



# **OKLAHOMA GAS and ELECTRIC COMPANY**

## **2013 Arkansas Energy Efficiency Program Portfolio Annual Report**

**Section 9: Annual Reporting Requirements, and Order No. 18 in Docket No. 06-004-R.  
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# **1.0 Executive Summary**

# Executive Summary

Oklahoma Gas and Electric Company (“OG&E” or “Company”) hereby submits its Energy Efficiency (“EE”) program portfolio Annual Report for Plan Year (“PY”) 2013 to the Arkansas Public Service Commission (“APSC” or “Commission”) pursuant to Order No. 18 in Docket 06-004-R. This report is required to be filed annually by April 1, per Section 9 of the APSC Rules for Conservation and Energy Efficiency Programs.

## **HISTORY:**

OG&E began implementation of Energy Efficiency Programs in Arkansas in December 2007 with its Quick Start Program Portfolio. The Quick Start Program continued through December 31, 2009. That portfolio contained seven programs in total; five OG&E administered programs and two state administered programs. The OG&E administered programs included; Livingwise® Student Energy Education, Residential Energy Audit, Commercial Lighting, Motor Replacement and Compact Fluorescents (“CFL”). The two state administered programs included are the Arkansas Weatherization Program (“AWP”), and the Energy Efficiency Arkansas (“EEA”) program. The CFL program was not launched with the other Quick-Start programs and was ultimately discontinued. The Quick-Start portfolio allowed OG&E to build a framework to deliver programs to over 65,000 customers in the Arkansas jurisdiction.

The initial Comprehensive Energy Efficiency (“CEE”) Portfolio was approved and implemented on February 3, 2010 and ended on June 30, 2011. That CEE portfolio included the continuation of the two statewide programs AWP and EEA, and three OG&E programs; Livingwise® Student Energy Education, Commercial Lighting and Motor Replacement programs. The Residential Energy Audit program was renamed the Custom Energy Report (“CER”) program and the new OG&E Weatherization program was introduced. The OG&E Weatherization program was established to offer weatherization for residential customers that would not otherwise qualify for the AWP.

The current Comprehensive Portfolio was approved on June 30, 2011 for the remainder of PY 2011. The PY’s 2012 and 2013 were subsequently approved on December 30, 2011. The two statewide programs, AWP and EEA, were continued as were OG&E’s Commercial Lighting program and the Livingwise® Student Energy Education program. The CER program was discontinued as an EE program but is still available through OG&E’s website. The OG&E Weatherization program was modified to a collaborative program with Arkansas Oklahoma Gas Corporation (“AOG”) to take advantage of administrative efficiencies and cost sharing. The Motor Replacement Program was incorporated into the new Commercial and Industrial Standard Offer Program (“C&I SOP”). In addition, new programs were created for both residential and nonresidential customers. For residential customers, the HVAC tune-up and duct repair program, the Window Unit A/C program, and the Multi-family program were created to provide a more diverse residential portfolio of programs. After the plan was approved, it was determined the Multi-family program could not be implemented as designed and was discontinued. For nonresidential customers, in addition to the C&I SOP, the Commercial Tune-up program was created to inspect and tune commercial HVAC systems.

The following table summarizes historical EE savings achieved by OG&E's previous efforts:

	<u>Energy</u>	<u>Demand</u>
PY 2008	2,434,738 kWh	665.9 kW
PY 2009	5,607,951 kWh	921.3 kW
PY 2010	4,143,096 kWh	1,317.1 kW
PY 2011	4,985,328 kWh*	1,520.2 kW
PY 2012	7,595,741 kWh*	1,840.6 kW

\* EM&V evaluated energy savings conducted by 3<sup>rd</sup> party independent evaluation since July 2011.

### **GOALS AND OBJECTIVES:**

Order No. 15 in Docket 08-137-U established default energy savings goals as a percent of 2010 energy sales. The annual energy savings goals are shown in the following table.

<u>Program Year</u>	<u>Percent of 2010 Sales</u>	<u>Energy Savings Goals</u>
PY 2011	0.25	6,752,758 kWh
PY 2012	0.50	11,363,560 kWh
PY 2013	0.75	16,843,560 kWh
PY 2014	0.75	16,287,689 kWh

OG&E's energy savings goal for 2013 was 16,843,560 kWh or 0.75% of 2010 weather normalized sales as adjusted for self-direct exemptions. The 2013 EE portfolio actual results achieved for energy savings were 13,410,729 kWh.

### **MAJOR ACCOMPLISHMENTS:**

The collaborative Weatherization Program with AOG remains very successful and exceeded energy savings targets for 2013 by 101% and is 37% of the Portfolio savings. Word of mouth marketing from customers continues to be the main source of new customers in the program for both OG&E and AOG. In a 2013 EVOLVE Research survey the AOG-OGE Weatherization customers ranked whether they would recommend the program to friends and relatives at an exceptionally high 9.25 on a scale of 0-10. The AOG-OGE cross fuel Weatherization Program was given an excellent review in the recent PWC Unified Weatherization Technical Conference.

In July 2013 CLEAResult was commissioned to provide a Direct Install component to the Commercial Tune and Standard Offer Programs. The Direct Installs added significantly to the kWh savings for those programs and also increased customer leads for other commercial projects.

### **PROGRESS ACHIEVED:**

The 2013 Portfolio Goal was 47% higher than the 2012 Portfolio Goal and the Portfolio savings increased from 54% of Goal in 2012 to 79.6% of Goal in 2013. This is a major step forward for OG&E and reflects significant enhancements in many program areas and confirms we are on the right track to meet our 2014 savings Goals.

The 2013 OG&E portfolio increased energy savings 177% over 2012. This represents significant progress for OG&E's energy efficiency ("EE") efforts. OG&E's performance in 2013 is clear evidence of its commitment to helping customers save energy through Company sponsored programs and measures and commitment to achieving APSC EE goals. The Company's EE portfolio performance reflects adjustments and modifications made to address deficiencies in program and measure implementation.

**HIGH-LEVEL RECAP:**

The 2013 portfolio produced 13,410,729 kWh or 79.6% of the energy savings goal. These on-going energy savings will accumulate over the life of the measures. The EE Program recoverable expenses of \$3,714,378 for 2013 were 94% of the approved annual budget of \$3,938,015. Customer incentives and rebates account for 73% of the total program expenses. OG&E did not earn an incentive for 2013 due to actual kWh savings performing just below the 80% threshold.

**HIGHLIGHTS OF WELL PERFORMING PROGRAMS:**

OG&E achieved 107% of its 2013 residential goal. OG&E weatherized 1,623 homes, representing 7% of its residential customers in Arkansas. This program performed very well in 2013 and accounted for 87% of OG&E's residential portfolio energy savings.

OG&E's added focus of a full-time employee working the Commercial & Industrial market assisted the Commercial Lighting program to grow by over 230% from 2012.

The C&I Standard offer program grew by over 400% over 2012 with the use of additional crews performing energy efficiency improvements along with direct installs.

**WHAT'S WORKING, WHAT'S NOT:**

The residential portfolio of EE programs is working well. OG&E is reached 107% of energy savings targets within its budgets and has successfully enhanced operating procedures. The current EM&V reports validate the impact and process success of OG&E's residential programs.

The C&I portfolio of EE programs met 71% of the 2013 goals compared to only 33% of goals in 2012, this is a significant increase in performance. OG&E's marketing and sales efforts have begun to effectively penetrate the C&I customer base.

The Commercial Lighting Program achieved 70% of goal in 2013, an 18% increase over 2012, and continues to pick up momentum from lighting customers. The new Direct Install component of the C&I programs has provided a major increase to savings for the 6 months that it has been implemented. Even so, the C&I Standard Offer Program continues to struggle achieving only 35% of 2013 goal.

The Window AC Program is not working, although the savings was 127% of the 2013 goal it had a TRC of only 0.33, which is too low to maintain.

**PLANNED CHANGES:**

On February 14, 2014, OG&E filed for interim modifications to the current portfolio and subsequently received approval in case 07-075-TF order 55 approved on March 17, 2014. The changes include

discontinuing three underperforming programs, adding one new residential program, increasing the customer rebate for commercial programs, modifying the rebate structure and finally increasing marketing efforts to reach more commercial and industrial customers. The programs that were discontinued had not performed as well as expected in 2011, and 2012. OG&E plans to review the discontinued programs to see if opportunities exist for reintroducing the programs in future portfolios with modifications that improve consistency in their ability to be cost effective. The new residential program is a multi-family direct install program designed to address a hard to reach customer segment. For commercial and industrial programs the modification of customer rebates and increased marketing efforts are expected to drive participation levels in those programs.

#### **TRAINING ACHIEVEMENTS:**

OG&E provided training to approximately 751 individuals in 2013. The training included weatherization contractors and crews, hosting seminars to explain how the residential program works and educating the commercial and industrial customers on the benefits of energy efficient lighting.

#### **EM&V ACTIVITIES:**

EnerNOC Utility Solutions was selected to perform the EM&V for all of the Energy Efficiency programs in the portfolio except the AWP and the OGE/AOG Weatherization program. ADM Associates, Inc. performs the EM&V for both the AWP and the OGE/AOG Weatherization Program. Using the same contractor for both weatherization programs ensures consistency in evaluation. For PY 2013 both EM&V contractors performed process and impact evaluations of the programs delivering measure by measure evaluated net savings. The three EM&V reports detail their finding and are in the appendix of this annual report.

#### **LONG-TERM ENERGY SAVINGS:**

The current program portfolio was developed to meet the energy efficiency targets established by the APSC in Order No.15 in Docket 08-137-U. The expected kW and kWh savings delivered by this portfolio, estimated kW and kWh savings from future portfolios and the cumulative kW and kWh savings from previous portfolios, are included in the Company's Load forecast. The IRP incorporates this information in its planning report.  
Estimation of EE Resource Potential

#### **EE OVERVIEW:**

The following three tables provide an overview of the EE portfolio results for PY 2013:

<b>2013 Portfolio Summary</b>						
<b>Net Energy Savings</b>		<b>Cost</b>			<b>Cost-Benefits</b>	
<b>Demand MW</b>	<b>Energy MWh</b>	<b>Actual Expenses</b>	<b>LCFC</b>	<b>Performance Incentives</b>	<b>TRC Net Benefits</b>	<b>TRC Ratio</b>
2.8	13,411	\$ 3,714,378	\$ 898,331	\$0	\$ 6,823	2.90

EE Portfolio Cost by Program					
Program Name	Target Sector	Program Type	2013		% of RBudget
			Budget (\$)	Actual (\$)	
Custom Energy Report (Discontinued)	Residential	Behavior/Education	-	-	-
Multi-Family (Discontinued)	Residential	Market Specific/Hard to Reach	-	-	-
OG&E - AOG Weatherization	Residential	Whole Home	2,302,446	2,302,158	100%
Residential HVAC Tune-up & Duct Repair	Residential	Measure/Technology Focus	121,169	122,004	101%
Student Energy Education	Residential	Behavior/Education	76,298	73,907	97%
Window A/C	Residential	Market Specific/Hard to Reach	10,519	9,089	86%
C&I Standard Offer	Commercial & Industrial	Measure/Technology Focus	537,940	523,591	97%
Motors (Discontinued)	Commercial & Industrial	Measure/Technology Focus	-	-	-
Commercial HVAC Tune-up	Small Business/C&I	Measure/Technology Focus	134,206	107,724	80%
Commercial Lighting	Small Business/C&I	Measure/Technology Focus	514,899	387,722	75%
Arkansas Weatherization Program (AWP)	Residential	Whole Home	85,730	38,714	45%
Energy Efficiency Arkansas (EEA)	All Classes	Behavior/Education	24,000	18,659	78%
Regulatory	-	-	130,809	130,809	100%
<b>Total</b>			<b>3,938,015</b>	<b>3,714,378</b>	<b>94%</b>

EE Portfolio Summary by Cost Type				
EE Program Cost Summary	2013 Total Cost			
	Cost Type	% of Total	Budget (\$)	Actual (\$)
Planning / Design	0%	17,707	-	0%
Marketing & Delivery	5%	208,886	238,943	6%
Incentives / Direct Install Costs	81%	3,186,825	2,728,787	73%
EM&V	5%	200,000	151,082	4%
Administration	5%	193,789	464,757	13%
Regulatory	3%	130,809	130,809	4%
	100%	<b>3,938,015</b>	<b>3,714,378</b>	100%

Company Statistics										
Program Year	Revenue and Expenses					Energy				
	Total Revenue (a) (\$000's)	Budget		Actual		Total Annual Energy Sales (d) (MWh)	Plan		Evaluated	
		Portfolio Budget (b) (\$000's)	% of Revenue (% = b/a)	Portfolio Spending (c) (\$000's)	% of Revenue (% = b/a)		Net Annual Savings (e) (MWh)	% of Energy Sales (% = b/a)	Net Annual Savings (f) (MWh)	% of Energy Sales (% = b/a)
2009	\$ 140,287	\$ 421	0.3%	\$ 352	0.3%	2,558,917	3,971	0.2%	5,608	0.2%
2010	\$ 176,717	\$ 1,364	0.8%	\$ 1,305	0.7%	2,837,921	2,667	0.1%	4,143	0.1%
2011	\$ 180,406	\$ 2,680	1.5%	\$ 2,172	1.2%	2,802,634	6,991	0.2%	4,985	0.2%
2012	\$ 167,615	\$ 3,524	2.1%	\$ 3,149	1.9%	2,743,246	14,145	0.5%	7,596	0.3%
2013	\$ 179,047	\$ 3,938	2.2%	\$ 3,714	2.1%	2,710,927	20,848	0.8%	13,411	0.5%



## **2.0 Portfolio Programs**

## Program Overview

OG&E has developed energy efficiency programs to help customers manage their energy usage and to reduce load during periods of high peak demand. The programs allow OG&E the ability to alleviate potential power shortages and achieve energy savings by enabling customers to change their behavior, attitudes, awareness and knowledge about energy savings and the use of energy efficient technologies.

By implementing energy efficiency programs, demand for electricity will decrease which in turn avoids emissions that would otherwise be produced by increased power generation. Energy efficiency programs have the potential to significantly reduce the effect power generation has on the environment by reducing pollutants emitted during the process of generating electricity. These energy efficiency programs decrease electric demand for generation which reduces emissions.

All customer classes may benefit from energy efficiency programs. Hard-to-reach residential customers benefit by keeping more of their disposable income, maintaining the same quality of lifestyle and adopting a more energy efficient philosophy. Energy efficiency programs lower operating costs and enable the efficient use of energy throughout all customer classes. With lower operating costs and enhanced productivity, Arkansas businesses remain competitive in the global economy and avoid the outsourcing of jobs and services.

## **2.1 OG&E Weatherization Program**

### **2.1.1 Program Description**

Designed to target residential customers and allow them to participate in the program for free, this program allows customers the opportunity to participate in managing their energy costs and begin participating in the price response tariffs. The program targets all residential customers of single family homes which were built before 1997, specifically those that are severely energy inefficient. The program is designed to upgrade and improve the thermal envelope of the dwelling. Homes in all of the OG&E service territory were targeted to participate by having an energy audit performed utilizing blower door technology on the structure to capitalize on specific weatherization techniques.

OG&E serves more than 54,000 residential customers in Arkansas and has estimated there are as many as 30,000 homes in need of weatherization improvements. OG&E views the Weatherization Program as a key component in the EE area, and uses three independent contractors: DK Construction, based in Van Buren (Crawford County), Total Home Efficiency, based in south Fort Smith (Sebastian County) and Williams Energy Efficiency, based in Barling (East Sebastian County). The contractors received over 20 hours of training on weatherization techniques. Each contractor has certified Building Performance Institute (“BPI”) and RESNET, HESP auditors on staff. OG&E personnel also conducted in-the-field training throughout the course of the program which will continue throughout the remainder of the existing program. Some of the cost effective and energy saving equipment that was installed in the homes include: replacement of glass, and or windows, doors, ground cover for vapor barrier, compact fluorescent lighting, return air cavity sealing, CO detectors, and smoke detectors. Utilizing blower door technology the contractors were able to locate and seal larger areas of air infiltration on the homes. Contractors are encouraged to attend and receive additional education on weatherization of homes, both online and in classrooms, for improvement in proper home weatherization techniques. Additional training is recommended for National Certifications for each of the contractors.

The partnership with Arkansas Oklahoma Gas Corporation (“AOG”) has proved to be successful in the joint weatherization program. The ability to work together with other utilities is an ongoing effort to combine resources as well as to reach out to more customers in our adjoining market place. OG&E and AOG continued to work in an atmosphere of transparency with the existing contractors already in the program while OG&E recruited an additional contractor to help relieve the stress of the summer time heat for the existing contractors. OG&E and AOG, along with the efforts of Frontier Associates, continue to fine tune the software package to meet the criteria of the TRM put in place by the Arkansas Public Service Commission. The improvements were to help insure the software would capture more accurate field data as well as a split payment process for each of the utilities to pay the individual contractors assigned to the program. The contractors continued to weatherize homes even during another hot summer allowing OG&E customers to receive the rewards and benefits of maintaining or reducing their overall utility bills while increasing their comfort in the home.

## **2.1.2 Program Highlights**

- Civic and community presentations highlighting the program were conducted throughout each town served by OG&E promoting the Weatherization Program.
- OG&E achieved 122% of planned energy savings.
- OG&E weatherized 1,623 home in 2013 (100% of planned participation).

## **2.1.3 Program Budget, Savings and Number of Measures**

<b>OG&amp;E AOG Weatherization</b>												
Program	Cost			Energy Savings (kWh)			Demand Savings (kW)			Participants		
	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2011	\$ 1,964,321	\$ 1,645,000	84%	2,721,699	1,595,413	59%	642	544	85%	1,300	953	73%
Program Year 2012	\$ 2,296,960	\$ 2,296,935	100%	2,994,261	3,638,503	122%	516	1,006	195%	1,620	1,631	101%
Program Year 2013	\$ 2,302,198	\$ 2,302,158	100%	2,994,261	3,655,091	122%	516	1,040	202%	1,620	1,623	100%

## **2.1.4 Description of Participants**

- Participants of this program fall into two groups. The first group is customers that typically are mature customer in the lower middle class. Participants live in older single family homes over 15 years of age. Many of these participants are either retired or near retirement and they own their own home. They maintain a low-key lifestyle and typically do not have kids at home. These customers are high school educated.
- The second groups of customer are younger with kids and are in the lower middle class. These families live in small cities and ethnically diverse parents working in entry level service jobs.

## **2.1.5 Challenges and Opportunities**

- Working in conjunction with the Community Clearinghouse, OG&E has been able to maintain a steady pace in obtaining and qualifying customers' homes in a timely manner for weatherization. As OG&E evaluated the opportunity to complete the desired number of homes in this program, the need was present to bring an additional contractor on in June 2012. With the assistance of this contractor, OG&E was able to meet its goal on homes weatherized.

## **2.1.6 Planned or Proposed Changes to Program and Budget**

- This Comprehensive program ended on June 30, 2011 and a new Energy Efficiency Program was approved on June 30, 2011 for the program years 2011-2013. The program was enhanced

to include duplexes, condos, rental property or any residential customer in the Arkansas Territory. OG&E plans on exceeding the overall program goals for weatherization by performing an additional 3240 homes by the end of the 2014.

## 2.2 Student Energy Education Program (LivingWise®)

The program provides 6<sup>th</sup> grade teachers and their students a curriculum on home energy efficiency. At the end of the curriculum a LivingWise® education kit provides the students the opportunity to participate with their families on energy awareness. LivingWise® education kit contains a CFL, air filter alarm, aerator, low-flow shower head, LED night light, thermometer and a student handbook on energy efficiency for the home and community. The students take the LivingWise® kit home and install the energy efficiency measures with the assistance of their parents.

OG&E agreed to provide a list of schools each semester to Resource Action Programs (RAP) for potential participation in the LivingWise® Program. RAP contacts the school, enrolls the teacher and quantifies the number of students. A list of enrolled schools and participation information is sent to OG&E each month. There was an overwhelming consensus from all participating teachers that it was an informative and easy curriculum and each teacher felt that with the uncertain environmental and energy situation, the teaching materials were both timely and important.

The selection process for LivingWise® begins with a list of potential elementary public schools for 6<sup>th</sup> grade classes that OG&E sends to LivingWise®. This is a turn-key program, where the following services are performed by RAP:

- Contact the school
- Verify school address
- Speak with the teacher(s)
- Produce and mail the required number of kits for students and teachers
- Follow up with teachers on the class participation during the curriculum and then on the activities provided in the kit for the students to take home and interact with their parents.

### **2.2.2 Program Highlights**

- The LivingWise® Program provided Energy Efficiency and Awareness training for 2,006 students from January 2013 through December 31, 2013, targeting 9 school districts in Arkansas.
- Created OG&E customized box to improve the generic look for the LivingWise® Kits.
- OG&E utilized Community Coordinators along with key contact personnel for promotion of the program.  
A report is then submitted to OG&E at the end of each semester detailing the activity, the results and the participation level and acceptance of the program.
- OG&E has had a 100% return rate from teachers responding to the follow-up surveys.

### **2.2.3 Program Budget, Savings and Participants**

<b>Student Energy Education</b>												
<b>Program</b>	<b>Cost</b>			<b>Energy Savings (kWh)</b>			<b>Demand Savings (kW)</b>			<b>Participants</b>		
	<b>Budget</b>	<b>Actual</b>	<b>%</b>	<b>Plan</b>	<b>Evaluated</b>	<b>%</b>	<b>Plan</b>	<b>Evaluated</b>	<b>%</b>	<b>Plan</b>	<b>Actual</b>	<b>%</b>
Program Year 2011	\$ 87,963	\$ 74,373	85%	160,441	46,227	29%	15	4	26%	1,840	1,813	99%
Program Year 2012	\$ 87,508	\$ 82,273	94%	152,120	291,628	192%	15	36	237%	1,840	1,817	99%
<b>Program Year 2013</b>	<b>\$ 76,298</b>	<b>\$ 73,907</b>	<b>97%</b>	<b>152,120</b>	<b>126,084</b>	<b>83%</b>	<b>15</b>	<b>15</b>	<b>99%</b>	<b>1,840</b>	<b>2,006</b>	<b>109%</b>

### **2.2.4 Description of Participants**

- This program focuses on 6th grade students in the public school system. Providing several small self-installing energy efficiency products will allow both the student and the parents to have energy efficiency conservations. This program provides energy efficiency education to the future home owners so they will understand the impacts for energy conservation.

### **2.2.5 Challenges and Opportunities**

- OG&E's success with this program has been through key contacts in each of the school districts. Each of the participating schools within the OG&E territory have embraced the concept and curriculum provided through Resource Actions.

### **2.2.6 Planned or Proposed Changes to Program and Budget**

- This Comprehensive program ended on June 30, 2011 and a new Energy Efficiency Program was approved on June 30, 2011 for the program years 2011-2013. OG&E plans to continue its support for the Student Energy Education Program.

## **2.3 Commercial Lighting Program**

### **2.3.1 Program Description**

The purpose of the Commercial Lighting Program is to provide incentives to the OG&E Commercial and Industrial customers during change outs. The program targets commercial, public authority and industrial facilities of all sizes with a focus on the small to medium-sized facilities, where saturation rates and awareness levels of high efficiency lighting are expected to be lower than in larger operations. To encourage commercial customers to participate, incentives are offered for the following upgrades; T-12 to T-8 or T-5 lamps, upgrading HID to high efficiency T-8, or T-5's, installation of sensors, LED exit lighting, incandescent lighting to CFL's or the upgrade of parking lot lighting. The new program also encourages new construction to upgrade their lighting utilizing the 2006 IECC code for standards and guidelines. Incentives were based on lamp replacement or kW reduced on the structure.

The Energy Efficiency Lighting Program was designed to reach existing customers including large school districts, commercial, and industrial complexes. OG&E personnel continued to recruit and educate commercial customers on the advantages of upgrading their lighting systems, through educational seminars and booth displays at local vendor open houses. OG&E personnel utilized many different avenues and strategies to help entice customers to upgrade the lighting in each of the business including working with lighting manufacture representatives, conducting walk through audits and detailed audits.. The program is very well received with the incentives allowing for quicker payback on the lighting and enhanced lighting levels in their facilities. More of the commercial customers took advantage of the rebate while educating themselves on the benefits of more efficient lighting and controls.

### **2.3.2 Program Highlights**

- Presentations were made at supply and distributor warehouses throughout the year.
- Civic and community presentations highlighting the program were conducted throughout each town served by OG&E promoting the lighting program.
- Cleareresults® Consulting was contracted in June to assist OG&E personnel in capturing lighting opportunities with all classifications of C&I consumers.



### **2.3.3 Program Budget, Savings and Participants**

<b>Commercial Lighting</b>												
<b>Program</b>	<b>Cost</b>			<b>Energy Savings (kWh)</b>			<b>Demand Savings (kW)</b>			<b>Participants</b>		
	<b>Budget</b>	<b>Actual</b>	<b>%</b>	<b>Plan</b>	<b>Evaluated</b>	<b>%</b>	<b>Plan</b>	<b>Evaluated</b>	<b>%</b>	<b>Plan</b>	<b>Actual</b>	<b>%</b>
Program Year 2011	\$ 118,763	\$ 66,689	56%	1,797,729	1,531,936	85%	451	413	92%	35	24	69%
Program Year 2012	\$ 323,331	\$ 246,824	76%	5,238,456	2,725,963	52%	1,323	512	39%	125	66	53%
<b>Program Year 2013</b>	<b>\$ 514,899</b>	<b>\$ 387,722</b>	<b>75%</b>	<b>9,010,145</b>	<b>6,325,111</b>	<b>70%</b>	<b>2,275</b>	<b>967</b>	<b>43%</b>	<b>215</b>	<b>186</b>	<b>87%</b>

### **2.3.4 Description of Participants**

- Participants in the program included all classifications of commercial and industrial customers.

### **2.3.5 Challenges and Opportunities**

- Notification of distributors and contractor on program advantages and opportunities.
- Presentations to distributors and civic clubs.
- DOE regulations.

### **2.3.6 Planned or Proposed Changes to Program and Budget**

- OG&E plans to spend the approved budgeted amount and does not anticipate any changes to the goals or budget for 2013. OG&E has filed an amended program for 2014.

## **2.4 Energy Efficiency Education Program**

### **2.4.1 Program Description:**

The Energy Efficiency Education Program provides information to all customers, of all classes, allowing them to make informed decisions about how they use energy and to look at alternatives to improve their consumption, thereby decreasing demand and energy usage.

OG&E has continued its support of the EEA Comprehensive Plan through three components: 1) Residential Education and Information Outreach; 2) Media Promotion; 3) Commercial and Industrial Education and Outreach, provided by the Arkansas Energy Office.

The Arkansas Energy Office (“AEO”) administered the collaborative efforts of the Arkansas utilities educational profile in training opportunities. The AEO also provided educational pamphlets, DVDs, and training materials to homeowners throughout the OG&E service territory. Multiple classes were held throughout the State of Arkansas on residential, commercial, and industrial energy efficient usage and design. Area industry plant engineers as well as CEOs, CFOs, and purchasing agents were updated on techniques of how to manage energy consumption in their plants. Courses on Refrigeration and Compressed Air were held in the Fort Smith area to update individual businesses on energy efficiency operations within the industrial segment.

### **2.4.2 Program Highlights:**

- The Arkansas Energy office provides various methods of reaching all classifications of OG&E customers through radio, print, and seminars.
- The Arkansas Energy office offered training through Arkansas Manufacturing Solutions throughout the year in the OG&E territory.
- Additional information is submitted by the Arkansas Energy Office annual report.
- Comprehensive Program began February 3, 2010 and ended on June 30, 2011. The Energy Efficiency Program began on July 1, 2011 and continues on through December 2013.

### **2.4.3 Program Budget, Savings and Participants**

<b>Energy Efficiency Arkansas (EEA)</b>												
<b>Program</b>	<b>Cost</b>			<b>Energy Savings (kWh)</b>			<b>Demand Savings (kW)</b>			<b>Participants</b>		
	<b>Budget</b>	<b>Actual</b>	<b>%</b>	<b>Plan</b>	<b>Evaluated</b>	<b>%</b>	<b>Plan</b>	<b>Evaluated</b>	<b>%</b>	<b>Plan</b>	<b>Actual</b>	<b>%</b>
Program Year 2011	\$ 39,319	\$ 24,435	62%	0	0	-	0	0	-	0	0	-
Program Year 2012	\$ 25,977	\$ 25,929	100%	0	0	-	0	0	-	0	0	-
<b>Program Year 2013</b>	<b>\$ 24,000</b>	<b>\$ 18,659</b>	<b>78%</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>0</b>	<b>0</b>	<b>-</b>

### **2.4.4 Description of Participants**

- Residential and business customer in Arkansas.

### **2.4.5 Challenges and Opportunities**

- OG&E, along with the AEO, has continued to provide updated material to all classifications of consumers throughout the OG&E territory. Challenges to residential, commercial and industrial consumers will be to initiate timely and important energy improvements to homes and businesses. Cost effective measures should be implemented in a timely manner to maintain lower utilities. Education to the consumer is essential in stressing the importance of energy efficiency in all applications.

### **2.4.6 Planned or Proposed Changes to Program and Budget**

- OG&E agreed to participate with EEA in the new Energy Efficiency Program that was approved on June 30, 2011 for the program years 2011-2013. OG&E plans to continue its support for the Energy Efficiency Arkansas Program.

## 2.5 HVAC Tune-Up and Duct Repair Program

### 2.5.1 Program Description

The HVAC Tune-Up and Duct Repair program is a comprehensive long-term energy efficiency program to reach customers who normally do not participate in annual services of an HVAC company. This residential program is for customers who need assistance in improving the efficiency of their existing HVAC equipment and/or assistance in sealing or repairing HVAC ductwork. This program helps the customer realize the need of regular scheduled maintenance on their equipment. The program will allow customers to maximize efficiency of existing equipment and increase the comfort in their home.

### 2.5.2 Program Highlights

- The HVAC Tune-Up and Duct Repair program began with contractor meetings in March 2012, with a total of 7 contractors and 49 technicians in attendance.
- OG&E signed an agreement with 7 contractors to participate in the program.
- OG&E promoted the program through civic presentations, direct mail pieces and the Fort Smith Home Show as well as across the Fort Smith Territory.
- Audits were performed in the field with the service technician at the customer's residence.
- With the help of 7 HVAC companies in Fort Smith and Van Buren, and with the OG&E Weatherization crews; OG&E was able to complete 300 tune-ups which included 305 Duct & Plenum seals on homes throughout the OG&E Arkansas territory.

### 2.5.3 Program Budget, Savings and Participants

Residential HVAC Tune-up & Duct Repair												
Program	Cost			Energy Savings (kWh)			Demand Savings (kW)			Participants		
	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2011	\$ 35,443	\$ 11,442	32%	43,720	17,049	39%	29	9	29%	50	77	154%
Program Year 2012	\$ 147,471	\$ 147,271	100%	229,025	214,632	94%	155	97	63%	300	464	155%
<b>Program Year 2013</b>	<b>\$ 121,169</b>	<b>\$ 122,004</b>	<b>101%</b>	<b>229,025</b>	<b>354,058</b>	<b>155%</b>	<b>155</b>	<b>130</b>	<b>84%</b>	<b>300</b>	<b>510</b>	<b>170%</b>

### 2.5.4 Description of Participants

- Many home owners' financial resources are limited and homeowner choose lesser efficiency options because of their lower initial costs than other energy cost options. Many homes built before 2000, energy efficiency options were not installed or energy efficiency options were not available. This program will allow customer to maximize efficiency of existing equipment.

### **Sample of Events:**

- Training was held with each contractor on expectations of the program.
- Presentations were performed for local civic groups in various areas of the OG&E territory.
- Name solicitations were also done by direct mail campaigns and during the Greater Fort Smith Home Builders home show.

### **2.5.5 Challenges and Opportunities**

- Meeting with each technician on the program qualifications and expectations.

### **2.5.6 Planned or Proposed Changes to Program and Budget**

- This Energy Efficiency program will continue to be implemented through the budget years of 2012-2013.

## 2.6 Window Unit A/C Program

### 2.6.1 Program Description

The objective of the Comprehensive Energy Efficient Window Unit A/C Program is to provide OG&E single family residential customers without central HVAC systems incentives for purchasing and installing high-efficiency window air conditioners. The program is designed to help increase energy efficiency of window unit sales, while reducing energy consumption, lowering energy costs, and increasing the comfort of the residential customers' home with window units.

### 2.6.2 Program Highlights

OG&E has partnered with a local family owned hardware store which has outlets in 4 major areas of the Fort Smith service area, to help promote the program. Along with the local hardware stores, OG&E partnered with Home Depot and LOWES to promote the program.

### 2.6.3 Program Budget, Savings and Participants

Window A/C												
Program	Cost			Energy Savings (kWh)			Demand Savings (kW)			Participants		
	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2011	\$ 6,460	\$ 402	6%	1,260	206	16%	1	0	15%	13	1	8%
Program Year 2012	\$ 12,065	\$ 4,240	35%	2,423	2,161	89%	2	2	88%	25	30	120%
Program Year 2013	\$ 10,519	\$ 9,089	86%	2,423	3,075	127%	2	3	129%	25	30	120%

### 2.6.4 Description of Participants

- Many home owners' financial resources are limited and homeowners choose lesser efficient options because of lower initial costs. In many homes built before 1997, energy efficiency options were not installed over energy efficiency options was not available.

### 2.6.5 Challenges and Opportunities

- This is a very limited market; OG&E estimates that only 700 homes are cooled with window units in the Fort Smith area.
- OG&E will continue to pursue additional avenues to help promote and meet target market areas for window unit sales.
- Consumers will continue to be educated on the benefits of high efficiency window units and encouraged to participate in the program through civic presentations in 2013.

### **2.6.6 Planned or Proposed Changes to Program and Budget**

- No changes planned.

## 2.7 Commercial Tune-Up Program

### 2.7.1 Program Description

This is a comprehensive long term energy efficiency program targeted to commercial and industrial customers. The Commercial Tune-Up program will continue to offer financial incentives for air conditioning, foodservice, refrigeration and/or ventilation systems upgrades in efficiency. The intent of the program is to provide inducements for energy savings and peak demand reductions produced through any measured, verified, and inspected efficiency improvements.

### 2.7.2 Program Highlights

- The Commercial Tune-Up program was initiated with a contractor meeting on July 22, 2011 with 15 contractors in attendance.
- Contractors have been slow to embrace the program.
- OG&E continued to promote the program through civic presentations and customer calls across the Fort Smith service area.
- Rebate dollars have been adjusted downward with the new TRM standards.
- CLearresults® Consulting were contracted in June 2013 to assist OG&E personnel in promoting the Commercial Tune-Up program.

### 2.7.3 Program Budget, Savings and Number of Measures

Commercial HVAC Tune-up												
Program	Cost			Energy Savings (kWh)			Demand Savings (kW)			Participants		
	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2011	\$ 50,884	\$ 6,370	13%	227,991	20,845	9%	33	10	32%	3	2	67%
Program Year 2012	\$ 141,423	\$ 57,840	41%	759,969	26,059	3%	112	22	19%	10	11	110%
Program Year 2013	\$ 134,206	\$ 107,724	80%	759,969	356,827	47%	112	41	37%	10	159	1590%

### 2.7.4 Description of Participants

- Participants in the program were small to medium size C&I consumers. Actual participation was upgrades in Energy Efficiency on HVAC equipment.

### 2.7.5 Challenges and Opportunities

- Meeting with each technician and HVAC companies on the program qualifications and expectations.



- Economic conditions in the Fort Smith market place have been slow to rebound; however, have seemed to level off with unemployment numbers holding steady. Energy efficiency improvements with many commercial customers have continued to be delayed with due to tighter budgets from their corporate office.

### **2.7.6 Planned or Proposed Changes to Program and Budget**

- This Energy Efficiency program will continue to be implemented through the budget years of 2012-2013 with no changes to the format or additional budget. This program may be modified in 2014.

## 2.8 Commercial/Industrial Standard Offer Program

### 2.8.1 Program Description

This is a comprehensive long term energy efficiency program targeted to Commercial and Industrial Power and Light rate customers. The program provides inducements for the energy savings and peak demand reductions produced through energy efficiency improvements. This program provides customized energy efficiency solutions to meet requirements unique to each facility. It has proven to be successful in helping to not only manage but to assist in upgrading existing equipment to higher efficiency. This program has an on-going opportunity to help industrial customers achieve higher efficiency standards while providing incentives to help lower payback periods. OG&E personnel made calls on individual industrial customers along with local Engineering firms to inform them of the new TRM3 standards set by the Arkansas Public Service Commission.

### 2.8.2 Program Highlights

- The Commercial/Industrial Standard Offer program was promoted through various functions to Industrial customers throughout 2013.
- Contractors, Public School Districts, and customers embraced the program with HVAC equipment upgrades.
- OG&E promoted the program through various civic presentations across the Fort Smith Territory.
- OG&E contracted with Cleareresults® Consulting to assist OG&E personnel in the Commercial and Industrial programs.

### 2.8.3 Program Budget, Savings and Participants

C&I Standard Offer												
Program	Cost			Energy Savings (kWh)			Demand Savings (kW)			Participants		
	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2011	\$ 141,589	\$ 109,419	77%	1,688,328	1,080,273	64%	402	349	87%	5	6	120%
Program Year 2012	\$ 327,434	\$ 161,145	49%	4,246,188	619,897	15%	1,141	154	13%	12	22	183%
Program Year 2013	\$ 537,940	\$ 523,591	97%	7,177,710	2,535,967	35%	1,962	570	29%	18	2,469	#####

### 2.8.4 Description of Participants

- Most of the participants were small to medium size C&I customers.

### **2.8.5 Challenges and Opportunities**

- Economic conditions in the Fort Smith market place have started to rebound slowly, along with the unemployment rate leveling off; however, the energy efficiency improvements with many industrial customers continue to move at a slow pace due to budget limitations.
- Available dollars in O&M budgets for Industrial Plants.
- Projects may take up to 18 months from start to finish.

### **2.8.6 Planned or Proposed Changes to Program and Budget**

- This Energy Efficiency program will continue to be implemented through the budget years of 2012-2013. Possible modifications to the program for 2014.

## 2.9 Multi-Family Program

### 2.9.1 Program Description:

- The Multi-Family program was intended to target multi-family complex owners and or managers who needed assistance in improving the efficiency of their existing HVAC equipment. With the program, OG&E would offer incentive payments to apartment complex owners to upgrade from an existing air conditioning to a 16 SEER heat pump unit or a 16 SEER air conditioner with a 90+ AFUE furnace.

### 2.9.2 Program Highlights:

- Due to the size restrictions and characteristics of new equipment to be installed this program was discontinued at the end of 2011.

### 2.9.3 Program Budget, Savings and Number of Measures:

Multi-Family												
Program	Cost			Energy Savings (kWh)			Demand Savings (kW)			Participants		
	Budget	Actual	%	Plan	Evaluated	%	Plan	Evaluated	%	Plan	Actual	%
Program Year 2011	\$ 37,778	\$ -	0%	27,655	0	0%	13	0	0%	25	0	0%
Program Year 2012	\$ -	\$ -	-	0	0	-	0	0	-	0	0	-
Program Year 2013	\$ -	\$ -	-	0	0	-	0	0	-	0	0	-

### 2.9.4 Description of Participants

- No participants in PY2013.

### 2.9.5 Challenges and Opportunities

- OG&E is looking at ways to reach this target market where the decision maker isn't the customer paying for the impacts of inefficient homes with a direct install program.

### 2.9.6 Planned or Proposed Changes to Program and Budget

- Proposed changes were made in an interim filing filed Feb, 2014

## **2.10 Arkansas Weatherization Program (AWP)**

### **2.10.1 Program Description**

The Arkansas Weatherization Program was designed to promote energy efficiency in homes throughout the Fort Smith service area. This Program is monitored by the Arkansas Community Action Agencies Association. The Energy Efficiency Program is targeted to residential customers and allows the customer to participate in programs to assist in managing energy costs and to begin to utilize price response tariffs. This program focused on customers who owned their home and who have homes that were severely energy inefficient. The program design is to upgrade and improve the thermal envelope of the dwelling and the energy use of appliances.

OG&E continued their participation with the Arkansas Weatherization Program in conjunction with other utilities across the state. The Central Arkansas Development Council has control of the disbursement of funding for the collaborative. OG&E serves over 54,000 residential customers its Arkansas service area Region and has estimated as many as 30,000 homes needs weatherization improvements. It also estimates there are 10,000 severely energy inefficient homes in the service area. OG&E views the Weatherization Program as a key component in the DSM area. Presentations on the Weatherization Program were made to Civic and Senior Citizen Groups throughout the OG&E territory to inform customers of the program. Agency contractor crews installed key weatherization components in the homes to help upgrade the homes from energy inefficient to modern day standards. Some of the components that were installed are as follows: ceiling insulation, caulking, insulating foam, weather stripping, replacement of glass and, or windows, doors, ground cover, compact fluorescent lighting, duct and plenum repair, return air cavity sealing, CO detectors, smoke detectors, HVAC tune-ups, replacements, and indoor coil cleaning.

OG&E provided funding for the Arkansas Community Action Agency Associations to weatherize severely energy inefficient homes in the Fort Smith service area. Working with the Crawford-Sebastian Community Development Council, Inc., located in Fort Smith, and the Universal Housing Authority based in Russellville, the AWP program weatherized 45 severely energy inefficient residential homes in 2012. Many of these homes also utilized DOE monies, as well as LIHEAP funding and additional grants, for improvements to the home. Area counties served by the agencies are Crawford, Sebastian, Franklin, Johnson, and Logan.

### **2.10.2 Program Highlights**

- Energy Efficiency Arkansas Weatherization Program was launched on July 1, 2011.
- AWP weatherized 35 homes in 2013 at an average cost per home of \$1,106.
- Civic and community presentations on the program were conducted throughout each town served by OG&E promoting the Arkansas Weatherization Program.

- The Arkansas Weatherization Program was administered through the Central Arkansas Development Council.
- The Crawford-Sebastian Community Development Council Inc., Universal Housing Corporation, (Russellville based), performed audits and jobs in the OG&E District.

### **2.10.3 Program Budget, Savings and Participants**

<b>Arkansas Weatherization Program (AWP)</b>												
<b>Program</b>	<b>Cost</b>			<b>Energy Savings (kWh)</b>			<b>Demand Savings (kW)</b>			<b>Participants</b>		
	<b>Budget</b>	<b>Actual</b>	<b>%</b>	<b>Plan</b>	<b>Evaluated</b>	<b>%</b>	<b>Plan</b>	<b>Evaluated</b>	<b>%</b>	<b>Plan</b>	<b>Actual</b>	<b>%</b>
Program Year 2011	\$ 114,582	\$ 130,358	114%	205,519	232,805	113%	27	115	425%	59	89	151%
Program Year 2012	\$ 86,988	\$ 66,767	77%	522,485	76,898	15%	69	12	17%	59	45	76%
<b>Program Year 2013</b>	<b>\$ 85,730</b>	<b>\$ 38,714</b>	<b>45%</b>	<b>522,485</b>	<b>54,516</b>	<b>10%</b>	<b>69</b>	<b>31</b>	<b>46%</b>	<b>59</b>	<b>35</b>	<b>59%</b>

### **2.10.4 Description of Participants**

- This program looks for customer with inefficient homes and limited disposable income for energy efficiency measures. Customer may qualify for federal funds based on low income.

### **2.10.5 Challenges & Opportunities**

- The ability to process lead generation in a timely manner continues to be a challenge in the program.
- Fluctuations in the funding process.

