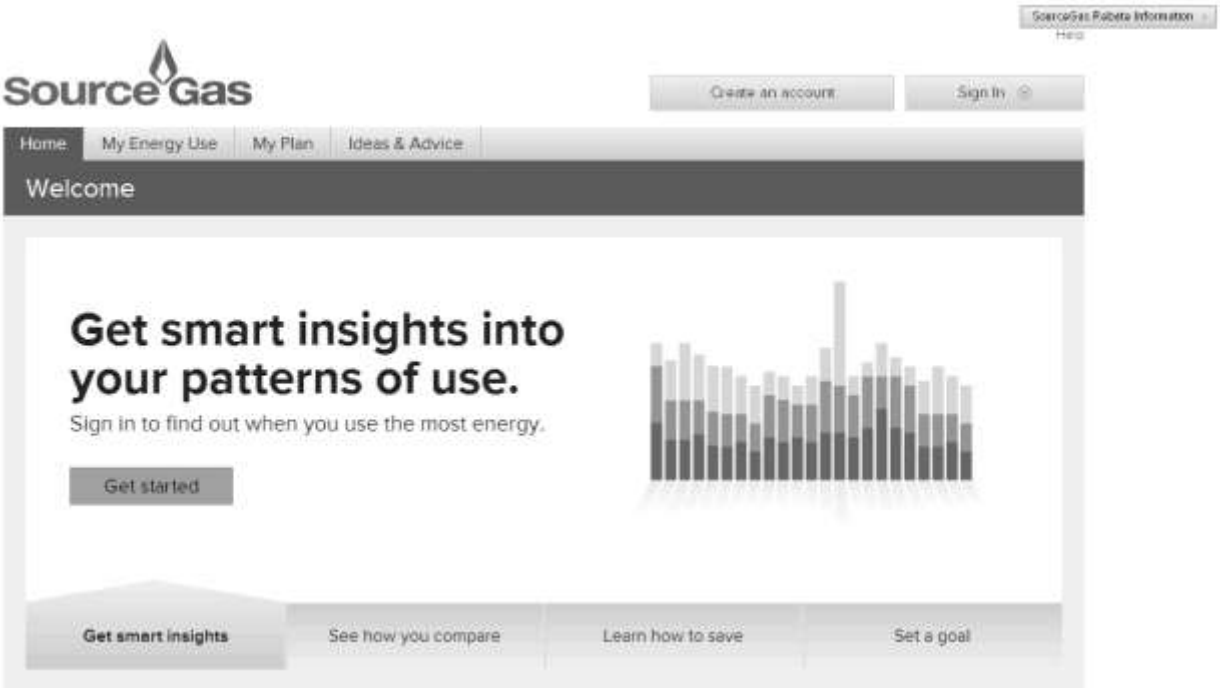
PASO 2: Baje y llene un formulario de reembolsos de ExcessIsOut.com y envíelo por correo junto con la facturación o recibo para el equipo que califique a:
Excess Is Out / 3800 Watt Ave, Suite 105 / Sacramento, CA 95821

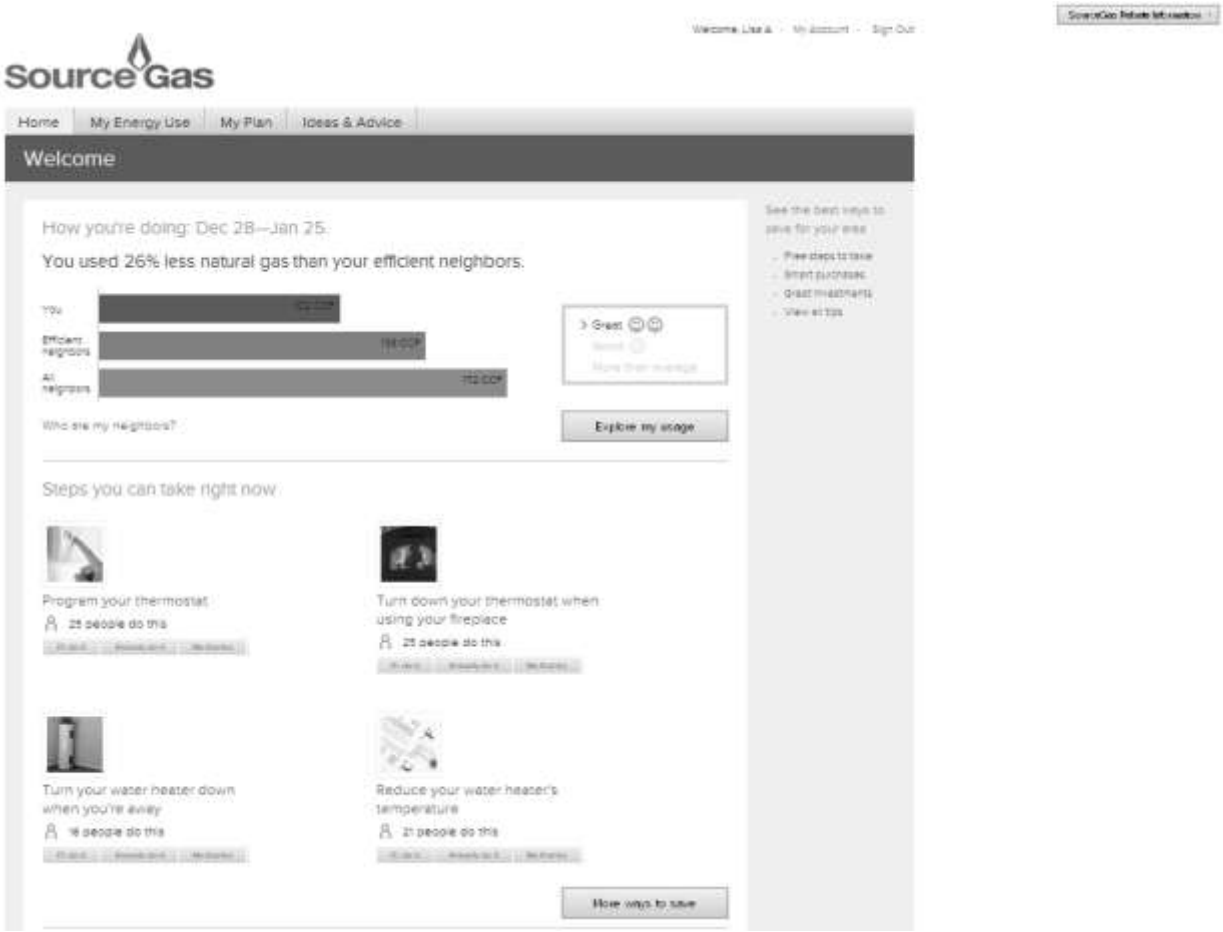
PASO 3: ¡Salte de alegría cuando llegue su cheque de reembolso por correo! ¡Eso es todo!