### **2.10.6 Planned or Proposed Changes to Program & Budget**

- This Comprehensive program ended on June 30, 2011 and a new Energy Efficiency Program was approved on June 30, 2011 for the program years 2011-2013. OG&E plans to continue its support for the Arkansas Weatherization Program.

## **3.0 Supplemental Requirements**

### **3.1 Staffing**

Programs	Back Office Support (hours per week)	Program Management (hours per week)	Sales (hours per week)	Hours per week to manage Programs	FTE
Weatherization	5	35		40	1
HVAC Tune-Up and Duct Repair	1	3	6	10	0.25
Window Unit A/C	0.25	3.25	3.5	7	0.175
Commercial Lighting	5	10	5	20	0.5
Commercial Tune-Up	3	4	8	15	0.375
C&I Standard Offer	3	4	8	15	0.375
Student Energy Education	0.5	2.5		3	0.075
<b>Totals</b>	<b>17.75</b>	<b>61.75</b>	<b>30.5</b>	<b>110</b>	<b>2.75</b>

OG&E has 2 FTE's working full time managing the programs and an EM&V Specialist and Clerical Support making up the remaining .75 FTE. EM&V Specialist and Clerical Support also have additional responsibilities in Oklahoma Programs.

New staffing in 2014 will include one additional supervisor in the Arkansas area that is currently in rate base. Having a local working supervisor with relationships with the large commercial and industrial customers is expected to offer additional opportunities for the EE programs along with local supervision that will assist in the delivery of the programs by the program managers

### **3.2 Stakeholders Activities**

Training classes fall into three categories: first, training for trade allies who are working with OG&E on the implementation of the program. Their purpose is to educate the installers of the components and operations of the program. Second, classes for customers will provide information on both OG&E's program and how energy efficiency products can assist their facility in being more energy wise. Third, classes were held to train OG&E members, installers and customers on the technical issues to improve energy efficiencies for customers.

Please see training activity included in annual workbook tables.



### **3.3 Information provided to Customer to Promote EE**

Please see Section 5.0 Appendix X for samples of educational materials and information used in the program year.

## 4.0 Appendix A: EM&V Contractor Report

Attach as an appendix, any materials or documentation which is deemed useful in explaining or clarifying the results or performance of any program conducted during the program year. At minimum, the appendix should include any study or research relied upon in the delivery or EM&V of any program conducted during the program year. If any such items **include confidential information shall be redacted** in the public version of the document.

## EM&V Contractor Report

OG&E has three different EM&V Reports associated with evaluated savings for PY2012. ADM & Associates provided Results for both the AWP Program and OG&E's Weatherization Program while EnerNOC provided results for the remaining programs. OG&E is attaching each of these reports as provided to OG&E in the attached exhibits.

### **Attachments:**

- Attachment B) contains Frontier's Cost Effective Analysis
- Attachment C) contains ADM's evaluation for the AWP Program.
- Attachment D) contains ADM's evaluation of OG&E/AOG's Weatherization Program.
- Attachment E) contains EnerNOC's evaluation of the remaining programs.
- Attachment F) contains Energy Efficiency Arkansas (Collaborative)

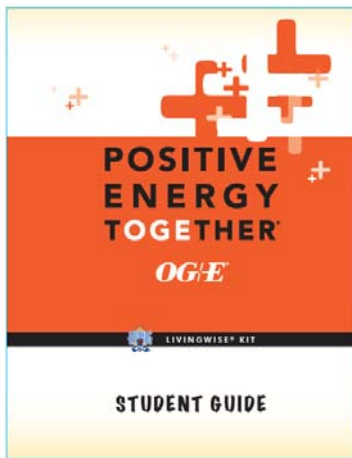
## **5.0 Appendix X**

## **5.0 Appendix X:**

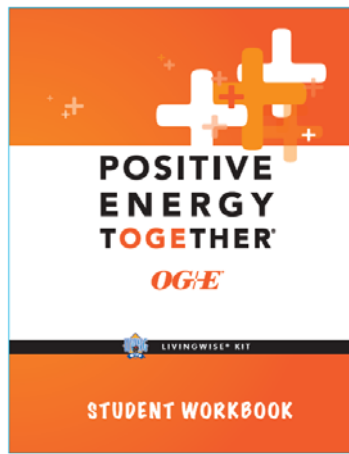
**LivingWise® Kit**



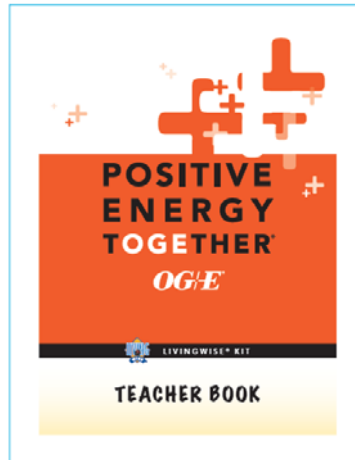
## Living Wise Education Materials



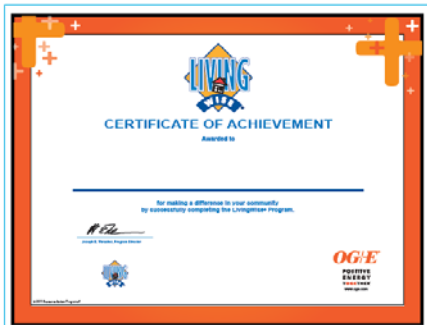
Student Guide



Student Workbook



Teacher Book



Certificate of Achievement



Kit Box

# Weatherization Program

## Energy Savings Tips

### JANUARY

- ❑ After cooking in your oven, leave the door partly open; the left over heat can help warm your home.
- ❑ Ring in the New Year by lowering the temperature of your water heater. A 10-degree temperature reduction can save about 13% of your water heating costs this year.
- ❑ During the day, open curtains and blinds on your south facing windows to allow sunlight to naturally warm your home. Just be sure to close them at night to reduce the chill.
- ❑ Sealing air duct leaks in your attic can reduce heating costs by up to 20%, with reductions of 10% common.
- ❑ Don't let heat go up the chimney! Make sure your fire place damper is closed when you're not using it.

### FEBRUARY

- ❑ Love is in the air for Valentine's Day. Because heat rises, reversing the direction of your ceiling fan blades will pull warm air down from the ceiling and spread the heat more evenly throughout your home.
- ❑ Turn off the oven or stovetop a minute or two before cooking time has elapsed. It will still retain enough heat to finish the cooking.
- ❑ When you are asleep or away from home, turn your thermostat back 10-degrees for eight hours. Do this consistently and you'll save around 10% a year on your heating bills.
- ❑ Insulate hot water pipes and ducts wherever they run through unheated areas in your home.

### MARCH

- ❑ As often as possible, wash your clothes in cold water. Experts agree that modern laundry detergents wash just as well in cold as in hot water, but without the cost to heat the water.
- ❑ Daylight Savings Time is all about the "lights." Whenever possible, use one light bulb instead of multiple bulbs. A single 100-watt incandescent bulb produces the same amount of light as two 60-watt bulbs – but uses 20% less energy for some extra savings. And to save even more, use compact fluorescent light bulbs.

- ❑ cool air and can reduce the "on" time of your air conditioner. A ceiling fan uses only about as much electricity as a light bulb.
- ❑ Don't place lamps or televisions near your air conditioning thermostat. The heat from these appliances will cause the air conditioner to run longer.
- ❑ If your heating system has a pilot light, turn it off during the summer. A pilot light costs about \$3 to \$5 per month to keep lit.
- ❑ Sometimes a summer breeze can be enough to keep you cool. Open doors and windows on opposite sides of your house for cross ventilation.

### SEPTEMBER

- ❑ Consider using a dehumidifier instead of turning on the air conditioning. You will be comfortable at much higher temperatures if you reduce the humidity in your home.
- ❑ This Labor Day, reduce your air conditioner's labor; place window units on the north or shady side of your residence to avoid overworking the unit in the hot daytime sun.
- ❑ Use an attic fan to get rid of the heat build-up in your attic. Heat from your attic eventually finds its way into your home.
- ❑ Keep both indoor and outdoor lighting fixtures and light bulbs clean. Dirty fixtures are not only unattractive, but can absorb as much as 50% of the light's illumination.
- ❑ Save energy by air drying your dishes instead of using your dishwasher's drying heater.

### OCTOBER

- ❑ Make a new discovery this Columbus Day and cut your heating bill by 1% to 3% with a 1° F change in temperature. Many energy experts recommend setting your thermostat at 68° F or less and several degrees cooler overnight.
- ❑ A programmable thermostat lets you set your home temperature by time of day. Set it to lower the thermostat when no one is home and overnight. Save up to 20% on heating costs!

- ❑ A faucet that leaks one drip per second can waste 400 gallons of water in a year.
- ❑ Never write or mail a check again. Sign up for EZ Pay from OGE which lets you pay your electric bill automatically from your checking or savings account. Sign up today!

### APRIL

- ❑ Spring is a great time to check your cooling system and proper sealing of all air ducts. And, it is the best way to improve the energy efficiency and overall performance of your system.
- ❑ Clean or change air filters every two to three months. The free-flow of air is the key to cooling, so don't make your system work harder and use more energy than it has to.
- ❑ In as little as one hour, exhaust fans in your kitchen or bathroom can deplete a house of its warm or cool air. Turn fans off as soon as they have finished their job.
- ❑ In honor of Earth Day, plant leafy trees on the south and west sides of your home to block heat from the sun in summer and let heat in during the winter. For continuous shade or to block heavy winds, use dense evergreen trees or shrubs.

### MAY

- ❑ When using your dishwasher and washing machine, washing full loads saves time, detergent and energy. Your dishwasher uses the same amount of hot water for both small and full loads.
- ❑ Every time you open the oven door, the temperature drops 25 degrees or more and your oven has to work harder and use more energy to sustain temperature settings.
- ❑ When you're done wrapping the May pole, wrap your hot water tank, which can save on energy costs.
- ❑ Switch to compact fluorescent light bulbs, which can save 75% over conventional light bulbs and last up to four years!
- ❑ When cooking, use the smallest pan that will do for the job. It takes less time and energy to heat a smaller volume.

### NOVEMBER

- ❑ Give "thanks" for your electronic conveniences, but to save energy, shut off computers and other electronic appliances when not in use. Many computer monitors have a sleep mode setting which, when activated, greatly reduces energy consumption.
- ❑ Use a dimmer switch or three-way incandescent bulbs to control the amount of light you need in a room. Dimming your lights' illumination by one-half cuts energy consumption almost in half.
- ❑ Have your heating and cooling system tuned and inspected by a service professional. Losses from a poorly-maintained system accumulate over time, wasting energy and costing you more to operate.
- ❑ Set refrigerator temperatures between 37 and 40 degrees, and don't forget to clean the coils. Keep the refrigerator stocked; it takes more energy to cool an empty refrigerator.

### DECEMBER

- ❑ When using your clothes dryer, dry loads consecutively to take advantage of the heat already built up in your dryer.
- ❑ Here's a warm way to greet the first day of winter: Try to minimize the number of times that outside doors are opened and closed at your home. Each time you open the door, it allows cold air to enter your home and makes your heater work harder to keep up.
- ❑ Use energy saving products such as small electric pans or toaster ovens to cook small meals instead of heating your large stove or oven.
- ❑ Lighting accounts for about 15 percent of a typical residential utility bill. So, turn off the lights when not in use.

Reminder to clean or change the filter in your heat & air system every two to three months.

Reminder to clean or change the filter in your heat & air system every two to three months.

### JUNE

- ❑ Replacing older shower heads with low flow units could save a family of four as much as 15-thousand gallons of water per year and can significantly reduce your water heating costs.
- ❑ If your oven has a self-cleaning cycle, start it while your oven is still warm from prior cooking.
- ❑ Clean the lint filter on your dryer after every load. Lint on the filter reduces air flow and makes your dryer use more energy.
- ❑ Father knows best! Celebrate dad's day by caulking windows and doors to prevent drafts from coming into your home and keep conditioned air from escaping out of your house.

### JULY

- ❑ Keep your thermostat at a constant, comfortable level (75-78 degrees) when you are home. Lowering the thermostat setting too far will not cool your home faster.
- ❑ Declare your independence of wasteful energy! A microwave oven cooks up to 75% faster and saves up to 70% of the energy used by a conventional oven.
- ❑ At the start of the cooling season, replace the air conditioner filter and check its condition monthly.
- ❑ To reduce heat and moisture, run appliances such as ovens, washing machines, dryers and dishwashers in the early morning or evening hours when it's generally cooler outside.
- ❑ Keep shades, blinds and curtains closed. About 40% of unwanted heat comes through windows. Simply drawing blinds and curtains, which act as a layer of insulation, can reduce heat gain.

### AUGUST

- ❑ August is National Literacy Month. To show your energy literacy, don't preheat your oven except when required. If you must preheat, most ovens will preheat in 10 minutes or less.
- ❑ Use fans to circulate air. This will more evenly distribute

## Money Saving Tips for Your Home 12-Month To Do List

Season after season, keep this list handy and refer to it often for helpful ideas to raise your energy savings and lower your energy costs. And, for more money-saving tips and ideas, go to [oge.com](http://oge.com), today.



POSITIVE ENERGY TOGETHER



## Weatherization Flyer

Could your home use protection against hot and cold weather?



If so, you could qualify for **FREE** home weatherization from OG&E.

The OG&E Electric Services weatherization program could help you manage the costs of your utility bills and improve the comfort of your home.

Typical home weatherization improvements could include:

- Adding insulation to your attic
- Caulking, air sealing and weather stripping throughout your home
- Door and window replacements
- Installing energy saving compact fluorescent light bulbs

You could qualify for OG&E weatherization if you meet the following criteria:

- You must be an OG&E customer
- Your home was built before 1997

The weatherization program has a limited time offering and will be completed at no charge to you.

To sign up or for more information, contact the **Community Service Clearinghouse at 479-782-5074. CALL TODAY!**

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\*An independent contractor will perform an audit on your home to help determine the criteria and qualifications of your home and the program.



**Saving energy and money just got easier...**

**POSITIVE ENERGY TOGETHER**

### The OG&E Weatherization Program

The OG&E Weatherization Program provides free home energy efficiency upgrades to customers who's home was built prior to 1997. This program is designed to help customers manage the costs of their utility bills and improve the comfort of their home. Some improvements could include:

- Adding insulation to the attic
- Caulking, air sealing and weather stripping throughout your home
- Door and window replacements
- Installing energy-saving compact fluorescent light bulbs (CFLs)

If you or someone you know could benefit from free home weatherization improvements, contact the Community Services Clearinghouse from 8:30 a.m. to 4 p.m. Monday through Friday at 479-782-5074. \*Some qualifications apply, talk to an OG&E representative for more information.

Know your power at **myOGEPower**. That's where you can view your electricity use and costs, track your estimated bill and compare your use to others in the area — all to manage your electricity more efficiently and save money. Go to **myOGEPower.com** to log in.





## OG&E offers FREE home weatherization to qualified customers

The OG&E Weatherization Program offers FREE energy efficiency upgrades to help customers manage the costs of their utility bills and improve the comfort of their home.

**Some home improvements may include:**

- Adding insulation to the attic
- Caulking, air sealing and weather stripping throughout your home
- Door and window replacements
- Installing energy saving compact fluorescent light bulbs.

*(See reverse side for details)*



**OG&E**

bill insert 1-13.indd 1

1/21/13 4:22 PM



### To qualify you must:

- Be an OG&E customer.
- Own or rent a home built before 1997.

If you or someone you know could benefit from FREE home weatherization improvements, contact the Community Services Clearinghouse at **479-782-5074** from 8:30 a.m. to 4 p.m.

**The number of OG&E customer homes that can be weatherized with this FREE program is limited, so don't delay. Call today!**

**OG&E**

bill insert 1-13.indd 2

1/21/13 4:22 PM

# Window Unit A/C Program

## Energy Tips For Window AC

### Save Energy and Money



OG&E has a number of programs for our Arkansas Residential customers to help them save energy and money. See which of these programs will work for you.

#### Residential A/C Tune

Sign-up for OG&E's Residential A/C Tune program and save. Having a properly tuned and serviced air conditioning system is a great way to help with summertime electric bills. For a limited time, OG&E is offering a FREE air conditioner tune-up.

Along with the free tune-up (valued at \$75) you will also receive a duct system inspection and if needed, duct repairs. **Sign up now at, call 649-2838 for this free offer.**

#### Weatherization

The OG&E Weatherization Program provides FREE home energy efficiency upgrades to customers with severely energy inefficient homes. This program is designed to reduce energy consumption, lower energy costs, increase the comfort of homes and safeguard the occupant's health. Program eligibility is not based upon income, but upon the energy inefficiency of the home. To see if your home qualifies and to enroll in this program call the Community Service Clearinghouse at 1-479-782-5074.

#### Window Unit Rebates

OG&E offers appliance rebates for ENERGY STAR® qualified window air conditioners. This program provides customers without central HVAC systems incentives for purchasing and installing high-efficiency air conditioners. Look for the rebate forms where you purchase ENERGY STAR® qualified window air conditioners.



[www.oge.com](http://www.oge.com)

### Rebate Flyer

**OG&E**

## Replacing your Air Conditioner Unit?

Get cash back from OG&E for purchasing an ENERGY STAR® qualified Window Air Conditioner.

# \$40<sup>00</sup>

rebate on Energy Star rated window units

Just fill out the form & return to OG&E to get your cash back.

# Geothermal Program

## Geothermal information on Web

[SYSTEM WATCH](#) | [CAREERS](#) | [CONTACT US](#)

[f](#) [t](#) [in](#) [yt](#)

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[OGE Home](#) > [Residential Customers](#) > [Products and Services](#) > [Geothermal](#)

- ▶ [Wind Power](#)
- ▶ [Billing Options](#)
- ▶ [Lighting](#)
- ▶ [Positive Energy Smart Grid](#)
- ▼ [Smart Hours](#)
  - [Smart Hours Communication Center](#)
- ▶ [Geothermal](#)
- ▶ [Positive Energy™ Home](#)



## TAP THE EARTH'S POWER

### Going Geothermal

Geothermal power is an environmentally sensitive energy alternative that may be your winning solution. Drawing on the earth's fairly constant ground temperatures, heat is transferred from the earth to your house in the winter and vice-versa in the summer.

Unlike conventional heating and cooling systems, your geothermal system:

- Is not exposed to the elements; it's mostly indoors and underground
- Has few moving parts to wear out, break down, or maintain
- Operates without any noisy outside condenser fan unit
- Performs consistently regardless of outside air temperatures

*Save with Geothermal*

Installing a geothermal system is now more affordable than ever with a Federal tax credit of 30 percent for residential and 10 percent for business customers. Residential customers can receive a \$375 per ton rebate for residential geothermal installations for both new construction and existing homes.

In fact, you'll realize an immediate return on investment in the form of greater comfort and savings up to 60% on your heating, cooling and water heating costs. That's


### ADDITIONAL RESOURCES

[The International Ground Source Heat Pump Association](#)  
Learn more about geothermal technology at IGSHPA

[Federal Tax Credits for Energy Efficiency](#)  
[Geothermal Tax Credits](#)

# Positive Energy Home

## Web Information



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Search By Keyword

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BILLING & PAYMENT • CUSTOMER SERVICE • OUTAGE INFORMATION • PRODUCTS & SERVICES • SAVE ENERGY & MONEY

OG&E Home > Residential Customers > Products and Services > Positive Energy™ Home

- Wind Power
- Billing Options
- Lighting
- Positive Energy Smart Grid
- Smart Hours
  - Smart Hours Communication Center
- Geothermal
- Positive Energy™ Home



### GET CERTIFIED AND SAVE

#### Your Positive Energy® Home

Available to Oklahoma customers only

Before starting any new construction, ask yourself: Is the home I'm building really energy-efficient? Then look at a Positive Energy® Home – OG&E's energy efficient home certification program. Making the right decisions up front is crucial. And while state and local building codes set minimum requirements, OG&E's Positive Energy® Home offers a higher standard in efficiency – saving energy, money and more. These homes employ advanced materials and innovative design to:

- Increase energy efficiency and reduce utility costs
- Deliver a higher level of comfort in every season
- Provide a higher standard of construction value and overall quality
- Meet or exceed all specifications of a 2010 Energy Star® home

For more information, contact Steve Sullivan at 405.553-3393.

#### Home Investments, Future Gains

When building a new home, take the time to explore forward-thinking investments. We're ready to help with proven, professional recommendations such as:

- Increased insulation
- High-performance windows
- Tight construction and tight ducts
- Heating and cooling systems such as:
  - Dual Fuel: A combination of electricity and natural gas
  - Total Electric: No fumes to vent, ultra-clean and whisper quiet
  - Efficiency: A 14-SEER A/C paired with a 90% AFUE furnace
  - Geothermal System: An underground system that uses the earth to heat and

### ADDITIONAL RESOURCES


**ENERGY STAR® Homes**  
Homes that earn the ENERGY STAR include four "must have" features behind the walls that will make you more comfortable, reduce utility bills, and help protect the environment. Learn what they are here.


**Home Improvement with ENERGY STAR®**  
ENERGY STAR can guide you in making your home more efficient — whether you do-it-yourself or hire a qualified professional.

**Positive Energy Home Builders**  
A list of Positive Energy Home builders in our service area.

# Commercial Lighting Retrofit Information Sheet

[SYSTEM WATCH](#) | [CAREERS](#) | [CONTACT US](#)





**Power at the speed of life.**

OG&E Home > Business Customers > Save Energy and Money > Energy Efficiency Solutions > Lighting

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▼ Energy Efficiency Solutions

- [Lighting](#)
- [Building Efficiency](#)
- [Geothermal](#)
- [Rate Tamer](#)
- [Time of Use \(TOU\)](#)

---

► Energy Technology Center

## EFFICIENCIES SHINING BRIGHT

### Lighting Rebate Program

Lighting is one of the easiest areas to make a significant change in your expenses. Energy-efficient upgrades can reduce energy consumption and operating costs by 30 percent to 50 percent. To encourage these savings, we are pleased to provide a lighting rebate for commercial, industrial and school accounts.

**Oklahoma Customers**

**Good News!** Funding has been approved for our 2013 Commercial Lighting program and we will start accepting online applications very soon.

Note: OG&E will require at least two photographs of your lighting project, one before work begins and one after the project is completed, a material or labor invoice will also be required (additional photos may be required on larger projects). These pictures and documents can be uploaded (or faxed) as part of your online application. Please continue to monitor this site for updates on the start of the 2013 program.

Your participation in this program has greatly enhanced OG&E's vision of deferring construction of new fossil fuel power plants before 2020 and the reduced kilowatts and kilowatt-hours our customers realized from energy efficient lighting installations can pay big dividends on their electric bills.

If you have any questions, contact Gale Lewis at [lewislg@oge.com](mailto:lewislg@oge.com) or 405-553-3163.

[2013 Lighting Rebate Brochure](#)

[Apply for an OG&E lighting rebate](#)

**Arkansas Customers**

The Commercial Lighting program provides incentives to Arkansas commercial and industrial (C&I) customers who purchase and install energy efficient indoor and outdoor lighting, lighting controls and light emitting diode (LED) exit lights in both retrofit and new construction applications. This program helps customers reduce monthly energy costs while reducing some of the initial cost barrier. Commercial buildings in the U.S. consume an estimated 18% of total U.S. energy use and contribute nearly 4% of global carbon dioxide emissions. Last year the average rebate for customers participating in OG&E's Commercial Lighting program was \$2,880.

If you have any questions, contact, Robin Arnold at [arnoldrk@oge.com](mailto:arnoldrk@oge.com) or 479-649-2838.

### ADDITIONAL RESOURCES

[Explore Your Lighting Options](#)

[OG&E Lighting Rebate Brochure](#)  
Learn about the variety of lighting rebates OG&E offers to businesses.

[Apply for an OG&E lighting rebate](#)

[Energy Efficiency Programs Brochure](#)  
Learn about the variety of programs OG&E offers to help your business save energy and money.

WTO ALL YOUR SERVICES + 800.451.2000 + COMMERCIAL LIGHTING

**Login** [First Time User?](#)  
[Click here](#) with your Email Address

Work Site State:

Email:

Password:

[Forgot your Password?](#) [Sign Up](#)



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## New, High Efficiency Lighting Upgrades Deliver Lower Energy Bills & Cash Rebates from OG&E

OG&E's Commercial Lighting Program now offers a **CASH REBATE** to business customers who install new, high efficiency lighting for:

- Significantly reducing your energy costs;
- Enhancing the lighting/visibility at your business;
- Qualifying your business for a CASH REBATE worth hundreds – even thousands – of dollars!

### A Commitment to Savings

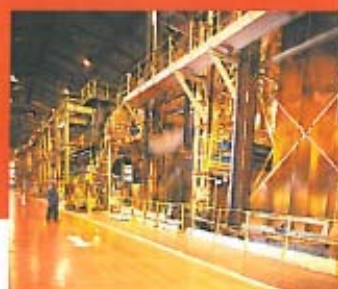
These high efficiency lighting rebates are just one aspect of OG&E's commitment to reducing business energy consumption.

By lowering the demand for electricity, everyone saves. Here's how...

1. By making your business more energy efficient, you help OG&E avoid the building of expensive new power plants, which helps keep energy costs low.
2. Businesses installing new, high efficiency lighting will enjoy lower energy bills every month and every season for years to come!
3. When high efficiency lighting is installed, participating businesses will enjoy a significant, one-time cash rebate for upgrading.
4. Your business will enjoy the increased visibility, convenience and safety of new, state-of-the-art lighting for the years to come.

### How to Get Your Rebates & Savings

Join the hundreds of OG&E business customers who have taken advantage of the Commercial Lighting Program cash rebate to help offset their energy efficiency upgrade costs AND increase their annual energy and money savings.



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## Construction of NEW Facilities...

Your business can take advantage of the OG&E Commercial Lighting Program to help justify installing the high efficiency lighting option in your new facility. By choosing this option, you'll not only save on your monthly energy bill, but can use the OG&E rebate to help justify this selection.

The OG&E rebate for new construction energy efficient lighting is \$160 per kW saved. The saved kW for new construction will be determined by comparing the as-designed kW to the allowable kW (as prescribed by the 2006 International Energy Conservation Code – IECC 2006).

This comparison can be performed by using the U.S. Department of Energy's (DOE) free software, called COMcheck. COMcheck can be accessed at [www.energycodes.gov/comcheck](http://www.energycodes.gov/comcheck). The lighting engineer you've hired for your new construction project may already be using COMcheck or similar software for your building.

In addition to the lighting rebate for new construction, your installed Sensors and Controls can be rebated at \$160 per kW saved. This can be calculated using the Commercial Lighting Rebate Form.

## Retro-Fitting of EXISTING Facilities...

1. Replace T12 lamps with T8 or T5 lamps (4-foot fixtures only)
  - Rebate of \$4 per fixture for one - or two-lamp fixtures
  - Rebate of \$8 per fixture for three - or four-lamp fixtures
  - Other fixtures rebated at \$0.16 per watt of reduced consumption
2. Replace HID fixtures with fluorescent fixtures
  - Rebate of \$52 per 400 watt HID fixture replaced
  - Rebate of \$102 per 750-1000 watt HID fixture replaced
3. Replace inefficient incandescent lamps with hard-wired Compact Fluorescent Lamps (CFL)
  - Rebate of \$8 per fluorescent fixture (26 watts or less)
  - Rebate of \$11 per fluorescent fixture (more than 26 watts)
4. Replace inefficient incandescent Exit fixtures with more efficient LED fixtures
  - Rebate of \$5 per LED fixture installed
5. Lighting, Sensors or Controls not specified
  - Rebate of \$160 per kW of reduced peak demand



### Saving Energy Means Saving Money

The Commercial Lighting Program can put cash in your pocket and energy and money savings in your future. For more information about how your business could benefit from the OG&E lighting rebates, contact

**Robin Arnold**  
 Senior Program Manager  
 479-649-2838 office  
 479-221-3641 cell  
[arnoldrk@oge.com](mailto:arnoldrk@oge.com)  
 7200 Hwy 45  
 Fort Smith, Arkansas 72916

Visit [oge.com](http://oge.com) today for more information about your rebate!

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**OG&E**

# Commercial Tune Up Program

## Contractor Information Sheet

### OG&E's Efficiency Programs

# SERIOUS SAVINGS

**Our expertise can improve the energy efficiency of your business. That's Positive Energy Together.**

Improving the efficiency of your business is one of the most cost-effective ways to improve your company's bottom line. Not only do these investments reduce costs and protect the environment, they also help address volatile energy prices, strengthen energy security, create new jobs and spur economic growth.

OG&E has several flexible programs to help our business and industrial customers make energy efficiency upgrades easier and more affordable.

#### + Commercial Lighting

The Commercial Lighting program provides incentives to Arkansas commercial and industrial (C&I) customers who purchase and install energy efficient indoor and outdoor lighting, lighting controls and light emitting diode (LED) exit lights in both retrofit and new construction applications. This program helps customers reduce monthly energy costs while reducing some of the initial cost barrier.

Commercial buildings in the U.S. consume an estimated 18% of total U.S. energy use and contribute nearly 4% of global carbon dioxide emissions. Last year the average rebate for customers participating in OG&E's Commercial Lighting program was \$2,880.

#### + Standard Offer

The Commercial/Industrial Standard Offer program provides incentives for the installation of a wide range of measures that reduce customer energy costs, reduce peak demand, and/or save energy in non-residential facilities such as public authority buildings, schools, hospitals and other industrial

customers. In this program, large individual customers, energy service companies (ESCOs), and qualified contractors are eligible for incentive payments of \$250/kW for energy efficiency projects that significantly reduce customer peak demand. The Standard Offer program was designed to offer a flexible program to help larger customers achieve energy and demand savings.

All commercial and industrial customers on the PL and LPL rates are eligible for this program. Last year the average rebate for customers participating in the Commercial and Industrial Standard Offer program was \$17,720.

#### + Commercial Tune-Up

The Commercial Tune-Up Offer program provides incentives to help customers by improving the efficiency of their commercial air conditioning, food service, refrigeration and/or ventilation systems to upgrade in efficiency or tune-up of commercial air conditioning.

Last year the average rebate for customers participating in the Commercial Tune-Up program was \$4,300.

**Don't wait. Get started today on improving the energy efficiency of your business and help keep your energy costs down. To take advantage of these programs, please contact Robin Arnold:**

Office (479) 649-2838

Cell (479) 221-3641

Email [arnoldrk@oge.com](mailto:arnoldrk@oge.com)


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Page 2 of 6

# C&I Standard Offer Program

## Web Information





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BILLING & PAYMENT | 
 CUSTOMER SERVICE | 
 OUTAGE INFORMATION | 
 PRODUCTS & SERVICES | 
 SAVE ENERGY & MONEY

[OG&E Home](#) > [Residential Customers](#) > [Products and Services](#) > [Positive Energy™ Home](#)

- » Wind Power
- » Billing Options
- » Lighting
- » Positive Energy Smart Grid
- » Smart Hours
  - Smart Hours Communication Center
- » Geothermal
- » Positive Energy™ Home

### GET CERTIFIED AND SAVE

#### Your Positive Energy® Home

Available to Oklahoma customers only

Before starting any new construction, ask yourself: Is the home I'm building really energy-efficient? Then look at a Positive Energy® Home – OG&E's energy efficient home certification program. Making the right decisions up front is crucial. And while state and local building codes set minimum requirements, OG&E's Positive Energy® Home offers a higher standard in efficiency – saving energy, money and more. These homes employ advanced materials and innovative design to:

- Increase energy efficiency and reduce utility costs
- Deliver a higher level of comfort in every season
- Provide a higher standard of construction value and overall quality
- Meet or exceed all specifications of a 2010 Energy Star® home

For more information, contact Steve Sullivan at 405.553-3393.

#### Home Investments, Future Gains

When building a new home, take the time to explore forward-thinking investments. We're ready to help with proven, professional recommendations such as:

- Increased insulation
- High-performance windows
- Tight construction and tight ducts
- Heating and cooling systems such as:
  - Dual Fuel: A combination of electricity and natural gas
  - Total Electric: No fumes to vent, ultra-clean and whisper quiet
  - Efficiency: A 14-SEER A/C paired with a 90% AFUE furnace
  - Geothermal System: An underground system that uses the earth to heat and

#### ADDITIONAL RESOURCES

[ENERGY STAR® Homes](#)  
Homes that earn the ENERGY STAR include four "must have" features behind the walls that will make you more comfortable, reduce utility bills, and help protect the environment. Learn what they are here.

[Home Improvement with ENERGY STAR®](#)  
ENERGY STAR can guide you in making your home more efficient — whether you do-it-yourself or hire a qualified professional.

[Positive Energy Home Builders](#)  
A list of Positive Energy Home builders in our service area.

## Standard Offer

# OG&E Rebates Can Generate New Savings For Your Commercial or Industrial Facility

Upgrades to Any Electrical Equipment or System Can Earn Your Business Rebates Now and Monthly Savings from Now On!

## How the Standard Offer Program Works

The **Standard Offer Program** is about helping industrial, institutional, commercial, schools, state agencies and retail enterprises become smarter and more frugal in their energy usage.

Naturally, there are some easy-to-follow guidelines for securing your OG&E rebates, including a description of the upgrade project, costs associated with the project, current and projected energy cost savings for the upgrade, as well as some other basics.

For a complete overview of the **Standard Offer Program** and its participation requirements, go to [www.oge.com](http://www.oge.com) for complete details.

### Saving Energy Means Saving Money

Nothing as good as these Standard Offer rebates can last forever. And once these rebates are gone, they're gone for good. That's why NOW is the time to take advantage of these money-saving electrical upgrade opportunities that can put cash in your pocket and energy and money savings in your future.

For more information about how your business could benefit from the OG&E rebates, contact:

**Robin Arnold**  
Senior Program Manager  
479-649-2838 office  
479-221-3641 cell  
arnoldrk@oge.com  
7200 Hwy 45  
Fort Smith, Arkansas 72916



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## Re-Invest in Your Business and OG&E Will Invest in You.

Now, OG&E is making it easy to upgrade your business infrastructure and put money back in your pocket with the Standard Offer Program, the demand reduction opportunity offered all industrial, institutional, commercial, schools, state government facilities and retail businesses who upgrade to new, more energy efficient systems and processes.

From now through December 31, 2013, OG&E has hundreds of thousands of dollars in rebate money available to those entities who upgrade their infrastructure and can demonstrate verifiable electrical cost savings results back to OG&E.



### The More You Save, the More You Can Make!

Naturally, larger consumers of electrical power represent the greatest energy savings potential. But big or small, every business holds the possibility of energy and money savings with your electrical upgrades.

Whether your business is...

- A manufacturer upgrading your chillers or air compression systems;
- An institutional facility switching to new, high-efficiency HVAC equipment;
- A commercial enterprise opting for a more efficient electrical-powered steam system;
- An industrial concern upgrading your various machines with new motors and drives with premium efficient electrical motors;
- A school upgrading your central heat and air system to a geothermal system.
- Other energy-saving facility upgrades in a variety of businesses and applications.

...OG&E can show you how to earn thousands of dollars in rebates NOW, plus enjoy thousands more in monthly energy savings over the life of your investment.

### A Commitment to Savings

These rebates are just one aspect of OG&E's commitment to reducing business energy consumption. By lowering the demand for electricity, everyone saves. Here's how...

1. By making your business more energy efficient, you help OG&E avoid the building of expensive new power plants, which helps keep energy costs low.
2. Businesses installing new, high efficiency equipment upgrades will enjoy lower energy bills every month and every season for years to come!
3. When these new systems are installed, businesses providing verifiable, before-and-after energy savings documentation will enjoy significant, one-time cash rebates for their upgrades.
4. Your business will reap the increased productivity and safety of your new, state-of-the-art equipment upgrades for years to come.

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## HVAC Tune Up and Duct Repair

Customer Postcard

**Saving energy and  
money just got easier...**

**POSITIVE  
ENERGY  
TOGETHER™**

### **The OG&E Residential A/C Tune Program**

The OG&E Residential A/C Tune Program offers customers living in single-family homes, built prior to 2000, a FREE A/C tune-up. This service includes duct repair and tightening, if eligible.

Keeping your A/C tuned and in good working order will help keep your electric bill down while increasing the life of your system. For more information, visit [oge.com](http://oge.com) or contact a representative at **479-649-2849**.

Know your power at **myOGpower**. That's where you can view your electricity use and costs, track your estimated bill and compare your use to others in the area — all to manage your electricity more efficiently and save money. **Go to [myOGpower.com](http://myOGpower.com) to log in.**

**OG&E**

**Contractor Recruitment Information**



# WANTED!

HVAC contractors, in the Fort Smith area, who want to earn an additional **\$125** per home by participating in OG&E's Residential A/C Tune Program.

This is a free service to customers and includes duct system and plenum sealing and will be paid for by OG&E, with a budget of \$25,000, directly to the contractor.

A small investment by contractors can give customers increased comfort and savings while providing new revenue to contractors; a win-win for all.

Work can be performed during any routine A/C service call and takes 15 – 20 minutes.

Offer lasts through the end of the year or until 200 homes have received this service.

**If interested or for more information,** please contact Robin Arnold at 479-649-2838 or email [arnoldrk@oge.com](mailto:arnoldrk@oge.com) or Ryan Lee at 479-649-2849 or email [leesr@oge.com](mailto:leesr@oge.com).

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[www.oge.com](http://www.oge.com)

## **5.0 Attachment B**





# Annual Report of Energy Efficiency Programs - Program Year 2013



March 2014

Evaluation Conducted by:  
Frontier Associates

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## Introduction

Oklahoma Gas & Electric's Arkansas Energy Efficiency portfolio was approved by the Arkansas Public Service Commission (APSC) for program year 2013 on December 30, 2011 in Docket Number 07-075-TF, Order Number 34. As required by the Conservation and Energy Efficiency Rules, OG&E is submitting its annual report addressing the performance of all approved energy efficiency programs. This report covers program savings and the amount spent per program and total amount spent. It also includes a cost-effectiveness analysis of each program and the portfolio of programs, including all costs and benefits from January 1, 2013 through December 31, 2013.

## Report Organization

This report presents the following information, which is based on the Commission's Energy Efficiency Rule, but also includes the results of California Standard Practice Manual cost-benefit tests:

1. Brief description of each program;
2. The most current information available comparing projected savings to reported savings for each of the utility's programs;
3. The results of the standard cost/benefit tests for each program;
4. A statement of funds expended by the utility for program administration.

### *Program Descriptions*

#### *Student Energy Education (SEE):*

The Student Energy Education program is an established residential energy efficiency program that uses a school delivery format, in which students are provided with take-home kits containing efficiency devices and are exposed to creative classroom and in-home education techniques which inspire families to adopt new resource usage habits. Students receive a kit of energy and water efficient devices, which are taken home and installed, and the learning experience is shared with family members. They work on subjects required by state learning standards to understand and appreciate the value of natural resources in everyday life. The program aims to shape new behaviors and encourage reduced energy use through a mix of new product installation and resource efficiency knowledge.

In OG&E'S Arkansas service territory, the program provides the teachers and their classes of 6th grade students a curriculum on home energy efficiency. At the end of the curriculum a SEE education kit, (which includes a CFL, air filter, aerator, low-flow shower head, night light and energy efficiency information), provides the students the opportunity to participate with their families on energy

awareness. The students take the kit home and install the energy efficiency measures with the assistance of their parents.

SEE is a turnkey program managed by Resource Action Programs (RAP) of Modesto, California. In coordination with OG&E, Resource Action Programs performs the marketing and outreach to acquire participation and enrollment in the program. Once schools are enrolled into the program, Resource Action Programs will deliver educational materials directly to participant teachers.

#### *Arkansas Weatherization Program (AWP):*

This program is targeted to severely energy inefficient homes. It provides energy efficiency improvements to participants, thereby decreasing demand and energy usage for those customers. The purpose of the AWP is to improve comfort and reduce energy costs by upgrading the thermal envelope and appliances in severely energy inefficient homes. The AWP program is designed to work in partnership with agencies that assist residents occupying severely energy inefficient homes. OG&E partners with the Fort Smith Community Clearing House and other CAP Agencies in Fort Smith, Arkansas. The program helps individuals and families primarily by making their homes more secure from the weather, which helps to conserve energy and reduce energy bills for future years. In addition, homes that are warm in the winter and cool in the summer are more comfortable for individuals.

#### *OG&E Weatherization Program:*

This measure is targeted to acutely energy inefficient homes. It provides energy efficiency improvements to participants, thereby decreasing demand and energy usage for those customers. The purpose of OG&E's Weatherization Program is to improve comfort and reduce energy costs by upgrading the thermal envelope and appliances in targeted households.

This program is delivered in association with the Ft. Smith region gas distribution company, Arkansas Oklahoma Gas (AOG). AOG is contributing resources to be used alongside OG&E's on a per household basis to ensure the most effective application of energy efficiency possible.

#### *HVAC Tune-Up and Duct Repair Program:*

This is an optional program offered by OG&E Arkansas, designed to help them reach the energy savings goals outlined in the Order. The program is targeted toward single family residential customers with central HVAC systems, and works towards improving the efficiency of these units. For both the HVAC tune-up portion and the duct repair portion of this program, the customer must contract for air conditioning tune-up and inspection services from an OG&E approved local, certified, and licensed HVAC contractor.

#### *Window Unit A/C Program:*

The purpose of the Window Unit A/C Program is to provide OG&E single family residential customers without central HVAC systems incentives for purchasing and installing high-efficiency air conditioners. The program is designed to increase energy efficiency of window unit sales, while is reducing energy consumption, lowering energy costs, and increasing the comfort of residential customers that cool part or all or their home with window units. This program is available to any residential customer without a central HVAC system.

### *Commercial Lighting Program:*

The Commercial Lighting Program provides prescriptive rebates for customers that improve the efficiency of lighting systems in existing buildings. This measure is designed to educate, offer performance contracting services, and provide incentives on replacement of inefficient T-12 or T-8 lamps with higher efficiency T-8 or T-5 lamps to commercial and industrial customers. It also promotes replacing less efficient high intensity discharge (HID) lighting with high-bay and low-bay fluorescent lamps, replacing inefficient incandescent lighting with hardwired CFLs, and replacing incandescent exit lighting with LED exit lighting.

Additionally, this program provides incentives to OG&E construction commercial and industrial (C & I) customers who purchase and install energy efficient indoor and outdoor lighting, lighting controls, occupancy sensors, light emitting diode (LED), and exit lights. The measure offers incentives based on the kW and kWh reduction calculated from a lighting survey by a lighting contractor that takes into account the type and quantity of lighting fixtures installed, the building type, and control technologies in place.

### *Commercial and Industrial Standard Offer Program (SOP):*

The SOP offers financial incentives for the installation of a wide range of measures that reduce customer energy costs, reduce peak demand, and/or save energy in non-residential facilities such as public authority buildings, schools, hospitals, and other industrial customers in OG&E's Arkansas jurisdiction (entities that qualify for the Power and Light rate or the Large power and Light rate). In this program, large individual customers, energy service companies (ESCOs), and qualified contractors are eligible for incentive payments for energy efficiency projects that significantly reduce customer peak demand. The applying entity, whether the customer, ESCO, or other contractor, is a "Project Sponsor," and is the responsible party for complying with all program requirements.

The SOP allows for incentivizing of many measures not covered under other OG&E programs. If the Commercial/Industrial customer participates in this program then they are not eligible to participate in the Commercial Lighting Program.

### *Commercial Tune-Up Program:*

The program is designed to help customers by improving the efficiency of their Commercial Air Conditioning, Food Service, Refrigeration and/or Ventilation systems to upgrade in efficiency or tune-up of Commercial Air Conditioning. Commercial Tune-Up Program will target commercial, public authority and industrial facilities of all sizes for efficiency information and upgrades. OG&E will pay an incentive for Commercial Air Conditioning, Foodservice, Refrigeration and/or Ventilation systems to upgrades in efficiency. OG&E will also pay to tune-up the Commercial Air Conditioning systems.

## ***Program Projections and Results***

The following tables present program specific information, including forecasted savings, reported savings, the number of participants, participant costs, the economic benefit realized in 2013, and the economic benefits to be expected over the life of the measures. Note that economic benefits are restricted to avoided electricity generation and capacity costs and avoided natural gas costs.

Note also the important distinction between the "Forecasted Net Savings" displayed in this section and the "Ex Ante" savings stated as "Actual Net Savings". The "Forecasted Net Savings" are the net savings

included in OG&E's Arkansas Energy Efficiency Program Analysis and Plan, filed in Docket No. 07-075-TF (William L. Brooks' testimony, Exhibit WLB-01, No. 123), which were based on projections of program participation. The "Ex Ante" savings reflect the savings calculated using actual participation data and the deemed savings used to develop the forecasted savings and in continuous tracking of program savings. Assumptions related to measure costs, energy and demand savings used to calculate projected impacts, discount rates, line losses, fuel costs and other inputs in the cost-benefit calculation can be found in the exhibit accompanying Brooks' testimony. The modeling of the Forecasted Net Savings and Project Net Savings are based on the following assumptions:

- (a) Forecasted savings are based on the target participation levels for program year 2013 as approved by the APSC in Order 34 of Docket No. 07-075-TF.
- (b) Program participants are those who participated in the program year 2013.
- (c) The cost per kWh saved is calculated by dividing the total program costs by the lifetime energy saved. The cost per kW-year is calculated by dividing the total program costs by the product of the kW reduction and the approximate average effective useful life (EUL) of measures installed in the program.
- (d) The net present value of the total economic benefits was calculated by taking the discounted value of the annual avoided cost times the annual savings over the useful life of each program measure.
- (e) The Projected Net Savings for residential programs assume an energy rate based on Rate Arkansas Rate Tariff R-1. Commercial energy rates are assumed to be \$.09/kWh for all seasons. Commercial load rates are accounted for in this assumption. The energy rates' escalation rates are derived from the avoided costs.

## Considerations

The cost-effectiveness results of OG&E Arkansas' 2013 energy efficiency program should be evaluated with the following considerations:

- OG&E Arkansas' avoided costs show a new cost of capacity appearing in 2020. This additional cost of capacity is not reflected in the retail rates provided for this cost-effectiveness evaluation. Because this new avoided cost of capacity in 2020 is not included in the customer retail rates, the Ratepayer Impact Measure ("RIM") passes 1.0 for two programs, the Arkansas Weatherization Program (AWP) and the Residential HVAC and Duct Repair Program. The AWP, emphasizing annual energy savings, should not pass the RIM. Residential HVAC and Duct Repair Program measures would have a less, although still, negative RIM net benefit, with net benefits improving as the percentage of electric AC with gas heat homes increases. Frontier recommends developing rate forecasts that more accurately reflect changes in avoided costs over time, or to reduce the period included in the RIM analysis to no more than five years, or the soonest expected rate change.
- Not all incentive costs ended up as direct payment to customers. These incentive costs contribute to the exaggerated Participant Test ("PT") results for the Commercial SOP. In future cost-effectiveness analyses, OG&E Arkansas may want to consider alternative methods for handling these non-direct payment incentives in the cost-effectiveness analysis.
- Detailed information on measure type and measure costs was not available for some measures within this analysis. For these measures, incremental cost estimates were made using high-level assumptions about the most common measure installations in the OG&E Arkansas service territory. To refine the incremental cost data for future analyses, OG&E Arkansas may want to consider capturing more detailed information about the baseline and change case equipment and measure costs.

- Issues related to incentives and rates are important relative to the PT and RIM, but do not affect the Utility Cost ("UCT") or Total Resource Cost tests ("TRC"). Potential inaccuracy in customer incremental costs affects the PT and TRC. None of the above cited issues affects the UCT. As a consequence, Frontier has high confidence in the UCT result, reasonable confidence in the TRC result, and moderate confidence in the PT and RIM results.

The Forecasted Net Savings and Actual Net Savings are presented in Table 1.

**Table 1 - Forecasted Net Savings vs. Actual Net Savings**

Program	Forecasted Net Savings (2013)			Actual Net Savings (2013)		
	Annual Energy Savings (kWh)	Peak Demand Reduction (kW)	Participants	Annual Energy Savings (kWh)	Peak Demand Reduction (kW)	Participants
SEE Program	152,120	15.2	1,840	136,825	16.4	2,006
AWP	522,485	69.0	59	55,639	31.27	35
OG&E Weatherization Program	2,994,261	515.8	1,620	4,160,530	1,107.7	1,623
Window Unit A/C Program	2,423	2.1	25	3,457	3.1	30
HVAC Tune-Up and Duct Repair	229,025	154.5	300	385,954	141.5	350
Commercial Lighting	9,010,145	2,275.0	215	6,902,884	1,056.0	186
Commercial and Industrial SOP	7,177,710	1,962.4	18	2,667,113	626.9	31
Commercial Tune-Up Program	759,969	112.0	10	389,421	44.5	159
<b>TOTAL</b>	<b>20,848,138</b>	<b>5,106.0</b>	<b>4,087</b>	<b>14,701,823</b>	<b>3,027.4</b>	<b>4,420</b>

The results of the Total Resource Cost Test show \$5,614,650 in present value net benefits for all of 2013, as illustrated in Table 2. Of these benefits, \$4,124,390 can be attributed to commercial programs and \$1,490,250 is associated with residential programs.

**Table 2 - Energy Efficiency Program Total Resource Cost Test Net Benefits**

Program Name	TRC Net Benefits (\$000s)	Lifetime Energy Savings (kWh)
SEE Program	-18.14	1,062,077
AWP	0.52	884,759
OG&E Weatherization	1,447.97	57,936,523
HVAC and Duct Repair Program	215.69	6,370,883
Window Unit A/C Program	-6.32	38,031
Commercial Lighting	2,807.63	89,131,164
Commercial SOP	1,223.04	28,549,800
Commercial Tune-Up	93.73	3,202,449
ALL RESIDENTIAL	1,490.25	66,292,272
ALL COMMERCIAL	4,124.39	120,883,412
<b>TOTAL</b>	<b>5,614.65</b>	<b>187,175,685</b>

Table 3 shows the cumulative results of OG&E's residential energy efficiency programs cost-effectiveness portfolio. The five cost tests deliver a snapshot of the general benefit of the residential energy efficiency programs. The TRC, being above 1, indicates that the residential programs produce an aggregate benefit.

**Table 3 - ALL Residential Cost/Benefit Tests**

	PCT	UCT	RIM	TRC	SCT
<b>Benefit/Cost Ratio</b>	2.25	1.39	0.80	1.53	1.55
<b>Net Benefits (\$000s)</b>	2,793.27	1,062.17	-925.60	1,490.25	1,564.19
<b>Total Benefits (\$000s)</b>	5,024.03	3,757.52	3,757.52	4,325.25	4,399.18
<b>Total Costs (\$000s)</b>	2,230.75	2,695.35	4,683.12	2,835.00	2,835.00

Tables 4 through 8 individually show the results of OG&E's residential energy efficiency programs cost-effective portfolio.

**Table 4 – SEE Program Cost/Benefit Tests**

	PCT	UCT	RIM	TRC	SCT
<b>Benefit/Cost Ratio</b>	1.91	0.58	0.41	0.71	0.73
<b>Net Benefits (\$000s)</b>	59.58	-30.89	-61.58	-18.14	-16.73
<b>Total Benefits (\$000s)</b>	125.32	43.01	43.01	44.59	46.00
<b>Total Costs (\$000s)</b>	65.75	73.91	104.60	62.73	62.73

**Table 5 - AWP Cost/Benefit Tests**

	PCT	UCT	RIM	TRC	SCT
<b>Benefit/Cost Ratio</b>	0.93	1.72	1.08	1.01	1.02
<b>Net Benefits (\$000s)</b>	-2.42	28.04	5.04	0.52	1.48
<b>Total Benefits (\$000s)</b>	31.58	66.75	66.75	73.23	74.19
<b>Total Costs (\$000s)</b>	34.00	38.71	61.71	72.71	72.71



**Table 6 – OG&E Weatherization Program Cost/Benefit Tests**

	PCT	UCT	RIM	TRC	SCT
<b>Benefit/Cost Ratio</b>	2.30	1.42	0.81	1.62	1.65
<b>Net Benefits (\$000s)</b>	2,538.94	960.15	-767.68	1,447.97	1,512.52
<b>Total Benefits (\$000s)</b>	4,499.40	3,262.32	3,262.32	3,789.34	3,853.89
<b>Total Costs (\$000s)</b>	1,960.47	2,302.17	4,030.00	2,341.37	2,341.37

**Table 7 – HVAC Tune-Up and Duct Repair Program Cost/Benefit Tests**

	PCT	UCT	RIM	TRC	SCT
<b>Benefit/Cost Ratio</b>	2.17	3.14	1.17	2.08	2.12
<b>Net Benefits (\$000s)</b>	195.38	260.49	56.15	215.69	222.65
<b>Total Benefits (\$000s)</b>	362.02	382.50	382.50	414.98	421.94
<b>Total Costs (\$000s)</b>	166.64	122.00	326.35	199.29	199.29

**Table 8 – Window Unit A/C Program Cost/Benefit Tests**

	PCT	UCT	RIM	TRC	SCT
<b>Benefit/Cost Ratio</b>	1.46	0.32	0.27	0.33	0.33
<b>Net Benefits (\$000s)</b>	1.80	-6.15	-8.02	-6.32	-6.27
<b>Total Benefits (\$000s)</b>	5.70	2.94	2.94	3.11	3.16
<b>Total Costs (\$000s)</b>	3.90	9.09	10.95	9.43	9.43

Table 9 shows the cumulative results of OG&E's commercial energy efficiency programs cost-effectiveness portfolio. Tables 10-12 individually show the results of OG&E's commercial energy efficiency programs cost-effective portfolio. All Commercial Programs pass the Total Resource Cost Test.

**Table 9 - All Commercial Cost/Benefit Tests**

	PCT	UCT	RIM	TRC	SCT
<b>Benefit/Cost Ratio</b>	4.83	5.61	0.84	3.13	3.20
<b>Net Benefits (\$000s)</b>	6,557.73	4,693.01	-1,124.30	4,124.39	4,269.12
<b>Total Benefits (\$000s)</b>	8,269.22	5,712.05	5,712.05	6,062.95	6,207.68
<b>Total Costs (\$000s)</b>	1,711.49	1,019.04	6,836.35	1,938.56	1,938.56

**Table 10 - Commercial Lighting Cost/Benefit Tests**

	PCT	UCT	RIM	TRC	SCT
<b>Benefit/Cost Ratio</b>	3.68	10.72	0.89	2.74	2.81
<b>Net Benefits (\$000s)</b>	4,319.58	3,766.78	-500.37	2,807.63	2,913.20
<b>Total Benefits (\$000s)</b>	5,931.54	4,154.51	4,154.51	4,417.33	4,522.90
<b>Total Costs (\$000s)</b>	1,611.95	387.72	4,654.88	1,609.71	1,609.71

**Table 11 – Commercial and Industrial Standard Offer Program Cost/Benefit Tests**

	PCT	UCT	RIM	TRC	SCT
<b>Benefit/Cost Ratio</b>	36.26	2.67	0.73	5.80	5.93
<b>Net Benefits (\$000s)</b>	2,001.22	875.13	-516.67	1,223.04	1,258.13
<b>Total Benefits (\$000s)</b>	2,057.97	1,398.72	1,398.72	1,478.01	1,513.10
<b>Total Costs (\$000s)</b>	56.75	523.59	1,915.39	254.97	254.97

**Table 12 – Commercial Tune-Up Program Cost/Benefit Tests**

	PCT	UCT	RIM	TRC	SCT
<b>Benefit/Cost Ratio</b>	6.54	1.47	0.60	2.27	2.32
<b>Net Benefits (\$000s)</b>	236.93	51.09	-107.38	93.73	97.79
<b>Total Benefits (\$000s)</b>	279.71	158.82	158.82	167.61	171.67
<b>Total Costs (\$000s)</b>	42.78	107.72	266.20	73.88	73.88

Table 13 shows the cumulative cost-effectiveness results for OG&E's energy efficiency portfolio for program year 2013.

**Table 13 – Portfolio Cost/Benefit Tests**

	PCT	UCT	RIM	TRC	SCT
<b>Benefit/Cost Ratio</b>	3.37	2.55	0.82	2.18	2.22
<b>Net Benefits (\$000s)</b>	9,351.00	5,755.18	-2,049.91	5,614.65	5,833.31
<b>Total Benefits (\$000s)</b>	13,293.24	9,469.57	9,469.57	10,388.20	10,606.86
<b>Total Costs (\$000s)</b>	3,942.24	3,714.39	11,519.47	4,773.56	4,773.56

## Program-Related Expenditures

All program-related expenditures are presented in Table 14 and are separated by administrative costs and inducements. The administrative costs include program planning and design, marketing and delivery, EM&V, and third party implementation costs.

**Table 14 - Program Costs - 2013**

Program Name	Administrative and Other Non-Inducement Costs (\$)	Inducements (\$)	Total Program Cost (\$)
SEE Program	8,161	65,746	73,907
AWP	4,716	33,998	38,714
OG&E Weatherization	341,693	1,960,465	2,302,158
HVAC and Duct Repair Program	49,312	72,693	122,004
Window Unit A/C Program	6,310	2,779	9,089
Commercial Lighting	158,947	228,776	387,722
Commercial SOP	198,999	324,592	523,591
Commercial Tune-Up	31,307	76,417	107,724
<b>TOTAL</b>	<b>799,445</b>	<b>2,765,465</b>	<b>3,564,910</b>

Planned and actual program costs, including additional regulatory costs and costs associated with the Energy Efficiency Arkansas Program, are compared in Table 15.

**Table 15- Planned and Actual Program Costs - 2013**

Program Name	Planned Program Cost (\$)	Actual Program Cost (\$)
SEE Program	82,800	73,907
AWP	80,771	38,714
OG&E Weatherization	2,135,023	2,302,158
HVAC and Duct Repair Program	131,495	122,004
Window Unit A/C Program	11,416	9,089
Commercial Lighting	558,780	387,722
Commercial SOP	579,915	523,591
Commercial Tune-Up	133,815	107,724
Energy Efficiency AR	Not provided	18,659
Regulatory Costs	Not provided	130,809
<b>TOTAL</b>		<b>3,714,377</b>



## **5.0 Attachment C**

# Evaluation of 2013 Arkansas Weatherization Program

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Submitted to:

*Arkansas Community Action Agencies Association*

*Arkansas Oklahoma Gas Corporation*

*CenterPoint Energy Arkansas*

*Oklahoma Gas and Electric*

*Southwestern Electric Power Company*

*Empire District Electric Company*

*Entergy Arkansas, Inc.*

*SourceGas Arkansas*

March 2014

Prepared by:



ADM Associates, Inc.

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**Prepared by:**

**Brian Harold  
Adam Thomas  
Matthew Jaoudi  
Jeremy Offenstein, Ph.D  
Evan Clark  
William Holleran**

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**Corporate Headquarters:  
3239 Ramos Circle  
Sacramento, CA 95827  
Tel: (916) 363-8383**

**ADM Associates Inc.  
Energy Research & Evaluation**

**200 Brown Road  
Suite 208  
Fremont, CA 94539  
Tel: (510) 371-0763**

## Acknowledgements

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Additionally, we would like to thank participating customers of the aforementioned utilities, the community action agencies and the Arkansas Community Action Agencies Association (ACAAA), and program tracking database management staff for their cooperation and assistance throughout the evaluation.

We would also like to thank Independent Evaluation Monitor staff for their active involvement in providing thorough answers and clarification to the evaluation team when higher-level questions arose during the EM&V effort.



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# 1. Executive Summary

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The purpose of this report is to provide a summary of the evaluation effort of the 2013 Arkansas Weatherization Program (AWP). This evaluation was conducted by ADM Associates (referred to in this report as the Evaluators). This report provides verified gross savings estimates for the evaluated program, and discusses changes and updates in the program since the prior program year.

This report primarily focuses on program gas and electric savings impacts. As there have been few significant modifications to overall program structure and delivery, the process findings are limited to assessing recent program improvements, modifications, and performance characteristics. A comprehensive process evaluation can be found in the 2012 Arkansas Weatherization Program Evaluation Report.

## 1.1 Summary of Arkansas Weatherization Program

---

Much of the program's structure has remained consistent since the 2012 program year. The following provides a review of program design characteristics and operational procedures, noting any specific updates for 2013.

In 2013, 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);
- EAI;
- 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 measures typically implemented through the program include:

- Ceiling, floor and wall insulation;
- Air sealing;
- Window sealing and replacement;

- Furnace, air conditioner, and heat pump tune-up and replacement;
- Water heater insulation and replacement;
- Lighting retrofits;
- Low flow shower heads; and
- Other measures as deemed appropriate.<sup>1</sup>

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. Program services such as residential audits and measure installation are implemented by local community action agencies in Arkansas. These agencies comprise the Arkansas Community Action Agencies Association (ACAAA), which works with each agency to plan and coordinate program services. 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 provides 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.<sup>2</sup> Through this arrangement, the AWP is able to leverage federal funding in order to generate participation and offset the audit and implementation cost to a large percentage of participants (approximately 90% of 2013 participants received WAP funding in conjunction with AWP funds). In 2013, the administrative roles for the WAP transitioned to the Arkansas Energy Office (AEO) from the Department of Human Services (DHS). This transition was implemented for organizational efficiency purposes, and is expected to result in some procedural modifications for the WAP.

Rather than an income requirement, eligibility for the AWP is based on a set of criteria regarding customer residence energy efficiency. In order to qualify, customer homes must meet specific criteria indicating that the residence is severely energy-inefficient. There were no modifications to these criteria for the 2013 program year. The AWP is designed based on the “whole house” approach to residential energy efficiency, where energy efficiency measures are chosen and implemented based on total cost and

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<sup>1</sup> This list contains a sample of some of the most commonly installed program measures. A complete list of measures that were implemented during the 2013 program year can be found in Table 1-4 of Section 1.3 in this report. A complete list of all eligible program measures can be found in ACAA Docket no. 07-079-TF, Attachment A (AWP Modified Program Design and Description).

<sup>2</sup> Eligibility for the Weatherization Assistance Program (WAP) is based on income thresholds, which increase with the number of residents in the home. A description of the WAP, along with the associated income requirements, can be found here: <http://www.benefits.gov/benefits/benefit-details/1843>.

energy savings rather than focusing on a specific fuel type or measure category. The program provides a wide range of measures in order to improve residential energy efficiency and to increase comfort and safety levels in the home.

Local community action agencies work with customers to enroll in the program and determine AWP and WAP eligibility. In 2013, the number of active community action agencies for weatherization services was reduced to six, although some of the previous agencies continued to provide weatherization during the first few months of the year.

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 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. These installation crews record all relevant measure input data and report it to the Central Arkansas Development Council (CADC), who aggregates the information from each agency. Batches of data are then sent to Frontier Associates, the program database provider that manages the EnerTrek software tool. EnerTrek incorporates the onsite data into TRM savings formulas (and NEAT/MHEA values for measures not included in the TRM) to calculate ex ante savings for each measure. The resulting savings are made accessible to program utilities and EM&V contractors, who use EnerTrek database exports to conduct measure implementation and savings verification activities.

Table 1-1 identifies core program stages and includes key activities performed throughout the program process. The activities and stages shown for 2013 are consistent with those that were in place during 2012 and prior years.

*Table 1-1 Key Activities and Program Stages, 2013 Program Year*

<i>Program Stage</i>	<i>Key Activities</i>
Program Design Planning	<ul style="list-style-type: none"> <li>• ACAA, CADC and utilities discuss program delivery and make design changes.</li> <li>• Necessary modifications made to program structure and operations.</li> <li>• Key parties meet to discuss program expectations and goals.</li> </ul>
Training and Implementation Planning	<ul style="list-style-type: none"> <li>• Community action agencies, contractors, and other program operations staff attend program-relevant training sessions.</li> <li>• ACAA, CADC, and local agencies discuss implementation and program updates.</li> </ul>
Program Promotion	<ul style="list-style-type: none"> <li>• Community action agencies market the program to local customers.</li> <li>• Utility representatives may cross-promote the AWP with other programs.</li> </ul>
Program Participation	<ul style="list-style-type: none"> <li>• Customers apply for the AWP and home eligibility is determined.</li> <li>• WAP eligibility is determined.</li> <li>• Participants receive in-home audits and measures are identified.</li> <li>• 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).</li> </ul>

<i>Program Stage</i>	<i>Key Activities</i>
Data Processing and Monitoring	<ul style="list-style-type: none"> <li>Measures and associated savings are calculated and recorded.</li> <li>Agencies update CADC, ACAA, and utilities with participation data throughout the year.</li> <li>Utilities, ACAA, CADC, and local agencies continue to communicate regarding program progress and participation.</li> </ul>

## 1.2 Evaluation Objectives

The evaluation of the 2013 Arkansas Weatherization Program (AWP) consisted of several objectives and tasks. These evaluation objectives were primarily focused on savings analysis and verification, as well as program updates and tracking of prior evaluation findings. Specifically, the objectives of this evaluation include:

- Documentation review of deemed savings calculations. The Evaluators reviewed all savings calculations for measures included in the Arkansas Technical Reference Manual, Versions 3.0, 2.0, and 1.0, (TRM), in order to ensure that measure savings were properly calculated according to TRM protocols.
- Tracking database and documentation review. The Evaluators conducted a comparative assessment of the AWP tracking database in order to evaluate tracking data modifications and improvements since the 2012 program year. Additionally, the Evaluators assessed whether there had been modifications to post-implementation field forms and other program materials since the prior year.
- Regression analysis of participant billing data. The Evaluators analyzed pre- and post-implementation billing data for participants in both the 2012 and 2013 program years in order to develop savings estimates for major program measures. The purpose of this analysis is to compare results with the TRM verified savings and to gain insight into the reasonableness of TRM calculations.
- Supplemental participant impact survey. In order to inform the evaluation's regression analysis of program savings, a sample of participants from both the 2013 and 2012 program years were surveyed. This survey focused on identifying behavioral variables that may affect household energy usage, in order to provide context for and clarity within the analysis results.
- 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 focused on assessing the extent of changes in program performance, delivery, and organizational structure during the 2013 program year.



- Program staff interviews. Interviews were conducted with utility staff and implementation staff (members of ACAA). These interviews provided insight into recent program changes for 2013, updates in specific program processes, potential future improvements to program operation, and overall 2013 program performance.

### 1.3 Summary of TRM Verification 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, including measure-level realization rates (RR). The Evaluators conducted a net-to-gross assessment of the program during the previous evaluation (2012 program year) in order to determine the likelihood of significant free-ridership or savings spillover. Due to program design factors, target customer segment characteristics, and lack of participant spillover found during 2012, the Evaluators determined the net-to-gross ratio for the Arkansas Weatherization Program to be 1, or 100% of gross savings, for the 2012 program year. This determination has been carried over and applied to the 2013 program year, and 2013 AWP gross savings are equal to net savings.

*Table 1-2 Net Verified Savings by Electric Utility*

<i>Electric Utility</i>	<i># of Homes</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Lifetime Savings (kWh)</i>	<i>Realization Rate</i>
AEP-SWEPCO	29	18.50	47,714	664,523	59%
EDEC	1	0.36	3,240	33,577	54%
EAI	177	161.48	444,779	5,909,257	85%
OG&E	35	31.41	54,516	905,726	90%
Non-IOU <sup>3</sup>	49	42.91	86,217	1,142,144	82%
<b>Total</b>	<b>291</b>	<b>254.66</b>	<b>636,467</b>	<b>8,655,227</b>	<b>82%</b>

*Table 1-3 Net Verified Savings by Gas Utility*

<i>Gas Utility</i>	<i># of Homes</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Lifetime Savings (Therms)</i>	<i>Realization Rate</i>
AOG	36	179.2623191	6,100	97,852	91%
CenterPoint	177	1152.428749	49,858	706,563	90%
SGA	23	144.1994378	7,829	123,705	93%
Non-IOU	55	119.5031302	5,032	71,732	100%
<b>Total</b>	<b>291</b>	<b>1,595.39</b>	<b>68,820</b>	<b>999,852</b>	<b>91%</b>

<sup>3</sup> The "Non-IOU" category refers to savings that were achieved as a result of program services, but were not attributable to the investor-owned utilities (IOUs) that fund the Arkansas Weatherization Program.

Table 1-4 Net Verified Savings by Measure Type – Overall

Measure	Peak Demand Savings (kW)	Annual Savings (kWh)	Lifetime Savings (kWh)	Peak Demand Savings (Therms)	Annual Savings (Therms)	Lifetime Savings (Therms)	kWh RR	Therms RR
Air Infiltration	69.77	180,764	1,988,405	1,012.94	41,064	451,702	79%	100%
Attic Insulation	86.1	115,579	2,311,586	183.48	11,486	229,718	66%	84%
Central AC	17.66	40,658	609,870	-	-	-	100%	-
Double Pane Window	46.76	64,510	1,290,193	175.11	3,943	78,861	82%	100%
Floor Insulation	-	16,192	323,837	50.93	3,564	71,288	97%	102%
Gas Central Replacement	-	-	-	76.38	3,883	77,668	-	97%
Heat Pump Replacement	2.3	25,610	384,150	-	-	-	115%	-
Inside Lighting	27.72	168,669	1,315,620	-	-	-	107%	-
Low-flow Shower Heads	-	-	-	0.05	16	161	-	100%
Refrigerator Replacement	0.59	4,240	64,408	-	-	-	99%	-
Smart Thermostat	-	1,675	20,096	-	436	5,232	100%	100%
Storm Windows	2.62	14,113	282,267	65.85	2,164	43,280	100%	100%
Vented Space Heater	-	-	-	21.81	1,358	27,151	-	100%
Wall Insulation	0.49	1,140	22,796	6.96	514	10,286	3%	10%
Water Heater Insulation	0.1	1,292	16,796	0.18	100	1,299	100%	100%
Water Heater Replacement	0.01	147	1,906	0.21	87	955	100%	100%
Water Pipe Insulation	0.45	1,429	18,571	1.49	205	2,250	101%	101%
Window AC	0.1	450	4,725	-	-	-	100%	-
Window Sealing	-	-	-	-	-	-	0%	0%
<b>Total</b>	<b>254.66</b>	<b>636,467</b>	<b>8,655,227</b>	<b>1,595.39</b>	<b>68,820</b>	<b>999,852</b>	<b>82%</b>	<b>91%</b>

All calculations were verified as per the appropriate TRM based on available information within the tracking data. For the most part, the inputs specified within TRM 3.0 were present for each major measure type. However, there were a few measure types representing a very minor portion of savings that did not include sufficient inputs for TRM 3.0 or previous TRM versions.

### 1.3.1 Summary of Tracking Data Findings

Ex post savings were based on TRM verification of EnerTrek inputs and savings values. Thus, instances of discrepancies between ex ante and ex post savings were due to TRM compliance issues and errors within EnerTrek calculations. The overall realization rates for electric utilities ranged from 54% to 90%, while the realization rates for gas utilities ranged from 90% to 93%. Low realization rates were due to several factors, including:

- Air Infiltration, Attic Insulation, Double Pane Windows, and Floor Insulation
  - According to all versions of the TRM (V1.0, V2.0, V3.0), savings for these measures are calculated with a deemed value that is a function of a household’s heating and cooling equipment type (i.e., electric air

conditioning with gas heat, or gas heat only, or electric air conditioning with resistance heat, or a heat pump). The ex ante savings were calculated using the appropriate TRM methodologies; however, for some households, an incorrect heating and cooling equipment type was applied. Additionally, some attic insulation measures were installed with insufficient R-values, and did not qualify for savings under any TRM.

- Heat Pump Replacement
  - According to Section 2.1.8 of TRM V2.0 and TRM V3.0, there are cooling energy savings and heating energy savings associated with the heat pump replacement measure. The cooling and heating savings are a function of size (tons). The data provided by Frontier Associates tracks a size for cooling, as well as a size for heating. The evaluators utilized the corresponding size when calculating the savings associated with heating and with cooling. However, ex ante savings were calculating using only cooling size for both cooling and heating savings.
- Inside Lighting (CFLs)
  - The Evaluators applied TRM V3.0 to estimate savings for the inside lighting measure, resulting in higher savings than were claimed for lighting in the tracking data.
- Wall Insulation
  - According to Section 2.2.3 of TRM V3.0 and TRM V2.0, the minimum efficiency standard is an R-value of 13. However, all but one household had an R-value of only 11 and, therefore, did not qualify for savings.

A detailed description of the savings verification findings can be found in Section 2.5 of this report.

#### **1.4 Summary of Regression Analysis Findings**

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Utilizing both 2012 and 2013 participants in the AWP, the Evaluators conducted a regression analysis in order to estimate the reasonableness of measure level savings reported in the TRM. This analysis was performed as a research activity that may be used to inform future TRM updates and to gain insight into participant behavioral effects.

The Evaluators received a sample of monthly billing data for 2012 and 2013 program participants. The billing data spanned from January 2011 to October 2013.

##### **1.4.1 Incorporating Survey Responses**

The Evaluators conducted a survey of 2012 and 2013 participants to inform the regression models as to which participants may have undertaken activities that may

impact their savings when analyzed at the premise level. A total of 181 fully completed surveys were used for the analysis. The specific survey questions that were used to inform this analysis are as follows:

- Did you increase (decrease cooling) your heating thermostat set-point after the program implementation?
- Did you add a new appliance to the premise after the program implementation?
- Was an appliance returned to operation as a result of the program?
- Was there a change in population in the household after the program implementation?

These details were used to split the dataset into four groups:

- Customers who have changed their usage behavior (snapback) in the post period.
- Customers who have an appliance returned to operation or added appliances to their home in the post period (takeback).
- Customers who exhibit potential snapback or have takeback influences (member of group 1 and 2).
- The full data set consisting of all customers who completed a survey, regardless of response indicators.

#### 1.4.1 Energy Savings Derived From Regression Models

The results from each model are applied in combination with the average HDD by month in the baseline period (2012), and then applied as a percentage savings on a monthly basis with the average monthly baseline usage. The resulting savings are listed in Table 1-5, including realization rates (RR) as compared to TRM savings.

*Table 1-5 Per-Participants Annual Savings Comparison*

Group	Annual Regression Model kWh Savings	% kWh Savings	TRM Based kWh Savings	kWh RR	Annual Regression Model Therms Savings	% Therms Savings	TRM Based Therms Savings	Therms RR
Group 1 - No Snapback	1,231	9%	2,083	79%	56	11%	236	24%
Group 2 - No Takeback	1,061	8%	2,083	68%	76	15%	236	32%

Group 3 - No Snapback or Takeback	1,550	12%	2,083	99%	84	17%	236	36%
Group 4 - All Customers	901	7%	2,083	58%	53	11%	236	22%

The significance of these results shows that there is an impact on program savings due to takeback and snapback with Group 1 showing much lower savings than the takeback-excluded or snapback-excluded models. Using the comparable regression results, the impact of snapback is estimated as 2.5% of annual kWh usage, while and the impact of takeback is estimated as 2.4% of annual usage. When all snapback and takeback participants are removed from the model, electric savings are very closely aligned with those in the TRM (showing a realization rate of 99%).

With regard to Therms results, takeback (4.7%) has a much larger impact than snapback (1.7%). This is to be expected, as the impact of returning a furnace or water heater to service will have a much larger impact than a set point change in a home.

#### 1.4.2 Billing Analysis Summary Results

The analysis of participant billing data shows a significant difference in savings based on behavioral changes after program implementation. Based on the questions asked of participants, it appears that the deemed electric savings within the TRM accurately represent actual participant savings, in isolation of changes in customer behavior.

The analysis identified a larger discrepancy between the modeled Therms savings and TRM savings even after taking into account behavioral changes. The realization rate for the snapback- and takeback-excluded group is 36%. This suggests that at the premise level for a complete weatherization project, the TRM may be overestimating total Therms savings. As a percentage of total annual residence usage, the TRM based Therms savings are 47%. This is a potentially unrealistic savings target, further indicating that the TRM savings are overstating the actual impacts. This may be due to interaction effects between measures, as the TRM provides savings for isolated measures rather than at the aggregated premise level.

### 1.5 Summary of Conclusions and Recommendations

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. After reviewing the Arkansas Weatherization Program for 2013, the Evaluators highlight the following conclusions:

**WAP Reliance Issues:** The community action agencies and ACAA are working in the context of their other community programs and the statewide Weatherization Assistance Program (WAP), which is directly tied to federal funding. Ideally, this arrangement would use utility funds to efficiently leverage federal funding and substantially increase the number of weatherization projects that the agencies are able to perform. However, it appears that the AWP's inherent link to the WAP has resulted in performance issues due to federal funding reductions and statewide program reorganization.

As noted during the 2012 program evaluation, based on the Commission's Order in docket no. 13-002-U, all of the utility energy efficiency programs, including the AWP, will be revised through the Collaborative process outlined in the Order. In addition, the transfer of the WAP to the Arkansas Energy Office may result in beneficial modifications that alleviate some of these issues.

**Beneficial Agency Reduction Effects:** Nearly all interview respondents reported that the reduction in weatherization agencies has been a beneficial modification. As the remaining agencies appear to be actively recruiting participants and implementing services, the weatherization network may become more engaged as a whole as compared to previous years. Additionally, if the per-agency funding levels are increased, this will likely allow the agencies to weatherize additional homes and improve savings performance.

The agencies appear to be adequately managing the increased distance between service providers, and all utility service territories are represented by at least one of the six agencies. Although the majority of the remaining agencies report that they do not prioritize AWP funds over WAP funds, two agencies report that they are actively seeking non-WAP participants and that they expect to recruit a substantial number in the coming year.

**Program Coordination Complexity:** Interviewed utility staff reiterated their main concerns from the prior program year, and generally reported that the program has continued to struggle with meeting participation goals, facilitating efficient communication, and ensuring prompt, accurate data reporting. The AWP operational structure is composed of many different entities: Six active community action agencies and their contractors, the Arkansas Community Action Agency Association (ACAAA), and seven utility providers. Each utility is operating within the context of its other energy savings programs, with specific energy savings goals and cost effectiveness targets.

The program incorporates many organizations that must communicate clearly and operate cooperatively in order for the program to avoid reporting delays and inconsistent program delivery. These factors place the AWP in a somewhat fragile operational framework, where delays and performance issues have been difficult to avoid.

**Data Revision and Transfer Issues:** One of the most commonly mentioned issues by program staff has been the consistent delays in the data transfer and reporting process.

The program is structured such that CADC collects the completed weatherization data from each agency, and then delivers it to Frontier Associates, the EnerTrek software provider. Frontier then enters the data into the EnerTrek software tool and then makes the data available to the program utilities. Ideally, this would be a one-way process, but Frontier Associates has needed to obtain additional data, data corrections, or data revisions from CADC for each batch of data. These tasks and their associated turnaround times have added to the lead time between job completion and final data reporting. This situation is reportedly being addressed through clarifying discussions between CADC and Frontier, although thus far it is unclear whether all issues will be quickly resolved.

**Program Interruption:** Although the AWP has not met participation or savings goals in prior years, the additional decrease in participation levels during the 2013 program year may be mainly attributable to the fact that the program paused implementation activity in April due to funding issues. These issues were partially related to the initiation of program restructuring on a statewide level, and the overall fact that the timing and level of DOE funding for the WAP was uncertain. The end result has left the AWP with fewer participants than past years, and the program has not met the savings goals for any of the participating utilities.

The AWP has operated within a transitional phase of the WAP, and program performance difficulties may have been expected during this time. However, it appears that the performance issues noted in prior years have persisted during this period. This issue may be avoided if funding levels are maintained and delivered as expected during the 2014 program year.

**Potential for Collaborative Communication:** Utility and agency staff noted that it may be useful to hold introductory meetings between the utilities and local agencies so that all parties may familiarize themselves with each other and develop a more collaborative working relationship. With the recent transition to a smaller group of agency providers, participants in some utility service territories will now be served by different agency organizations. Additionally, with a smaller number of entities working to implement the program, it may be more feasible to develop and mutually agree on promotional or general implementation strategies.

A collaborative relationship among all utilities and agency implementers has been a goal and an integral component of the AWP since its inception. In 2013, WAP transition and funding issues, as well as uncertainty due to the Commission's requirement to develop and submit for approval collaborative procedural guidelines, led to fewer AWP Collaborative meetings. Such meetings had been a regular part of AWP implementation in prior years. While these discussions may reveal opportunities to improve marketing efforts towards non-WAP participants or other aspects of program performance, the actual result may simply serve to acknowledge the new utility-agency partnerships that have resulted from the weatherization agency transition.

**Tracking Data Limitations:** While the tracking database has been updated to contain adequate inputs for the majority of measures, the process of uploading data to the database and updating database structure has been fairly inefficient. Thus far, it appears that the current arrangement of attempting to periodically update EnerTrek and align NEAT and MHEA measures and calculations with TRM requirements has been costly and time-consuming. In addition to administrative costs, the time and budget required to retroactively update the database can affect program cost-effectiveness and create barriers to program performance.

Additionally, EnerTrek has encountered difficulties with accurately constructing savings algorithms for certain measures. Low realization rates were primarily due to some homes being labeled with a specific heating or cooling type, but where the EnerTrek calculation assumed a different cooling or heating type that overestimated savings.

The most notable instances of this involved attic insulation, air infiltration, and window replacement. As these measure types were not evenly distributed across service territories, overall realization rates varied widely among IOUs. This appears to be a savings algorithm issue rather than a data collection issue. Resolving this error should be fairly straightforward and require only a minor adjustment to the EnerTrek savings algorithms. This has led to low realization rates on the measure and overall program level.

In order to fully comply with TRM V3.0 and any future TRM updates, EnerTrek will have to be flexible enough to receive updates without disrupting the data input process or delaying savings reporting. This will likely require substantial improvements in staff coordination and potentially significant changes to how the software is maintained. Without approval of additional budgets to implement substantial changes, database modifications will likely be limited to minor improvements that focus on the highest impact measures.

Based on these conclusions and other findings, the Evaluators make the following recommendations:

**Resolve Data Transfer Issues:** If there are any remaining uncertainties between CADC and Frontier regarding the format, content, or interpretation of data fields or inputs, these should be reconciled prior to the data transfer process in upcoming years. Resolving these uncertainties should reduce the number of data correction or clarification requests and increase the efficiency of the data reporting process. Ideally, it will not be necessary to reprogram the EnerTrek software or revise the structure of CADC data batches during the program year.

**Maintain Electronic Records:** It would be beneficial for each agency to collect and maintain accessible electronic records of any data that may be requested by Frontier, or that CADC aggregate the data from each agency and store it in a centrally accessible way. Situations where there are implementation, audit, or verification data that only exist



in hardcopy format at the end of the program year should be avoided. Additionally it may be beneficial for CADC to eventually develop a shared database that is accessible to all agencies for the purposes of submitting implementation data. This would ensure that all relevant data are stored in a single location, and would likely reduce the turnaround time for data requests.

**Utility-Agency Communication:** Although the AWP is intended to be fully implemented and delivered by the community action agencies and ACAAAA, regular communication and information accessibility are key factors to facilitate a cooperative working relationship. While CADC consolidates agency-collected data and holds a key role as a lead agency, it may not have the bandwidth to serve as the sole contact point between each agency and utility for all purposes. Thus, the Evaluators provide two recommendations that may improve communications among program entities:

- **Collaboration Meeting:** It may be useful for the utilities and the agencies within their respective service territories to hold an introductory meeting in order to recognize the newly established agency-utility connections that have resulted from the reduction in weatherization providers. This may facilitate a mutually beneficial working relationship, or at a minimum allow territory-specific questions to be answered more efficiently.
- **Updated Organizational Chart:** Along with the reduction in weatherization service providers and the broader changes in statewide weatherization, some program staff has reported that they are not currently aware of the roles and responsibilities of each entity. As recommended by utility staff, CADC and the utilities should consider developing an organizational chart showing the relationship among all AWP entities, as well as the roles, responsibilities, and contact information of representatives at each agency and utility. This is related to the overall coordination of the program, and explicitly identifying key roles and connections between organizations would likely facilitate effective working relationships.

**Incrementally Increase Compliance with TRM Requirements:** As with the prior program year, 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:

- Water Heater Replacement
  - The tracking data did not present the energy factor (EF) of the energy efficient equipment, which is a necessary input in TRM V3.0 for savings calculation. As this measure accounted for a minor portion of program savings, the Evaluators classified it as a low rigor measure and determined that the ex ante savings were reasonable. The ex ante savings were carried over to ex post results.

- Vented Space Heater
  - The tracking data did not present the square footage or age of the replaced vented space heater, which are necessary inputs in TRM V3.0 for savings calculation. As this measure accounted for a minor portion of program savings, the Evaluators classified it as a low rigor measure and determined that the ex ante savings were reasonable. The ex ante savings were carried over to ex post results.

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. Additionally, TRM V3.0 contains additional requirements that may require further updates to the EnerTrek software tool. The utilities and CADC should ensure that all possible updates to this database are included prior to the end of the 2014 program year.

**Increase Level of Detail in Utility Updates:** Utility staff reported that the updates they receive from CADC regarding program performance are mainly limited to participant counts and overall costs. Utility staff are not aware which customers participated in the program or which measures were installed until the end of the program year. CADC should increase the level of detail within these reports and include participant names, addresses, measure counts, and other information if possible. This will allow the utilities to identify participants, to understand more about how the program is performing, and to potentially estimate preliminary savings.

**Adjust EnerTrek Algorithms and Conduct Thorough Quality Assurance:** Frontier should conduct more thorough quality assurance procedures when verifying the accuracy of EnerTrek savings algorithms. The largest contributors to low realization rates for this program year were related to simple errors within EnerTrek calculations. Although the heating system type was provided within program tracking data, EnerTrek did not reliably incorporate the correct heating type into savings calculations for attic insulation, air infiltration, and window replacement. This specific issue, and any other algorithm errors, should be addressed as soon as possible.

Another issue is that some insulation measures were installed without meeting minimum TRM R-value requirements. This is related to both the measure installation and savings calculation program phases, as agency contractors should avoid implementing measures that will not qualify for savings under the TRM. Additionally, if these measures are implemented, the EnerTrek system should be adjusted to eliminate savings for measures that do not meet minimum requirements.

**Conduct Further Research Assessing Air Infiltration and Insulation Estimates:** The ability to isolate specific measure effects and behavioral variables with regression analyses of the AWP may be somewhat restricted by the limited participant population size and high presence of measure crossover, in that the majority of residences received both air infiltration and attic insulation measures. However, a billing analysis

involving a larger participant population may allow for quantitative isolation of individual behavioral variables and measure types. This may provide further evidence that necessitates revisions to the TRM with regard to the reasonableness of air infiltration and insulation measure savings calculations. These are the two highest-impact gas savings measures that are implemented through the AWP. The Evaluators recommend conducting additional research in the form of billing analysis and reviews of industry standards for TRM estimates of weatherization savings prior to implementing any specific changes to existing TRM formulas.