A continuación se presenta una lista de los equipos elegibles y sus reembolsos.

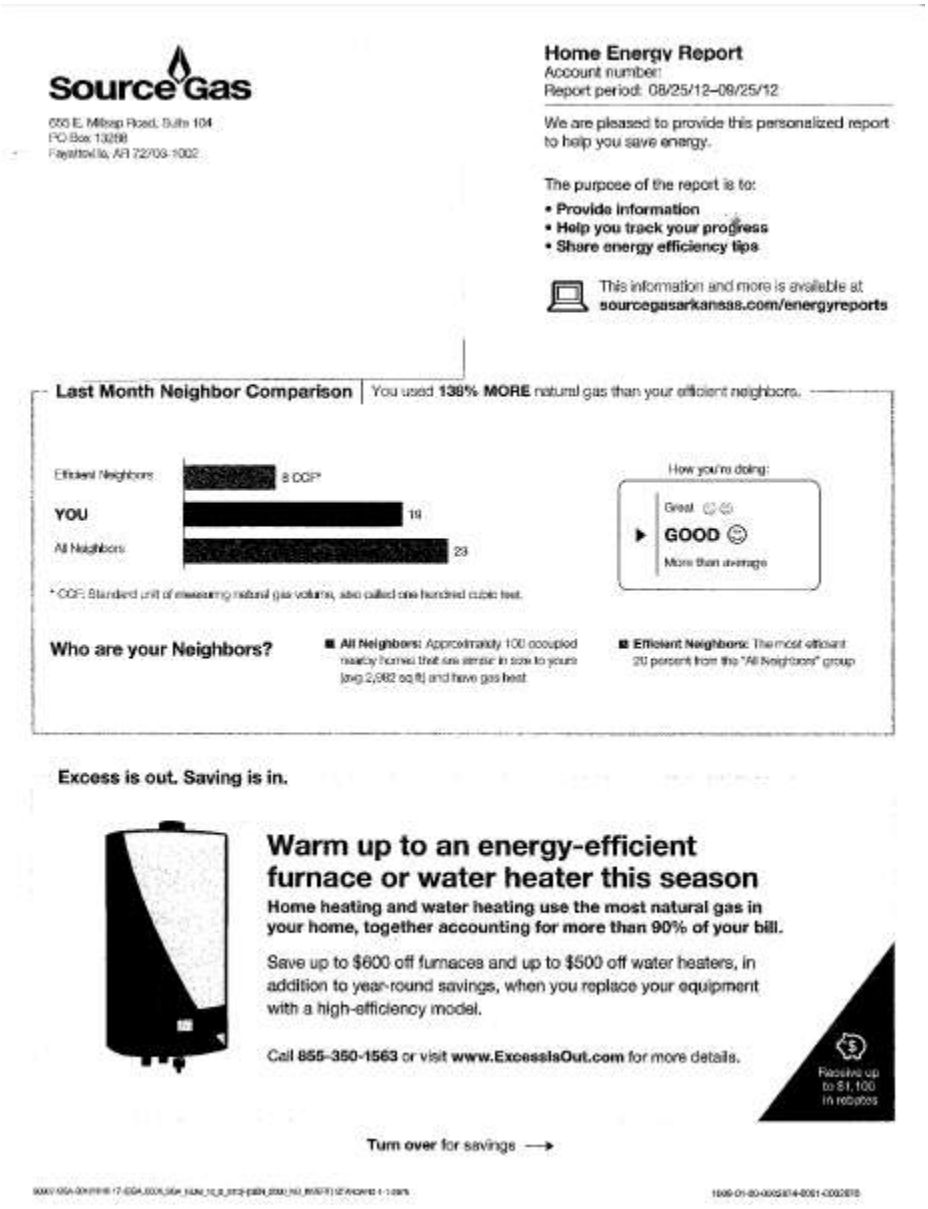
EQUIPOS	EFICIENCIA	CANTIDAD DE INCENTIVO
Reembolsos para calentadores de agua		
Calentador de agua con tanque	≥2% o superior	$50
Calentador de agua sin tanque	82% o superior	$500
Reembolsos para calefactores		
Calefactor de pared con ventilación directa	80% o superior	$300
Calefactor de aire forzado de gas natural	90 a 96.9%	$400
Calefactor de aire forzado de gas natural	95% o superior	$600
Sistema de calefacción hidrónico	82% o superior	$500
Reembolsos para equipos de cocina comercial		
Asador de alta eficiencia	Infrarrojo, vertical	$650
Asador de alta eficiencia	Infrarrojo	$350
Horno Combi de alta eficiencia		$1050
Horno de convección de alta eficiencia		$550
Horno de banda transportadora de alta eficiencia		$800
Freidora de alta eficiencia	Freidora de alta eficiencia/infrarrojo	$300
Hornos rotantes de alta eficiencia		$550
Reductoras de alta eficiencia	Infrarrojo	$550
Salamandras de alta eficiencia		$200
Máquinas de alta eficiencia para cocinar pasta		$250
Reembolsos para equipos de calefacción comercial e industrial		
Calderas comerciales de alta eficiencia	86 a 93.9%	$1400/MMBTU/Hr
Calderas comerciales de alta eficiencia	94% o superior	$6000/MMBTU/Hr
Reemplazo del hornillas (de mantenimiento) al gas de mantenimiento mínimo		$1000/MMBTU/Hr
Controles de reinicio de caldera		$225
Controles de desactivación de caldera		$150
Regulador de tiro para la caldera		$400