*Table 1-6 Recommendations from 2013 Program Year Evaluation*

Issue	Consequences	Recommendation
There have been delays in database finalization due to uncertainties in data interpretation and requirements between CADC and Frontier.	Reduces accessibility to database for utilities  Delays savings reporting and may cause inaccurate reports	Resolve issues early in 2014 program year, including data interpretation issues, so that multiple data and database revisions are not necessary.
Some data are not available due to being only in hardcopy form or decentralized from the CADC.	Potential lost data  Potential delays in data transfer if additional data are needed	Agencies should maintain electronic records of all collected audit, implementation, and verification data.
Communication among utilities and agencies is limited.	Causes difficulties in utility-agency coordination	Recommendation 1: Hold introductory meetings between utilities and the remaining six agencies in order to develop familiarity and identify key contact persons, establish communication lines  Recommendation 2: Develop an organizational chart displaying roles, responsibilities, and contact persons for each entity (utilities, agencies, ACAA, etc.)
Some data required for TRM 2.0 and 3.0 do not appear to have been collected.	Creates difficulties in savings verification  May result in inaccurate ex ante savings estimates if insufficient inputs are used	Ensure that the data collection forms and database are compliant with relevant TRM requirements to the extent possible based on budget constraints.

<p>Utilities are not aware of project details until end of year.</p>	<p>Limits utility ability to plan for annual reporting</p> <p>Limits utility awareness of program performance</p>	<p>Include more details in the periodic reports that are sent to utilities, including measure counts/descriptions, customer names, etc.</p>
<p>EnerTrek contains erroneous assumptions for individual measure algorithms (air infiltration, attic insulation, window replacement).</p>	<p>Results in inaccurate ex ante savings (in this case savings were highly overestimated)</p> <p>Decreases program realization rates</p>	<p>Frontier should perform thorough quality assurance practices and verify that EnerTrek calculations comply with TRM algorithms.</p>
<p>TRM estimates for Therms savings substantially exceed regression analysis results.</p>	<p>TRM formulas may be inaccurately estimating Therms savings.</p>	<p>Conduct further research into TRM industry standards for weatherization, or perform a more in-depth billing analysis for a larger population, prior to implementing TRM changes for air infiltration or insulation.</p>

## 1.6 Report Organization

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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 and net savings for the program;
- Chapter 3 presents the results of the process evaluation tasks and additional program findings;
- Chapter 4 presents key conclusions and recommendations from the evaluation of the program;
- Appendix A presents the survey instrument that was administered to program participants in order to supplement the regression analysis of customer billing data;
- Appendix B presents sample marketing materials that are used by the utilities and community action agencies to promote AWP services to customers; and
- Appendix C provides summary tables of planned and achieved program costs and savings goals.

## 2. Impact Findings

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This chapter presents the results of the gross savings verification and savings calculation review for the Arkansas Weatherization Program (AWP) in the 2013 program year. Additionally, this chapter summarizes the methodology and results obtained from the regression analysis of billing data that was conducted in order to inform the reasonableness of participant savings estimates.

### 2.1 Glossary of Terms

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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)* =  $(1 - \text{Free-Ridership \%} + \text{Spillover \%})$ , 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

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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, or utility-reported, savings by

measure. These values are based on the claimed savings values within the EnerTrek software tool. Exports of these data were provided to the Evaluators for verification purposes.

*Table 2-1 Ex Ante Savings by Measure Type – Overall*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>
Air Infiltration	115.17	229,682	1,014.90	41,093
Attic Insulation	99.59	176,274	218.47	13,615
Central AC	17.66	40,658	-	-
Double Pane Window	57.75	78,416	175.39	3,947
Floor Insulation	-	16,742	50.50	3,508
Gas Central Replacement	-	-	78.81	4,020
Heat Pump Replacement	2.32	22,311	-	-
Inside Lighting	16.48	158,195	-	-
Low-flow Shower Heads	-	-	0.05	16
Refrigerator Replacement	0.60	4,294	-	-
Smart Thermostat	-	1,675	-	436
Storm Windows	2.62	14,113	65.85	2,164
Vented Space Heater	-	-	21.81	1,358
Wall Insulation	10.04	33,216	82.32	5,065
Water Heater Insulation	0.10	1,292	0.18	100
Water Heater Replacement	0.01	147	0.21	87
Water Pipe Insulation	0.45	1,420	1.48	203
Window AC	0.10	450	-	-
Window Sealing	-	284	-	135
<b>Total</b>	<b>322.87</b>	<b>779,170</b>	<b>1,709.97</b>	<b>75,745</b>

**2.2.1 Ex Ante Savings for Electric Utilities**

The participating electric utilities are AEP-SWEPCO, EDEC, EAI, and OG&E. Table 2-2 presents the savings results of the evaluation of the 2013 AWP for electric utilities. Table 2-3 through Table 2-6 summarize the ex ante savings by measure for each electric utility. The “Non-IOU” category refers to savings that were achieved as a result of program services, but were not attributable to the investor-owned utilities (IOUs) that fund the Arkansas Weatherization Program.



*Table 2-2 Ex Ante Savings by Electric Utility*

<i>Electric Utility</i>	<i># of Homes</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>
AEP-SWEPCO	29	28.49	81,394
EDEC	1	0.30	5,952
EAI	177	203.42	526,161
OG&E	35	34.82	60,567
Non-IOU	49	55.84	105,095
Total	291	322.87	779,170

*Table 2-3 Ex Ante Savings by Measure Type – AEP-SWEPCO*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>
Air Infiltration	10.85	18,314
Attic Insulation	11.26	26,505
Central AC	-	-
Double Pane Window	1.61	1,891
Floor Insulation	-	878
Gas Central Replacement	-	-
Heat Pump Replacement	0.29	1,054
Inside Lighting	1.42	13,685
Low-flow Shower Heads	-	-
Refrigerator Replacement	0.05	386
Smart Thermostat	-	469
Storm Windows	0.42	1,402
Vented Space Heater	-	-
Wall Insulation	2.44	16,533
Water Heater Insulation	-	-
Water Heater Replacement	-	-
Water Pipe Insulation	0.04	127
Window AC	0.10	150
Window Sealing	-	-
Total	28.49	81,394

*Table 2-4 Ex Ante Savings by Measure Type – EDEC*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>
Air Infiltration	0.22	2,594
Attic Insulation	-	-
Central AC	-	-
Double Pane Window	-	-
Floor Insulation	-	-
Gas Central Replacement	-	-
Heat Pump Replacement	-	2,646
Inside Lighting	0.07	712
Low-flow Shower Heads	-	-
Refrigerator Replacement	-	-
Smart Thermostat	-	-
Storm Windows	-	-
Vented Space Heater	-	-
Wall Insulation	-	-
Water Heater Insulation	-	-
Water Heater Replacement	-	-
Water Pipe Insulation	-	-
Window AC	-	-
Window Sealing	-	-
<b>Total</b>	<b>0.30</b>	<b>5,952</b>

*Table 2-5 Ex Ante Savings by Measure Type - EAI*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>
Air Infiltration	77.90	171,050
Attic Insulation	67.14	116,015
Central AC	15.34	35,312
Double Pane Window	20.51	31,416
Floor Insulation	-	14,573
Gas Central Replacement	-	-
Heat Pump Replacement	2.03	17,399
Inside Lighting	11.38	109,171
Low-flow Shower Heads	-	-
Refrigerator Replacement	0.36	2,587
Smart Thermostat	-	1,206
Storm Windows	1.73	11,897
Vented Space Heater	-	-
Wall Insulation	6.56	12,909
Water Heater Insulation	0.09	1,156
Water Heater Replacement	0.01	147
Water Pipe Insulation	0.37	1,158
Window AC	-	-
Window Sealing	-	167
<b>Total</b>	<b>203.42</b>	<b>526,161</b>

*Table 2-6 Ex Ante Savings by Measure Type – OG&E*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>
Air Infiltration	2.53	8,121
Attic Insulation	5.31	8,872
Central AC	-	-
Double Pane Window	25.93	33,179
Floor Insulation	-	229
Gas Central Replacement	-	-
Heat Pump Replacement	-	1,212
Inside Lighting	0.82	7,886
Low-flow Shower Heads	-	-
Refrigerator Replacement	0.07	482
Smart Thermostat	-	-
Storm Windows	0.15	252
Vented Space Heater	-	-
Wall Insulation	-	-
Water Heater Insulation	0.01	68
Water Heater Replacement	-	-
Water Pipe Insulation	0.01	44
Window AC	-	150
Window Sealing	-	74
<b>Total</b>	<b>34.82</b>	<b>60,567</b>

Table 2-7 presents the ex ante electric savings that were not associated with any IOU. These ex ante savings are attributable to municipal utilities, co-op utilities, or other energy providers. These savings are not attributed to any specific program sponsoring utility, and are provided for reference only.

*Table 2-7 Ex Ante Savings by Measure Type – Non-IOU (Electric)*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>
Air Infiltration	23.67	29,603
Attic Insulation	15.88	24,882
Central AC	2.32	5,346
Double Pane Window	9.69	11,931
Floor Insulation	-	1,063
Gas Central Replacement	-	-
Heat Pump Replacement	-	-
Inside Lighting	2.78	26,741
Low-flow Shower Heads	-	-
Refrigerator Replacement	0.12	839
Smart Thermostat	-	-
Storm Windows	0.32	563
Vented Space Heater	-	-
Wall Insulation	1.03	3,774
Water Heater Insulation	0.01	68
Water Heater Replacement	-	-
Water Pipe Insulation	0.03	91
Window AC	-	150
Window Sealing	-	43
<b>Total</b>	<b>55.84</b>	<b>105,095</b>

**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 2013 AWP for gas utilities. Table 2-9 through Table 2-11 summarize the ex ante savings by measure for each gas utility. The “Non-IOU” category refers to savings that were achieved as a result of program services, but were not attributable to the investor-owned utilities (IOUs) that fund the Arkansas Weatherization Program.

*Table 2-8 Ex Ante Savings by Gas Utility*

<i>Gas Utility</i>	<i># of Homes</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>
AOG	36	189.371165	6,715
CenterPoint	177	1248.68097	55,538
SGA	23	151.593877	8,439
Non-IOU	55	120.328163	5,053
<b>Total</b>	<b>291</b>	<b>1,709.97</b>	<b>75,745</b>

*Table 2-9 Ex Ante Savings by Measure Type - AOG*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>
Air Infiltration	65.12	2,658
Attic Insulation	21.25	1,287
Central AC	-	-
Double Pane Window	91.94	1,995
Floor Insulation	4.39	305
Gas Central Replacement	-	-
Heat Pump Replacement	-	-
Inside Lighting	-	-
Low-flow Shower Heads	-	-
Refrigerator Replacement	-	-
Smart Thermostat	-	-
Storm Windows	4.24	294
Vented Space Heater	2.31	149
Wall Insulation	-	-
Water Heater Insulation	0.01	4
Water Heater Replacement	0.02	9
Water Pipe Insulation	0.10	13
Window AC	-	-
Window Sealing	-	-
<b>Total</b>	<b>189.37</b>	<b>6,715</b>

*Table 2-10 Ex Ante Savings by Measure Type – CenterPoint*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>
Air Infiltration	794.61	31,700
Attic Insulation	167.98	10,326
Central AC	-	-
Double Pane Window	61.16	1,409
Floor Insulation	20.73	1,293
Gas Central Replacement	70.20	3,581
Heat Pump Replacement	-	-
Inside Lighting	-	-
Low-flow Shower Heads	-	-
Refrigerator Replacement	-	-
Smart Thermostat	-	357
Storm Windows	48.55	1,505
Vented Space Heater	13.25	818
Wall Insulation	70.79	4,213
Water Heater Insulation	0.13	73
Water Heater Replacement	0.19	78
Water Pipe Insulation	1.10	152
Window AC	-	-
Window Sealing	-	35
<b>Total</b>	<b>1,248.68</b>	<b>55,538</b>

*Table 2-11 Ex Ante Savings by Measure Type – SourceGas*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>
Air Infiltration	72.48	3,532
Attic Insulation	18.60	1,338
Central AC	-	-
Double Pane Window	13.01	339
Floor Insulation	20.64	1,581
Gas Central Replacement	2.33	154
Heat Pump Replacement	-	-
Inside Lighting	-	-
Low-flow Shower Heads	0.05	16
Refrigerator Replacement	-	-
Smart Thermostat	-	79
Storm Windows	11.45	334
Vented Space Heater	1.32	80
Wall Insulation	11.53	852
Water Heater Insulation	0.03	15
Water Heater Replacement	-	-
Water Pipe Insulation	0.16	20
Window AC	-	-
Window Sealing	-	99
<b>Total</b>	<b>151.59</b>	<b>8,439</b>

Table 2-12 presents the ex ante gas savings that were not associated with any AWP IOU. As there are few non-IOU gas utility providers in the state of Arkansas, the “non-IOU” 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-IOU 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-IOU (Gas)*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>
Air Infiltration	82.69	3,202
Attic Insulation	10.65	664
Central AC	-	-
Double Pane Window	9.28	204
Floor Insulation	4.74	329
Gas Central Replacement	6.29	285
Heat Pump Replacement	-	-
Inside Lighting	-	-
Low-flow Shower Heads	-	-
Refrigerator Replacement	-	-
Smart Thermostat	-	-
Storm Windows	1.62	31
Vented Space Heater	4.92	311
Wall Insulation	-	-
Water Heater Insulation	0.01	8
Water Heater Replacement	-	-
Water Pipe Insulation	0.13	18
Window AC	-	-
Window Sealing	-	1
<b>Total</b>	<b>120.33</b>	<b>5,053</b>

### **2.3 Gross Savings Calculation Methodology**

For equipment and retrofits rebated through the 2013 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. There were three measures implemented under the AWP that are not addressed within the set of TRM savings algorithms. The ex ante savings for these measures resulted from NEAT/MHEA stipulated calculations. As these measures accounted for a minor portion of total program savings, the Evaluators deferred to the NEAT/MHEA results during savings verification.

*Table 2-13 TRM Sections by Measure Type*

<i>Measure</i>	<i>TRM Version</i>	<i>Section in TRM</i>
Air Infiltration	3.0	2.2.9
Attic Insulation	3.0	2.2.2
Central AC	3.0	2.1.6
Double Pane Window	3.0	2.2.7
Floor Insulation	3.0	2.2.4
Gas Central Replacement	2.0	2.1.3
Heat Pump Replacement	3.0	2.1.8
Inside Lighting	3.0	2.5.1
Low-flow Shower Heads	3.0	2.3.5
Refrigerator Replacement	3.0	2.4.3
Smart Thermostat	N/A	N/A
Storm Windows	N/A	N/A
Vented Space Heater	3.0	2.1.1
Wall Insulation	3.0	2.2.3
Water Heater Insulation	3.0	2.3.2
Water Heater Replacement	3.0	2.3.1
Water Pipe Insulation	3.0	2.3.3
Window AC	3.0	2.1.10
Window Sealing	N/A	N/A

Three measures accounted for the majority of the gross savings for the AWP: air infiltration reduction, attic insulation, and indoor lighting (the replacement of incandescent lamps with compact fluorescent lamps). 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 CFM50 of air leakage rate reduction. The following table summarizes the deemed savings values for Weather Zone 7 (from TRM V3.0).

*Table 2-14 Deemed Savings Values for Air Infiltration Reduction, Zone 7*

<i>Equipment Type</i>	<i>kWh Savings / CFM50</i>	<i>kW Savings / CFM50</i>	<i>Therm Savings / CFM50</i>	<i>Peak Therms / CFM50</i>
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<sub>50</sub> before air infiltration reduction and a leakage rate of 7,220 CFM<sub>50</sub> after, then the residence would have an annual gross savings of 2,120 kWh.

$$Air\ Infiltration\ Savings = 0.2387 \frac{kWh\ Savings}{CFM_{50}} \cdot (16,100\ CFM_{50\ pre} - 7,220\ CFM_{50\ post})$$

$$Air\ Infiltration\ Savings = 2,120\ kWh$$

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. This determination was also applied to 2012 program savings.

### **2.3.2 Attic 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 V3.0).

*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.

$$Ceiling\ Insulation\ Savings = 0.969 \frac{kWh}{ft^2} \cdot (1,200\ ft^2) = 1,163\ kWh$$

### 2.3.3 Compact Fluorescent Lamps (CFLs) Savings Calculations

The deemed savings for compact fluorescent lamps can be calculated by using the following equation.

$$kWh_{savings} = ((Watts_{base} - Watts_{post})/1,000) \times Hours \times ISR \times IEF_E$$

The inputs, which assume the following prerequisite knowledge, can be found in Section 2.5.1 of TRM V3.0:

- The quantity and wattages of both pre and post fixtures;
- Whether or not the retrofits were indoor or outdoor;
- Whether or not the retrofits were time of sale or direct install; and
- The heating type of the residence.

For example, if in March 2013 (5) 23W CFLs were directly installed to replace (5) 75W incandescent lamps in a residence with gas heating, then the residence would have an annual gross savings of 231.0kWh.

$$kWh_{savings} = ((5 \cdot 75 - 5 \cdot 23)/1,000 \cdot 803.6 \cdot 0.97 \cdot 1.14 = 231.0kWh$$

## 2.4 Net Savings Determination

The Evaluators conducted a net-to-gross assessment of the program in 2012 in order to determine the likelihood of significant free-ridership or savings spillover. 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 the Evaluators' field staff were asked a series of questions related to program savings spillover, and none of these customers identified any potential spillover savings.

Due to these factors, the Evaluators determined the net-to-gross ratio for the Arkansas Weatherization Program to be 1, or 100% of gross savings, for the 2012 program year. This determination has been carried over and applied to the 2013 program year, and 2013 AWP gross savings are equal to net savings. This determination may be modified, with an additional net-to-gross assessment required, if the portion of participants who provide their own private co-pay (non-WAP) increases significantly.

## 2.5 Verified Savings by Measure

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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 or mostly matched the calculations provided by Frontier Associates:

- Central AC;
- Gas Central Replacement;
- Low-flow Shower Heads;
- Refrigerator Replacement;
- Water Heater Insulation; and
- Water Pipe Insulation.

The savings calculated through this verification process 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:

- Air Infiltration, Attic Insulation, Double Pane Windows, and Floor Insulation
  - According to all versions of the TRM (V1.0, V2.0, V3.0), savings for these measures are calculated with a deemed value that is a function of a household's heating and cooling equipment type (i.e., electric air conditioning with gas heat, or gas heat only, or electric air conditioning with resistance heat, or a heat pump). The ex ante savings were calculated using the appropriate TRM methodologies; however, for some households, an incorrect heating and cooling equipment type was applied.

- Heat Pump Replacement
  - According to Section 2.1.8 of TRM V2.0 and TRM V3.0, there are cooling energy savings and heating energy savings associated with the heat pump replacement measure. The cooling and heating savings are a function of size (tons). The data provided by Frontier Associates tracks a size for cooling, as well as a size for heating. The evaluators utilized the corresponding size when calculating the savings associated with heating and with cooling. However, ex ante savings were calculating using only cooling size for both cooling and heating savings.
- Inside Lighting (CFLs)
  - The Evaluators applied TRM V3.0 to estimate savings for the inside lighting measure, resulting in higher savings than were claimed for lighting in the tracking data.
- Wall Insulation
  - According to Section 2.2.3 of TRM V3.0 and TRM V2.0, the minimum efficiency standard is an R-value of 13. However, all but one household had an R-value of only 11 and, therefore, did not qualify for savings.

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. As these measures comprised a small portion of overall program savings, they are considered low rigor measures that did not call for additional data input collection during the evaluation. Thus, the Evaluators deferred to the listed ex ante savings and carried these values over to the ex post results. These measures include:

- Smart Thermostat, Storm Windows, Window Sealing
  - These measures are not detailed in the TRM, and savings were obtained from NEAT/MHEA calculations. The Smart Thermostat measure only accounts for 0.215% of the overall claimed kWh savings and 0.056% of the overall claimed Therms savings. The Storm Windows measure only accounts for 1.811% of the overall claimed kWh savings and 0.278% of the overall claimed Therms savings. The Window Sealing measure accounts for 0.036% of the overall claimed kWh savings and 0.017% of the overall claimed Therms savings. However, the Evaluators determined that the claimed Window Sealing savings were already accounted for under the Air Infiltration measure.
- Direct Vent Heaters
  - As described in Section 2.1.1 of TRM V3.0, savings for direct vent heaters are calculated as a function of the heat load, and the AFUE of the baseline and energy efficient equipment. A deemed value for the heating load is

available in the TRM as a function of square feet. However, in the data provided by Frontier Associates, square feet were unavailable, and as a result, savings could not be verified. This measure accounts for only 1.79% of the claimed Therms savings.

- Water Heater Replacement
  - As described in Section 2.3.1 of TRM V3.0, savings for water heaters are calculated as a function of the energy factor (EF) of the baseline and energy efficient equipment. In the data provided by Frontier Associates, there was a column tracking the EF of the energy efficient equipment; however, it was not populated, and as a result, savings could not be verified. This measure accounts for only 0.019% of the claimed kWh savings, and 0.011% of the claimed Therms savings
- Window AC
  - In section 2.1.10 of TRMV3.0, savings for window air conditioners are calculated as a function of the capacity, and the energy efficiency rating (EER) of the baseline and energy efficient equipment. Not all of the EER values tracked in the data provided by Frontier Associates correspond to a deemed value in the TRM. This measure accounts for only 0.058% of the claimed kWh savings.

Table 2-16 presents the savings results of the evaluation of the 2013 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 2013 program year is 1.

*Table 2-16 Net Verified Savings by Measure Type – Overall*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Lifetime Savings (kWh)</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Lifetime Savings (Therms)</i>
Air Infiltration	69.77	180,764	1,988,405	1,012.94	41,064	451,702
Attic Insulation	86.10	115,579	2,311,586	183.48	11,486	229,718
Central AC	17.66	40,658	609,870	-	-	-
Double Pane Window	46.76	64,510	1,290,193	175.11	3,943	78,861
Floor Insulation	-	16,192	323,837	50.93	3,564	71,288
Gas Central Replacement	-	-	-	76.38	3,883	77,668
Heat Pump Replacement	2.30	25,610	384,150	-	-	-
Inside Lighting	27.72	168,669	1,315,620	-	-	-
Low-flow Shower Heads	-	-	-	0.05	16	161
Refrigerator Replacement	0.59	4,240	64,408	-	-	-
Smart Thermostat	-	1,675	20,096	-	436	5,232
Storm Windows	2.62	14,113	282,267	65.85	2,164	43,280
Vented Space Heater	-	-	-	21.81	1,358	27,151
Wall Insulation	0.49	1,140	22,796	6.96	514	10,286
Water Heater Insulation	0.10	1,292	16,796	0.18	100	1,299
Water Heater Replacement	0.01	147	1,906	0.21	87	955
Water Pipe Insulation	0.45	1,429	18,571	1.49	205	2,250
Window AC	0.10	450	4,725	-	-	-
Window Sealing	-	-	-	-	-	-
<b>Total</b>	<b>254.66</b>	<b>636,467</b>	<b>8,655,227</b>	<b>1,595.39</b>	<b>68,820</b>	<b>999,852</b>

**2.6 Verified Savings for Electric Utilities**

The participating electric utilities are AEP-SWEPCO, EDEC, EAI, and OG&E. Table 2-17 presents the savings results of the evaluation of the 2013 AWP for electric utilities. Table 2-18 through Table 2-21 summarize the savings by measure for each electric utility.

The overall realization rates for electric utilities ranged from 54% to 90%. Low realization rates were primarily due to some homes being labeled with a specific heating or cooling type, but where the EnerTrek calculation assumed a different cooling or heating type that overestimated savings. The most notable instances of this involved attic insulation, air infiltration, and window replacement. As these measure types were not evenly distributed across service territories, overall realization rates varied widely among IOUs. This appears to be a savings algorithm issue rather than a data collection issue. Resolving this error should be fairly straightforward and require only a minor adjustment to the EnerTrek savings algorithms.



*Table 2-17 Net Verified Savings by Electric Utility*

<i>Electric Utility</i>	<i># of Homes</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Lifetime Savings (kWh)</i>	<i>Realization Rate</i>
AEP-SWEPCO	29	18.50	47,714	664,523	59%
EDEC	1	0.36	3,240	33,577	54%
EAI	177	161.48	444,779	5,909,257	85%
OG&E	35	31.41	54,516	905,726	90%
Non-IOU	49	42.91	86,217	1,142,144	82%
<b>Total</b>	<b>291</b>	<b>254.66</b>	<b>636,467</b>	<b>8,655,227</b>	<b>82%</b>

*Table 2-18 Net Verified Savings by Measure Type – AEP – SWEPCO*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Lifetime Savings (kWh)</i>	<i>Realization Rate</i>
Air Infiltration	4.68	9,942	109,357	54%
Attic Insulation	9.61	15,977	319,537	60%
Central AC	-	-	-	-
Double Pane Window	0.45	626	12,511	33%
Floor Insulation	-	708	14,167	81%
Gas Central Replacement	-	-	-	-
Heat Pump Replacement	0.27	1,718	25,770	163%
Inside Lighting	2.39	15,098	117,762	110%
Low-flow Shower Heads	-	-	-	-
Refrigerator Replacement	0.05	357	5,717	93%
Smart Thermostat	-	469	5,627	100%
Storm Windows	0.42	1,402	28,035	100%
Vented Space Heater	-	-	-	-
Wall Insulation	0.49	1,140	22,796	7%
Water Heater Insulation	-	-	-	-
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	0.04	128	1,669	101%
Window AC	0.10	150	1,575	100%
Window Sealing	-	-	-	-
<b>Total</b>	<b>18.50</b>	<b>47,714</b>	<b>664,523</b>	<b>59%</b>

*Table 2-19 Net Verified Savings by Measure Type – EDEC*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Lifetime Savings (kWh)</i>	<i>Realization Rate</i>
Air Infiltration	0.22	2,594	28,535	100%
Attic Insulation	-	-	-	-
Central AC	-	-	-	-
Double Pane Window	-	-	-	-
Floor Insulation	-	-	-	-
Gas Central Replacement	-	-	-	-
Heat Pump Replacement	-	-	-	0%
Inside Lighting	0.13	646	5,041	91%
Low-flow Shower Heads	-	-	-	-
Refrigerator Replacement	-	-	-	-
Smart Thermostat	-	-	-	-
Storm Windows	-	-	-	-
Vented Space Heater	-	-	-	-
Wall Insulation	-	-	-	-
Water Heater Insulation	-	-	-	-
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	-	-	-	-
Window AC	-	-	-	-
Window Sealing	-	-	-	-
<b>Total</b>	<b>0.36</b>	<b>3,240</b>	<b>33,577</b>	<b>54%</b>

*Table 2-20 Net Verified Savings by Measure Type – EAI*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Lifetime Savings (kWh)</i>	<i>Realization Rate</i>
Air Infiltration	50.19	142,085	1,562,940	83%
Attic Insulation	60.31	78,946	1,578,927	68%
Central AC	15.34	35,312	529,680	100%
Double Pane Window	11.96	20,338	406,760	65%
Floor Insulation	-	14,433	288,658	99%
Gas Central Replacement	-	-	-	-
Heat Pump Replacement	2.03	22,477	337,155	129%
Inside Lighting	19.09	113,007	881,454	104%
Low-flow Shower Heads	-	-	-	-
Refrigerator Replacement	0.36	2,614	39,245	101%
Smart Thermostat	-	1,206	14,469	100%
Storm Windows	1.73	11,897	237,930	100%
Vented Space Heater	-	-	-	-
Wall Insulation	-	-	-	0%
Water Heater Insulation	0.09	1,156	15,028	100%
Water Heater Replacement	0.01	147	1,906	100%
Water Pipe Insulation	0.37	1,162	15,104	100%
Window AC	-	-	-	-
Window Sealing	-	-	-	0%
<b>Total</b>	<b>161.48</b>	<b>444,779</b>	<b>5,909,257</b>	<b>85%</b>

*Table 2-21 Net Verified Savings by Measure Type – OG&E*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Lifetime Savings (kWh)</i>	<i>Realization Rate</i>
Air Infiltration	1.92	7,016	77,176	86%
Attic Insulation	2.66	3,716	74,315	42%
Central AC	-	-	-	-
Double Pane Window	25.13	32,187	643,733	97%
Floor Insulation	-	147	2,945	64%
Gas Central Replacement	-	-	-	-
Heat Pump Replacement	-	1,415	21,225	117%
Inside Lighting	1.46	9,026	70,405	114%
Low-flow Shower Heads	-	-	-	-
Refrigerator Replacement	0.07	495	7,855	103%
Smart Thermostat	-	-	-	-
Storm Windows	0.15	252	5,040	100%
Vented Space Heater	-	-	-	-
Wall Insulation	-	-	-	-
Water Heater Insulation	0.01	68	884	100%
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	0.01	44	574	101%
Window AC	-	150	1,575	100%
Window Sealing	-	-	-	0%
<b>Total</b>	<b>31.41</b>	<b>54,516</b>	<b>905,726</b>	<b>90%</b>

Table 2-22 presents the electric savings that were not associated with any AWP IOU. These savings are attributable to municipal utilities, co-op utilities, or other energy providers. Thus, the savings are not attributed to any specific program sponsoring utility, and are provided for reference only.

*Table 2-22 Net Verified Savings by Measure Type – Non-IOU (Electric)*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Lifetime Savings (kWh)</i>	<i>Realization Rate</i>
Air Infiltration	12.74	19,127	210,397	65%
Attic Insulation	13.52	16,940	338,807	68%
Central AC	2.32	5,346	80,190	100%
Double Pane Window	9.22	11,359	227,189	95%
Floor Insulation	-	903	18,067	85%
Gas Central Replacement	-	-	-	-
Heat Pump Replacement	-	-	-	-
Inside Lighting	4.64	30,892	240,958	116%
Low-flow Shower Heads	-	-	-	-
Refrigerator Replacement	0.11	774	11,591	92%
Smart Thermostat	-	-	-	-
Storm Windows	0.32	563	11,262	100%
Vented Space Heater	-	-	-	-
Wall Insulation	-	-	-	0%
Water Heater Insulation	0.01	68	884	100%
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	0.03	94	1,224	103%
Window AC	-	150	1,575	100%
Window Sealing	-	-	-	0%
<b>Total</b>	<b>42.91</b>	<b>86,217</b>	<b>1,142,144</b>	<b>82%</b>

## 2.7 Verified Savings for Gas Utilities

The participating gas utilities are AOG, CenterPoint, and SourceGas. Table 2-23 presents the savings results of the evaluation of the 2013 AWP for gas utilities and for non-IOU savings sources. Table 2-24 through Table 2-26 summarize the savings by measure for each gas utility.

The primary reason that the realization rate is less than 100% is that the EnerTrek savings algorithms calculated savings for attic insulation measures that did not meet the stipulated R-value within the TRM. Resolving this issue within EnerTrek should be straightforward, and will involve adjusting the savings algorithm to eliminate savings for any measures that do not meet minimum R-value requirements. Additionally, community action agency contractors should avoid implementing insulation measures that do not meet minimum R-value requirements in the TRM. Implementing measures that do not achieve savings reduces overall program cost-effectiveness.

*Table 2-23 Net Verified Savings by Gas Utility*

<i>Gas Utility</i>	<i># of Homes</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Lifetime Savings (Therms)</i>	<i>Realization Rate</i>
AOG	36	179.2623191	6,100	97,852	91%
CenterPoint	177	1152.428749	49,858	706,563	90%
SGA	23	144.1994378	7,829	123,705	93%
Non-IOU	55	119.5031302	5,032	71,732	100%
<b>Total</b>	<b>291</b>	<b>1,595.39</b>	<b>68,820</b>	<b>999,852</b>	<b>91%</b>

*Table 2-24 Net Verified Savings by Measure Type – AOG*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Lifetime Savings (Therms)</i>	<i>Realization Rate</i>
Air Infiltration	65.12	2,658	29,243	100%
Attic Insulation	11.14	672	13,442	52%
Central AC	-	-	-	-
Double Pane Window	91.94	1,995	39,902	100%
Floor Insulation	4.39	305	6,102	100%
Gas Central Replacement	-	-	-	-
Heat Pump Replacement	-	-	-	-
Inside Lighting	-	-	-	-
Low-flow Shower Heads	-	-	-	-
Refrigerator Replacement	-	-	-	-
Smart Thermostat	-	-	-	-
Storm Windows	4.24	294	5,880	100%
Vented Space Heater	2.31	149	2,982	100%
Wall Insulation	-	-	-	-
Water Heater Insulation	0.01	4	51	100%
Water Heater Replacement	0.02	9	99	100%
Water Pipe Insulation	0.10	14	150	101%
Window AC	-	-	-	-
Window Sealing	-	-	-	-
<b>Total</b>	<b>179.26</b>	<b>6,100</b>	<b>97,852</b>	<b>91%</b>

*Table 2-25 Net Verified Savings by Measure Type – CenterPoint*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Lifetime Savings (Therms)</i>	<i>Realization Rate</i>
Air Infiltration	793.20	31,684.19	348,526	100%
Attic Insulation	145.92	8,983.69	179,674	87%
Central AC	-	-	-	-
Double Pane Window	61.16	1,408.60	28,172	100%
Floor Insulation	21.15	1,353.57	27,071	105%
Gas Central Replacement	67.77	3,444.80	68,896	96%
Heat Pump Replacement	-	-	-	-
Inside Lighting	-	-	-	-
Low-flow Shower Heads	-	-	-	-
Refrigerator Replacement	-	-	-	-
Smart Thermostat	-	357.00	4,284	100%
Storm Windows	48.55	1,505.00	30,100	100%
Vented Space Heater	13.25	817.81	16,356	100%
Wall Insulation	-	-	-	0%
Water Heater Insulation	0.13	72.79	946	100%
Water Heater Replacement	0.19	77.80	856	100%
Water Pipe Insulation	1.11	152.89	1,682	101%
Window AC	-	-	-	-
Window Sealing	-	-	-	0%
<b>Total</b>	<b>1,152.43</b>	<b>49,858.14</b>	<b>706,563</b>	<b>90%</b>

*Table 2-26 Net Verified Savings by Measure Type – Source Gas*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Lifetime Savings (Therms)</i>	<i>Realization Rate</i>
Air Infiltration	72.48	3,532.40	38,856	100%
Attic Insulation	15.77	1,165.79	23,316	87%
Central AC	-	-	-	-
Double Pane Window	13.01	339.42	6,788	100%
Floor Insulation	20.64	1,578.42	31,568	100%
Gas Central Replacement	2.33	153.75	3,075	100%
Heat Pump Replacement	-	-	-	-
Inside Lighting	-	-	-	-
Low-flow Shower Heads	0.05	16.09	161	100%
Refrigerator Replacement	-	-	-	-
Smart Thermostat	-	79.00	948	100%
Storm Windows	11.45	334.00	6,680	100%
Vented Space Heater	1.32	80.12	1,602	100%
Wall Insulation	6.96	514.28	10,286	60%
Water Heater Insulation	0.03	15.26	198	100%
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	0.16	20.48	225	101%
Window AC	-	-	-	-
Window Sealing	-	-	-	0%
<b>Total</b>	<b>144.20</b>	<b>7,829.02</b>	<b>123,705</b>	<b>93%</b>

Table 2-27 presents the gas savings that were not associated with any AWP IOU. As there are few non-IOU gas utility providers in the state of Arkansas, the “non-IOU” 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 2-27 is a reflection of the non-IOU 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-IOU (Gas)*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Lifetime Savings (Therms)</i>	<i>Realization Rate</i>
Air Infiltration	82.14	3,188.78	35,077	100%
Attic Insulation	10.65	664.32	13,286	100%
Central AC	-	-	-	-
Double Pane Window	9.00	199.96	3,999	98%
Floor Insulation	4.74	327.32	6,546	99%
Gas Central Replacement	6.29	284.82	5,696	100%
Heat Pump Replacement	-	-	-	-
Inside Lighting	-	-	-	-
Low-flow Shower Heads	-	-	-	-
Refrigerator Replacement	-	-	-	-
Smart Thermostat	-	-	-	-
Storm Windows	1.62	31.00	620	100%
Vented Space Heater	4.92	310.53	6,211	100%
Wall Insulation	-	-	-	-
Water Heater Insulation	0.01	7.92	103	100%
Water Heater Replacement	-	-	-	-
Water Pipe Insulation	0.12	17.60	194	99%
Window AC	-	-	-	-
Window Sealing	-	-	-	0%
<b>Total</b>	<b>119.50</b>	<b>5,032.24</b>	<b>71,732</b>	<b>100%</b>

## 2.8 Regression Analysis of Customer Billing Data

Utilizing both 2012 and 2013 participants in the AWP, the Evaluators conducted a regression analysis in order to estimate the reasonableness of measure level savings reported in the TRM. This analysis was performed as a research activity that may be used to inform future TRM updates and to gain insight into participant behavioral effects.

The Evaluators received a sample of monthly billing data for 2012 and 2013 program participants. The billing data spanned from January 2011 to October 2013.

### 2.8.1 Control Group Selection

The inherent difficulty in conducting a billing analysis for the AWP is the lack of a randomized control group. As assignment into the participant group was non-random, it is necessary to select a control group that can successfully replicate the usage profile of the participants. In this analysis, the 2012 cohort was assigned as the treatment group, with the 2013 cohort as the control when analyzing 2012 program effects. This is detailed in **Error! Reference source not found.**

The 2013 participants are the most viable, available replacement for a randomized control group because their selection into the program necessitates that they have similar needs and home characteristics. The only drawback to using the 2013 group as a control is the delay that this imposes on the analysis. As such, the results from this year’s evaluation will be comparable to measures installed in 2012. The analysis will only use Pre-Implementation data from the 2013 Cohort as a control.

*Table 2-28 Detail of Treatment and Control Specifications by Year*

Year	2012 Cohort (Treatment)	2013 Cohort (Control)
2011	Pre-Implementation	Pre-Implementation
2012	Mix of Pre and Post data	Pre-Implementation
2013	Post Implementation	Pre-Implementation

### 2.8.2 Regression Model Specification

The regression models utilize a fixed effects specification with pre/post data for treatment and control groups. Specifically, monthly treatment and controls data were used from 2011 to 2013 and incorporated with weather data. The weather data were matched using a representative city for each IOU. This is specified in **Error! Reference source not found.**

*Table 2-29 Weather Data Source by IOU*

IOU	Weather Station
OGE	Fort Smith, KSFM
AOG	Little Rock, KLIT
AEP-SWEPCO	Texarkana, KTXK
EAI	Little Rock, KLIT
Centerpoint	Little Rock, KLIT
SGA	Fort Smith, KSFM

For each weather station, daily Heating Degree Days (HDD) and Cooling Degree Days (CDD) are calculated with a base of 65 degrees. These values are matched by IOU to each customer’s usage data by billing period.

The fixed-effects regression model was specified as follows:

$$\begin{aligned}
 \text{Energy Usage}_{i,t} &^4 \\
 &= \alpha_1 \text{Fixed Effects by Customer}_i + \beta_1 \text{HDD}65_t + \beta_2 \text{CDD}65_t + \beta_4 \text{Post}_{i,t} \\
 &* \text{HDD}65_t + \varepsilon_{i,t}
 \end{aligned}$$

<sup>4</sup> This equation is used for both kWh and Therms regressions. The two models were determined to have the same specification (using both HDD and CDD) after checking the coefficients for statistical significance.

*Table 2-30 Description of Variables Used in the AWP Regression Model*

<i>Variable</i>	<i>Description</i>
Fixed Effects by Customer	Unique identifier for each customer to control for any customer specific differences.
Heating Degree Days (HDD)	Heating Degree Days calculated by summing up the number of heating degree hours per day. The setpoint of 65 was used for the models.
Cooling Degree Days (CDD)	Cooling Degree Days calculated by summing up the number of cooling degree hours per day. The setpoint of 65 was used for the models.
Post	Indicator if a participant's observation is post audit (=1 if post, =0 otherwise). 0 for all control group observations.

The dataset was then screened using the following techniques before incorporating survey responses:

- Removal of duplicate observations (identical kWh readings and identical dates);
- Combining independent readings with the same date; and
- Removal of outliers ( > 99th Percentile for monthly usage, zero or negative readings).

### **2.8.3 Incorporating Survey Responses**

The Evaluators conducted a survey of 2012 and 2013 participants to inform the regression models as to which participants may have undertaken activities that may impact their savings when analyzed at the premise level. A total of 181 fully completed surveys were used for the analysis. The specific survey questions that were used to inform this analysis are as follows:

- Did you increase (decrease cooling) your heating thermostat set-point after the program implementation?
- Did you add a new appliance to the premise after the program implementation?
- Was an appliance returned to operation as a result of the program?
- Was there a change in population in the household after the program implementation?

These details were used to split the dataset into four groups:

- Customers who have changed their usage behavior (snapback) in the post period.
- Customers who have an appliance returned to operation or added appliances to their home in the post period (takeback).
- Customers who exhibit potential snapback or have takeback influences (member of group 1 and 2).

- The full data set consisting of all customers who completed a survey, regardless of response indicators.

### 2.8.4 Regression Results

Four separate regression models are tested to evaluate the program savings versus the TRM determined values in 2012. The first model excludes participants who exhibit snapback activities in the post period. The second excludes participants who exhibit takeback behaviors. The third excludes both takeback and snapback, providing the most un-impacted savings value that is comparable with TRM values. The fourth model contains all participants.

The coefficient of importance in the models is HDD65\*Post, as it determines the program impacts. As only the interaction term HDD65\*Post has statistical significance, it alone will be used to calculate per premise savings. The results from these regressions are detailed in **Error! Reference source not found.**

*Table 2-31 Electric Regression Results*

Variable Description	Regression Coefficients and Standard Errors							
	(1) No Snapback		(2) No Takeback		(3) No Snapback or Takeback		(4) All Participants	
<b>HDD65</b>	<b>0.00125</b>	**	<b>0.00126</b>	**	<b>0.00131</b>	**	<b>0.00123</b>	**
	-0.00008		-0.00008		-0.00009		-0.00007	
<b>CDD65</b>	<b>0.00215</b>	**	<b>0.00215</b>	**	<b>0.00218</b>	**	<b>0.0021</b>	**
	-0.00008		-0.00008		-0.00009		-0.00007	
<b>HDD65*Post</b>	<b>-0.00047</b>	**	<b>-0.00041</b>	**	<b>-0.0006</b>	**	<b>-0.00035</b>	**
	-0.00013		-0.00013		-0.00015		-0.00012	
<b>Dependent Variable Mean</b>	6.722		6.7125		6.7235		6.7036	
<b>Sample Size</b>	1,684		1,612		1,359		2,013	
<b>R-Squared</b>	0.6855		0.6572		0.6638		0.6625	

Notes: (1) The dependent variable is Log Monthly kWh. (2) \* and \*\* denote statistical significance at the 0.10 level and 0.05 levels, respectively. (3) Standard Errors are in parenthesis. (4) Variables Post and CDD\*Post were tested but found to be insignificant and not included in the final model.

### 2.8.5 Therms Regression Results

The same model specifications are then repeated with Therms as the dependent variable. The coefficient of importance in the models is HDD65\*Post, as it determines the program impacts. As only the interaction term HDD65\*Post has statistical significance, it alone will be used to calculate per premise savings. The results from this regression are detailed in Table 2-32.

Table 2-32 Gas Regression Results

Variable Description	Regression Coefficients and Standard Errors							
	(1) No Snapback		(2) No Takeback		(3) No Snapback or Takeback		(4) All Participants	
<b>HDD65</b>	<b>0.003</b>	**	<b>0.00285</b>	**	<b>0.00291</b>	**	<b>0.00293</b>	**
	-0.00009		-0.0001		-0.00011		-0.00008	
<b>CDD65</b>	<b>-0.00129</b>	**	<b>-0.00142</b>	**	<b>-0.00153</b>	**	<b>-0.00124</b>	**
	-0.00009		-0.00011		-0.00012		-0.00008	
<b>HDD65*Post</b>	<b>-0.00028</b>	**	<b>-0.00038</b>	**	<b>-0.00043</b>	**	<b>-0.00027</b>	**
	-0.00013		-0.00014		-0.00017		-0.00012	
<b>Dependent Variable Mean</b>	3.3288		3.3195		3.3084		3.3353	
<b>Sample Size</b>	1,651		1,565		1,367		1,874	
<b>R-Squared</b>	0.7661		0.7532		0.7552		0.7667	

Notes: (1) The dependent variable is Log Monthly Therms. (2) \* and \*\* denote statistical significance at the 0.10 level and 0.05 levels, respectively. (3) Standard Errors are in parenthesis. (4) Variables Post and CDD\*Post were tested but found to be insignificant and not included in the final model.

### 2.8.6 Energy Savings Derived From Regression Models

The results from each model are applied in combination with the average HDD by month in the baseline period (2012), and then applied as a percentage savings on a monthly basis with the average monthly baseline usage. The resulting savings are listed in Table 2-33, including realization rates (RR) as compared to TRM savings.

Table 2-33 Per-Participants Annual Savings Comparison

Group	Annual Regression Model kWh Savings	% kWh Savings	TRM Based kWh Savings	kWh RR	Annual Regression Model Therms Savings	% Therms Savings	TRM Based Therms Savings	Therms RR
Group 1 - No Snapback	1,231	9%	2,083	79%	56	11%	236	24%
Group 2 - No Takeback	1,061	8%	2,083	68%	76	15%	236	32%
Group 3 - No Snapback or Takeback	1,550	12%	2,083	99%	84	17%	236	36%
Group 4 - All Customers	901	7%	2,083	58%	53	11%	236	22%

The significance of these results shows that there is an impact on program savings due to takeback and snapback with Group 1 showing much lower savings than the takeback-excluded or snapback-excluded models. Using the comparable regression results, the impact of snapback is estimated as 2.5% of annual kWh usage, while and the impact of takeback is estimated as 2.4% of annual usage. When all snapback and takeback participants are removed from the model, electric savings are very closely aligned with those in the TRM (showing a realization rate of 99%).

With regard to Therms results, takeback (4.7%) has a much larger impact than snapback (1.7%). This is to be expected, as the impact of returning a furnace or water heater to service will have a much larger impact than a set point change in a home.

### **2.8.7 Billing Analysis Summary Results**

The analysis of participant billing data shows a significant difference in savings based on behavioral changes after program implementation. Based on the questions asked of participants, it appears that the deemed electric savings within the TRM accurately represent actual participant savings, in isolation of changes in customer behavior.

The analysis identified a larger discrepancy between the modeled Therms savings and TRM savings even after taking into account behavioral changes. The realization rate for the snapback- and takeback-excluded group is 36%. This suggests that at the premise level for a complete weatherization project, the TRM may be overestimating total Therms savings. As a percentage of total annual residence usage, the TRM based Therms savings are 47%. This is a potentially unrealistic savings target, further indicating that the TRM savings are overstating the actual impacts. This may be due to interaction effects between measures, as the TRM provides savings for isolated measures rather than at the aggregated premise level.

The scope of the current analysis did not isolate the effects of individual measures, although it may be possible to identify the effects of specific, high-impact measures. The accuracy and detail of further analysis may be somewhat restricted by the limited participant population size and high presence of measure crossover, in that the majority of residences received both air infiltration and attic insulation measures. These are the two highest-impact gas savings measures that are implemented through the AWP.

A billing analysis involving a larger participant population may allow for quantitative isolation of individual behavioral variables and measure types. This may provide further evidence that necessitates revisions to the TRM. A future assessment of TRM accuracy should revisit the reasonableness of air infiltration and insulation measure savings calculations.

### 3. Process Findings and Program Updates

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This chapter presents the key findings related to program operation, performance, and delivery. This includes a status assessment of recommendations from prior program evaluations and a summary of updates to program operation and delivery. Additionally, the chapter presents findings from in-depth interviews with program staff and addresses the checklist factors for portfolio comprehensiveness.

#### 3.1 Process Evaluation Considerations

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The Evaluators conducted a formal process evaluation of the AWP in 2012. This process evaluation resulted in several recommendations and identified program strengths and weaknesses, as well as existing opportunities. TRM V3.0 Protocol C addresses the criteria used to determine the timing and conditions needed for a process evaluation, and the following tables summarize the AWP in the context of these requirements.

*Table 3-1 Determining Process Evaluation Timing*

<i>Component</i>	<i>Determination</i>
New and Innovative Components	No. The overall program design has not been modified in the past year.
No Previous Process Evaluation	No. A formal process evaluation was conducted in 2012.
New Vendor or Contractor	No. The number of active community action agencies has been reduced, but all agencies were already participating during 2012.

*Table 3-2 Determining Process Evaluation Conditions*

<i>Component</i>	<i>Determination</i>
Are program impacts lower or slower than expected?	Yes. The program has fallen short of savings goals due to several factors including delays and reductions in federal funding for the WAP.
Are the educational or informational goals not meeting program goals?	No. Program awareness appears to be high, and the AWP has actively provided energy and non-energy education to participants and prospective participants.
Are the participation rates lower or slower than expected?	Yes. The program has fallen short of participation goals due to several factors including delays and reductions in federal funding for the WAP.
Are the program's operational or management structure slow to get up and running or not meeting program administrative needs?	Yes. There have been delays in the data reporting process, including errors within the tracking database.
Is the program's cost-effectiveness less than expected?	No. The program's cost-effectiveness has been maintained at expected levels.
Do participants report problems with the programs or low rates of satisfaction?	No. Participants in 2012 reported very high levels of satisfaction with their participation and with the quality of work performed.
Is the program producing the intended market effects?	Yes. Overall weatherization activity, including development of additional weatherization programs, has increased since the initiation of the AWP.

Based on these findings, there are certain areas of the program that call for process evaluation activities. While the timing components indicate that a full process evaluation is not currently necessary, the Evaluators determined that the 2013 evaluation of the AWP calls for a limited process evaluation focusing on specific program areas. These areas include:

- Program operations and managerial structure;
- Program savings performance; and
- Program participation levels.

In order to address these areas, the Evaluators conducted the following research tasks:

- Tracking database and documentation review;
- Interviews with community action agency and ACAA staff; and
- Utility staff interviews.

Additionally, the Evaluators gained insight into savings performance through the impact evaluation. Results from the TRM verification and regression analysis activities provided insight into ex ante vs. ex post savings discrepancies and overall measure savings estimates.



Table 3-3 below summarizes the survey and interview data collection for these process evaluation activities, including data collection type, number of respondents, and additional details.

*Table 3-3 Interview and Survey Data Collection Summary*

<i>Target</i>	<i>Component</i>	<i>Activity</i>	<i>N</i>	<i>Details</i>
Program Management Staff	AOG Program Manager	Interview	2	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 ACAA staff as necessary throughout the program year.
	OG&E Program Manager and Staff	Interview	3	
	SourceGas Program Manager	Interview	1	
	SWEPCO Program Manager	Interview	1	
	CenterPoint Program Manager	Interview	1	
	EAI Program Manager and Staff	Interview	2	
ACAAA Staff	AWP Coordination Staff	Interview	2	The Energy Policy Coordinator and other ACAA staff are responsible for coordinating efforts among the local agencies and providing information to the utility program managers.
Community Action Agency Directors and Staff	Central Arkansas Development Council (CADC)	Interview	1	The community action agency directors and staff members 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.
	Crowley's Ridge Development Council (CRDC)	Interview	1	
	Crawford-Sebastian Community Development Council, Inc. (C-SCDC)	Interview	1	
	Pine Bluff Jefferson County Economic Opportunities Commission, Inc. (PBJCEOC)	Interview	1	

### **3.2 Response to Program Recommendations**

Table 3-4 summarizes the status of issues and recommendations identified in the 2012 process evaluation and impact evaluation of the Arkansas Weatherization Program. While some of the recommendations have been addressed, such as individual tracking data discrepancies and incremental improvements in non-WAP participation, the majority of issues have persisted through the 2013 program year.

Table 3-4 Status of Recommendations from 2012 Program Year

<b>Issue</b>	<b>Consequences</b>	<b>Recommendation</b>	<b>Utility/ACAAA Response</b>	<b>Status of Issue</b>
Tracking data missing some measure inputs required by TRM	<p>Program cannot comply with current TRM calculation requirements</p> <p>May negatively affect the accuracy of ex ante calculations</p>	Add inputs to tracking system in accordance with the most up-to-date TRM (TRM 2.0 at the time of recommendation)	Frontier has continually modified the program tracking database to revise calculations but some TRM V2.0/TRM V3.0 inputs are not present. Rather than retroactively adjusting the database to match previous versions of the TRM, efforts should be made to reconcile the database with up-to-date TRM requirements, taking into account TRM grace periods and any other stipulated time frames and budget constraints.	Partially addressed
Some measure labels listed in the tracking data do not match measure names listed in the TRM (e.g. 'Vented Space Heater' vs. 'Direct Vent Heater')	Causes difficulties during savings verification, potential to calculate savings for incorrect measure.	Standardize tracking data measure terminology with TRM language	No observed change in tracking data measure labels. While the TRM does not include all of the NEAT and MHEA measures, it is important to reconcile measure labels for those measures that do appear in both NEAT/MHEA, and the TRM so that they clearly match.	Persists
Program is fairly dependent on the success of the Weatherization Assistance Program (WAP)	<p>Delayed or reduced federal funding results in delayed or limited AWP completions</p> <p>Some agencies prioritize WAP over AWP, delaying AWP completions</p>	<p>Increase focus on recruiting non-WAP participants by promoting it as a general utility program in addition to a WAP leveraging program</p> <p>Strongly encourage agencies to directly seek out and work with non-WAP customers</p>	<p>Two agencies recruited non-WAP participants, most agencies continue to report reliance on WAP funds</p> <p>Marketing materials that exclusively mention the AWP without the WAP have been developed and distributed (see Appendix B)</p>	Partially addressed

<p>Some errors exist within tracking data calculations (CFL hours of use and refrigerator replacement at the time of recommendation)</p>	<p>Creates difficulties in M&amp;V, specifically savings verification May negatively affect the accuracy of ex ante calculations</p>	<p>Review all calculation assumptions and remove/replace any erroneous values within the tracking database</p>	<p>There continue to be calculation discrepancies between TRM savings calculation results and tracking data claimed savings for some measures.</p>	<p>Persists</p>
<p>Private co-pay customers are able to select measures more freely than WAP recipient participants</p>	<p>Some participants may only select measures that have a lower savings-to-investment ratio (SIR) than the average SIR for WAP participants, reducing overall program cost-effectiveness May detract from the program's "whole house approach" to weatherization if participants approach the AWP only seeking individual measures (such as windows).</p>	<p>Require private co-pay participants to select highly cost-effective measures, potentially prioritizing measures by their savings-to-investment ratio and requiring participants to install measures in order</p>	<p>No observed modifications to program structure for private co-pay participants</p>	<p>Persists</p>
<p>Delays in collecting all necessary project data from agencies and reporting data to database provider</p>	<p>Places stress on utility and evaluator deadlines Reduces the time available to ensure accuracy and completeness within data</p>	<p>Ensure that all necessary data are provided to CADC and then to Frontier Associates as soon as available, or develop a shared electronic system for data input by all agencies</p>	<p>Agencies/CADC collected and finalized the dataset earlier than the prior year, but delays continued to occur for some data. No observed change in the method of data transfer</p>	<p>Partially addressed</p>

### 3.3 Program Structure Overview

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The overall design, structure, and objectives of the Arkansas Weatherization Program have remained fairly constant throughout 2011-2013. This section provides a summary of current program design characteristics and processes, noting any new differences between 2013 and prior program years.

The most notable modification has been the 2013 restructuring of weatherization service providers, where the decision was made to reduce the number of agencies promoting and implementing program services from 15 to 6. Some of the remaining agencies continued to provide weatherization services through 2013, as it was a transitional year. This modification was made in conjunction with the administrative transition of the Weatherization Assistance Program from the Department of Human Services (DHS) to the Arkansas Energy Office (AEO). During 2013, the agencies that participated in program implementation 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);
- EAI;
- Oklahoma Gas and Electric (OG&E);
- Arkansas Oklahoma Gas Corporation (AOG);
- CenterPoint Energy (CenterPoint); and
- SourceGas Arkansas (SGA).

As with prior years, 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;
- Air sealing;
- Window sealing and replacement;
- Furnace, air conditioner, and heat pump tune-up and replacement;
- Water heater insulation and replacement;
- Lighting retrofits;

- Low flow shower heads; and
- Other measures as deemed appropriate.<sup>5</sup>

Program structure has remained fairly consistent through the 2013 program year. As noted above, the most notable modification involved the decision to reduce the number of agencies (from 15 to 6). These agencies continued to receive federal funding for the WAP as well as utility funds for the AWP for use in weatherization implementation activities.

As with prior years, customers who do not receive funding through the statewide income-qualified 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 only to residences built prior to 1997. Additionally, participant homes must meet three of the following seven criteria:<sup>6</sup>

- 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 2013 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

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<sup>5</sup> This list contains a sample of some of the most commonly installed program measures. A complete list of measures that were implemented during the 2013 program year can be found in Table 1-4 of Section 1.3 in this report. A complete list of all eligible program measures can be found in ACAAA Docket no. 07-079-TF, Attachment A (AWP Modified Program Design and Description).

<sup>6</sup> 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](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](http://www.apscservices.info/pdf/07/07-079-tf_76_1.pdf) issued on June 30, 2011.

Mobile Home Energy Audit (MHEA) software, which determines the most cost-effective and energy-saving measures for each home.

Participating homes must be 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.

The active weatherization agencies continued to recruit and enroll customers 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.

The AWP has continued to use a “whole house” 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. This varies somewhat for participants who provide their own private co-payment for the audit and for energy efficiency measures, in that these participants are able to individually select measures rather than receiving a predetermined group of measures based on the NEAT or MHEA recommendations.

Agencies collect onsite data documenting initial home conditions, the set of measures installed, and post-implementation conditions and measurements. The agencies then provide these data to CADC, who aggregates the information and submits it to Frontier Associates for processing within the EnerTrek software tool. EnerTrek incorporates the onsite data into TRM savings formulas (and NEAT/MHEA values for measures not included in the TRM) to calculate ex ante savings for each measure. The resulting savings are made accessible to program utilities and EM&V contractors, who use EnerTrek database exports to conduct measure implementation and savings verification activities.

### **3.4 Arkansas Weatherization Program Logic Model**

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Figure 3-1 presents a logic model for the Arkansas Weatherization Program, divided into stages to represent the phases involved in administering and operating the program. As discussed above, the overall structure and phases have remained fairly consistent since 2012 and prior years. The 2013 logic model has been updated to reflect the stipulated number of active weatherization agencies.

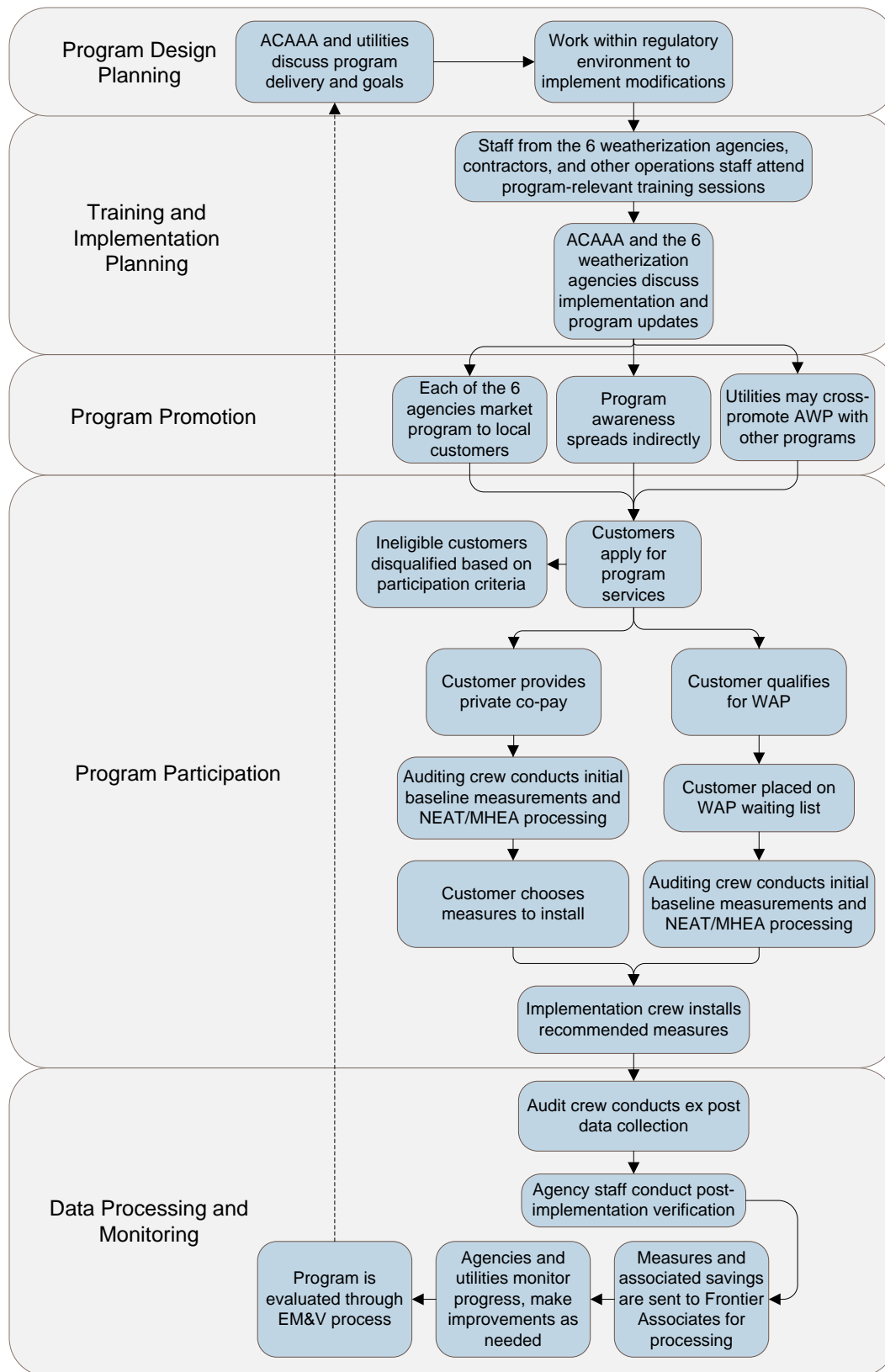


Figure 3-1 Arkansas Weatherization Program Logic Model

### 3.5 Arkansas Weatherization Program 2013 Participation

In 2013, the Arkansas Weatherization Program serviced a total of 291 homes, which is a reduction from the 641 homes serviced in 2012 and the 810 homes serviced in 2011. The primary factor contributing to this significant reduction in participation was likely the fact that program activity declined significantly during the April 2013, and did not fully resume until September 2013. This was due to federal funding delays and uncertainties, and associated organizational changes within the WAP.

The program was promoted and implemented through a total of eight local community action agencies, which were responsible for communicating with potential participants, enrolling them in the program, and providing audits and measure implementation. Although the number of active weatherization agencies was reduced to six, some of the previous agencies continued to provide weatherization services during the first few months of 2013.

Table 3-5 displays total participation disaggregated by the community action agency associated with the participant. These proportions are somewhat similar to prior program years, where CADC completed the largest percentage of implementations.

*Table 3-5 Total Participation by Community Action Agency*

<i>Agency Name</i>	<i>Percentage of Participating Homes</i>
Central Arkansas Development Council	41%
Crawford-Sebastian Community Development	17%
Crowley's Ridge Development Council	14%
Southwest Arkansas Development Council	9%
Universal Housing Development Council	9%
Pine Bluff-Jefferson County Economic Opportunities Commission	7%
Black River Area Development Corporation	2%
Office of Human Concern	1%
N	291

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 3-6 cross-tabulates participation by the gas and/or electric utility associated

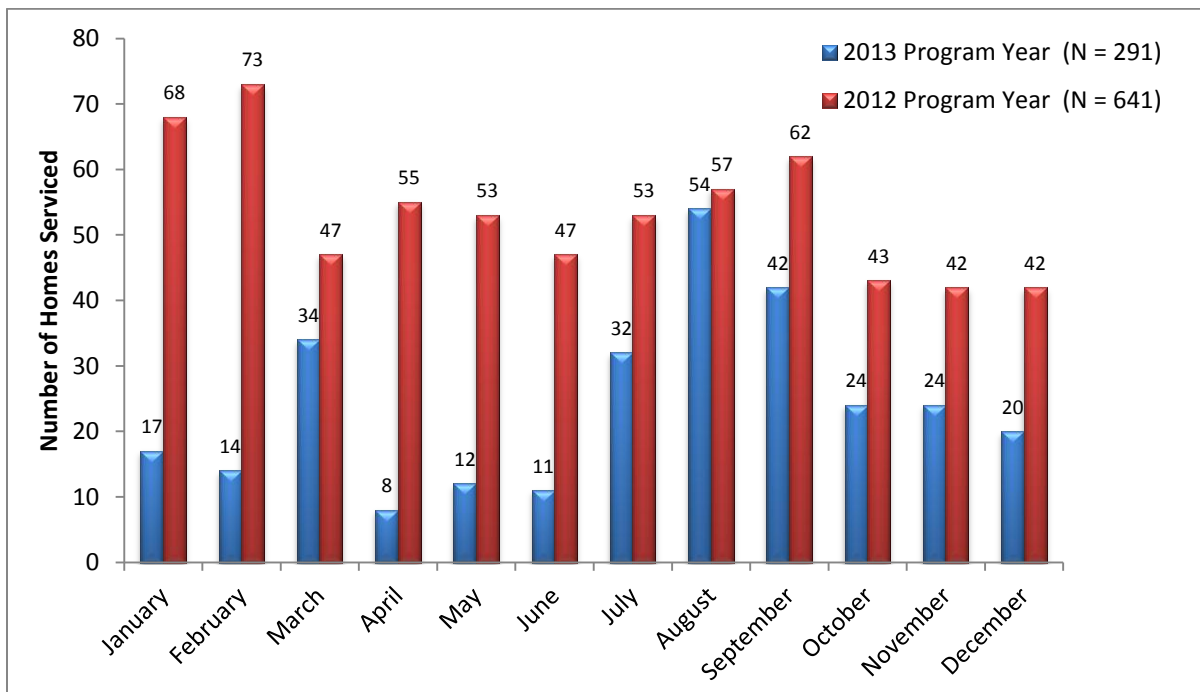


with the participant. "N/A" represents projects performed in homes with only one utility source or with a utility service provider that is not part of the AWP.

*Table 3-6 Participation by Associated Utility*

Electric Utility	Gas Utility			
	Arkansas Gas	Oklahoma Gas	CenterPoint	Source Gas
EAI	-	-	125	6
OG&E	29	-	-	4
AEP-SWEPCO	3	15	-	5
Empire Electric	-	-	-	-
N/A	4	37	8	-

Figure 3-2 displays a comparison between 2013 and 2012 in terms of participation rates by month. Overall, the 2013 program year experienced more participation seasonality and lower participation rates than the 2012 year. As noted above, much of the program activity ceased during the spring months, primarily due to funding delays and transitional activity within the WAP. However, even after program activity fully resumed, the 2013 program year achieved substantially less participation per month than the 2012 year.



*Figure 3-2 Participation Rates by Month, 2012 vs. 2013*

Approximately 1,440 measures were installed during the 2013 program year, as compared to nearly 3,700 in the 2012 year and more than 4,700 in the 2011 year. Table 3-7 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 improvements. Heat pump, water heater, and window air conditioner replacement comprised a small percentage of measures.

*Table 3-7 Total Installations by Measure*

<i>Measure</i>	<i>Number of Installations</i>
CFL	291*
Air Infiltration	265
Water Heater Pipe	183
Ceiling Insulation	164
Window Replacement	109*
Vented Space Heater	63
Gas Furnace Replacement	60
Central AC Replacement	51
Water Heater Jacket	50
Storm Windows	49*
Energy Star Refrigerator	45
Floor Insulation	23
Wall Insulation	23
Smart Thermostat	19
Central HP Replacement	18
Water Heater Replacement	9
Window Sealing	9*
Window AC Replacement	3
Low Flow Showerhead	1

\*Values are based on total number of projects rather than on total number of units installed.

The average square footage of participating residences was 1,361 while the median square footage was 1,292. The average age of participant homes was 45.5 years, and all homes complied with the 1997 or prior construction date program requirement.

### **3.6 Utility Staff and ACAA Interviews**

As part of the evaluation of the 2013 Arkansas Weatherization Program, the Evaluators conducted in-depth interviews with utility staff members involved in managing and operating the program, as well as ACAA representatives and community action agency directors. As a formal process evaluation was conducted in 2012, these interviews primarily served to assess the status of previous evaluation conclusions and recommendations, as well as to identify notable changes in program operation.

Thus, the 2013 evaluation interviews seek 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.

### 3.6.1 Statewide Weatherization Transition

**WAP Software Update:** Interviewed staff noted that the transition of the WAP from the Department of Human Services to the Arkansas Energy Office is expected to have several effects. The AEO has reportedly adopted a new software system for savings tracking and other database activities, which will likely result in a new audit form for the WAP. Staff noted that this new software, along with any changes to the audit form, will likely have to be reconciled with the AWP in order to prevent confusion and inaccurate or insufficient data collection on the part of the agencies. As the AWP was designed to adhere to WAP protocols, including the use of NEAT and MHEA as audit tools, new software may require substantial changes to AWP implementation procedures.

**Transition Awareness:** Utility and ACAA staff reported that news releases and other informational materials had been developed in order to inform customers of the agency transition and to direct them to the appropriate weatherization provider. However, some utility staff reported that they would like to have a more clear understanding of how the transition will affect the program and whether there will be additional requirements on the part of the utilities or service providers.

**Waiting List Status:** As mentioned in prior years, the majority of AWP participants have also qualified for WAP funding. Due to the high demand for WAP funds, the waiting list for the federal program has increased substantially over the past several years. This has affected AWP participation, as the timeline for a participant of both AWP and WAP to receive services is dependent on the speed of the statewide waiting list. However during 2013, interview respondents reported that the Arkansas Energy Office may allow for some flexibility within the WAP waiting list for projects that are able to leverage additional funding sources. For example, customers who are on the WAP waiting list but who also qualify for AWP funds may be moved to a higher priority on the list.

While this would not alleviate the overall waiting list for the federal program, it may increase the participation rate for the AWP. Interviewed staff noted that the community action agencies will have the authority to increase AWP participants to a higher waiting list priority level. The extent to which this arrangement will improve AWP participation is unclear thus far, although interviewees estimated that there are several thousand customers who may potentially benefit. As the WAP waiting list appears to have had a bottleneck effect on AWP performance across program years, this development has the potential to address a primary program issue.

### 3.6.2 Data Quality and Availability

**Data Quality:** Interviewed utility staff members generally reported that there were persisting communication issues with regard to participation data, program planning, reimbursements, and savings results. Staff members explained that they had typically not received timely information regarding how many of their customers had received weatherization services, and that when the information was delivered it did not include sufficient detail to accurately estimate where the utilities stood in terms of their goals. For instance, utility staff reported that it would be useful to know which measures had been implemented, and to have cost levels broken down into more specific categories.

**Data Availability:** Although detailed participation data are intended to be available to the utilities throughout the program year, there were difficulties in accessing EnerTrek and some of the initial data reports contained inaccuracies that had to be corrected. During follow-up discussions, Frontier staff acknowledged these delays and explained that each year of the AWP had involved updates to the data collection and reporting process. This required programming modifications, and Frontier staff noted that there had been some issues during this process. As the utilities rely on the database for details such as types of measures installed and estimated savings, and as EnerTrek also serves as a consistency check against information obtained through CADDC, utility staff noted that regular access to this portal is important for performance tracking and planning purposes. These issues suggest that although nearly all of the necessary data are being collected onsite in participant homes, there are lag points in multiple stages of the data reporting process that result in delays and missing information.

### 3.6.3 Community Action Agency Involvement

**Agency Coverage:** ACAAA staff reported that one primary objective during the agency transition was to ensure that the remaining agencies would cover all of the utilities' service territories. As there are now fewer service providers, each agency now has an expanded territory of activity. ACAAA staff also noted that some agencies have established outpost offices in order to mitigate distances between agency headquarters and participant homes. Additionally, the six agencies are able to work with the nine additional previous providers in order to obtain participant referrals and potentially contract out some of the installation work. This arrangement is intended to simplify the weatherization provider network while maintaining collaborative efforts among all agencies.

**Agency Engagement:** Interviewed staff noted that on average, the remaining six implementing agencies have been more active in providing AWP services than the initial 15 organizations. One interviewee explained that the AEO is planning to strongly encourage or require the six agencies to leverage funding from sources such as the AWP, which is expected to further increase participation activity.

### 3.6.4 Recruiting Private Co-payment Customers

**Participation Issues:** When asked about the presence of AWP participants who are not eligible for WAP-funding, the general statement among interviewees was that the AWP has continued to encounter barriers to participation for these customers. As with prior years, staff identified barriers including AWP eligibility requirements, the reliance on WAP funding and participation levels, and the continued customer perspective that the AWP is associated with an income requirement. Interviewees reported that while the percentage of participants who are not WAP-eligible has increased slightly, the program still heavily relies on the availability of federal funding. ACAA staff also noted that the availability of other utility-sponsored weatherization programs may serve as a barrier to AWP participation, as customers may be drawn away from the AWP and instead choose to enroll in these alternative programs. Overall, utility staff members reiterated their perspectives from prior program years: 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.

**Measure Selection:** Interviewees reported that even with additional private co-pay participation, there may be issues with program cost-effectiveness targets. Specifically, utility staff members noted that participants who provide their own co-pay are still able to determine which measures to install in their homes. As mentioned in the 2012 evaluation, these customers may select measures that are not necessarily as cost-effective as the full set of measures recommended by NEAT or MHEA.

### 3.6.5 Program Efficiency and Performance

**Program Interruption:** Utility staff explained that while the funding from the program utilities was available to the AWP for the entire program year, uncertainty regarding the timing and total amount of government funding for weatherization services had limited the number of homes that the agencies were able to service. Several staff members noted that the decrease in participation levels during the 2013 program year may be mainly attributable to the fact that the program paused implementation activity in April through well into the fall due to funding and transition issues. These issues were partially related to the initiation of program restructuring on a statewide level, and caused the agencies to halt their activities for several months.

**Savings Issues:** Some utility staff members reported that they have attempted to offset the low savings achieved through the AWP by focusing on one or more of their other energy efficiency programs. These interviewees reported that as they did not have the ability to significantly influence the performance of the AWP, they decided to focus their attention towards internal programs in order to meet savings targets. Overall, comments suggested that the AWP is not currently successful in serving its intended purpose within utility energy efficiency portfolios.

### 3.6.6 Communication and Collaborative Efforts

**Establishing Communications:** Utility staff members reported that their interactions with the program were typically limited to receiving periodic notifications of job completions and having weekly conference calls regarding EnerTrek software updates. Some interview respondents noted that it may be useful to hold introductory meetings or monthly calls between the utilities and local agencies so that all parties may familiarize themselves with each other and develop a more collaborative working relationship. These interviewees explained that with the recent transition to a smaller group of agency providers, participants in some utility service territories will now be served by different agency organizations. Additionally, with a smaller number of entities working to implement the program, it may be more feasible to develop and mutually agree on promotional or general implementation strategies.

**Roles and Responsibilities:** All interview respondents acknowledged that overall communication among parties has been fairly infrequent, and that it has been difficult to coordinate tasks or arrive at mutual understandings regarding program objectives and strategies. One utility staff member noted that it would be useful to have an organizational chart showing the relationship among all AWP entities, as well as the roles, responsibilities, and contact information of representatives at each agency and utility. This interviewee explained that this information is crucial for moving forward as a cooperative group.

## 3.7 Community Action Agency Interviews

The Evaluators conducted interviews with community action agencies who were selected to continue providing weatherization services through the AWP. These interviews were designed to revisit topics from the 2012 process evaluation, as well as to identify any changes in program operation or delivery. The Evaluators were provided with a list of contact information for the six remaining weatherization service providers and were able to contact and conduct interviews with four of these organizations. This section highlights key findings from these interviews.

### 3.7.1 Service Interruption

Agency staff reported that the combination of uncertainty regarding federal funding, and the complexities of transitioning the WAP from the Department of Human Services to the Arkansas Energy Office resulted in service interruptions for nearly all of the weatherization providers. Agency staff explained that there had been a lack of communication from the DOE regarding expected funding for 2013. As the agencies typically plan their activity levels based on WAP funding, they had been hesitant to hire contractor staff and begin providing weatherization services. Additionally, although the nine agencies that were not chosen as future weatherization services providers were

able to continue implementation during the beginning of the year, several of these agencies ceased weatherization services early.

### 3.7.2 Transitional Effects

**WAP Administration:** For the most part, agency staff reported that the WAP transition to the AEO has been beneficial, and that they expect the AEO to implement some positive changes to statewide weatherization. For example, one agency staff member reported that the AEO is more focused on energy efficiency and savings, and that this is expected to lead to a more accurate and comprehensive energy audit tool. Additionally, one agency staff member reported that the AEO has raised the standards for providing weatherization services, which is expected to increase safety levels and improve accuracy within data collection and reporting.

**Agency Coverage:** One interviewed agency director noted that the transition has actually resulted in more complete coverage of the state, as some regions were previously represented by agencies that were not actively providing weatherization. Agency staff stated that the expanded service areas have been manageable, and that they have established auxiliary facilities in order to reduce distance issues.

### 3.7.1 Funding Issues

**Absence of ARRA:** When asked about funding levels, agency staff stated that the absence of American Recovery and Reinvestment Act (ARRA) funding has significantly reduced participation potential, for both the WAP and the AWP. Agency staff explained that the ARRA funding had allowed the agencies to hire more implementation crews and that the lack of ARRA funding has substantially reduced their resources and implementation potential.

**DOE Reliance:** Agency staff members noted that while the AWP utility funding is beneficial and available, the agencies' weatherization activity is heavily dependent on the status and level of federal funding. Several agency staff members noted that although total DOE funding is expected to decrease, the reduction in service providers will likely result in more funding per agency.

**Participant Recruiting:** Several agency staff members noted that they do not focus on recruiting non-WAP participants because those customers are typically much more difficult to find. One agency noted that they only use AWP funds when they are coupled with WAP funds, because that is the most efficient use of their resources.

### 3.7.1 Communication with Utilities

Interviewed agency staff confirmed that communications with the utilities have been fairly limited and infrequent. Another agency respondent explained that while there had been meetings between the utilities and CADC, there had not been much interaction between each agency and its respective utilities. This interviewee noted that it may be

useful to meet with the utilities in order to make efforts to collaborate and reach a mutual understanding about how to approach program operation and delivery.

### 3.7.1 Data Collection and Reporting

**AWP Data Collection Requirements:** Agency staff members reported that they have received modified data collection requirements for the AWP, and that they have already implemented these changes. This includes collecting exact inches of pipe insulation and recording the square footage of windows. One agency staff member stated that their contractors typically collect all of this information, and that it would be very easy to comply with any further data requests.

**AEO Data Collection Requirements:** Agency staff reported that the WAP transition to the AEO has required the agencies to modify their data collection forms. For example, the data collection forms now indicate the temperature settings of water heaters and collect exact SEER ratings rather than ranges for air conditioner systems.

**Database Issues:** When asked about data reporting, agency staff noted that the change in data collection inputs had caused some issues within the EnerTrek software. Specifically, it had been challenging to ensure that the data were being interpreted correctly, and that no inputs were being lost. Agency staff reported that these issues had for the most part been resolved, but that it had taken a considerable amount of troubleshooting before the database could be finalized.

## 3.8 Post-Implementation Verification Review

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As per the February 8, 2012 Supplemental Guidance Regarding Evaluation Strategies memorandum, programs are assessed for their internal quality assurance and quality control procedures conducted by program operations staff. The goals of this QA/QC assessment include:

- 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.



The Evaluators assessed these factors during the 2012 program evaluation, and provided recommendations as necessary. Overall, the verification efforts were found to be sufficient, with few issues identified. Other than minor data collection modifications such as additional measure inputs, the verification methods within the AWP have not been notably modified during 2013. This section provides a brief overview of the existing verification procedures, for reference.

### **3.8.1 Verification Overview**

- Community action agency staff members conduct verification visits continually throughout the program year as projects are completed. Additionally, CADC staff visit the agencies in order to review documentation and visit a sample of participant homes which are randomly selected.
- 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.
- The continued introduction of new TRM protocols has required the agencies to conduct additional measurement and verification procedures in order to satisfy the stipulated data requirements, such as exact pipe insulation inches and the square footage of windows. Several agency directors reported that the continued introduction of new TRM requirements has been fairly straightforward without resulting in issues.
- Agency representatives reported that few errors or missing measures had been identified throughout the course of the verification visits during 2013. Any errors were corrected prior to final data reporting and savings finalization.

### **3.8.2 Overall Review Findings**

As the verification efforts have been maintained through 2013, the Evaluators conclude that the Arkansas Weatherization Program currently has sufficient internal verification procedures to provide accurate and complete implementation data. As with prior years, the current procedures involve conducting post-implementation verification on all participant homes in order 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.

As previously noted, it is crucial that the community action agencies and their subcontractors collect all data required by the applicable TRM. Tracking data reviewed for the 2013 year suggests that some minor inputs are not currently being collected. Additionally, each agency should submit all collected data to CADC, whether it is currently required for TRM verification or it is supplemental. This is best suited to an electronic format, perhaps in the form of a shared database entry system for all

agencies. Supplementary implementation data such as specific measures implemented for air infiltration work, for example, may be beneficial during the ex-post verification process.

### 3.9 Tracking Database Review

Frontier Associates develops and maintains EnerTrek, a software tool that is used to store participant data and to calculate measure level savings based on collected inputs and TRM formulas. EnerTrek 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 received periodic tracking data updates as well as final tracking exports. These tracking files were evaluated for overall organization and content, particularly in order to identify any changes that had been made since the 2012 evaluation.

According per protocol A of the TRM V3.0, 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 3-8 below summarizes the goals and activities of the Database Review of the Arkansas Weatherization Program.

*Table 3-8 Database Review Goals & Activities*

<i>Category</i>	<i>Activity</i>
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	Cost summaries are recorded and separately reviewed by the utilities, although the AWP data exports do contain measure costs.

<i>Category</i>	<i>Activity</i>
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.

### 3.9.1 Customer, Premise, and Vendor Information

Each of these factors was assessed individually based on the guidelines stated in the TRM V3.0. Overall, the Evaluators conclude the following regarding tracking data completeness:

- The tracking data contained names and addresses for all participants, and contained contact information for all but one participant. All participants were listed with a Job ID number. Additional participant information present in the tracking data included gas and electric utility provider designations and utility account numbers.
- All participant records included the name of the agency that implemented the weatherization services, and all records included the date of measure installation. Additionally, all records included the date that that energy audit was conducted.
- Premise characteristics such as home heating type, cooling type, construction date, baseline measurements, and attic square footage were present for all participants where necessary.

Section 3.9.2 includes specific findings related to measure-level tracking data.

As mentioned in the 2012 evaluation, the tracking data did not specifically include information related to program marketing and outreach. The Evaluators confirmed that the agencies have continued to administer participant surveys to program participants, and that these surveys collect participant satisfaction and program feedback. ACAA tracks the results of these surveys separately.

### 3.9.2 Energy Savings Calculation Data

As with the prior program year, 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:

- Water Heater Replacement
  - The tracking data did not present the energy factor (EF) of the energy efficient equipment, which is a necessary input in TRM V3.0 for savings calculation.

- Vented Space Heater
  - The tracking data did not present the square footage or age of the replaced vented space heater, which is are necessary inputs in TRM V3.0 for savings calculation.

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.

Additionally, some of the calculations found within the tracking data resulted in inaccurate ex ante savings estimates. The most significant case of this involved air infiltration and insulation calculations that were based on a different heating and cooling type than what was recorded for the specific home within the tracking data. Further details regarding this issue, and other database calculation discrepancies, can be found within Section 2.5 of Chapter 2.

### 3.9.3 Tracking Data Recommendations

While the current version of the tracking database contains adequate calculations and inputs for the majority of measures, the processes of uploading data to the database and updating database structure have both been fairly inefficient. Thus far, it appears that the current arrangement of attempting to periodically update EnerTrek and align NEAT and MHEA measures and calculations with TRM requirements has been costly and time-consuming. In order to fully comply with TRM V3.0 and any future TRM updates, EnerTrek will have to be flexible enough to receive updates without disrupting the data input process or delaying savings reporting. This will likely require substantial improvements in staff coordination and potentially significant changes to how the software is maintained. Without approval of additional budgets to implement substantial changes, database modifications will likely be limited to minor improvements that focus on the highest impact measures.

Following this database review, the following recommendations should be considered:

- Agencies mentioned that their contractors typically collect more data than is required for AWP reporting purposes. Including all collected data in an electronic format, potentially separate from the savings tracking database, may be useful for measure verification purposes. This may include the presence of window air conditioner units, in-progress construction work, or whether the home configuration required any atypical methods to be performed during the contractor blower door test.
- The EnerTrek software should be updated to include the inputs noted above in Section 3.9.2 in order to comply with TRM 3.0 calculation requirements.
- As noted above, ensure that the weather zone is designated within the tracking data for each participant record.

### 3.10 Comprehensiveness Factors

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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;*
- **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;*
- **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;*
- **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*
- **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)*
- **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;*
- **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.*

This section reviews the Arkansas Weatherization Program in relation to each factor, but does not provide a portfolio-wide perspective. The AWP is one component of the larger utility energy efficiency program portfolios, and a broader perspective is necessary in order to determine how well it is serving its intended role in those groups of programs. Utility annual reports and portfolio evaluations may present the AWP within the context of these broader energy efficiency portfolios.

- **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;*

### ○ **Assessment of Education**

The AWP sufficiently implements educational efforts towards its prospective participants and other customers. Appendix B provides examples of the educational messages and materials used by the utilities and community action agencies for this purpose. This includes:

- Providing educational materials (energy audit, brochures, demonstrations)
- Providing outreach through multiple channels (news releases, in-person, direct mail, informational flyers, website)
- Providing education targeted to specific market barriers (emphasizing increased comfort and safety levels as a benefit of energy efficiency)

The AWP could potentially improve the following component:

- Providing coordinated education from multiple entities. Each agency and some utilities provide this, but based on interviews with agency and utility staff, the coordination could be improved. For example, seeking best practices from agency to agency may lead to a unified and effective educational approach.

### ○ **Assessment of Training**

The majority of active agencies have continued to participate in multiple training courses throughout the year. Nearly all of these training courses award certifications and each attendee logged between 35 and 237 training hours on average.<sup>7</sup> These courses maintain contractor skill levels and ensure that agency services comply with up-to-date audit and installation requirements.

### ○ **Marketing and Outreach**

The marketing methods that have been used during 2013 meet the following criteria:<sup>8</sup>

- Address specific barriers (emphasizing association with utility providers, emphasizing lack of income requirement)
- Performed through several channels (in-person, websites, direct mail, word-of-mouth)

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<sup>7</sup> These values are based on information received from ACAA staff regarding the types and attendance level of training courses offered to community action agencies. Further training information may be found in Section 5.1 (Training) of the Arkansas Weatherization Program annual report: (<http://www.apscservices.info/EEInfo/EEReports/AWP%202012.pdf>)

<sup>8</sup> Specific examples of marketing and outreach materials used for the AWP can be found in Appendix B.