- F3 – Opower Home Energy Report Web Portal





- F4 – Opower Home Energy Report mailed to homes



SourceGas

655 E. Millsap Road, Suite 104
PO Box 13298
Fayetteville, AR 72703-1002

Home Energy Report
Account number:
Report period: 08/25/12–09/25/12

We are pleased to provide this personalized report to help you save energy.

The purpose of the report is to:

- **Provide information**
- **Help you track your progress**
- **Share energy efficiency tips**

This information and more is available at **sourcegasarkansas.com/energyreports**

Last Month Neighbor Comparison | You used **138% MORE** natural gas than your efficient neighbors.

Efficient Neighbors	8 CCF*
YOU	19
All Neighbors	23

How you're doing:
Great
GOOD
More than average

* CCF: Standard unit of measuring natural gas volume, also called one hundred cubic feet.

Who are your Neighbors?

All Neighbors: Approximately 100 occupied nearby homes that are similar in size to yours (avg 2,982 sq ft) and have gas heat

Efficient Neighbors: The most efficient 20 percent from the "All Neighbors" group

Excess is out. Saving is in.

Warm up to an energy-efficient furnace or water heater this season

Home heating and water heating use the most natural gas in your home, together accounting for more than 90% of your bill.

Save up to $600 off furnaces and up to $500 off water heaters, in addition to year-round savings, when you replace your equipment with a high-efficiency model.

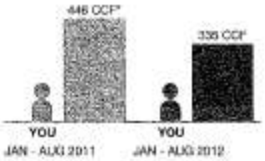
Call **855-350-1563** or visit **www.ExcessIsOut.com** for more details.

Receive up to $1,100 in rebates

Turn over for savings →

Personal Comparison

How you're doing compared to last year:



* CCF: Standard unit of measuring natural gas volume, also called one hundred cubic feet.

So far this year, you used **25% LESS** natural gas than last year.

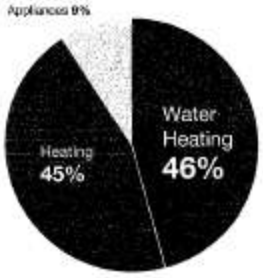
★ You're on pace to use less in 2012.

Looking for ways to save even more? Visit **sourcegasarkansas.com/energyreports**

Understanding your energy use

Heating and water heating account for over 90% of natural gas use for a typical household in our area. To maximize your savings this winter, focus on the biggest gas users first.

Annual natural gas use for a typical household in our area



Based on a typical household with gas heating and water heating.

Top Tips For Saving	Save up to
☐ **Install a fireplace insert** Next Steps: A professionally installed fireplace insert will provide warmth and ambience with an efficient, controlled fire.	$30/yr
☐ **Improve your home's insulation** Next Steps: Start with the places easiest to access, such as an attic.	$85/yr
☐ **Program your thermostat** Next Steps: Program your thermostat to save energy when you will be away from home.	$45/yr
☐ **Add storm windows** Next Steps: Choose interior or exterior storm windows. Be sure they are hung square to the window and sealed tightly.	$65/yr
☐ **Choose an ENERGY STAR® furnace** Next Steps: Consider an ENERGY STAR qualified model, and be sure it is properly sized for your home to get the best performance.	$65/yr
☐ **Insulate outlets and light switches** Next Steps: Install low-insulant plastic foam gaskets. You can find them at most home improvement stores.	$10/yr
☐ **Find more ways to save** Next Steps: Ask your household members to participate in any energy-saving plans you make.	