The AWP could potentially improve the following component:

- Promoted by trade allies (agencies and their contractors). Program marketing activity has generally been negatively correlated with the increase in WAP waiting list participants. Agencies could be more active in promoting the program to non-WAP participants, although these efforts appear to have increased during the 2013 program year.<sup>9</sup>
- **Factor 2: Budgetary, Management, and Program Delivery Resources**

The funding provided by AWP utility sponsors is sufficient based on the program's objective of leveraging the WAP.<sup>10</sup> However, utility and ACAA staff noted that issues within the WAP, including the participation waiting list and reduced agency staffing due to funding uncertainties, have resulted in fewer resources than initially expected. Agencies report that their staffing is highly dependent on WAP funding, meaning that it will be very difficult to meet program goals if there continue to be issues within the federal component.

These issues cannot specifically be attributed to the design of the AWP, as they are related to external factors that cannot easily be addressed within the program's structure. However, adequate budgetary and staffing levels may not be achieved unless the agencies have access to additional funding. Thus far, it is unclear whether the transition of the WAP to the Arkansas Energy Office will alleviate some of these issues. An increased level of funding per home from the utilities could mitigate issues with reliance on WAP funding for the AWP. This issue should be addressed through the new Weatherization Collaborative.

**Factor 3: Addressing Major End-Uses**

The AWP offers a wide range of measures, which are chosen based on cost-effectiveness testing through NEAT and MHEA. The list of eligible program measures covers all major end-uses for targeted customer homes, including:

- HVAC systems;
- Equipment tune-ups;
- Hot water measures;
- Appliances (refrigerators);
- Safety measures (smoke detectors);

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<sup>9</sup> Based on program tracking data, a higher percentage (~10%) of participants were non-WAP customers as compared to prior years where less than 5% of participants were non-WAP customers.

<sup>10</sup> Program planning documentation such as ACAA Docket no. 07-079-TF and the Arkansas Weatherization Program Annual Reports provide estimated participation levels based on available WAP and AWP budgets: (<http://www.apscservices.info/EEInfo/EEReports/AWP%202012.pdf>). Appendix C of this report provides summary tables of planned vs. achieved program costs and savings goals.

- Lighting; and
- Building envelope measures.<sup>11</sup>

The “whole house” approach to participant home improvements is conducive to providing a comprehensive set of measures in each home. The eligible measure list may be modified if additional energy efficiency measures become relevant to the residential sector.

- **Factor 4: *Comprehensively Addressing Customer Needs***

The AWP comprehensively addresses the major needs of most of its participants. The program primarily provides services to customers who likely would not otherwise make major efficiency improvements to their homes, and whose homes are in substantial need of energy efficiency improvements and repairs. Specifically, the program provides the following benefits:

- Technical assistance through in-home audits;
- Energy and monthly bill savings through measure installation; and
- Increased comfort and/or safety for participants.

Participants who provide their own private co-pay for the audit and energy efficiency measures may choose to receive a less comprehensive set of services as they are allowed to select individual measures. These participants are encouraged to install the full set of recommended items, but comprehensiveness within measure installation is not required by the program in these cases.

- **Factor 5: *Targeting Market Sectors & Leveraging Opportunities***

The AWP focuses on a specific market of utility residential customers whose homes are severely energy inefficient. This program is intended to amplify the benefits of the statewide Weatherization Assistance Program (WAP) in order to provide additional services to customers who have substantial weatherization needs. Thus, the program leverages WAP resources and is delivered through the same channels as the WAP. The AWP also involves utility partnerships and is intended to provide cross-fuel coordination rather than focusing only on gas or electric savings in isolation.

- **Factor 6: *Cost-Effectiveness of Energy Efficiency***

The program is designed to cost-effectively generate net savings and meet the stated annual program goals. However, the program has been unable to meet the annual goals thus far. Additionally, cost-effectiveness has varied widely

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<sup>11</sup> A complete list of eligible AWP measures can be found in program filing and planning documentation such as Attachment A, (AWP Modified Program Design and Description), of ACAA Docket no. 07-079-TF.



among utilities, with TRC scores ranging from .31 to 5.01.<sup>12</sup> The AWP has successfully met industry standards for net-to-gross levels, as the Evaluators have determined that it calls for a net-to-gross ratio of 1. However, in terms of cost-effectiveness and savings goals, the AWP has not performed sufficiently.

- **Factor 7: Adequacy of EM&V Procedures**

The AWP was reviewed for EM&V procedures in the following areas:

- QA/QC and EM&V procedures conducted by utility staff;
- QA/QC and EM&V procedures conducted by installation contractor staff; and
- QA/QC and EM&V procedures conducted by the Evaluators.

The onsite QA/QC procedures currently conducted by utility staff and agency staff are adequate. These procedures monitor implementation quality, ensure the accuracy of ex ante records, and are able to resolve onsite issues soon after they occur. During onsite field verification visits during 2012, the Evaluators found that the reported installation data was fairly accurate and matched actual observed conditions.

Although there have been various issues regarding data consistency, calculation accuracy, and data cleaning, the current version of the tracking database within EnerTrek contains nearly all necessary information to comply with existing TRM requirements.<sup>13</sup> Frontier Associates, the EnerTrek provider, has made efforts to update the system as needed, and although this has resulted in delays and access issues, the system appears to be functional at this point. There continue to be some improvements that could be made to the tracking system, as identified within this report. Additionally, in the future it will be necessary to ensure that the data are accessible and accurate earlier in the program year. This may require including additional information, such as measure counts, within the periodic updates that are provided to utilities throughout the year.

These results indicate that the Arkansas Weatherization Program partially meets the comprehensiveness criteria outlined above. There are issues within multiple areas, and further changes will likely be necessary both within the program's operational structure and within the external market, before these criteria can be fully met. As previously noted, utility annual reports and other portfolio-level assessments may provide a more comprehensive view of how the AWP fits into the larger context of the sponsoring utilities' energy efficiency program portfolios.

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<sup>12</sup> Further information regarding program cost-effectiveness can be found in utility-specific cost-benefit spreadsheets on the Arkansas Public Service Commission (APSC) website: <http://www.apscservices.info/eeAnnualReports.aspx>

<sup>13</sup> See Section 2.5 of this report for detailed information regarding the program tracking data review.

## 4. Conclusions & Recommendations

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After reviewing the Arkansas Weatherization Program for 2013, the Evaluators highlight the following conclusions:

**WAP Reliance Issues:** The community action agencies and ACAA are working in the context of their other community programs and the statewide Weatherization Assistance Program (WAP), which is directly tied to federal funding. Ideally, this arrangement would use utility funds to efficiently leverage federal funding and substantially increase the number of weatherization projects that the agencies are able to perform. However, it appears that the AWP's inherent link to the WAP has resulted in performance issues due to federal funding reductions and statewide program reorganization.

As noted previously, based on the Commission's Order in docket no. 13-002-U, all of the utility energy efficiency programs, including the AWP, will be revised through the Collaborative process outlined in the Order. In addition, the transfer of the WAP to the Arkansas Energy Office may result in beneficial modifications that alleviate some of these issues.

**Beneficial Agency Reduction Effects:** Nearly all interview respondents reported that the reduction in weatherization agencies has been a beneficial modification. As the remaining agencies appear to be actively recruiting participants and implementing services, the weatherization network may become more engaged as a whole as compared to previous years. Additionally, if the per-agency funding levels are increased, this will likely allow the agencies to weatherize additional homes and improve savings performance.

The agencies appear to be adequately managing the increased distance between service providers, and all utility service territories are represented by at least one of the six agencies. Although the majority of the remaining agencies report that they do not prioritize AWP funds over WAP funds, two agencies report that they are actively seeking non-WAP participants and that they expect to recruit a substantial number in the coming year.

**Program Coordination Complexity:** Interviewed utility staff reiterated their main concerns from the prior program year, and generally reported that the program has continued to struggle with meeting participation goals, facilitating efficient communication, and ensuring prompt, accurate data reporting. The AWP operational structure is composed of many different entities: Six active community action agencies and their contractors, the Arkansas Community Action Agency Association (ACAAA), and seven utility providers. Each utility is operating within the context of its other energy savings programs, with specific energy savings goals and cost effectiveness targets.

The program incorporates many organizations that must communicate clearly and operate cooperatively in order for the program to avoid reporting delays and

inconsistent program delivery. These factors place the AWP in a somewhat fragile operational framework, where delays and performance issues have been difficult to avoid.

**Data Revision and Transfer Issues:** One of the most commonly mentioned issues by program staff has been the consistent delays in the data transfer and reporting process. The program is structured such that CADC collects the completed weatherization data from each agency, and then delivers it to Frontier Associates, the EnerTrek software provider. Frontier then enters the data into the EnerTrek software tool and then makes the data available to the program utilities. Ideally, this would be a one-way process, but Frontier Associates has needed to obtain additional data, data corrections, or data revisions from CADC for each batch of data. These tasks and their associated turnaround times have added to the lead time between job completion and final data reporting. This situation is reportedly being addressed through clarifying discussions between CADC and Frontier, although thus far it is unclear whether all issues will be quickly resolved.

**Program Interruption:** Although the AWP has not met participation or savings goals in prior years, the additional decrease in participation levels during the 2013 program year may be mainly attributable to the fact that the program paused implementation activity in April due to funding issues. These issues were partially related to the initiation of program restructuring on a statewide level, and the overall fact that the timing and level of DOE funding for the WAP was uncertain. The end result has left the AWP with fewer participants than past years, and the program has not met the savings goals for any of the participating utilities.

The AWP has operated within a transitional phase of the WAP, and program performance difficulties may have been expected during this time. However, it appears that the performance issues noted in prior years have persisted during this period. This issue may be avoided if funding levels are maintained and delivered as expected during the 2014 program year.

**Potential for Collaborative Communication:** Utility and agency staff noted that it may be useful to hold introductory meetings between the utilities and local agencies so that all parties may familiarize themselves with each other and develop a more collaborative working relationship. With the recent transition to a smaller group of agency providers, participants in some utility service territories will now be served by different agency organizations. Additionally, with a smaller number of entities working to implement the program, it may be more feasible to develop and mutually agree on promotional or general implementation strategies.

A collaborative relationship among all utilities and agency implementers has been a goal and an integral component of the AWP since its inception. In 2013, WAP transition and funding issues, as well as uncertainty due to the Commission's requirement to develop and submit for approval collaborative procedural guidelines, led to fewer AWP

Collaborative meetings. Such meetings had been a regular part of AWP implementation in prior years. ACAA staff reported that collaborative discussions have been a key aspect of AWP design since its inception, and that collaborative meetings had been common in years prior to 2013. The 2013 WAP transition and funding issues, as well as uncertainty regarding the future of weatherization in Arkansas, likely created additional barriers to this type of collaboration. While future discussions may reveal opportunities to improve marketing efforts towards non-WAP participants or other aspects of program performance, the actual result may simply serve to acknowledge the new utility-agency partnerships that have resulted from the weatherization agency transition.

**Tracking Data Limitations:** While the current version of the tracking database contains adequate calculations and inputs for the majority of measures, the processes of uploading data to the database and updating database structure have both been fairly inefficient. Thus far, it appears that the current arrangement of attempting to periodically update EnerTrek and align NEAT and MHEA measures and calculations with TRM requirements has been costly and time-consuming. In addition to administrative costs, the time and budget required to retroactively update the database can affect program cost-effectiveness and create barriers to program performance.

In order to fully comply with TRM V3.0 and any future TRM updates, EnerTrek will have to be flexible enough to receive updates without disrupting the data input process or delaying savings reporting. This will likely require substantial improvements in staff coordination and potentially significant changes to how the software is maintained. Without approval of additional budgets to implement substantial changes, database modifications will likely be limited to minor improvements that focus on the highest impact measures.

Based on these conclusions and other findings, the Evaluators make the following recommendations:

**Resolve Data Transfer Issues:** If there are any remaining uncertainties between CADC and Frontier regarding the format, content, or interpretation of data fields or inputs, these should be reconciled prior to the data transfer process in upcoming years. Resolving these uncertainties should reduce the number of data correction or clarification requests and increase the efficiency of the data reporting process. Ideally, it will not be necessary to reprogram the EnerTrek software or revise the structure of CADC data batches during the program year.

**Maintain Electronic Records:** It would be beneficial for each agency to collect and maintain accessible electronic records of any data that may be requested by Frontier, or that CADC aggregate the data from each agency and store it in a centrally accessible way. Situations where there are implementation, audit, or verification data that only exist in hardcopy format at the end of the program year should be avoided. Additionally it may be beneficial for CADC to eventually develop a shared database that is accessible

to all agencies for the purposes of submitting implementation data. This would ensure that all relevant data are stored in a single location, and would likely reduce the turnaround time for data requests.

**Utility-Agency Communication:** Although the AWP is intended to be fully implemented and delivered by the community action agencies and ACAAAA, regular communication and information accessibility are key factors to facilitate a cooperative working relationship. While CADC consolidates agency-collected data and holds a key role as a lead agency, it may not have the bandwidth to serve as the sole contact point between each agency and utility for all purposes. Thus, the Evaluators provide two recommendations that may improve communications among program entities:

- **Collaboration Meeting:** It may be useful for the utilities and the agencies within their respective service territories to hold an introductory meeting in order to recognize the newly established agency-utility connections that have resulted from the reduction in weatherization providers. This may facilitate a mutually beneficial working relationship, or at a minimum allow territory-specific questions to be answered more efficiently.
- **Updated Organizational Chart:** Along with the reduction in weatherization service providers and the broader changes in statewide weatherization, some program staff has reported that they are not currently aware of the roles and responsibilities of each entity. As recommended by utility staff, CADC and the utilities should consider developing an organizational chart showing the relationship among all AWP entities, as well as the roles, responsibilities, and contact information of representatives at each agency and utility. This is related to the overall coordination of the program, and explicitly identifying key roles and connections between organizations would likely facilitate effective working relationships.

**Incrementally Increase Compliance with TRM Requirements:** As with the prior program year, 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:

- Water Heater Replacement
  - The tracking data did not present the energy factor (EF) of the energy efficient equipment, which is a necessary input in TRM V3.0 for savings calculation.
- Vented Space Heater
  - The tracking data did not present the square footage or age of the replaced vented space heater, which are necessary inputs in TRM V3.0 for savings calculation.

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. Additionally, TRM V3.0 contains additional requirements that may require further updates to the EnerTrek software tool. The utilities and CADC should ensure that all possible updates to this database are included prior to the end of the 2014 program year.

**Increase Level of Detail in Utility Updates:** Utility staff reported that the updates they receive from CADC regarding program performance are mainly limited to participant counts and overall costs. Utility staff are not aware which customers participated in the program or which measures were installed until the end of the program year. CADC should increase the level of detail within these reports and include participant names, addresses, measure counts, and other information if possible. This will allow the utilities to identify participants, to understand more about how the program is performing, and to potentially estimate preliminary savings.

**Adjust EnerTrek Algorithms and Conduct Thorough Quality Assurance:** Frontier should conduct more thorough quality assurance procedures when verifying the accuracy of EnerTrek savings algorithms. The largest contributors to low realization rates for this program year were related to simple errors within EnerTrek calculations. Although the heating system type was provided within program tracking data, EnerTrek did not reliably incorporate the correct heating type into savings calculations for attic insulation, air infiltration, and window replacement. This specific issue, and any other algorithm errors, should be addressed as soon as possible.

Another issue is that some insulation measures were installed without meeting minimum TRM R-value requirements. This is related to both the measure installation and savings calculation program phases, as agency contractors should avoid implementing measures that will not qualify for savings under the TRM. Additionally, if these measures are implemented, the EnerTrek system should be adjusted to eliminate savings for measures that do not meet minimum requirements.

**Conduct Further Research Assessing Air Infiltration and Insulation Estimates:** The ability to isolate specific measure effects and behavioral variables with regression analyses of the AWP may be somewhat restricted by the limited participant population size and high presence of measure crossover, in that the majority of residences received both air infiltration and attic insulation measures. However, a billing analysis involving a larger participant population may allow for quantitative isolation of individual behavioral variables and measure types. This may provide further evidence that necessitates revisions to the TRM with regard to the reasonableness of air infiltration and insulation measure savings calculations. These are the two highest-impact gas savings measures that are implemented through the AWP. The Evaluators recommend conducting additional research in the form of billing analysis and reviews of industry

standards for TRM estimates of weatherization savings prior to implementing any specific changes to existing TRM formulas.

*Table 4-1 Recommendations from 2013 Program Year Evaluation*

Issue	Consequences	Recommendation
There have been delays in database finalization due to uncertainties in data interpretation and requirements between CADC and Frontier.	<p>Reduces accessibility to database for utilities</p> <p>Delays savings reporting and may cause inaccurate reports</p>	Resolve issues early in 2014 program year, including data interpretation issues, so that multiple data and database revisions are not necessary.
Some data are not available due to being only in hardcopy form or decentralized from the CADC.	<p>Potential lost data</p> <p>Potential delays in data transfer if additional data are needed</p>	Agencies should maintain electronic records of all collected audit, implementation, and verification data.
Communication among utilities and agencies is limited.	Causes difficulties in utility-agency coordination	<p>Recommendation 1: Hold introductory meetings between utilities and the remaining six agencies in order to develop familiarity and identify key contact persons, establish communication lines</p> <p>Recommendation 2: Develop an organizational chart displaying roles, responsibilities, and contact persons for each entity (utilities, agencies, ACAA, etc.)</p>
Some data required for TRM 2.0 and 3.0 do not appear to have been collected.	<p>Creates difficulties in savings verification</p> <p>May result in inaccurate ex ante savings estimates if insufficient inputs are used</p>	Ensure that the data collection forms and database are compliant with relevant TRM requirements to the extent possible based on budget constraints.



<p>Utilities are not aware of project details until end of year.</p>	<p>Limits utility ability to plan for annual reporting</p> <p>Limits utility awareness of program performance</p>	<p>Include more details in the periodic reports that are sent to utilities, including measure counts/descriptions, customer names, etc.</p>
<p>EnerTrek contains erroneous assumptions for individual measure algorithms (air infiltration, attic insulation, window replacement).</p>	<p>Results in inaccurate ex ante savings (in this case savings were highly overestimated)</p> <p>Decreases program realization rates</p>	<p>Frontier should perform thorough quality assurance practices and verify that EnerTrek calculations comply with TRM algorithms.</p>
<p>TRM estimates for Therms savings substantially exceed regression analysis results.</p>	<p>TRM formulas may be inaccurately estimating Therms savings.</p>	<p>Conduct further research into TRM industry standards for weatherization, or perform a more in-depth billing analysis for a larger population, prior to implementing TRM changes for air infiltration or insulation.</p>

## 5. Appendix A: Supplemental Survey for Billing Analysis

### Arkansas Weatherization Program - Supplemental Survey for Billing Analysis

Page One

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 or last year.

We are conducting a study to help evaluate the energy savings from the program, and would like to ask you some questions about how you use energy in your home as well as any changes that may have happened since the work was completed. Would you be the best person to speak with regarding these topics?

(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) The interview will take approximately 10 minutes. May I proceed with the survey? Your responses will remain completely confidential.

1. What temperature do you normally set your thermostat to during the summer? \*

2. What temperature do you normally set your thermostat to during the winter?

3. Have you changed your thermostat settings since receiving the weatherization work on your home?

- Yes
- No
- Don't know

What did you used to set your thermostat to during the summer? (If participant does not know, ask "Did you turn the thermostat up or down after the work was done?" and "Do you know by about how much you changed the temperature of the thermostat?")

What did you used to set your thermostat to during the winter? (If participant does not know, ask "Did you turn the thermostat up or down after the work was done?" and "Do you know by about how much you changed the temperature of the thermostat?")

4. Has your comfort level improved in your home since the work was completed?

- Yes
- No
- Don't know

5. Have you added any major appliances to your home since the work was completed?

- Yes
- No
- Don't know

What major appliances have you added to your home since the work was completed? (if necessary, prompt with "Such as a television, computer, air purifier, air conditioner, etc.)

6. Were any of your appliances non-operational or broken before you received the work through the AWP?

- Yes
- No
- Don't know

Which of your appliances were non-operational or broken prior to having the work completed through the AWP?

Which, if any, of the appliances you mentioned are now currently operating correctly?

7. Do any of the residents of your home spend significantly more time at home than they did before the work was completed?

- Yes
- No
- Don't know

8. Have you installed any additional energy efficient items other than what was installed through the weatherization program?

- Yes
- No
- Don't know

What energy efficient items have you installed since receiving the weatherization work? (If necessary, prompt with "Such as insulation, door sweeps, lighting, etc.")

9. What temperature is your water heater currently set to?

10. Have you changed your water heater temperature since participating in the program?

- Yes
- No
- Don't know

What was your old water heater temperature setting, before the weatherization work was completed?

11. Has your use of hot water changed since the work was done?

- Yes
- No
- Don't know

How has your use of hot water changed since the work was done?

- We now use more hot water than before
- We now use less hot water than before
- We use the same amount of hot water, just at different times
- Actually, we haven't changed how we use hot water
- Don't know
- Other

12. How many people currently live in your home?

- 0 (Part-time home, vacation home, etc.)
- 1
- 2
- 3
- 4
- 5
- Don't know
- Other

13. Has the number of people living in your home changed in the past 2 years?

- Yes
- No
- Don't know

14. Has any other work been performed on your home since you received weatherization work through this program? (If necessary, prompt with "Such as structural repairs, plumbing repairs, etc.")

- Yes
- No
- Don't know

What work has been performed on your home since you received weatherization work through the Arkansas Weatherization Program? (If necessary, prompt with "Such as structural repairs, plumbing repairs, etc.")

**Thank You!**

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Thank you for taking our survey. Your response is very important to us.



## 6. Appendix B: Sample AWP Marketing Materials

The image displays two pieces of marketing material for the Arkansas Weatherization Program. The top item is a flyer with a blue background and a white house in a snowy landscape. The text on the flyer reads: "Apply now for utility funding to help weatherize your home!" and "ARKANSAS WEATHERIZATION PROGRAM". The bottom item is a brochure with a light green background. It features the text: "Great news: Funds are available to help you cut your utility bills." and "The Arkansas Weatherization Program (AWP) is approved by the Arkansas Public Service Commission and is offered to owners of severely energy inefficient homes by Arkansas' seven investor-owned energy utilities. Service will be delivered on a first-come-first-served basis and will include detailed energy audits and installation of US Dept. of Energy approved weatherization measures. Program costs will be shared by customers and participating utilities." Below this text are three small images: a person in a blue shirt holding a spray can, a hand holding a compact fluorescent light bulb, and a person in a green shirt wearing a white mask.

**ARKANSAS WEATHERIZATION PROGRAM**  
For more information visit [cedc.com](http://cedc.com)

Receive up to 50% of home weatherization improvements for **free**, if you are a customer of any of the following utilities:

Arkansas Western Gas  
Arkansas Oklahoma Gas Corporation  
CenterPoint Energy Arkansas Gas  
Empire District Electric  
Entergy Arkansas  
Oklahoma Gas & Electric  
Southwestern Electric Power Company

**Apply now for utility funding to help weatherize your home!**

**ARKANSAS WEATHERIZATION PROGRAM**

**Great news: Funds are available to help you cut your utility bills.**

The Arkansas Weatherization Program (AWP) is approved by the Arkansas Public Service Commission and is offered to owners of severely energy inefficient homes by Arkansas' seven investor-owned energy utilities. Service will be delivered on a first-come-first-served basis and will include detailed energy audits and installation of US Dept. of Energy approved weatherization measures. Program costs will be shared by customers and participating utilities.

*\*Those eligible for the Low-Income Weatherization Assistance Program may qualify for federal funds to pay their share of program costs.*



**Who is Eligible?**

Owners of severely energy-inefficient homes may qualify using the following selection criteria:

- Residential heating or cooling customer of at least one AWP Utility
- Site-constructed or mobile homes built before 1997
- Occupied by the current owner for at least one year
- Homes built prior to 1985 must meet three of the following seven criteria, and homes built from 1985 to 1996 must meet four of the following seven criteria:
  - Attic insulation equal to or less than R-12
  - Wall insulation equal to R-0
  - Floor insulation equal to R-0
  - Single pane windows with no storm windows attached
  - Heating system less than 70% efficient
  - Cooling system with SEER of 8 or less
  - Air infiltration problems identified through: a) visual inspection of duct-work, walls, floors, ceilings, doors, and windows; or b) pre-blower door test

**What Measures are Approved for Funds?**

The following measures are approved for the program:

- Installation of attics, walls, floors, foundations, sillboxes and/or ductwork
- Duct sealing/repair
- Reduction of air infiltration (caulk, repair and/or replace leaking walls, floors, ceilings, roofs, doors and windows)
- Storm windows
- Low flow shower heads
- Furnace tune-up or replacements
- Air conditioner tune-up or replacements
- Heat pump tune-up or replacements
- Refrigerator replacements
- Lighting retrofits
- Water heater tank insulation, pipe insulation or water heater replacements
- Smart thermostats

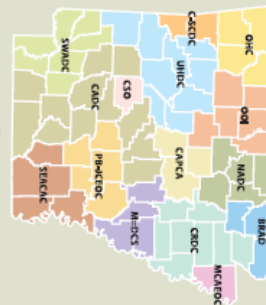
**How are Utility Funds Allocated?**

- Energy audits costing \$456
- Weatherization measures costing up to \$2,964

AWP Electric Utility	AWP Gas Utility	Primary Space Heat is Electric	% Utility Funds	Energy Audit Utility Funds	Weatherization Maximum Utility Funds
X	X		50%	\$228	\$1,482
X		X	50%	\$228	\$1,482
X			25%	\$114	\$741
	X		25%	\$114	\$741



**Arkansas Weatherization Program Service Providers:**  
The following Agencies provide weatherization services in Arkansas counties. Please contact the Agency Weatherization Director for your county to apply for the program.



Map Key	Agency / Counties Served	Contact
<b>BRAD</b>	BLACK RIVER AREA DEVELOPMENT CORPORATION Day, Lawrence, Randolph	870-692-2119 Ext. 246 rdito@bradcorp.org
<b>CADC</b>	CENTRAL ARKANSAS DEVELOPMENT COUNCIL Calloway, Clark, Columbia, Dallas, Hot Springs, Lonoke, Montgomery, Ouachita, Pike, Pulaski, Saline, Union	501-315-1121 bpallme@cadc.cc
<b>CAPCA</b>	COMMUNITY ACTION PROGRAM FOR CENTRAL ARKANSAS DeWitt, Fulton, White	501-429-3891 Ext. 135 amy.byrd@capcainc.org
<b>CRDC</b>	GROWLER'S RIDGE DEVELOPMENT COUNCIL Craighead, Crittenden, Cross, Greene, Jackson, Poinsett, St. Francis, Woodruff	870-6802-7100 Ext. 120 kennygunn@crdca.com
<b>CSCDC</b>	GRAFFORD-SEBASTIAN COMMUNITY DEVELOPMENT COUNCIL Crawford, Sebastian	479-485-2303 Ext. 111 lesamlee@cscdca.org
<b>CSO</b>	COMMUNITY SERVICES OFFICE Garland	501-624-5724 jbates@csobh.org
<b>MCAECC</b>	MISSISSIPPI COUNTY ARKANSAS ECONOMIC OPPORTUNITY COMMISSION Mississippi	870-776-1054 sam.schuggs@scghbal.net
<b>MDCS</b>	MID-DELTA COMMUNITY SERVICES Lee, Monroe, Phillips, Prairie	870-295-3897 sue.gatche@mdcghbal.net
<b>NADC</b>	NORTH-CENTRAL ARKANSAS DEVELOPMENT Fulton, Izard, Sharp, Stone, Independence	870-935-7065 nadc_billj@naho.com
<b>OHC</b>	OFFICE OF HUMAN CONCERN Benton, Carroll, Madison, Washington	479-636-7301 jdutton@ohc.org
<b>OOI</b>	OZARK OPPORTUNITIES, INCORPORATED Baker, Boone, Marion, Newton, Searcy, Van Buren	870-741-2544 oo@oiid.net
<b>PE-CECC</b>	PIKE BLUFF - JEFFERSON CITY ECONOMIC OPPORTUNITIES COMMISSION Arkansas, Cleveland, Jefferson, Lincoln, Grant	870-536-0046 pjcc@peccghbal.net
<b>SEACAC</b>	SOUTHEAST ARKANSAS COMMUNITY ACTION CORPORATION Ashby, Bradford, Chicot, Desha, Drew	870-226-0668 betsy.fornest@seacac.com
<b>SWADC</b>	SOUTHWEST ARKANSAS DEVELOPMENT COUNCIL Hempstead, Little River, Miller, Lafayette, Howard, Sevier, Nevada	870-775-5204 latwillson@shlhoone.net
<b>UHDC</b>	UNIVERSAL HOUSING DEVELOPMENT CORPORATION Conway, Franklin, Johnson, Logan, Pope, Perry, Scott, Van	479-668-5201 lov@uhdc.net

## NEWS RELEASE

For Immediate Release

Energy Efficiency Weatherization Assistance Program Is Continuing, With New Provider

*Mid-Delta Community Services, Inc., in Helena-West Helena* has announced in a news release that the Weatherization Assistance Program it has operated in *Phillips, Monroe, Prairie, and Lee* counties is continuing, but with a different provider.

As part of recent changes in the program, which is now administered by the Arkansas Energy Office of the Arkansas Economic Development Commission, weatherization will be provided in the *four* counties by the *Pine Bluff-Jefferson County Economic Opportunities Commission in Pine Bluff (PB-JCEOC)*, one of six private, nonprofit community action agencies that provide the service throughout the state.

*Mid-Delta Executive Director Margaret Staub* said in the news release announcing the development that weatherization has been “a vital part of our working to help people of low income sustain themselves and achieve economic self-sufficiency, and we want residents to know that, although there have been changes, the service is still available to those eligible to receive it.”

The program, established nationally in 1976 and funded by the federal Department of Energy (DOE), provides insulation and other measures to make homes more energy efficient, safe, and healthy, reducing energy consumption and saving income. The agency may invest up to \$6,904 in a home, free of charge, to those who meet income guidelines: \$22,980 for an individual; \$31,020, a family of two; \$39,060, family of three; \$47,100, family of four; \$55,140, family of five; \$63,180, family of six; \$71,220, family of seven; and \$79,260, family of eight. (Add \$4,020 for each additional person.)

Besides the regular DOE-funded weatherization program, *Mid-Delta* also operated another that weatherized the “severely energy inefficient” homes of customers of certain utilities. The service will continue, provided by *PB-JCEOC*. It is available to those of all incomes, but those whose incomes don’t meet the guidelines for the federally funded assistance must pay for the measures they choose to have done. (*PB-JCEOC*’s partners in the program are *Entergy* and *CenterPoint Energy*.)

More information may be obtained by calling *Mid-Delta* at (870) 338-3629.

#

**Save Energy, Save Money  
By Participating in The**



**If you are a customer of one or more of these utilities:**

**Southwestern Electric Power Company**

**SourceGas Arkansas**

**Arkansas Oklahoma Gas Corporation**

**Oklahoma Gas & Electric**

**CenterPoint Energy Arkansas Gas**

**Empire District Electric**

**Entergy Arkansas**

**Your house may qualify for “whole-house” weatherization work, if it is Severely Energy Inefficient, according to program guidelines. If so, some of the costs will be covered by the participating utility!**

**For more information please contact:**

**Crawford-Sebastian Community Development Council**

**479-785-2303 ext. 110 or 111**

## 7. Appendix C: Annual Report Summary of Program Budgets and Goals

This section presents tables summarizing annual program budgets, expenses, and energy savings goals for each of the utilities funding the Arkansas Weatherization Program. These tables were extracted directly from the Arkansas Weatherization Program Annual Report for 2012<sup>14</sup>, and are included in this report for reference purposes.

The data presented in these tables represent program activity from January 2010 through December 2012. Achieved savings values shown are based on the Evaluators' prior program evaluation report results. Further detail and narrative regarding the information presented in these tables may be found in the full versions of the aforementioned report.

Program Cost - Natural Gas										
RBudget (\$)	2010			2011			2012			
	Utility	RBudget (\$)	Actual (\$)	% of Rbudget	RBudget (\$)	Actual (\$)	% of Rbudget	RBudget (\$)	Actual (\$)	% of Rbudget
	Centerpoint	230,088	367,690	160%	379,544	445,761	117%	592,480	456,479	77%
	SourceGas	40,000	39,790	99%	120,000	44,245	37%	120,000	33,293	28%
	AOG	47,122	36,651	78%	52,127	40,419	78%	58,190	22,886	39%
	Regulatory	0	0	-	0	0	-	0	0	-
	<b>Total</b>	<b>317,210</b>	<b>444,131</b>	<b>140%</b>	<b>551,671</b>	<b>530,425</b>	<b>96%</b>	<b>770,670</b>	<b>512,657</b>	<b>67%</b>

Figure C-1 AWP 2012 Annual Report: Weatherization Program Costs, Natural Gas Utilities

<sup>14</sup> Obtained from Section 3.1.3 of the Arkansas Weatherization Program Annual Report for 2012 (<http://www.apscservices.info/EEInfo/EEReports/AWP%202012.pdf>)

Net Annual Savings (Energy & Demand) - Natural Gas									
ENERGY Therms	2010			2011			2012		
	Energy Savings			Energy Savings			Energy Savings		
Program	Therms		% of Plan	Therms		% of Plan	Therms		% of Plan
	Plan	Evaluated		Plan	Evaluated		Plan	Evaluated	
Centerpoint	136,931	206,870	151%	184,030	198,734	108%	223,476	172,709	77%
SourceGas	33,807	26,756	79%	69,987	21,317	30%	51,252	9,957	19%
AOG	22,220	26,756	120%	34,210	21,728	64%	27,792	4,864	17%
<b>Total</b>	<b>192,958</b>	<b>260,382</b>	<b>135%</b>	<b>288,227</b>	<b>241,779</b>	<b>84%</b>	<b>302,520</b>	<b>187,530</b>	<b>62%</b>

DEMAND Therms	2010			2011			2012		
	Demand Savings			Demand Savings			Demand Savings		
Program	Therms		% of Plan	Therms		% of Plan	Therms		% of Plan
	Plan	Evaluated		Plan	Evaluated		Plan	Evaluated	
Centerpoint	2,035	3,229	159%	2,872	3,854	134%	4,334	3,055	70%
SourceGas	300	451	150%	1,182	316	27%	760	170	22%
AOG	222	451	203%	578	377	65%	482	104	21%
<b>Total</b>	<b>2,557</b>	<b>4,131</b>	<b>162%</b>	<b>4,632</b>	<b>4,547</b>	<b>98%</b>	<b>5,576</b>	<b>3,329</b>	<b>60%</b>

Figure C-2 AWP 2012 Annual Report: Weatherization Program Savings Goals, Natural Gas Utilities

Program Cost - Electric									
RBudget (\$)	2010			2011			2012		
	RBudget (\$)	Actual (\$)	% of RBudget	RBudget (\$)	Actual (\$)	% of RBudget	RBudget (\$)	Actual (\$)	% of RBudget
Utility									
Entergy	785,000	617,077	79%	882,185	599,921	68%	1,000,739	532,992	53%
OG&E	72,000	60,591	84%	75,701	102,736	136%	80,771	54,183	67%
SWEPCO	136,900	62,816	46%	205,300	32,158	16%	273,800	67,667	25%
Empire	4,838	2,565	53%	4,838	0	0%	4,838	4,232	87%
Regulatory	0	0	-	0	0	-	0	0	-
<b>Total</b>	<b>998,738</b>	<b>743,049</b>	<b>74%</b>	<b>1,168,024</b>	<b>734,815</b>	<b>63%</b>	<b>1,360,148</b>	<b>659,073</b>	<b>48%</b>

Figure C-3 AWP 2012 Annual Report: Weatherization Program Costs, Electric Utilities

Net Annual Savings (Energy & Demand) - Electric									
ENERGY kWh	2010			2011			2012		
	Energy Savings			Energy Savings			Energy Savings		
	kWh		% of Plan	kWh		% of Plan	kWh		% of Plan
	Plan	Evaluated		Plan	Evaluated		Plan	Evaluated	
Entergy	1,913,166	2,666,649	139%	3,204,430	1,991,412	62%	712,491	981,539	138%
OG&E	176,646	305,918	173%	328,158	442,428	135%	293,295	76,898	26%
SWEPSCO	311,376	306,073	98%	802,104	178,650	22%	4,212,682	85,310	2%
Empire	11,976	2,258	19%	4,516	0	0%	4,516	8,357	185%
<b>Total</b>	<b>2,413,164</b>	<b>3,280,898</b>	<b>136%</b>	<b>4,339,208</b>	<b>2,612,490</b>	<b>60%</b>	<b>5,222,984</b>	<b>1,152,105</b>	<b>22%</b>

DEMAND kW	2010			2011			2012		
	Demand Savings			Demand Savings			Demand Savings		
	kW		% of Plan	kW		% of Plan	kW		% of Plan
	Plan	Evaluated		Plan	Evaluated		Plan	Evaluated	
Entergy	865	751	87%	904	669	74%	239	272	114%
OG&E	66	78	118%	84	115	137%	76	12	16%
SWEPSCO	116	84	72%	220	63	29%	1,486	24	2%
Empire	5	1	20%	1	0	0%	2	2	77%
<b>Total</b>	<b>1,052</b>	<b>914</b>	<b>87%</b>	<b>1,209</b>	<b>847</b>	<b>70%</b>	<b>1,803</b>	<b>311</b>	<b>17%</b>

Figure C-4 AWP 2012 Annual Report: Weatherization Program Savings Goals, Electric Utilities

## **5.0 Attachment D**



# Evaluation of 2013 AOG/OG&E Weatherization Program

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Submitted to:  
*Arkansas Oklahoma Gas Corporation*  
*Oklahoma Gas and Electric*

March 2014

Prepared by:



ADM Associates, Inc.

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**Prepared by:**

**Brian Harold  
Adam Thomas  
Matthew Jaoudi  
Jeremy Offenstein, Ph.D  
William Holleran**

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**Corporate Headquarters:  
3239 Ramos Circle  
Sacramento, CA 95827  
Tel: (916) 363-8383**

**ADM Associates Inc.  
Energy Research & Evaluation**

**200 Brown Road  
Suite 208  
Fremont, CA 94539  
Tel: (510) 371-0763**

## Acknowledgements

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# 1. Executive Summary

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The purpose of this report is to provide a summary of the evaluation effort of the 2013 AOG/OG&E Weatherization Program. This evaluation was conducted by ADM Associates (referred to in this report as the Evaluators). This report provides verified gross and net savings findings for the evaluated program, and discusses overall program progress as well as notable changes from the prior program year.

As there have been few modifications to program structure, operation, and delivery since the prior program year, this report primarily focuses on program impacts in terms of gas and electric savings. While this report provides a review of previous program findings and recommendations, a full process evaluation can be found in the 2012 AOG/OG&E Weatherization Program Evaluation Report.

## 1.1 Overview of AOG/OG&E Weatherization Program

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The general structure of the program has for the most part remained unchanged since the 2012 program year. The following provides a review of program design characteristics and operational procedures.

In 2013, the AOG/OG&E Weatherization Program provided residential energy audits and energy efficiency installations to customers within the service territory of Arkansas Oklahoma Gas Corporation (AOG) and Oklahoma Gas and Electric (OG&E). Participating homes were evaluated in order to determine potential energy efficiency measures that would improve overall building efficiency and reduce residential energy usage. The program provided funds for the installation of various measures, including insulation, lighting, air infiltration, air conditioner replacement, and refrigerator replacement.<sup>1</sup>

The AOG/OG&E Weatherization Program is designed to provide utility funds to customers in order to assist customers with the costs of the in-home audit and installation of energy efficiency improvements. Eligible customers receive funds from both AOG and OG&E in this co-funded program. As with the prior program year, total utility funding is a maximum of \$3,000 per participant home.

Eligible OG&E customers include homeowners or leaseholders of a single family home, duplex condos, townhouses or mobile home constructed prior to 1997. Participants

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<sup>1</sup> Refrigerator replacements were performed during the beginning of the program year, but were ceased due to cost effectiveness factors. The measures listed are those that were installed during the 2013 program year; a full list of measures can be found within the program filing documentation.



must meet three of the following eligibility criteria, which are identical to the criteria used for the 2012 program year.<sup>2</sup>

- Attic insulation less than or equal to R-22;
- Wall insulation equal to or less than R-4;
- Floor insulation equal to R-0;
- Single pane windows with no storm windows attached;
- Heating system less than or equal to 78% AFUE;
- Cooling system with SEER of 10 or less; and
- Air infiltration problems identified through either a pre-blower door test or visual inspection procedures.

These criteria have been specified and modified as needed in order to direct the program towards homes with substantial energy efficiency needs. This allows the program to have a significant energy impact on each serviced home, and contributes to overall program cost effectiveness.

The following table reviews core program stages and includes key activities performed throughout the program process. The activities and stages shown for 2013 are consistent with those conducted during 2012 and prior years.

*Table 1-1 Key Activities and Program Stages, 2013 Program Year*

<i>Program Stage</i>	<i>Key Activities</i>
Program Design Planning	<ul style="list-style-type: none"> <li>• AOG and OG&amp;E discuss program objectives and make any necessary modifications to program design.</li> <li>• Utilities work with regulatory environment to approve any necessary aspects of the program.</li> </ul>
Program Training and Promotion	<ul style="list-style-type: none"> <li>• Contractors and other program operations staff attend program-relevant training sessions.</li> <li>• Contractors promote the program through the use of service trucks, uniforms, and in-person promotion.</li> </ul>
Program Participation	<ul style="list-style-type: none"> <li>• Customers apply for the program.</li> <li>• Participants receive in-home audits and potential measures are identified.</li> <li>• One of the three participating contractor firms installs measures, with total utility funds not to exceed \$3,000.</li> </ul>
Data Processing and Monitoring	<ul style="list-style-type: none"> <li>• Measures and associated savings are calculated and recorded by Frontier Associates.</li> </ul>

<sup>2</sup> Eligibility requirements are taken from AOG informational materials. Obtained from: <https://www.aogc.com/energyefficiency.aspx#aogwp>

	<ul style="list-style-type: none"><li>• AOG and OG&amp;E monitor program progress and cooperate to make program improvements and maintain customer satisfaction.</li><li>• Program is evaluated through the use of measurement and verification activities.</li></ul>
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## 1.2 Evaluation Objectives

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The evaluation of the 2013 AOG/OG&E Weatherization Program consisted of several objectives and tasks. These evaluation objectives were related to program savings verification and tracking of program changes and improvements. 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 3.0, 2.0, and 1.0, (TRM), as applicable, in order to ensure that measure savings were properly calculated according to TRM protocols.
- 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.
- 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 efficiency improvements that they have done, or would like to do, since participating in the program.
- Program staff interviews. Interviews were conducted with utility staff who are responsible for designing and managing the program. These interviews primarily served to assess the status of previous evaluation conclusions and recommendations, as well as to identify notable changes in program operation, delivery, and performance.