Already do these tips?
Find more ways to save online

For energy-saving tips visit
sourcegasarkansas.com/energyreports

Source Gas

runs on OPQWER®

sourcegasarkansas.com/energyreports | (800) 563-0012 | energyreports@sourcegas.com

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- F5 – Commercial & Industrial Solutions Program Flyer

SourceGas

COMMERCIAL & INDUSTRIAL

TAKE CONTROL OF YOUR ENERGY USE

with the SourceGas Commercial & Industrial Program

The Commercial & Industrial Solutions Program offers financial incentives ($0.80/CCF) along with technical and consulting assistance to help commercial customers identify, develop and implement energy efficiency projects. From the installation of no-cost natural gas saving products to incentives for larger, more complex equipment and projects, the program provides the necessary resources to make immediate and sustainable reductions in energy use and spending.

FREE MEASURES. FREE INSTALLATION. BIG SAVINGS.

Program technicians will install no-cost natural gas and water-saving measures as appropriate based on your existing equipment. Items commonly include high-efficiency spray valves, and faucet aerators. Together, these measures can save you hundreds of dollars per year in gas and water costs. Best of all, they're available at no cost to you!

Utility Savings Achieved with Low-Flow Pre-rinse Spray Valves

Daily Hours of Use	Daily Water Savings (gal)	Daily Sewer Savings (gal)	Daily Gas Savings (CCF)	Annual Dollar Savings
1	60	60	0.5	$250
2	120	120	1	$500
3	180	180	1.5	$750

INCENTIVES FOR CUSTOMIZED ENERGY SOLUTIONS

Beyond the no-cost measures, the program offers $0.80/CCF toward other equipment types and processes to save energy. Depending on the facility type and operating characteristics, eligible measures may include:

- Boiler retrofits and improvements
- Infrared heating
- Demand controlled ventilation
- Roof and ceiling insulation
- Swimming pool covers
- And other natural gas-related equipment and processes

PROCESS OPTIMIZATION

Many industrial operations use large amounts of gas for process heating and steam production. Program representatives will perform a no-cost facility audit to determine if gas is being wasted and help identify cost-effective solutions to reduce energy waste.

CONTACT:

Robert Davenport | rdavenport@clearesult.com | (501) 221-4015
Lisa Pfitzinger | lisa.pfitzinger@sourcegas.com | (479) 582-7852

See participation steps and agreement on the reverse side.

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- F6 – Commercial & Industrial Solutions Introduction Letter

SourceGas

EXCESS IS OUT. SAVING IS IN.
www.sourcegasarkansas.com | www.excessisout.com

Dear Valued SourceGas Customer,

I am pleased to introduce the SourceGas Commercial & Industrial Solutions Program. This program is designed to help commercial customers identify, develop and implement energy efficiency upgrade projects. From the installation of no-cost natural gas saving products to incentives for larger, more complex equipment and projects, the program provides the necessary resources to make immediate and sustainable reductions in energy use and spending. These resources include:

- Financial incentives to help offset initial costs
- Technical & consulting assistance
- Communications support

Beyond the financial benefits of energy efficiency, the Commercial & Industrial Solutions Program can help customers improve the comfort and productivity of their facilities, generate positive publicity with the community, and help reduce the ecological impact of operating business facilities. Benefits of participating in the program include, but are not limited to:

- Reduced energy bills
- Free, on-site energy assessment
- Economic analysis to assist in evaluating possible projects
- Free equipment and installation of aerators and pre rinse valves for gas water heating customers
- Increased control of HVAC and hot water systems
- Improved efficiency of heating equipment or industrial processes that use natural gas

I hope you will take advantage of this program and give SourceGas the opportunity to help you improve your facility's energy efficiency and your bottom line! Please review the materials enclosed with this letter, and if you are interested in participating, take the next step toward enrolling in the program. All you have to do is complete and submit the Participation Agreement.

For more information about the Commercial and Industrial Solutions Program, please contact our program implementer, Robert Davenport, at the number below.

Regards,

Lisa Pfitzinger
Manager, Energy Efficiency Programs

Enclosed:
Participation Agreement
Informational Inserts

ROBERT DAVENPORT I (501) 221-4015 I rdavenport@clearesult.com

- F7 – SGA Direct Install Flyer

HOW MANY **TANKERS** ARE YOUR **FAUCETS** FILLING EACH YEAR?

THE AMOUNT MIGHT SURPRISE YOU...

→ Replacing one 2.2 gallon per minute aerator (in a high-traffic public restroom) with one energy efficient .5 gallon per minute aerator is estimated to save approximately 13,000 gallons of water per year or 1.6 tankers.

→ This same aerator is estimated to save approximately 6,000 cubic feet of natural gas or enough to fill a typical 53 foot semi-trailer (4,000 cubic feet) one and a half times.

SourceGas is making it easier for you to save!

In order to help customers reduce energy use, program technicians will install natural gas water-saving measures at your business or facility to help increase efficiency and save money—**AT NO COST TO YOU!**

These measures, which include high-efficiency pre-rinse spray valves and faucet aerators, can save you hundreds of dollars per year in energy and water costs:

- Pre-rinse spray valves are estimated to save up to **$750** or more annually depending on hours of use.
- Low-flow aerators reduce water use in bathroom and hand washing faucets by approximately **50 percent**.

For more information or to schedule your free install call your SourceGas representative:
Cara Murray at 479-935-8010 or
Larry Clay at 479-301-4136

SourceGas
ExcessIsOut.com

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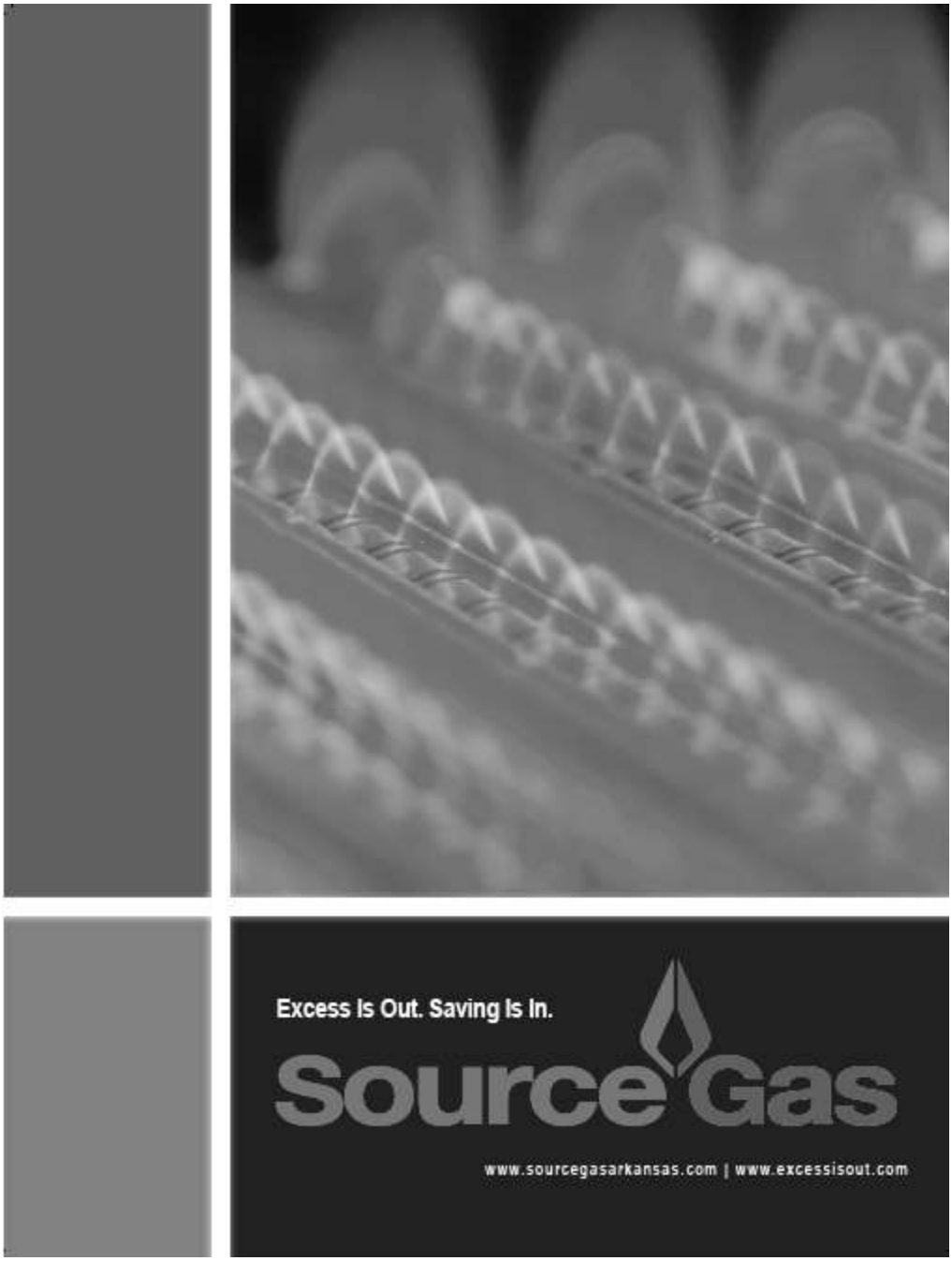
- F8 – SGA Program Information Folder Design



- F9 – Infrared Heating Fact Sheet

FACT SHEET: Infrared Heating

SourceGas

SourceGas Arkansas offers cash incentives for qualifying commercial, industrial and institutional customers who apply for incentives from infrared heating improvements. For additional details on how to receive such incentives, and the energy that you can save over the life of an infrared heating system, contact Robert Davenport at rdavenport@clearesult.com or (501) 221-4015.

WHEN TO RETROFIT WITH INFRARED HEATING SYSTEMS

- Infrared heating is a good retrofit option for commercial spaces that use forced air heating systems to heat spaces with high air exchange rates, such as plane hangars, bus terminals, warehouses, and loading docks
- SourceGas offers incentives for the replacement of forced air heating systems with infrared heat

INFRARED HEATING

High air exchange rates occur in spaces with frequently opened bay doors, in large, drafty spaces, and spaces that require high ventilation to maintain indoor air quality.

Forced air heating is expensive for large spaces with high air exchange rates because so much heated air is lost from the space. In addition to wasted heating energy, these spaces typically require large amounts of energy to drive the warm air down to floor level where it is needed by building occupants. With radiant infrared heat, heating energy is used to warm people, floor slabs, machines and other objects at floor level. The principle of radiant infrared heat is very similar to the sun's heat energy warming the surface of the earth, but not the upper atmosphere.

NATURAL GAS INFRARED HEATING

Traditional natural gas IR heating systems consist of a four-inch-diameter steel pipe with gas burners spaced about 40 feet apart. The combustion products are exhausted through a draft-induction fan located at the far end. Above the pipe is a spectral reflector that directs heat downward and improves efficiency. In order to impede the rust-out of pipes (due to the oxidation cycle), some manufacturers offer internal pipe coatings. Other cost saving IR heating systems exist but must be evaluated on a case by case basis.