## 1.3 Summary of Findings

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### 1.3.1 Onsite Verification Results

The Evaluators conducted onsite verification visits to 58 participant homes, supplemented by 10 telephone verifications. These site visits were conducted in order to verify complete and proper measure installation, to conduct post-implementation measurements, and to follow-up with participants regarding efficiency improvements that they have done, or would like to do, since participating in the program. The onsite field verification showed that the weatherization measures had for the most part been

installed in the quantities reported within program tracking data. Specific notes illustrating the accuracy of program tracking data include:

- **Contact information:** All residences were located at the addresses provided within the tracking data. Additionally, in cases where it was necessary for the field engineer to call a customer, all telephone numbers were found to be accurate.
- **Air infiltration:** For homes receiving blower door testing for air infiltration, the reported leakage value and measured leakage value closely matched in approximately 80% of cases. There were two instances where measured leakage was more than 50% greater than reported leakage, and two instances where reported leakage was more than 50% greater than measured leakage.
- **Attic insulation:** All reported instances of attic insulation were verified. There were only three instances where the inches of insulation differed slightly from reported values, and four instances of a discrepancy between reported insulation square footage and the observed square footage. These differences were very infrequent and minor.

There were a few instances of missing measures or discrepancies between the tracking data and field visit data, including:

- Out of 58 onsite verification visits, there were three cases where the reported heating type did not match the actual heating type found in the home.
- Approximately ten percent of homes had significantly fewer (i.e. less than half) of the CFL quantity that was reported in the program tracking data. This was typically due to customers replacing specific bulbs due to lighting preference, rather than due to bulb burnout.
- There were three instances of missing water heater jackets, and four instances of missing water heater pipe wrap. All other water heater measures were verified as being installed correctly.

### 1.3.2 Gross and Net Savings Results

For equipment and retrofits rebated through the 2013 program, calculation methodologies were performed as described in TRM V3.0. The following table identifies the sections in the TRM that were used for verification of measure-level savings under the AOG/OG&E Weatherization Program:

*Table 1-2 TRM Sections by Measure Type*

<i>Measure Type</i>	<i>TRM Section(s)</i>
Air Infiltration	2.2.9
Ceiling Insulation	2.2.2
CFLs	2.5.1

Refrigerator Replacement	2.4.3
Window AC	2.1.10
Water Heater Measures	2.3.2, 2.3.3

Table 1-3 presents gross savings for AOG and OG&E, including utility-level realization rates.

*Table 1-3 Gross Savings for AOG and OG&E*

Utility	# of homes	Peak Demand Savings (Therms)	Annual Savings (Therms)	Lifetime Savings (Therms)	Peak Demand Savings (kW)	Annual Savings (kWh)	Lifetime Savings (kWh)	Gross Realization Rate
AOG	1,278	4,274.25	207,661	3,213,126	-	-	-	99%
OG&E	1,623	-	-	-	1,031.67	3,618,154	51,535,375	98%

A net-to-gross analysis for the program was performed during the 2012 evaluation year, resulting in free-ridership and spillover savings estimates. These estimates have been carried over and applied to the 2013 evaluated gross savings in order to determine program net kWh and Therms impacts. The 2012 net savings assessment resulted in a program free-ridership rate of 2.0%. The participant spillover rate for Therms was calculated as 4.4%, while the participant spillover rate for kWh was calculated as 3.0% of program gross realized savings. Peak Therms and kW spillover savings were calculated at 2.8% and 1.4% of program savings, respectively. These values are reflected in the net savings tables below. Table 1-4 presents the net savings by utility. Table 1-5 presents the net impact by measure for AOG and OG&E.

*Table 1-4 Net Savings for AOG and OG&E*

Utility	Peak Demand Savings (Therms)	Annual Savings (Therms)	Lifetime Savings (Therms)	Peak Demand Savings (kW)	Annual Savings (kWh)	Lifetime Savings (kWh)
AOG	4,248.34	212,663	3,290,526	-	-	-
OG&E	-	-	-	1,039.84	3,655,091	52,061,484

*Table 1-5 Net Savings by Measure Type, AOG and OG&E*

Measure	Peak Demand Savings (Therms)	Annual Savings (Therms)	Lifetime Savings (Therms)	Peak Demand Savings (kW)	Annual Savings (kWh)	Lifetime Savings (kWh)
13-17w CFLs	-	-	-	176.07	1,013,259	6,586,184
26-32w CFLs	-	-	-	0.46	1,158	7,527
Air Infiltration	2,517.30	105,943	1,165,374	138.52	785,073	8,635,800
Ceiling Insulation	1,700.53	105,692	2,113,841	718.63	1,823,929	36,478,572
Refrigerator Replacement	-	-	-	1.16	8,341	51,522
Window AC	-	-	-	1.05	572	6,009

Water Heater Measures	30.52	1,028	11,311	3.94	22,759	295,870
Total	4,248.34	212,663	3,290,526	1,039.84	3,655,091	52,061,484

Ex post savings were based on TRM verification of EnerTrek inputs and savings values. Thus, the minor instances of discrepancies between ex ante and ex post savings were due to TRM compliance issues and errors within EnerTrek calculations. The Evaluators verified measure-level savings according to applicable TRM guidelines and obtained results that differed from Frontier Associates' calculations for the following measures:

- CFLs
  - 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 V1.0 to 2.20 hours of use per day. For the most part, EnerTrek used TRM V1.0, but used the outdated value of 2.28 hours of use per day in their calculations of savings for CFLs. The Evaluators used TRM V3.0 to calculate savings and assumed all retrofits were performed indoors.
- Refrigerator Replacement
  - In section 2.4.3, TRM V3.0 provides an energy savings algorithm for early retirement. However, the savings EnerTrek reports differs from the savings values that result from using this algorithm.
- Water Heater measures (water heater jacket and water heater pipe insulation)
  - EnerTrek uses TRM V1.0 to estimate savings for the water heater measures. The Evaluators used TRM V3.0 to estimate savings for the water heater measures. For water heater jacket, Section 2.3.2 of TRM V3.0 provides tables with savings values based on jacket thickness, type of water heating, and tank size. However, the tracking data received by the Evaluators did not include jacket thickness or tank size. As a result, the Evaluators made conservative estimates and assumed the minimum jacket thickness and tank size. For water heater pipe insulation, the Evaluators assumed a pipe diameter of 1 inch, an R-value of insulation of 3, and a length of 5 feet.
- Window AC
  - The Evaluators used TRM V3.0 to estimate savings for the window air conditioner replacement measures. It is unclear what methodology was employed to estimate ex ante savings.

A detailed description of the savings verification findings can be found in Section 2.6 of this report.

### 1.3.1 Conclusions and Recommendations

The AOG-OG&E 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. The key conclusions from the 2013 evaluation of the AOG/OG&E Weatherization Program are as follows:

**Improved Utility Coordination:** AOG and OG&E staff reported that the previous issue of occasionally miscategorizing participants' utility providers has for the most part been resolved. Program staff explained that the process of verifying customer utility providers has become more efficient and accurate, and that very few 2013 program participants were mislabeled. Overall, both AOG and OG&E staff members noted that the working relationship between the two utilities has continued to function effectively, and that at this point all parties are sufficiently familiar with program procedures.

**Program Resources are Sufficient:** The AOG/OG&E Weatherization Program currently has adequate staffing and budget allocations. The utility staff members have the resources to sufficiently manage and operate the program, and the number of contractors performing installations is reasonable and appropriate. Program budgets are sufficient to support the savings goals, and the overall program infrastructure is able to meet program demands. Current staffing levels will likely support increased demands in future years if needed.

**Effective Measure Installation Procedures:** During onsite field verification, the tracking data were found to be accurate and there were very few observed discrepancies. Additionally, the Evaluator field engineer reported that the majority of customers were satisfied with the measures that had been installed, and that there were very few complaints about the work that was performed by utility contractors. Utility staff members also reported that very few issues had been brought up by participating customers during visits or at other points. These findings confirm that the QA/QC procedures for the AOG/OG&E Weatherization Program have continued to adequately verify measure installation and to sufficiently monitor the quality of work being performed within participant residences.

**Opportunities for Database Improvement:** Although the actual implementation of measures and the associated data collection required during onsite visits have been sufficient, there are some persisting issues within the data processing stage. The EnerTrek database has been improved since prior years, but there are minor errors that should be addressed in order to ensure accurate data reporting. This includes resolving the summation issue identified in Section 3.9.3 of this report, and addressing any savings calculation issues such as those identified in Section 2.6 of this report.

**Program is Responsive to TRM Needs:** Program staff reported that there have been no significant changes to the home audit data collection forms or measure verification forms. Additionally, the updates to the Arkansas TRM (TRM 3.0) have not required a

notable increase in data collection requirements for the program measures other than water heater jackets and pipe wrap. Staff explained that the existing program contractors will be able to collect additional measure inputs if needed. In terms of any relevant changes due to TRM 3.0, program staff reported that Frontier is scheduled to incorporate all updates into the EnerTrek system for the 2014 year.

**Program is Meeting Savings, Participation, and Satisfaction Goals:** The AOG/OG&E Weatherization Program has succeeded in reaching its savings and performance goals for the 2013 program year. Program staff indicate that the program demand has been consistently increasing, and that there remains a large pool of potential participants for future program years. Additionally, utility staff noted that there have been very few issues or negative feedback from customers, and that the quality of work performed has continued to be high.

The AOG/OG&E Weatherization Program was very successful in 2013. The Evaluators identified few specific, systematic or persistent issues with program operation and design. Consideration of the following recommendations may benefit program performance and efficiency in future years:

**Include Itemized Air Infiltration Measures:** The initial home audit data collection form and the post-implementation measure verification form both include fields for detailed measure information and additional field notes. However, some of this information is not present in the tracking data exports. For example, the air infiltration section on the verification form includes fields to record which specific improvements were made (e.g. window caulking, door sweeps, weather stripping). The actual EnerTrek tracking exports include blower door readings for air infiltration, but do not itemize the air infiltration improvements. Maintaining complete electronic records of all collected data, including any qualitative comments on specific jobs, is beneficial from a program evaluation standpoint especially when onsite verification is conducted. Additionally, uploading all relevant data into a single accessible database will ensure that potentially useful information is not lost or discarded.

**Add Cursory Outreach Check to Audit:** The data collected onsite at participant homes during the audit and installation procedures is primarily quantitative in nature. However, these site visits also provide an opportunity to gain insight into customer awareness of the AOG/OG&E Weatherization Program (and other programs, if desired) in order to monitor marketing effects. As a process evaluation with participant surveys will likely not be required each year, collecting this type of information on the installation contractor level may be a more consistent method of assessing awareness methods. It would be beneficial to add one or two short questions to the contractor field forms asking how the customer learned of the program and/or what program information they have seen (website, flyers, etc.). During years where a broad participant survey is not performed, these inquiries may provide useful information for tracking program marketing and outreach effectiveness.

**Resolve Database Errors:** The Evaluators found that some of the columns within the tracking exports conflicted with data recorded in other columns. Specifically, the tracking database included summary columns of savings for each participant. However, for many participants, the overall savings value found in this column did not match the sum of the savings from the associated measures performed by the participant. Additionally, savings calculations for a few measures, itemized in Section 2.6 of this report, did not match TRM specifications. In the future, the utilities and database provider should ensure that the summary columns containing savings or other aggregated data match the sum of the individual fields being referenced, and that the savings calculations match TRM protocols. This could likely be done with a database query or cursory manual review of the data prior to database finalization.

**Investigate Duct Sealing Procedures:** AOG and OG&E did not perform duct sealing during the 2013 program year, but the cost-effectiveness and need for duct sealing is typically correlated with the need for air infiltration measures. It should be noted that duct sealing as a service is not absent from the utilities' energy efficiency portfolios; some AOG-OG&E Weatherization Program participants received duct sealing improvements through a separate OG&E residential tune-up and duct sealing program. It may be beneficial to implement duct sealing in a larger portion of participating homes as an included aspect of the weatherization services, but this is not recommended unless a separate deemed formula can be applied, the utilities are able to coordinate separate post-installation measurements, or the TRM is updated to allow measurement of air infiltration and duct sealing at the same pressure.

**Take Advantage of Cross-Promotion Opportunities:** AOG and OG&E reported that a substantial number of customers have expressed interest in the program but have not been eligible to participate due to the age or size of their home. Utility staff members explained that they have encouraged local contractors to provide weatherization services within the residential market in order to assist these customers. There is also an opportunity to refer these customers to other AOG or OG&E energy efficiency programs, such as the OG&E Custom Energy Report Program or the AOG Water Heating Equipment Rebate Program. The utilities should take advantage of their cross-fuel coordination relationship to provide customers with useful information about both gas and electric incentives programs. This will help to provide energy efficiency options to customers who are unable to receive services through the AOG-OG&E Weatherization Program.

Table 1-6 presents the above items, outlining the relevant issue, potential consequences, and associated recommendations. The following recommendation is listed as ongoing, as it is in the process of being implemented and will continue to be relevant until a 2014 tracking database is finalized.

**Ensure that Planned Tracking Improvements are Implemented (Ongoing):** Utility staff reported that Frontier is scheduled to incorporate all updates into the EnerTrek system for the 2014 year. This includes necessary measure inputs such as water heater



jacket and pipe wrap length and thickness, and making any other modifications as needed in order to comply with TRM V3.0. As updating the database can be time consuming, it is crucial to initiate all changes early in the program year. This is likely to be an ongoing recommendation, as future TRM updates may include additional data collection or savings calculation requirements.

*Table 1-6 Recommendations from 2013 Program Year Evaluation*

Issue	Consequences	Recommendation
Tracking data do not include specific measure details for some items (i.e. whether door sweeps, window sealing, etc. were installed, whether lighting was installed indoors or outdoors)	<p>Difficult to completely inspect measure installation</p> <p>Limits level of detail possible for measure tracking</p>	<p>Include an itemized list of all air infiltration reduction measures installed in each home.</p>
Limited onsite feedback from participants regarding program awareness and marketing effectiveness	<p>Possible missed opportunities for collecting useful marketing and outreach results during years where broad customer surveys are not administered</p>	<p>Add one or two short questions to the contractor field forms asking how the customer learned of the program and/or what program information they have seen (website, flyers, etc.)</p>
For many participants, the overall savings value found in the aggregated savings column of the tracking data did not match the sum of the savings from the associated measures performed by the participant. Additionally, some savings calculations did not match TRM protocols.	<p>May cause discrepancies between expected savings and verified savings</p>	<p>Ensure that the summary columns containing savings or other aggregated data match the sum of the individual fields being referenced. Also check to ensure that database calculations match TRM formulas. This could likely be done with a database query or cursory manual review of the data prior to database finalization.</p>
Duct sealing measurement requirements conflict with air infiltration measurement requirements in the TRM (must be measured at different pressures)	<p>Discourages implementation and claiming savings of duct sealing with air infiltration</p> <p>Difficult to verify duct sealing savings when combined with air infiltration</p>	<p>Investigate the feasibility of adding duct sealing to common program measures and whether the TRM can be modified to allow air infiltration and duct sealing to be tested at the same pressure.</p> <p>Avoid implementation of duct sealing with air infiltration measures unless measurement procedures can comply with TRM requirements or TRM is updated to facilitate efficient measurement (i.e. both measures can be tested at the same pressure).</p>
Some customers are interested in participating but are ineligible due to home age or size	<p>A portion of the customer base may not have access to alternative energy efficiency options</p>	<p>Actively refer ineligible customers to alternative AOG and OG&amp;E energy efficiency programs.</p>

## 1.4 Report Organization

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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 and net savings for the program;
- Chapter 3 presents the results of the process evaluation tasks and additional program findings;
- Chapter 4 presents key conclusions and recommendations from the evaluation of the program;
- Appendix A presents sample marketing materials used by AOG and OG&E in promotion of their energy efficiency programs; and
- Appendix B provides reference tables from AOG and OG&E 2012 annual reports, summarizing annual program budgets and goals.

## 2. Impact Findings

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This section presents the results of the gross savings verification and savings calculation review for the AOG/OG&E Weatherization Program in the 2013 program year.

### 2.1 Glossary of Terms

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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)* =  $(1 - \text{Free-Ridership \%} + \text{Spillover \%})$ , 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

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The AOG/OG&E Weatherization Program generated savings through the implementation of several energy efficient measure types, such as ceiling insulation, CFLs, air infiltration reduction, and water heater insulation. Table 2-1 and Table 2-2 present the overall ex ante, or expected, savings for AOG and OG&E by measure,

respectively. These values were obtained from the program tracking database exports that were provided to the Evaluators.

*Table 2-1 Ex Ante Savings by Measure Type – AOG*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>
13-17w CFLs	-	-
26-32w CFLs	-	-
Air Infiltration	2,532.65	103,453
Ceiling Insulation	1,711.03	103,210
Refrigerator Replacement	-	-
Window AC	-	-
Water Heater Measures	3.25	3,381
<b>Total</b>	<b>4,246.92</b>	<b>210,044</b>

*Table 2-2 Ex Ante Savings by Measure Type – OG&E*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>
13-17w CFLs	120.12	1,090,828
26-32w CFLs	0.50	4,636
Air Infiltration	137.38	776,127
Ceiling Insulation	712.99	1,805,517
Refrigerator Replacement	0.56	4,137
Window AC	1.62	2,784
Water Heater Measures	5.52	26,508
<b>Total</b>	<b>978.69</b>	<b>3,710,537</b>

The following table presents the ex ante gas and electric savings that were not associated with either AOG or OG&E as utility providers. These ex ante savings are attributable to municipal utilities, co-op utilities, or other investor owned utilities which are not sponsors of this program.

*Table 2-3 Ex Ante Savings by Measure Type – Non-Program*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>
13-17w CFLs	-	-	3.78	34,151
26-32w CFLs	-	-	-	-
Air Infiltration	264.69	10,886	24.12	62,622
Ceiling Insulation	202.98	12,307	99.07	173,830

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>
Refrigerator Replacement	-	-	-	-
Window AC	-	-	-	-
Water Heater Measures	0.22	233	0.24	1,000
Total	467.90	23,426	127.21	271,604

### 2.3 Gross Savings Calculation Methodology

For equipment and retrofits rebated through the 2013 program, calculation methodologies were performed as described in the TRM V3.0. Table 2-4 identifies the sections in the TRM that were used for verification of measure-level savings under the AOG/OG&E Weatherization Program.

*Table 2-4 TRM Sections by Measure Type*

<i>Measure Type</i>	<i>TRM Section(s)</i>
Air Infiltration	2.2.9
Ceiling Insulation	2.2.2
CFLs	2.5.1
Refrigerator Replacement	2.4.3
Window AC	2.1.10
Water Heater Measures	2.3.2, 2.3.3

Three measures were responsible for nearly all of the gross savings for the AOG/OG&E Weatherization Program: 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 CFM50 of air leakage rate reduction. The following table summarizes the deemed savings values for Weather Zone 7 (from TRM V3.0).

*Table 2-5 Deemed Savings Values for Air Infiltration Reduction, Zone 7*

<i>Equipment Type</i>	<i>kWh Savings / CFM50</i>	<i>kW Savings / CFM50</i>	<i>Therm Savings / CFM50</i>	<i>Peak Therms / CFM50</i>
Electric AC with Gas Heat	0.2387	0.0002171	0.0790	0.001853

<i>Equipment Type</i>	<i>kWh Savings / CFM50</i>	<i>kW Savings / CFM50</i>	<i>Therm Savings / CFM50</i>	<i>Peak Therms / CFM50</i>
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<sub>50</sub> before air infiltration reduction and a leakage rate of 7,220 CFM<sub>50</sub> after, then the residence would have an annual gross savings of 2,120 kWh.

$$\text{Air Infiltration Savings} = 0.2387 \frac{\text{kWh Savings}}{\text{CFM}_{50}} \cdot (16,100 \text{ CFM}_{50 \text{ pre}} - 7,220 \text{ CFM}_{50 \text{ post}})$$

$$\text{Air Infiltration Savings} = 2,120 \text{ kWh}$$

### 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 2-6 summarizes the deemed savings values for Weather Zone 8 (from TRM V3.0).

*Table 2-6 Deemed Savings Values for Ceiling Insulation, Zone 8*

<i>Ceiling Insulation Base R- Value</i>	<i>AC/Gas Heat kWh/sq ft</i>	<i>Gas Heat (no AC) Therms/sq ft</i>	<i>AC/Electrical Resistance kWh/sq ft</i>	<i>Heat Pump kWh/sq ft</i>	<i>AC Peak Savings kW/ sq ft</i>	<i>Peak Gas Savings Therms/sq ft</i>
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.

$$\text{Ceiling Insulation Savings} = 0.969 \frac{\text{kWh}}{\text{ft}^2} \cdot (1,200 \text{ ft}^2) = 1,163 \text{ kWh}$$

### 2.3.3 Compact Fluorescent Lamps (CFLs) Savings Calculations

The deemed savings for compact fluorescent lamps can be calculated by using the following equation.

$$kWh_{savings} = ((Watts_{base} - Watts_{post})/1,000) \times Hours \times ISR \times IEF_E$$

The inputs, which assume the following prerequisite knowledge, can be found in Section 2.5.1 of TRM V3.0:

- The quantity and wattages of both pre and post fixtures;
- Whether or not the retrofits were indoor or outdoor;
- Whether or not the retrofits were time of sale or direct install; and
- The heating type of the residence.

For example, if in March 2013 (5) 23W CFLs were directly installed to replace (5) 75W incandescent lamps in a residence with gas heating, the residence would have an annual gross savings of 231.0kWh.

$$kWh_{savings} = ((5 \cdot 75 - 5 \cdot 23)/1,000 \cdot 803.6 \cdot 0.97 \cdot 1.14 = 231.0kWh$$

## 2.4 On-site Verification Procedure

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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 where appropriate. The methodologies for sampling and conducting field visits during the 2013 program evaluation year are identical to those employed for the 2012 evaluation. A summary review of these methods is provided below.

### 2.4.1 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:

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

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. In total, the Evaluators scheduled appointments with 70 participants. Due to cancellations and customer absences, Evaluator field staff members were able to conduct on-site visits for 58 program participants. This was supplemented by telephone verification with an additional 10 participants in order to reach the 68 participant target.

#### **2.4.2 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 \$20. 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 any additional customer energy efficiency improvements that the customer had implemented or planned to implement in the future.

A field visit form was completed for each visited site in order to document measure quantities, home characteristics, and any needed additional commentary regarding the visit. Specifically, the field form included the following fields:

- Home Characteristics: The field engineer documented the type of home (i.e. single story vs. multi-story), number of bedrooms, number of bathrooms, total conditioned area, and heating type.
- Measure Quantity Verification: The engineer documented reported vs. actual quantities of each measure type (i.e. 13w-17w CFLs, 26w -32w CFLs, water

heater measures) and any applicable notes regarding burnt out bulbs or non-operational equipment.

- **Insulation Assessment:** The field form asks for insulation square footage, the R-value or inches of insulation, and the type of insulation (i.e. blown cell).
- **Infiltration Assessment:** For homes receiving air infiltration measures, the field engineer conducted a blower door test and recorded ex-post leakage for comparison with reported leakage values.
- **Supplemental Implementation Inquiry:** This included questions regarding whether the customer had implemented any major improvements to their home (i.e. appliance replacements, structural renovations, major repairs) since the weatherization work was completed, as well as whether there are additional improvements that they would like to implement in the future.

For the most part, field staff found the reported tracking information to be accurate, and confirmed that nearly all reported measures had been installed completely and correctly. There were few discrepancies between the reported data and actual verified sites. Further information detailing the overall results of the field verification visits can be found in Chapter 3.

## **2.5 2013 Net Savings Approach**

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This section provides methodologies and results of the net savings analysis for the AOG/OG&E Weatherization Program. For this program, net savings incorporated participant free-ridership as well as participant spillover savings.

For the 2013 program year evaluation, net savings are calculated by applying the free-ridership and spillover findings from the previous year (program year 2012). As there have been no major modifications to program structure or delivery, a separate net savings analysis was not necessary for the current year. For reference purposes, this section provides a brief review of the 2012 net savings analysis results. Further information, including a detailed outline of the free-ridership and spillover savings methodologies, can be found in the 2012 AOG/OG&E Weatherization Program Evaluation Report.

### **2.5.1 Overall 2012 Net-to-Gross Results**

A net-to-gross analysis for the program was performed during the 2012 evaluation year, resulting in free-ridership and spillover savings estimates. As described above, these estimates have been carried over and applied to the 2013 evaluated gross savings in order to determine program net kWh and Therms impacts.

The 2012 net savings assessment resulted in a program free-ridership rate of 2.0%. The participant spillover rate for Therms was calculated as 4.4%, while the participant

spillover rate for kWh was calculated as 3.0% of program gross realized savings. Peak Therms and kW spillover savings were calculated at 2.8% and 1.4% of program savings, respectively.

### 2.5.2 Participant Free-ridership

Several criteria were used for determining what portion of a customer’s savings for a particular project should be attributed to free ridership. The first criterion was based on the response to the question: “Would you have been financially able to have an audit performed and install these energy efficient measures without the Weatherization Program provided by AOG and OG&E?” If a customer answered “No” to this question, a free ridership score of 0% was assigned to the project. That is, if a customer required financial assistance from the AOG/OG&E Weatherization Program to undertake the project, then that customer was not deemed a free rider.

For decision makers that indicated that they were able to undertake the energy efficiency project without financial assistance from the program, three factors were analyzed to determine what percentage of savings may be attributed to free ridership. The three factors were:

- Plans and intentions of respondent to have an audit conducted or install similar measures without support from the program;
- The respondent’s previous knowledge of energy efficiency options and benefits; and
- The respondent’s previous experience with energy efficiency improvements in their home.

For each of these factors, rules were applied to develop binary variables indicating whether or not a participant’s behavior showed free ridership. These rules were used to construct four different indicator variables that address free ridership behavior. For each customer, a free ridership value of either 0 or 1 was assigned based on the combination of variables. Quantifiable program spillover was added to the program net savings after free-ridership was calculated.

Table 2-7 displays each combination of indicator variables, along with the percentage of responding participants falling into each category. After applying the financial ability variable to these groups, the calculated free-ridership level of the AOG/OG&E Weatherization Program in 2012 was 2%.

*Table 2-7 Distribution of Respondents across Indicator Variable Combinations*

<i>Indicator Variable Combination</i>	<i>Associated Free-ridership Score (as binary variable)</i>	<i>Percentage of Respondents in Category</i>
YYYY	1	1%

NNNY	0	42%
YYNN	1	0%
NYYN	0	1%
YYNY	1	0%
YYYN	1	0%
NNNN	0	13%
NNYN	0	12%
NYNN	0	0%
NNYY	0	26%
NYNY	1	4%
NYYY	0	1%
<b>Total Free-ridership rate</b>		<b>2%</b>

### 2.5.3 Participant Spillover

The 2012 participant survey and on-site verification visits 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) Obtain the respondent’s self-reported value for how important they felt information from AOG and/or OG&E was in inducing this non-incentivized behavior.

In total, 339 unique participants responded to the spillover instrument in 2012. Of these respondents, 45 indicated that they had purchased and installed one or more measures 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 AOG or OG&E was in influencing their decision to purchase this equipment. If the respondent rated information from the utilities at 6 or higher, the savings associated with their installation were attributed to the program. In total, 51 additional measures were reported to have been influenced by the AOG/OG&E program in 2012.

Savings estimates were calculated by determining average likely spillover savings per customer in the sample of 339 unique respondents. In cases where some details were not collected, available inputs from survey data and conservative inputs for values were applied (such as assuming that all high efficiency central air conditioners were in the 14.00 – 14.99 SEER range) and applying TRM V2.0 savings calculations. For cited measures that are included in program offerings, the average savings for a participant receiving this measure were applied.

The resulting spillover values represented 3% of gross realized kWh savings, and 4.4% of gross realized Therms savings for the 2012 program. Peak Therms and kW spillover savings were calculated at 2.8% and 1.4% of program savings, respectively.

### 2.5.1 Future Net Savings Approach

As the free-ridership and spillover rates nearly offset one another, it may not be necessary to continue applying a net-to-gross ratio to program savings in the future. Based on the program's structure and responses to the field visit survey, spillover savings and free-ridership are likely to be minimal unless substantial changes are made to program eligibility requirements. If the program structure and delivery remains fairly constant in future years, it would be reasonable to assume a net-to-gross ratio of 1 for the program.

### 2.6 Verified Savings by Measure

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After reviewing the tracking data and inputs for savings calculations, the Evaluators provided verified gross savings according to protocols from the TRM. Savings from the following measures were verified and matched the calculations provided by Frontier Associates through the EnerTrek software tool:

- Air Infiltration
  - Accounts for 13.3% of claimed kWh savings, and 49.3% of claimed Therms savings.
- Ceiling Insulation
  - Accounts for 69.1% of claimed kWh savings and 49.1% of claimed Therms savings.

The savings calculated in this evaluation differed from Frontier Associates' calculations for several items. The Evaluators verified measure-level savings according to applicable TRM guidelines and obtained results that differed from Frontier Associates' calculations for the following measures:

- CFLs
  - 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. For the most part, EnerTrek used TRM V1.0, but used the outdated value of 2.28 hours of use per day in their calculations of savings for CFLs. The Evaluators used TRM V3.0 to calculate savings and assumed all retrofits were performed indoors.
- Refrigerator Replacement
  - In section 2.4.3, TRM V3.0 provides an energy savings algorithm for early retirement. However, the savings EnerTrek reports differs from the savings values that result from using this algorithm.
- Water Heater measures (water heater jacket and water heater pipe insulation)

- EnerTrek uses TRM V1.0 to estimate savings for the water heater measures. The Evaluators used TRM V3.0 to estimate savings for the water heater measures. For water heater jacket, Section 2.3.2 of TRM V3.0 provides tables with savings values based on jacket thickness, type of water heating, and tank size. However, the tracking data received by the Evaluators did not include jacket thickness or tank size. As a result, the Evaluators made conservative estimates and assumed the minimum jacket thickness and tank size. For water heater pipe insulation, the Evaluators assumed a pipe diameter of 1 inch, an R-value of insulation of 3, and a length of 5 feet.
- Window AC
  - The Evaluators used TRM V3.0 to estimate savings for the window air conditioner replacement measures. It is unclear what methodology was employed to estimate ex ante savings.

The following table presents the savings results of the evaluation of the 2013 AOG/OG&E Weatherization Program, by measure type. Table 2-8 includes gross realized savings by measure for AOG and OG&E. Table 2-9 including any savings that are not attributable to either AOG or OG&E but that were reported in the tracking database. Net savings are presented by utility in the following section.

*Table 2-8 Verified Gross Savings by Measure Type, AOG and OG&E*

Measure	Peak Demand Savings (Therms)	Annual Savings (Therms)	Lifetime Savings (Therms)	Realization Rate	Peak Demand Savings (kW)	Annual Savings (kWh)	Lifetime Savings (kWh)	Realization Rate
13-17w CFLs	-	-	-	-	174.69	1,003,020	6,519,627	92%
26-32w CFLs	-	-	-	-	0.46	1,146	7,451	25%
Air Infiltration	2,532.65	103,451	1,137,962	100%	137.43	777,139	8,548,530	100%
Ceiling Insulation	1,710.90	103,206	2,064,119	100%	712.99	1,805,497	36,109,936	100%
Refrigerator Replacement	-	-	-	-	1.15	8,257	51,001	200%
Window AC	-	-	-	-	1.04	566	5,948	20%
Water Heater Measures	30.70	1,004	11,045	30%	3.91	22,529	292,880	85%
Total	4,274.25	207,661	3,213,126	99%	1,031.67	3,618,154	51,535,375	98%

*Table 2-9 Verified Gross Savings by Measure Type, Non-Program*

Measure	Peak Demand Savings (Therms)	Annual Savings (Therms)	Lifetime Savings (Therms)	Realization Rate	Peak Demand Savings (kW)	Annual Savings (kWh)	Lifetime Savings (kWh)	Realization Rate
13-17w CFLs	-	-	-	-	5.55	36,261	235,699	106%
26-32w CFLs	-	-	-	-	-	-	-	-
Air Infiltration	264.69	10,884	119,727	100%	24.16	62,725	689,978	100%

Ceiling Insulation	202.79	12,303	246,067	100%	99.01	173,848	3,476,964	100%
Refrigerator Replacement	-	-	-	-	-	-	-	-
Window AC	-	-	-	-	-	-	-	-
Water Heater Measures	0.51	72	787	31%	0.16	790	10,272	79%
<b>Total</b>	<b>467.99</b>	<b>23,259</b>	<b>366,581</b>	<b>99%</b>	<b>128.88</b>	<b>273,625</b>	<b>4,412,913</b>	<b>101%</b>

## 2.7 Verified Savings by Utility

In the AOG/OG&E Weatherization Program, the participating utilities are AOG and OG&E. Savings not attributable to either of these utilities are listed as “Non-Program”. These savings are attributable to municipal utilities, co-op utilities, or other investor owned utilities which are not sponsors of this program. Table 2-10 presents the AOG/OG&E Weatherization Program net savings results for each utility, and Table 2-11 through Table 2-12 summarize the gross savings by measure for each utility.

*Table 2-10 Verified Net Savings for AOG and OG&E*

<i>Utility</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Lifetime Savings (Therms)</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Lifetime Savings (kWh)</i>
AOG	4,248.34	212,663	3,290,526	-	-	-
OG&E	-	-	-	1,039.84	3,655,091	52,061,484

*Table 2-11 Verified Net Savings for AOG by Measure*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Lifetime Savings (Therms)</i>
13-17w CFLs	-	-	-
26-32w CFLs	-	-	-
Air Infiltration	2,517.30	105,943	1,165,374
Ceiling Insulation	1,700.53	105,692	2,113,841
Refrigerator Replacement	-	-	-
Window AC	-	-	-
Water Heater Measures	30.52	1,028	11,311
<b>Total</b>	<b>4,248.34</b>	<b>212,663</b>	<b>3,290,526</b>

*Table 2-12 Verified Net Savings for OG&E by Measure*

<i>Measure</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Lifetime Savings (kWh)</i>
13-17w CFLs	176.07	1,013,259	6,586,184
26-32w CFLs	0.46	1,158	7,527
Air Infiltration	138.52	785,073	8,635,800
Ceiling Insulation	718.63	1,823,929	36,478,572
Refrigerator Replacement	1.16	8,341	51,522
Window AC	1.05	572	6,009
Water Heater Measures	3.94	22,759	295,870
<b>Total</b>	<b>1,039.84</b>	<b>3,655,091</b>	<b>52,061,484</b>

Table 2-13 presents the gas and electric savings that were not associated with either AOG or OG&E. These savings were generated when a project was performed at a home that was serviced by both a program sponsoring utility and a non-program utility (such as AOG as a gas provider and a municipal utility as an electric provider).

*Table 2-13 Net Savings by Measure Type – Non-Program*

<i>Measure</i>	<i>Peak Demand Savings (Therms)</i>	<i>Annual Savings (Therms)</i>	<i>Lifetime Savings (Therms)</i>	<i>Peak Demand Savings (kW)</i>	<i>Annual Savings (kWh)</i>	<i>Lifetime Savings (kWh)</i>
13-17w CFLs	-	-	-	5.55	36,261	235,699
26-32w CFLs	-	-	-	-	-	-
Air Infiltration	264.69	10,884	119,727	24.16	62,725	689,978
Ceiling Insulation	202.79	12,303	246,067	99.01	173,848	3,476,964
Refrigerator Replacement	-	-	-	-	-	-
Window AC	-	-	-	-	-	-
Water Heater Measures	0.51	72	787	0.16	790	10,272
<b>Total</b>	<b>467.99</b>	<b>23,259</b>	<b>366,581</b>	<b>128.88</b>	<b>273,625</b>	<b>4,412,913</b>



### 3. Process Findings and Program Updates

This chapter presents the key findings from the limited process evaluation that the Evaluators conducted in 2013, including tracking recommendations from prior program evaluations and summarizing updates to program operation and delivery. Additionally, the chapter presents findings from in-depth interviews with program staff and addresses the checklist factors for portfolio comprehensiveness.

#### 3.1 Process Evaluation Considerations

The Evaluators conducted a formal process evaluation of the AOG/OG&E Weatherization Program in 2012 and determined that the program was operating effectively and had been successful in meeting its goals. TRM V3.0 Protocol C addresses the criteria used to determine the timing and conditions needed for a process evaluation, and the following tables summarize the program in the context of these requirements.

*Table 3-1 Determining Process Evaluation Timing*

<i>Component</i>	<i>Determination</i>
New and Innovative Components	No. The program design has not been modified in the past year.
No Previous Process Evaluation	No. A formal process evaluation was conducted in 2012.
New Vendor or Contractor	No. The program continues to use three installation contractors and is otherwise operated by AOG and OG&E jointly.

*Table 3-2 Determining Process Evaluation Conditions*

<i>Component</i>	<i>Determination</i>
Are program impacts lower or slower than expected?	No. The program met its goals in 2012 and 2013.
Are the educational or informational goals not meeting program goals?	No. Program awareness within the customer market has increased, and educational efforts have been successful.
Are the participation rates lower or slower than expected?	No. The program has met its participation goals in 2012 and 2013.
Are the program's operational or management structure slow to get up and running or not meeting program administrative needs?	No. The prior process evaluation found these structures to be operating efficiently with adequate resources.
Is the program's cost-effectiveness less than expected?	No. The program's cost-effectiveness has been maintained at expected levels.
Do participants report problems with the programs or low rates of satisfaction?	No. Participants in 2012 reported very high levels of satisfaction and quality of work performed.
Is the program producing the intended market effects?	Yes. Non-program contractors are being informed of opportunities within the non-participant market.

Based on these findings, the Evaluators determined that the 2013 evaluation of the AOG/OG&E Weatherization Program calls for a limited process evaluation. This consists of the following research tasks:

- Tracking database and documentation review;
- On-site field verification with supplemental questionnaires; and
- Program staff interviews.

Table 3-3 below summarizes the survey and interview data collection for the 2013 program evaluation, including data collection type, number of respondents, and additional details.

*Table 3-3 Interview and Survey Data Collection Summary*

<i>Target</i>	<i>Component</i>	<i>Activity</i>	<i>N</i>	<i>Details</i>
Program Staff	AOG Program Staff	Interview	2	The program manager and operational staff are responsible for coordinating program data, managing program resources, directing installation contractors, and communicating with AOG or OG&E staff as needed during the program process.
	OG&E Program Staff	Interview	2	
Program Participants	Onsite Supplemental Questionnaire	Survey	68	This constituted a participant questionnaire administered to customers whose homes were visited by evaluator field staff for measure verification purposes.

### **3.2 Response to Program Recommendations**

Table 3-4 summarizes the status of issues and recommendations identified in the 2012 process evaluation and impact evaluation of the AOG/OG&E Weatherization Program. Overall, AOG and OG&E have been very responsive to previous findings and recommendations, and in particular have actively made improvements to program data collection and reporting procedures.

Table 3-4 Status of 2012 Evaluation Recommendations

<i>Issue</i>	<i>Consequences</i>	<i>Recommendation</i>	<i>AOG/OG&amp;E Response</i>	<i>Status of Issue</i>
Tracking data missing some measure inputs required by TRM	Program cannot comply with current TRM calculation requirements  May negatively affect the accuracy of ex ante calculations	Add inputs to tracking system in accordance with the most up-to-date TRM (TRM 2.0 at the time of recommendation)	The utilities have worked with Frontier to add necessary inputs into the EnerTrek software, which is scheduled to be compliant with TRM 3.0 in the 2014 program year.	Reviewed & adopted
Tracking data lacks contractor comments regarding unique premise characteristics (e.g. whether fireplace flue was open or closed at time of infiltration test)	During onsite evaluation, it is difficult to recreate blower door conditions.	Include all relevant field notes in tracking database, such as unique premise characteristics and additional comments	The utilities are exploring the possibility of adding field notes and other collected qualitative data to the tracking system.	Reviewed & under consideration
Risk of eligibility requirements becoming outdated (e.q. age of home)	Exclusion of potential suitable program participants  Decreased participation potential over time	Monitor program participation levels and participation potential; only expand program requirements such as the age of participant homes if needed.	The utilities have been considering this change across program years, and thus far have determined that eligibility expansion is not yet needed.	Reviewed & under consideration
Some errors exist within tracking data calculations for CFL hours of use, refrigerator replacement	Creates difficulties in M&V, specifically savings verification  May negatively affect the accuracy of ex ante calculations	Review all calculation assumptions and remove/replace any erroneous values within the tracking database	The utilities and Frontier have corrected these issues, no erroneous assumptions present in 2013 data.	Reviewed & adopted

### 3.3 Program Structure Overview

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The overall structure and delivery of the AOG/OG&E Weatherization Program has remained fairly constant throughout 2011-2013. This section provides a summary of current program design features and procedures, noting any differences between 2013 and prior years.

As with prior years, the 2013 AOG/OG&E Weatherization Program provided residential energy audits and energy efficiency installations to customers within the service territory of Arkansas Oklahoma Gas Corporation (AOG) and Oklahoma Gas and Electric (OG&E). Participating homes were evaluated in order to determine cost-effective energy efficiency measures that would improve overall building efficiency and reduce residential energy usage. The program provided funds for the installation of various measures, including insulation, lighting, air infiltration, and refrigerator replacement.

The AOG/OG&E Weatherization Program is designed to provide utility funds to customers in order to fully offset the costs of energy efficiency audits and resulting energy efficiency measures and installations. Eligible customers receive funds from both AOG and OG&E in this co-funded program. As with prior years, the utilities jointly cover up to \$3,000 of services in participant homes. Payment is designated based on the specific utility provider for each participant, such that weatherization services in homes that are customers of both AOG and OG&E are paid for by both utilities.

The eligibility requirements for the 2013 program year have remained unchanged. Eligible OG&E customers include homeowners or leaseholders of a single family home, duplex condos, townhouses or mobile home constructed prior to 1997. Participants must meet three of the following eligibility criteria<sup>3</sup>:

- Attic insulation less than or equal to R-22;
- Wall insulation equal to or less than R-4;
- Floor insulation equal to R-0;
- Single pane windows with no storm windows attached;
- Heating system less than or equal to 78% AFUE;
- Cooling system with SEER of 10 or less; and
- Air infiltration problems identified through either a pre-blower door test or visual inspection procedures.

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<sup>3</sup> Eligibility requirements are taken from AOG informational materials. Obtained from: <https://www.aogc.com/energyefficiency.aspx#aogwp>

These criteria are designed to target severely energy inefficient residences; this helps to ensure that each participating home has the potential to generate a substantial amount of energy savings through the program.

Customers who are interested in participating in the program contact program staff members to sign up for the in-home audit. Additionally, prospective participants may learn about the program and apply for enrollment through a local community clearinghouse. This clearinghouse informs customers of eligibility requirements, provides informational marketing materials such as flyers, and assists customers with the program enrollment process.

As with the 2012 year, the program currently uses three installation contractors who perform the weatherization and measure implementation services.

One of the three program contractors contact customers within 48 hours of receiving customer information, and the audit is scheduled. During the in-home audit, contractors determine customer eligibility and identify potential energy efficiency measures for the residence. After the measures are installed, utility staff members perform post-inspections in order to verify that all measures have been properly implemented. In 2013, staff members performed these quality control procedures with 10% of participating homes.

### **3.4 Program Logic Model**

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Figure 3-1 presents a logic model for the AOG/OG&E Weatherization Program, divided into stages to represent the phases involved in administering and operating the program. The overall structure of the program has remained constant through the 2013 program year, although the 2013 logic model includes an additional component, outlined with a dashed border, within the Program Participation phase. This component was added in order to reflect the recent efforts that utility staff has made to inform non-program contractors of the weatherization opportunities that exist within the broad customer market.<sup>4</sup>

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<sup>4</sup> These efforts are intended to ensure that program-ineligible customers are able to find contractors who can provide weatherization services, minimizing dissatisfaction for customers who cannot participate in the AOG/OG&E Weatherization Program.