Interesting Facts

- Installing infrared heating systems in commercial facilities has been shown to provide as much as a 30% - 60% heating energy savings
- With infrared heating, building occupants can typically stay warm even when the air temperature is lowered by as much as 20 degrees

Contact Robert Davenport at rdavenport@clearesult.com or (501) 221-4015 for more information on incentives that may be available for infrared heating projects or other natural gas related energy efficiency projects.

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- F10 – Low Flow Devices Fact Sheet

FACT SHEET: Low Flow Devices

SourceGas

SourceGas Arkansas offers free installation of select low-flow devices for qualifying commercial, industrial and institutional customers as part of the Commercial & Industrial Program. For additional details on how to take advantage of this offer, and to learn about energy savings from low-flow devices, contact Robert Davenport at rdavenport@clearesult.com or (501) 221-4015.

WHEN TO RETROFIT WITH LOW-FLOW DEVICES

- Low-flow devices provide great natural gas, water, and cost saving opportunities, particularly in institutional settings such as hospitals, nursing homes, prisons, and dormitories
- They are also good measures for hotels and schools
- These devices save gas energy by reducing the need to heat water, so it must be verified whether a facility uses gas water heating when determining program eligibility

LOW-FLOW DEVICES

Multiple low-flow devices (listed below) are offered at no cost and can greatly reduce hot water usage while providing equivalent functionality as standard equipment. For participating customers, these devices can save as much money in terms of water and sewer savings as they do in water heating related energy savings.

Low-flow devices achieve the greatest savings for institutional and commercial kitchen facilities such as hospitals, nursing homes, schools, hotels and restaurants. They are also good for any facility that has shared hand washing or shower facilities, like gyms and dormitories.

PRE-RINSE SPRAY VALVES

Pre-rinse spray valves are used in commercial or institutional kitchens to remove food waste from dishes prior to cleaning in a dishwasher. Of the low-flow devices mentioned here, pre-rinse spray valves offer the greatest opportunity for energy savings because they typically use a lot of water and gas prior to the installation of a low-flow device.

A federal standard requires all pre-rinse spray valves manufactured after January 1, 2006 to have a maximum flowrate of 1.6 gallons per minute (gpm). Pre-rinse spray valves in existing facilities can be using as much as 5 gpm. New pre-rinse spray valves use as little as 0.64 gpm, but installing valves with very low flow rates can result in reduced performance. SourceGas incentivizes pre-rinse spray valves with a flow rate of 1.25 gpm, which offers both high performance and substantial savings. In new construction and retrofit applications these devices are a cost-effective way to reduce natural gas and water costs.[2]

Utility Savings Achieved with Low-Flow Pre-rinse Spray Valves

Daily Hours of Use	Daily Water Savings (gal)	Daily Sewer Savings (gal)	Daily Gas Savings (therms)	Annual Dollar Savings
1	60	60	.5	$300
2	120	120	1	$550
3	180	180	1.5	$800

Interesting Facts

- The dishwashing operation in a typical restaurant consumes over two-thirds of all the water used by that establishment. In some cases, nearly one-half of the water used in dishwashing is used by the pre-rinse spray valve[1]
- Low-flow devices result in cost savings to the customer by reducing water and wastewater costs as well as natural gas costs. Water and sewer cost savings to the customer typically constitute 20-50% of total customer cost savings from low-flow devices
- Efficient pre-rinse spray valves can yield average annual cost savings (gas, water and sewer) ranging from $150 for fast food facilities to $1000 for institutional facilities

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FACT SHEET:
Low Flow Devices

LOW-FLOW SHOWERHEADS

There are two types of low-flow shower heads. The most common is the aerating shower head which mixes air with the water. The other is a non-aerating shower head which does not introduce air into the water stream. These devices have flow rates as low as 1.8 gpm compared to federal minimum flow rate of 2.5 gpm. SourceGas incentivizes the installation of 1.5 gpm shower heads.

AERATORS

Low-flow aerators reduce water use in bathroom and hand washing faucets by approximately 50 percent. Low-flow aerators introduce air into the water stream in order to maintain the same effectiveness at lower water use rates. Aerators are available with flow rates as low as 0.5 gpm, compared to a federal minimum of 2.2 gpm.[3] SourceGas incentivizes the installation of a 0.5 gpm aerator. These devices are good for prisons, dormitories, commercial buildings and schools that have shared hand washing facilities, as well as hospitals and nursing homes. Because faucets in commercial kitchens (with the exception of hand washing sinks) are used to deliver large amounts of water for cooking purposes, aerators are not good applications for kitchen sinks.

Contact Robert Davenport at rdavenport@clearesult.com or (501) 221-4015 for information on how to receive free installation for low-flow devices or incentives that may be available for other natural gas related energy efficiency projects.

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[1]CEE Commercial Kitchens Initiative Program Guidance on Pre-Rinse Spray Valves, *www.cee1.org/com/com-kit/prv-guides.pdf*

[2]Pre-rinse spray valves may not work well in facilities with water pressures greater than 85 psi or less than 40 psi based on CEE Program Guidance and performance data from 2005 Waterloo pilot study

[3]Many showerheads and aerators have the flow rate etched into the device (see photo of faucet aerator)

- F11 – AOG & SGA Training Invitation

Arkansas Oklahoma Gas & SourceGas

invite you to attend a free training program on commercial & industrial energy efficiency equipment & best practices

{JULY 11, 2012}

Courtyard Marriott | 900 Rogers Ave | Fort Smith, AR 72901

Please RSVP by July 6, 2012 - see reverse for additional information >

aog

SourceGas

TRAINING SCHEDULE

Morning session: 10:30 a.m. - 12 p.m. *(1 PDH hour)*
Energy Recovery Wheels
Eric Tufto (Greenheck Fan Corporation) will present on total enthalpy air-to-air energy recovery wheels, and discuss how they're used to condition outdoor air in commercial applications.

Lunch (provided): 12 p.m. - 1 p.m.

Afternoon session: 1 p.m. - 2 p.m. *(1 PDH hour)*
Steam System Efficiency & Best Practices
Dusty White (Power Equipment Company) will share how to best manage your commercial or industrial steam systems to achieve the highest operating efficiency.

RSVP by **July 6, 2012** to sampacher@clearesult.com or call (501) 221-4036. The following information is requested:

- Which session(s) you will attend
- Name
- Company
- Phone
- Email
- Utility

aog

SourceGas

- F12 – CenterPoint, Entergy, & SGA Training Invitation

CenterPoint Energy,
Entergy Arkansas & SourceGas
invite you to attend a free training program on commercial & industrial energy efficiency equipment & best practices

{JULY 10, 2012}

Comfort Suites | 3404 Access Rd | Jonesboro, AR 72401

Please RSVP by July 6, 2012 - see reverse for additional information >

CenterPoint. Energy Entergy. THE POWER OF PEOPLE SourceGas

TRAINING SCHEDULE

Morning session: 10:30 a.m. - 12 p.m. *(1 PDH hour)*
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- Name
- Company
- Phone
- Email
- Utility

CenterPoint. Energy Entergy. THE POWER OF PEOPLE SourceGas

- F13 – Energy Conversion Factor Card

Energy Conversion Factors

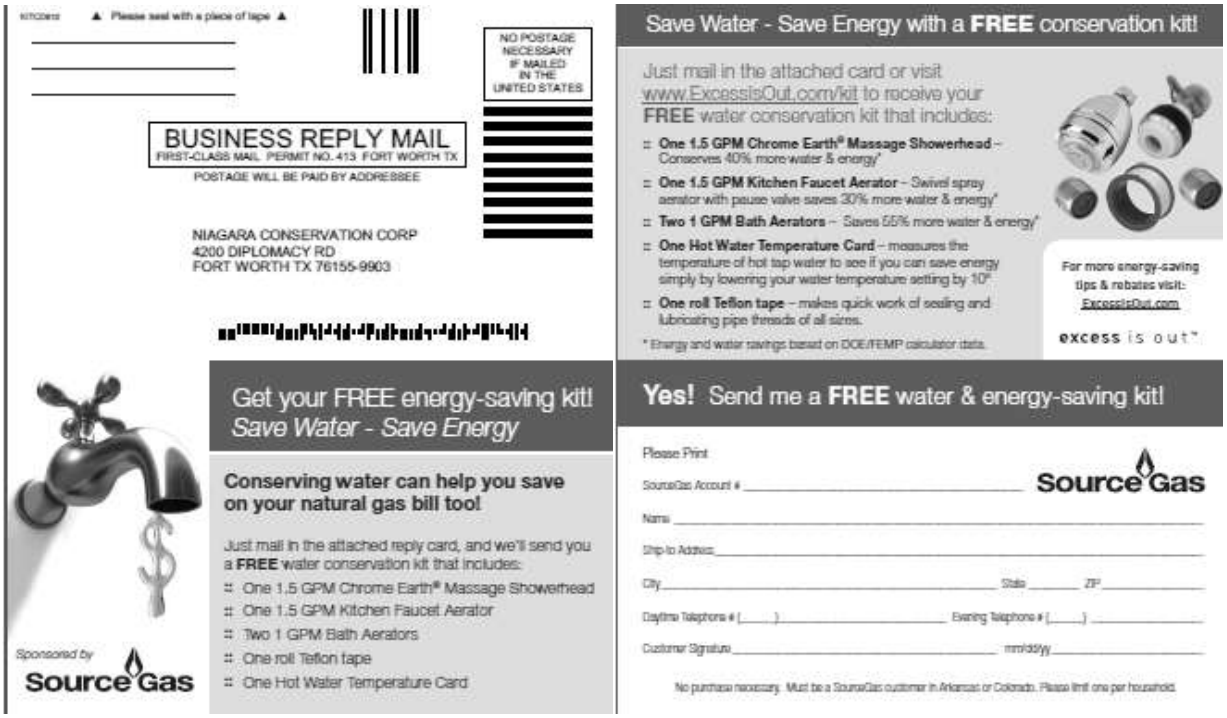
1 CF (Cubic Feet)	= Approx. 1,000 BTUs
1 CCF	= 100 CF = 1 Therm
1 therm	= 100,000 BTUs = 100 CF = 0.1 MCF
10 therms	= 1 MCF
1 MCF	= 1,000 CF = 10 CCF = 10 Therms
1 Quad	= 10^9 MCF = 10^{10} Therms = 10^{15} BTUs

SourceGas

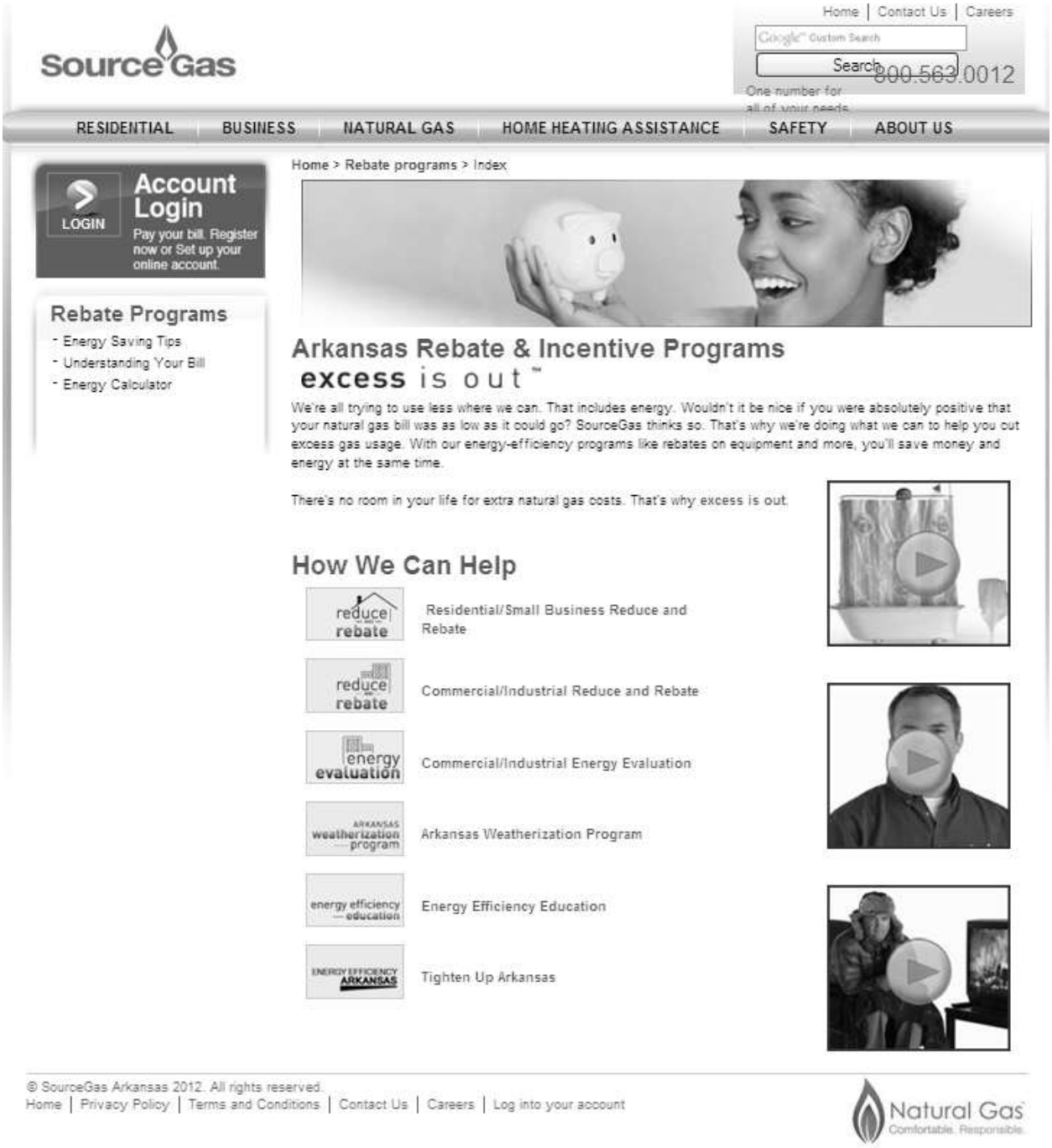
For rebate information visit: www.ExcessIsOut.com

COMPARATIVE THERMAL VALUES	1 Therms	240 Therms	0.016 Therms	1.25 Therms	1.39 Therms	1.50 Therms	0.3412 Therms
Natural Gas 1000 BTU/cu ft.	100 cu ft.	24,000 cu ft.	91.6 cu ft.	125 cu ft.	139 cu ft.	150 cu ft.	3.412 cu ft.
Coal 12,000 BTU/lb	8.333 lb	1 Ton	7.633 lb	10.417 lb	11.583 lb	12.500 lb	0.2843 lb
LP Gas 91,700 BTU/gal	1.092 gal	262.01 gal	1 gal	1.366 gal	1.517 gal	1.638 gal	0.0372 gal
Gasoline 114,000 BTU/gal	.8772 gal	192.000 gal	.733 gal	1 gal	1.112 gal	1.200 gal	0.0273 gal
Diesel (Fuel Oil #2) 130,000 BTU/gal	.7194 gal	172.66 gal	0.659 gal	0.899 gal	1 gal	1.079 gal	0.0245 gal
Fuel Oil #6 150,000 BTU/gal	0.6667 gal	160.000 gal	0.611 gal	0.833 gal	0.927 gal	1 gal	0.0227 gal
Electricity 3412 BTU/kWh	29.308 kWh	7.0334 kWh	26.846 kWh	36.635 kWh	40.739 kWh	43.962 kWh	1 kWh

- F14 – Business Reply Card for Water Conservation Kit



- F15 – Business Card for Water Conservation Kit

- F16 – Opening Screenshot for excessisout.com

- F17 – Opening Screenshot of SGA's EE website page