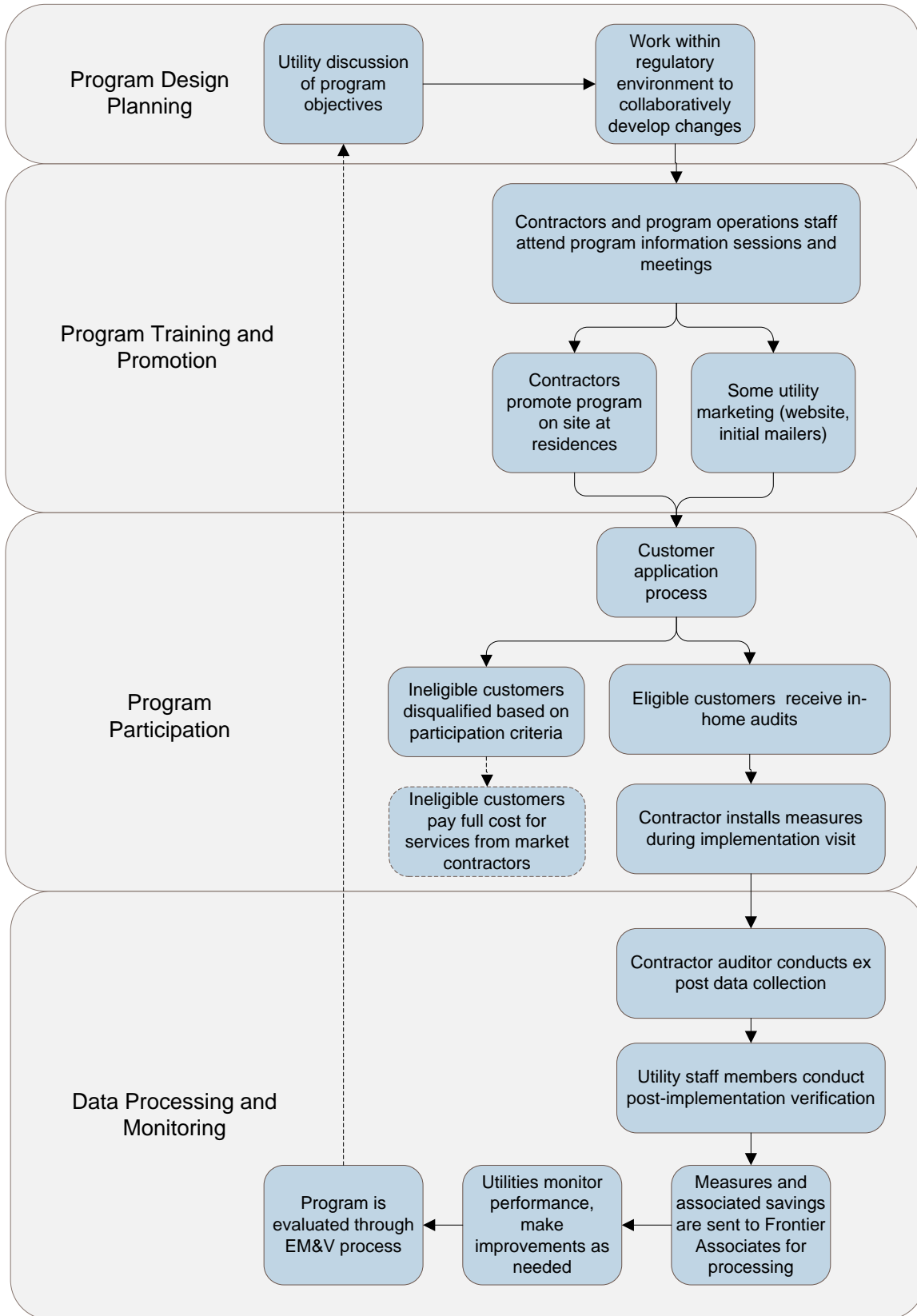


Figure 3-1 AOG/OG&E Weatherization Program Logic Model

### 3.5 AOG/OG&E Weatherization Program 2013 Participation

In 2013, the AOG/OG&E Weatherization Program serviced a total of 1,845 homes. This is a slight increase in participation over the 2012 year and a substantial increase over the 2011 year, which had 1,786 and 731 participant homes, respectively. Participants received in-home energy audits and one or more of the following measure types:

- 13-17 Watt CFLs;
- 26-32 Watt CFLs;
- Ceiling/attic insulation;
- Window air conditioner;
- Water heater pipe wrap;
- Water heater jacket;
- Air infiltration reduction improvements; and
- Refrigerator replacement.

The audits and measure installation in each home were performed by one of three program contractors. These contractors also conducted post-implementation visits to homes, and utility staff performed quality assurance visits on a sample of residences.

The AOG/OG&E Weatherization Program is offered in the service territories of both utilities, which are estimated to have an overlap of approximately 30,000 customers. Depending on the location of customers and the fuel sources used in their homes, services for each customer are funded by AOG, OG&E, or both AOG and OG&E. Table 3-5 cross-tabulates the number of participating homes by utility. As participants were only required to be customers of one of the two participating utilities, some residences in the program were serviced by utilities other than AOG and OG&E. These utilities included municipal utilities, Co-Ops, or non-participating investor owned utilities.

*Table 3-5 Participation by Associated Utility*

Electric Utility	Gas Utility	
	AOG	Other/None
OG&E	1,056	567
Other/None	222	-
<b>OG&amp;E Total</b>	<b>AOG Total</b>	<b>Total Homes</b>
<b>1,623</b>	<b>1,278</b>	<b>1,845</b>

Figure 3-1 displays the month of weatherization for homes serviced during the 2013 program year, based on the weatherization date listed in program tracking data. January was the most active month, followed by March. Overall, participation was fairly

active throughout the program year, although the first six months of the year had about 50% more activity than the second six months.

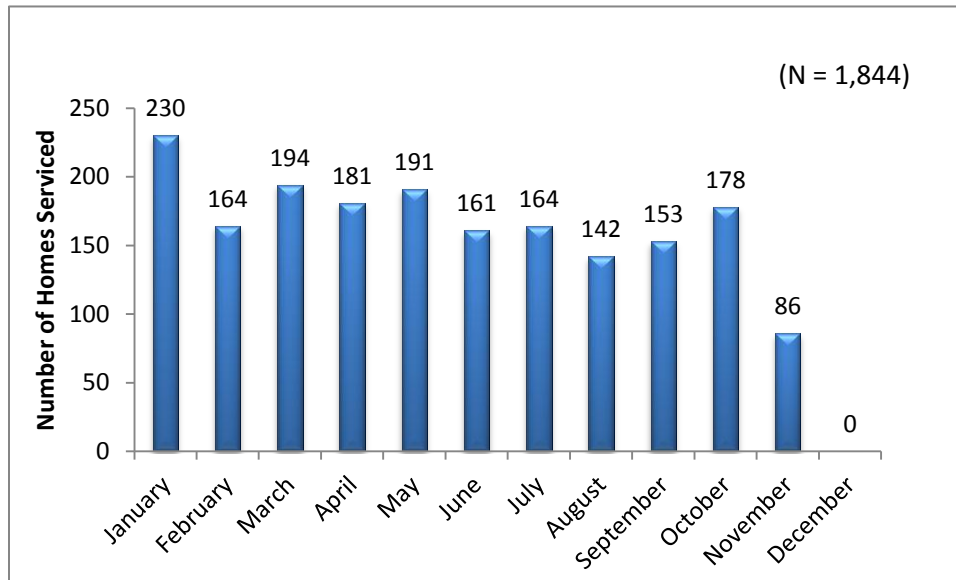


Figure 3-2 Homes Serviced by Month, 2013

Table 3-6 displays the number of 2013 measure installations by measure type for each utility, arranged by the most commonly installed measures.<sup>5</sup> Air infiltration was the most common measure type, followed by ceiling insulation and CFLs.

Table 3-6 Total Implementations by Measure

Measure Type	Number of attributable installations	
	AOG	OG&E
Air Infiltration	1,225	1,561
Ceiling Insulation	1,091	1,400
13-17w CFL	-	1,632
26-32w CFL	-	11
Water Heater Jacket/Pipe	895	1,200
Refrigerator	-	19
Window AC	-	18
<b>Total</b>	<b>3,099</b>	<b>4,874</b>

<sup>5</sup> For the purposes of this table, the values represent the number of homes receiving the measure, rather than the total number of measures installed at all homes. Thus, the values for CFLs do not present the total number of bulbs installed, but the total number of participants receiving at least one of that CFL type.



The distribution of measures is fairly consistent with the 2012 program year. The notable differences between 2013 and 2012 measure counts include:

- There was a substantial increase in the number of water heater pipe wrap measures installed in OG&E serviced homes.
- A small number of 26-32 Watt CFLs were installed, when previously the program had exclusively installed 13-17 Watt CFLs.
- A small number of window air conditioners were installed. Utility staff reported that this was not a likely measure for most participants, but that there had been a few opportunities during 2013 to install the air conditioners in multifamily residences.
- Refrigerator installations decreased substantially. This is due to the fact that OG&E determined that refrigerator replacement did not meet the designated savings to investment ratio (SIR) target of 1, and thus this measure was only installed during the first few months of the program year.

Overall, the number of measure installations attributable to AOG increased from 3,099 in 2012 to 3,211 in 2013. The number of measure installations attributable to OG&E increased from 4,874 in 2012 to 5,841 in 2013.

### **3.6 Utility Staff Member Interviews**

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As part of the 2013 program evaluation, interviews were conducted with utility staff members responsible for managing and designing the AOG/OG&E Weatherization Program. These interviews primarily served to assess the status of previous evaluation conclusions and recommendations, as well as to identify notable changes in program operation, delivery, and performance.

As the evaluation of the 2011 and 2012 program years provided details regarding program operation and design, the 2013 evaluation interviews are intended to explore any changes in the program and any new developments over the past year. The 2013 evaluation seeks to follow-up on key issues and draw comparisons between program years where appropriate.

These findings are based on utility staff in-depth interviews, as well as program documentation and periodic communications with program and regulatory staff.

#### **3.6.1 Data Collection and Reporting**

**Utility Coordination:** AOG and OG&E staff reported that the previous issue of occasionally miscategorizing participants' utility providers has for the most part been resolved. Previously, some participants were incorrectly identified as being AOG customers when they were in fact OG&E all-electric customers, or were identified as OG&E customers when they were actually serviced by AOG and a municipal electric

utility. Although the participants were correctly relabeled prior to savings finalization, this had created initial issues in determining payment responsibilities and savings attribution. Program staff explained that the process of verifying customer utility providers has become more efficient and accurate, and that very few 2013 program participants were mislabeled. Overall, both AOG and OG&E staff members noted that the working relationship between the two utilities has continued to function effectively, and that at this point all parties are sufficiently familiar with program procedures.

**Data Entry Revisions:** OG&E staff noted that there had been some manual data entry errors during the 2013 program year that delayed the finalization of program tracking data. Specifically, there was a discrepancy between the billed jobs and tracking data of approximately 300 homes. This caused some initial delays, but did not result in any substantial issues in savings calculations or job reimbursement. Utility staff noted that there is now a weekly consistency check which verifies that all reported jobs are correctly recorded in the tracking database.

**Data Collection Requirements:** Program staff reported that there have been no significant changes to the home audit data collection forms or measure verification forms. Additionally, the updates to the Arkansas TRM (TRM 3.0) have not required a notable increase in data collection requirements for the program measures. Staff explained that the existing program contractors would be able to collect additional measure inputs if needed, but that the savings calculation procedures for the program's currently implemented measures have remained largely unchanged. In terms of any relevant changes due to TRM 3.0, program staff reported that Frontier is scheduled to incorporate all updates into the database system for the 2014 year.

### 3.6.1 Program Implementation

**Installation Contractors:** Program staff reported that there have been no changes to the existing group of contractors who implement measures under the AOG/OG&E Weatherization Program. Additionally, interviewed staff stated that the existing three contractor organizations have had sufficient resources to meet program demands, and that there are no current plans to add or remove contractors from the program.

**Implemented Measures:** Although no new measures were implemented through the program during 2013, OG&E decided to cease the purchase and installation of energy efficient refrigerators. Program staff explained that the savings-to-investment ratio was typically too low for the measure to be considered cost effective, and that program resources would be better spent on the remaining set of measures (lighting, insulation, air infiltration improvements, etc.). This decision was put into effect early in the program year, and only a few refrigerators were installed during 2013. Other than this, there were no changes to the set of measures provided, and there are no immediate plans to further modify the measure list.

### 3.6.1 Program Marketing

**Outreach Consistency:** AOG and OG&E staff confirmed that the marketing structure has continued to focus primarily on word-of-mouth messaging and indirect marketing through logos on contractor shirts and vehicles. There have been a few modifications to program branding, such that most program materials have been changed to show the names of both AOG and OG&E rather than solely OG&E.

**Additional Outreach:** The utilities have also spoken with community organizations about conducting public presentations in order to increase program awareness and educate customers about weatherization benefits. Additionally, program staff noted that some customers subscribe to a monthly newsletter that contains information about the available measures and programs, and that a local community clearinghouse has continued to provide eligibility information, marketing flyers, and enrollment assistance to prospective participants. Overall, staff stated that program awareness is continually increasing, and that there has not yet been a need to explore substantial marketing modifications such as mainstream media messaging. Appendix A presents examples of marketing materials that are currently used by AOG and OG&E to promote energy efficiency opportunities including the weatherization program.

### 3.6.1 Program Performance and Market Effects

**Savings and Participation Goals:** The AOG/OG&E Weatherization Program has succeeded in reaching its savings and performance goals for the 2013 program year. Program staff indicate that the program demand has been consistently increasing, and that there remains a large pool of potential participants for future program years. Additionally, utility staff noted that there have been very few issues or negative feedback from customers, and that the quality of work performed has continued to be high.

**Eligibility Considerations:** Utility staff is still considering expanding program eligibility requirements such as the criteria for age of residence, but reported that there had not yet been a need to do so. However, the 2013 year saw an increase in the number of ineligible customers who expressed interest in the program.

**Market Engagement:** Utility staff reported that with the growing level of program awareness, some customers who have expressed interest in the program have been ineligible due to the size or age of their home. In order to manage this, utility staff has started to speak with various contractors in the service territory and inform them of the available weatherization opportunities within the customer population. Although the utilities cannot refer a customer to a specific non-program contractor or provide services to ineligible customers, encouraging contractors to promote weatherization services may help to service the non-participant market. This does not provide a direct savings

or financial benefit to the utilities, but may improve non-participant satisfaction and encourage energy usage reduction in the broader customer pool.

### 3.7 Onsite Verification Results

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As described in Section 2.4 of this report, the Evaluators conducted onsite verification visits to 58 participant homes, supplemented by 10 telephone verifications. These site visits were conducted in order to verify complete and proper measure installation, to conduct post-implementation measurements, and to follow-up with participants regarding efficiency improvements that they have done, or would like to do, since participating in the program.

This section summarizes the key findings from these field visits, highlighting results from the measure verification tasks and supplemental questionnaire.

#### 3.7.1 Measure Verification Findings

The onsite field verification showed that the weatherization measures had for the most part been installed in the quantities reported within program tracking data. Specific notes illustrating the accuracy of program tracking data include:

- **Contact information:** All residences were located at the addresses provided within the tracking data. Additionally, in cases where it was necessary for the field engineer to call a customer, all telephone numbers were found to be accurate.
- **Air infiltration:** For homes receiving blower door testing for air infiltration, the reported leakage value and measured leakage value closely matched in approximately 80% of cases. Due to differences in equipment type, weather changes, and situational residence characteristics (e.g. whether a fireplace flue is open or closed), it is difficult to reproduce blower door test leakage values on separate occasions. Thus, the field visit focused on identifying any cases where measured leakage varied greatly from reported values. There were two instances where measured leakage was more than 50% greater than reported leakage, and two instances where reported leakage was more than 50% greater than measured leakage.
- **Attic insulation:** All reported instances of attic insulation were verified. There were only three instances where the inches of insulation differed slightly from reported values, and four instances of a discrepancy between reported insulation square footage and the observed square footage. These differences were very infrequent and minor.

There were a few instances of missing measures or discrepancies between the tracking data and field visit data, including:

- Out of 58 onsite verification visits, there were three cases where the reported heating type did not match the actual heating type found in the home.
- Approximately ten percent of homes had significantly fewer (i.e. less than half) of the CFL quantity that was reported in the program tracking data. This was typically due to customers replacing specific bulbs due to lighting preference, rather than due to bulb burnout.
- There were three instances of missing water heater jackets, and four instances of missing water heater pipe wrap. All other water heater measures were verified as being installed correctly.

### **3.7.2 Supplemental Questionnaire**

In order to supplement the information gained during the field visit, and to provide insight into customer behavior since the implementations were performed, the field engineer administered a short questionnaire to visited customers. These questions asked whether the customer had implemented any improvements or repairs to their homes since the work was performed, as well as whether they desired or planned to implement any such improvements in the future.

Findings from prior evaluation years indicate that program participants are unlikely to spend their own funds on energy efficiency improvements or major repairs. This is consistent with the current findings. As only three respondents reported that they had implemented any major improvements since the weatherization work was performed. One of these customers reported that they had built an addition to their home consisting of a bedroom, bathroom, and laundry room. Another customer stated that they had installed new windows, while the third explained that they had made several improvements such as replacing tile, doors, sinks, and faucets.

When asked whether they would like to make further improvements to their homes, 10 of the respondents described the projects that they would like to implement. The most commonly mentioned measure was new windows, followed by floor replacement, kitchen remodeling, and additional leakage repairs. The desire for additional leakage repairs was due to persisting holes in customers' floors, ceilings, and walls. Out of all of the improvements mentioned by customers, repairing these holes would likely result in the greatest energy savings and would also substantially improve the quality of living in the home. Window replacement would also result in energy savings, but is typically a low priority for weatherization programs due to the low savings-to-investment ratio.

The results of the field visit questionnaire suggest that participants have many additional improvements in mind, but that they are unlikely to implement these without additional assistance. Most of these improvements, including major structural repairs, are outside the scope of the AOG/OG&E Weatherization Program. However, if program contractors notice opportunities for structural improvements that may be covered by community programs or possibly the statewide Weatherization Assistance Program, it may be

appropriate to inform participants of how they may be able to receive additional assistance.

### **3.7.1 Field Visit Summary**

Overall, the tracking data were found to be accurate and there were very few observed discrepancies. It is also likely that some of the discrepancies were due to customer actions after the contractors had implemented the measures. For measures such as CFLs, this is accounted for in the TRM calculations via an in-service factor, and some removal of measures is anticipated. Additionally, the field engineer reported that the majority of customers were satisfied with the measures that had been installed, and that there were very few complaints about the work that was performed by utility contractors. These results suggest that the implementation work is being conducted adequately, and that contractors are accurately documenting the work that is performed.

### **3.8 Post-Implementation Verification Review**

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As per the February 8, 2012 Supplemental Guidance Regarding Evaluation Strategies memorandum, programs are evaluated for their internal quality assurance and quality control procedures. The goals of this QA/QC assessment include:

- Identifying the goals for the inspection and verification of the AOG/OG&E 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.

During the 2012 evaluation the Evaluators assessed the program's quality assurance and quality control procedures in order to document the QA/QC structure and to identify any opportunities for improvement. Overall, the existing verification methods were found to be sufficient. For the 2013 evaluation, the Evaluators revisited these verification procedures during interviews with utility staff members in order to identify any modifications or updates. For the most part, there have been no changes to quality assurance and control since the 2012 program year. The QA/QC process for the program continues to involve the following components:

- Sites are randomly selected weekly from the population of participants who have recently received program services. Interviewed program staff reported that this sample typically represents approximately 10% of all homes serviced under the program.
- The utility staff members perform a visual inspection of each measure that has been recorded in the contractor installation form. Throughout the visit, the inspector completes the Weatherization Quality Control Form detailing the inspection findings.
- In cases where a measure is not functioning properly, such as damaged or loose air infiltration work, the contractor would be scheduled to return to the home in order to repair the measure.

The Evaluators previously conducted a document review of the field form used during the utility inspection procedures. This form was found to be sufficiently detailed and well-suited to the program's QA/QC needs. Specifically, the field form included the following categories of fields:

- Measure verification checks;
- Premise characteristics;
- Health and safety checks; and
- Additional notes.

During staff interviews for the current program year, utility program managers reported that no changes had been made to the inspection form, although some minor changes may be needed depending on the data requirements of future TRM updates.

### **3.8.1 Overall QA/QC Status**

Utility staff confirmed that no new significant issues were found during verification visits in 2013. The program contractors are now very familiar with program requirements and with the consistent set of implemented measures. Staff members also reported that very few issues had been brought up by participating customers during visits or at other points during their participation. These findings confirm that the QA/QC procedures for the AOG/OG&E Weatherization Program have continued to adequately verify measure installation and to sufficiently monitor the quality of work being performed.

## **3.9 Tracking Database Review**

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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 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 V3.0, 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 3-7 below summarizes the goals and activities of the Database Review of the AOG/OG&E Weatherization Program.

*Table 3-7 Database Review Goals & Activities*

<i>Category</i>	<i>Activity</i>
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 previously 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.



### 3.9.1 Customer, Premise, and Vendor Information

Each of these factors was assessed individually based on the guidelines stated in the TRM V3.0. Overall, the Evaluators conclude the following regarding tracking data completeness:

- Participating customer information was complete for all participants. This included Job IDs, telephone numbers, addresses, full names, and utility account numbers for AOG and OG&E. This is an improvement over the 2012 data, where a small percentage of participants (less than 10%) were missing one or more of these fields.
- Ninety-eight percent of participant records included the name of the installation contractor who performed the implementation as well as the invoice date. All but one participant record contained the home's weatherization date.
- As with the 2012 program year, premise characteristics such as home heating type, cooling type, and attic square footage were present for all participants where appropriate and needed.

Section 2.6 includes specific findings related to measure-level tracking data.

### 3.9.2 Measure Specific Information

The content of 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 measure:

- Water Heater Measures (Water Heater Jacket & Water Heater Pipe Insulation)
  - For water heater jacket, TRM V3.0 presents savings values as a function of jacket thickness, type of water heating, and tank size. The tracking data did not present jacket thickness or tank size.
  - For water heater pipe insulation, TRM V3.0 presents savings values as a function of length of pipe, diameter of pipe, and r-value of insulation. The tracking data did not present these values.

It should be noted that these measures only accounted for 0.38% of the total claimed kWh savings and 1.6% of the total gross Therms savings, and that all measures associated with a high level of energy savings included sufficient tracking information.

The tracking database included summary columns of savings for each participant. However, for many participants, the overall savings value found in this column did not match the sum of the savings from the associated measures performed by the participant.

The tracking database was for the most part well-organized. The recommended changes to the tracking data include providing a complete set of calculation inputs and being consistent when reporting claimed savings for each participant.

### **3.9.3 Tracking Data Recommendations**

Overall, the tracking data were found to be highly detailed and complete. The following recommendations should be considered for future program years:

- Additional field notes may be useful for the measure verification process, such as including details regarding any unique home characteristics that may change over time and influence energy usage. This may include the presence of window air conditioner units, in-progress construction work, or whether the home configuration required any atypical methods to be performed during the contractor blower door test.
- The field forms used by program contractors, and the measure verification form used by the utilities, both contain fields for recording which specific air infiltration improvements (e.g. door sweeps, window sealing) were made. These data do not appear in the tracking exports, but would likely be useful for evaluator verification purposes and detailed measure tracking.
- The tracking data focuses on quantitative inputs such as savings and measure details. If the installation contractors collect any information related to program marketing and customer awareness during their home visits, including these inputs in the tracking database would help to track program effects in years when a broad participant survey effort is not conducted.
- The EnerTrek software should be updated to include the inputs noted above in Section 3.9.2 in order to comply with TRM 3.0 calculation requirements.
- Ensure that the summary columns containing savings or other aggregated data match the sum of the individual fields being referenced. This could likely be done with a database query or cursory manual review of the data prior to database finalization.

### **3.10 Potential TRM Issues for Duct Sealing with Air Infiltration**

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Upon review of the current program offerings, TRM requirements, and measurement and verification procedures, the Evaluators found that there may be issues if AOG and OG&E implement duct sealing in combination with air infiltration measures during future years. The current measurement requirements for air infiltration and duct sealing testing create savings verification difficulties if both measure types are implemented in the same home. This section provides an overview of the issue for consideration.

According to TRM 3.0, the air infiltration measure must be tested via pre- and post-installation leakage measurements at a pressure of 50 pascals.<sup>6</sup> This requires the installer to make an initial infiltration reading and then a second reading after the air infiltration measures are installed. In contrast, the TRM states that the duct sealing measure must also receive pre- and post-installation leakage measurements, but at a pressure of 25 pascals.<sup>7</sup> The pre- measurements for these measures are feasible, but if both air infiltration and duct sealing are performed on a single home, it becomes very difficult to isolate the savings for each measure or to combine the savings achieved.

In order to isolate the savings, post-installation leakage measurements would have to be performed twice, once after the duct sealing is performed and then again after the air infiltration items are installed (or vice versa). However, as these two tests would be performed at different pressures, it would not be reasonable to assume that the difference in leakage during the second post-installation test is exclusively attributable to the second measure type. If both measures were individually tested at the same pressure, it would be possible to record the leakage reduction of the first and then subtract that reduction from the second in order to isolate the two measures. Additionally, if both measure types could be tested at the same pressure level it may be reasonable to perform only one post-installation leakage test and estimate a combined savings total for the two measures in cooperation.

AOG and OG&E did not perform duct sealing during the 2013 program year, but the cost-effectiveness and need for duct sealing is typically correlated with the need for air infiltration measures. It should be noted that duct sealing as a service is not absent from the utilities' energy efficiency portfolios; some AOG-OG&E Weatherization Program participants received duct sealing improvements through a separate OG&E residential tune-up and duct sealing program. It may be beneficial to implement duct sealing in a larger portion of participating homes as an included aspect of the weatherization services, , but this is not recommended unless the utilities are able to coordinate separate post-installation measurements or the TRM is updated to allow measurement of air infiltration and duct sealing at the same pressure.

Alternatively, OG&E has developed a deemed savings formula for duct sealing that has been applied to its other programs. If duct sealing services are added to the AOG/OG&E Weatherization Program, and the measurement issues associated with cross-implementing air infiltration and duct sealing improvements persist, it may be appropriate to assess the reasonableness of these deemed results and potentially use them to determine duct sealing savings rather than conducting separate pre- and post-measurements.

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<sup>6</sup> From Section 2.2.9 of the Arkansas Technical Reference Manual Version 3.0, Volume 2

<sup>7</sup> From Section 2.1.11 of the Arkansas Technical Reference Manual 3.0, Volume 2

### 3.11 Comprehensiveness Factors

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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;*
- **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;*
- **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;*
- **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*
- **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)*
- **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;*
- **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.*

This section reviews the AOG/OG&E Weatherization Program in relation to each factor, but does not provide a portfolio-wide perspective. As these criteria are intended to evaluate a portfolio of programs as a whole, assessment of the comprehensiveness factors is best suited to portfolio-level evaluations and reports. As such, a review of how the AOG/OG&E Weatherization Program fits into the overall utility profile can be found in the Evaluation of 2013 DSM Portfolio Report for AOG. The portfolio report includes the AOG/OG&E Weatherization Program in its tests for portfolio comprehensiveness, assessing the comprehensiveness factors in a cross-program context.

- **Factor 1: Education, Training, Marketing, and Outreach**
  - **Assessment of Education**

The AOG/OG&E Weatherization Program sufficiently implements educational efforts towards its prospective participants and other customers. Appendix A provides examples of educational messages and materials used. This includes:

- Providing educational materials (flyers, brochures)
- Providing outreach through multiple channels (in-person, utility websites, direct mail)
- Providing education targeted to specific market barriers (focusing on connection between comfort and energy efficiency, demonstrating potential savings from program measures)
- Providing coordinated education from multiple entities (staff members from both utilities and each of the three program contractors)

○ **Assessment of Training**

As mentioned in utility staff interviews and the utilities' annual energy efficiency reports, the program has continued to provide updated and relevant training to its contractors and has reached out to non-program contractors in order to inform them of existing opportunities within weatherization services to residences.

○ **Marketing and Outreach**

Program marketing has proven to be conservative in cost and scope but sufficient to recruit a high level of participation. The marketing methods of the program meet the following criteria:<sup>8</sup>

- Address specific barriers (informing customers that the program is available at no additional cost, demonstrating potential savings and increase in comfort level)
- Promoted by trade allies (program and non-program contractors inform prospective participants of program services and opportunities)
- Performed through several channels (in-person, websites, direct mail, word-of-mouth)

● **Factor 2: Budgetary, Management, and Program Delivery Resources**

The AOG/OG&E Weatherization Program currently has adequate staffing and budget allocations. According to utility program management staff members, the utilities have the resources to sufficiently manage and operate the program, and

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<sup>8</sup> Appendix A contains specific examples of AOG and OG&E marketing and outreach materials.

the number of contractors performing installations is reasonable and appropriate. As can be seen within the utilities' annual reports, program budgets are sufficient to support the savings goals, and the overall program infrastructure is able to meet program demands.<sup>9</sup> According to interviews with utility staff during the current year, and interviews with installation contractors during the prior program year, current staffing levels will likely support increased demands in future years if needed.

- **Factor 3: Addressing Major End-Uses**

The AOG/OG&E Weatherization Program offers a wide range of measures, which are chosen based on cost-effectiveness testing. The large list of eligible program measures covers all major end-uses for targeted customer homes, including:

- HVAC systems;
- Hot water measures;
- Appliances (refrigerators);
- Lighting; and
- Building envelope measures.<sup>10</sup>

Program staff monitors costs and customer needs and continually considers modifications to program measure offerings and services in order to fully address the scope of available end-uses.

- **Factor 4: Comprehensively Addressing Customer Needs**

The program comprehensively addresses the major needs of its targeted customer market by providing several benefits to participants. The program provides services to customers who likely would not otherwise make major efficiency improvements to their homes, and may not have the opportunity to participate in other utility-sponsored energy efficiency programs. Specifically, the program provides the following benefits:

- Technical assistance through in-home audits;
- Energy and monthly bill savings through measure installation; and
- Increased comfort and/or safety for participants.

- **Factor 5: Targeting Market Sectors & Leveraging Opportunities**

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<sup>9</sup> Appendix B provides reference tables from AOG and OG&E 2012 annual reports, summarizing annual program budgets and goals.

<sup>10</sup> A complete list of eligible measures for the AOG-OG&E Weatherization Program can be found in utility documentation such as filing documents and annual reports (for example: [http://www.apscservices.info/pdf/07/07-075-tf\\_75\\_1.pdf](http://www.apscservices.info/pdf/07/07-075-tf_75_1.pdf))

The AOG/OG&E Weatherization Program focuses on a specific market of utility residential customers whose homes are sufficiently energy inefficient. This is an important program in the residential sector of portfolio offerings. The AOG/OG&E Weatherization Program is also an example of utility leveraging of available partnerships: AOG and OG&E have successfully engaged in cross-fuel coordination in order to provide combined benefits to customers of one or both utilities.

- **Factor 6: Cost-Effectiveness of Energy Efficiency**

The program is designed to cost-effectively generate net savings and meet the stated annual program goals. It has been successful in these efforts thus far, meeting specific criteria such as:

- Meeting net savings goals (overall program net-to-gross ratio is 101%, program has met goals through 2013);
- Meeting industry norms for net-to-gross (expected net-to-gross of approximately 100%); and
- Meeting cost-effectiveness goals (the program is designed to meet cost-effectiveness on the measure level and as a whole, and has been successful in doing so).<sup>11</sup>

- **Factor 7: Adequacy of EM&V Procedures**

The AOG/OG&E Weatherization Program was reviewed for EM&V procedures in the following areas:

- QA/QC and EM&V procedures conducted by utility staff;
- QA/QC and EM&V procedures conducted by installation contractor staff; and
- QA/QC and EM&V procedures conducted by the Evaluators

The quality assurance and verification procedures currently conducted by utility staff and installation contractors continue to be sufficient for monitoring implementation quality and ensuring the accuracy of ex ante installation records. The Evaluators' field data was fairly consistent with reported tracking data values, indicating that overall measure implementation is recorded accurately and consistently.<sup>12</sup>

Several improvements have been made to the tracking database since the 2011 and 2012 program years, leading to greater clarity within program data and more

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<sup>11</sup> Further information regarding program cost-effectiveness can be found in utility-specific cost-benefit spreadsheets on the Arkansas Public Service Commission (APSC) website: <http://www.apscservices.info/eeAnnualReports.aspx>

<sup>12</sup> See Section 3.7 of this report for detailed information regarding program implementation verification.

accurate initial savings estimates. There are a few improvements that may further increase the reliability of program data, but these are fairly minor in nature.<sup>13</sup> Overall, the AOG/OG&E Weatherization Program has continued to accurately and efficiently collect, analyze, and report the information required for program evaluation.

These results indicate that the AOG/OG&E Weatherization Program is sufficiently contributing to portfolio comprehensiveness as a residential services offering. As mentioned above, a full review of the utilities' portfolio comprehensiveness factors can be found in the utilities' portfolio-wide evaluation reports.

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<sup>13</sup> See Section 3.9 of this report for detailed information regarding the program tracking data review.



## 4. Conclusions & Recommendations

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After reviewing the AOG/OG&E Weatherization Program for 2013, the Evaluators conclude that:

**Utility Coordination Has Improved:** AOG and OG&E staff reported that the previous issue of occasionally miscategorizing participants' utility providers has for the most part been resolved. Program staff explained that the process of verifying customer utility providers has become more efficient and accurate, and that very few 2013 program participants were mislabeled. Overall, both AOG and OG&E staff members noted that the working relationship between the two utilities has continued to function effectively, and that at this point all parties are sufficiently familiar with program procedures.

**Program Resources are Sufficient:** The AOG/OG&E Weatherization Program currently has adequate staffing and budget allocations. The utility staff members have the resources to sufficiently manage and operate the program, and the number of contractors performing installations is reasonable and appropriate. Program budgets are sufficient to support the savings goals, and the overall program infrastructure is able to meet program demands. Current staffing levels will likely support increased demands in future years if needed.

**Effective Measure Installation Procedures:** During onsite field verification, the tracking data were found to be accurate and there were very few observed discrepancies. Additionally, the Evaluator field engineer reported that the majority of customers were satisfied with the measures that had been installed, and that there were very few complaints about the work that was performed by utility contractors. Utility staff members also reported that very few issues had been brought up by participating customers during visits or at other points. These findings confirm that the QA/QC procedures for the AOG/OG&E Weatherization Program have continued to adequately verify measure installation and to sufficiently monitor the quality of work being performed within participant residences.

**Opportunities for Database Improvement:** Although the actual implementation of measures and the associated data collection required during onsite visits have been sufficient, there are some persisting issues within the data processing stage. The EnerTrek database has been improved since prior years, but there are minor errors that should be addressed in order to ensure accurate data reporting. This includes resolving the summation issue identified in Section 3.9.3 of this report, and addressing any savings calculation issues such as those identified in Section 2.6 of this report.

**Program is Responsive to TRM Needs:** Program staff reported that there have been no significant changes to the home audit data collection forms or measure verification forms. Additionally, the updates to the Arkansas TRM (TRM 3.0) have not required a notable increase in data collection requirements for the program measures other than

water heater jackets and pipe wrap. Staff explained that the existing program contractors will be able to collect additional measure inputs if needed. In terms of any relevant changes due to TRM 3.0, program staff reported that Frontier is scheduled to incorporate all updates into the EnerTrek software system for the 2014 year.

**Program is Meeting Savings, Participation, and Satisfaction Goals:** The AOG/OG&E Weatherization Program has succeeded in reaching its savings and performance goals for the 2013 program year. Program staff indicate that the program demand has been consistently increasing, and that there remains a large pool of potential participants for future program years. Additionally, utility staff noted that there have been very few issues or negative feedback from customers, and that the quality of work performed has continued to be high.

The AOG/OG&E Weatherization Program was very successful in 2013. The Evaluators identified few specific, systematic or persistent issues with program operation and design. Consideration of the following recommendations may benefit program performance and efficiency in future years:

**Include Itemized Air Infiltration Measures:** The initial home audit data collection form and the post-implementation measure verification form both include fields for detailed measure information and additional field notes. However, some of this information is not present in the tracking data exports. For example, the air infiltration section on the verification form includes fields to record which specific improvements were made (e.g. window caulking, door sweeps, weather stripping). The actual EnerTrek tracking exports include blower door readings for air infiltration, but do not itemize the air infiltration improvements. Maintaining complete electronic records of all collected data, including any qualitative comments on specific jobs, is beneficial from a program evaluation standpoint especially when onsite verification is conducted. Additionally, uploading all relevant data into a single accessible database will ensure that potentially useful information is not lost or discarded.

**Add Cursory Outreach Check to Audit:** The data collected onsite at participant homes during the audit and installation procedures is primarily quantitative in nature. However, these site visits also provide an opportunity to gain insight into customer awareness of the AOG/OG&E Weatherization Program (and other programs, if desired) in order to monitor marketing effects. As a process evaluation with participant surveys will likely not be required each year, collecting this type of information on the installation contractor level may be a more consistent method of assessing awareness methods. It would be beneficial to add one or two short questions to the contractor field forms asking how the customer learned of the program and/or what program information they have seen (website, flyers, etc.). During years where a broad participant survey is not performed, these inquiries may provide useful information for tracking program marketing and outreach effectiveness.

**Resolve Tracking Data Errors:** The Evaluators found that some of the columns within the tracking exports conflicted with data recorded in other columns. Specifically, the tracking database included summary columns of savings for each participant. However, for many participants, the overall savings value found in this column did not match the sum of the savings from the associated measures performed by the participant. Additionally, savings calculations for a few measures, itemized in Section 2.6 of this report, did not match TRM specifications. In the future, the utilities and database provider should ensure that the summary columns containing savings or other aggregated data match the sum of the individual fields being referenced, and that the savings calculations match TRM protocols. This could likely be done with a database query or cursory manual review of the data prior to database finalization.

**Investigate Duct Sealing Procedures:** AOG and OG&E did not perform duct sealing during the 2013 program year, but the cost-effectiveness and need for duct sealing is typically correlated with the need for air infiltration measures. It should be noted that duct sealing as a service is not absent from the utilities' energy efficient portfolios; some AOG-OG&E Weatherization Program participants received duct sealing improvements through a separate OG&E residential tune-up and duct sealing program. It may be beneficial to implement duct sealing in a larger portion of participating homes as an included aspect of the weatherization services, but this is not recommended unless a separate deemed formula can be applied, the utilities are able to coordinate separate post-installation measurements, or the TRM is updated to allow measurement of air infiltration and duct sealing at the same pressure.

**Take Advantage of Cross-Promotion Opportunities:** AOG and OG&E reported that a substantial number of customers have expressed interest in the program but have not been eligible to participate due to the age or size of their home. Utility staff members explained that they have encouraged local contractors to provide weatherization services within the residential market in order to assist these customers. There is also an opportunity to refer these customers to other AOG or OG&E energy efficiency programs, such as the OG&E Custom Energy Report Program or the AOG Water Heating Equipment Rebate Program. The utilities should take advantage of their cross-fuel coordination relationship to provide customers with useful information about both gas and electric incentives programs. This will help to provide energy efficiency options to customers who are unable to receive services through the AOG-OG&E Weatherization Program.

Table 4-1 presents the above items, outlining the relevant issue, potential consequences, and associated recommendations. The following recommendation is listed as ongoing, as it is in the process of being implemented and will continue to be relevant until a 2014 tracking database is finalized.

**Ensure that Planned Tracking Improvements are Implemented (Ongoing):** Utility staff reported that Frontier is scheduled to incorporate all updates into the EnerTrek system for the 2014 year. This includes necessary measure inputs such as water heater

jacket and pipe wrap length and thickness, and making any other modifications as needed in order to comply with TRM V3.0. As updating the database can be time consuming, it is crucial to initiate all changes early in the program year. This is likely to be an ongoing recommendation, as future TRM updates may include additional data collection or savings calculation requirements.

*Table 4-1 Recommendations from 2013 Program Year Evaluation*

Issue	Consequences	Recommendation
Tracking data do not include specific measure details for some items (i.e. whether door sweeps, window sealing, etc. were installed, whether lighting was installed indoors or outdoors)	Difficult to completely inspect measure installation  Limits level of detail possible for measure tracking	Include an itemized list of all air infiltration reduction measures installed in each home.
Limited onsite feedback from participants regarding program awareness and marketing effectiveness	Possible missed opportunities for collecting useful marketing and outreach results during years where broad customer surveys are not administered	Add one or two short questions to the contractor field forms asking how the customer learned of the program and/or what program information they have seen (website, flyers, etc.)
For many participants, the overall savings value found in the aggregated savings column of the tracking data did not match the sum of the savings from the associated measures performed by the participant. Additionally, some savings calculations did not match TRM protocols.	May cause discrepancies between expected savings and verified savings	Ensure that the summary columns containing savings or other aggregated data match the sum of the individual fields being referenced. Also check to ensure that database calculations match TRM formulas. This could likely be done with a database query or cursory manual review of the data prior to database finalization.
Duct sealing measurement requirements conflict with air infiltration measurement requirements in the TRM (must be measured at different pressures)	Discourages implementation and claiming savings of duct sealing with air infiltration  Difficult to verify duct sealing savings when combined with air infiltration	Investigate the feasibility of adding duct sealing to common program measures and whether the TRM can be modified to allow air infiltration and duct sealing to be tested at the same pressure.  Avoid implementation of duct sealing with air infiltration measures unless measurement procedures can comply with TRM requirements or TRM is updated to facilitate efficient measurement (i.e. both measures can be tested at the same pressure).
Some customers are interested in participating but are ineligible due to home age or size	A portion of the customer base may not have access to alternative energy efficiency options	Actively refer ineligible customers to alternative AOG and OG&E energy efficiency programs.

## Appendix A: Sample AOG-OG&E Weatherization Marketing



Get ahead  
of the crowd  
Install a SmartTemp now!  
[see reverse]



See if you qualify  
for OG&E's  
FREE Weatherization services!  
[see reverse]



### How much could you have saved?

You've heard about myOGEpower and how it gives you the ability to track and manage electricity use more efficiently, view current usage and see your estimated monthly bill. **But, did you know it also includes a rate comparison tool?**



With the rate comparison tool, you can compare the different rates against the plan you are already participating in. This will allow you to see which rate is a better option and where you can see the most savings. For instance, this tool can show you how much you could have saved this past summer if you had switched to the SmartHours® Price Plan. You can also see how shifts in your energy use could help you save even more.

Activate your free account now at [myOGEpower.com](http://myOGEpower.com) and see how much you could save!

For more information, visit [oge.com](http://oge.com) or contact the call center at 800-272-9741.

**Customer Service** online billing, energy tips, products, services & more 800.272.9741 or [oge.com](http://oge.com)



## Winter Tips

When the ice and snow hit, travel becomes compromised. To help you get out the door this winter season, use these quick-fix tips.

- Ice-proof your car windows with vinegar: mix 3 parts vinegar to one part water. Spray windows before ice or after, the ice will melt away.
- Prevent car doors from freezing shut: spritz cooking spray on the rubber seals around doors and rub in with a paper towels.
- Get your car unstuck from the snow: if kitty litter isn't available, use your floor mats for traction, just place the rubber side up.

And, as always, live safely.

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## Get your SmartTemp Thermostat Now!

Now that summer has ended, it's the perfect time to make the switch to the OG&E SmartHours Price Plan and receive your FREE SmartTemp Thermostat!

This is one of the highest quality thermostats on the market today. With the help of OG&E's SmartTemp Thermostat, customers enrolled in SmartHours, on average, saved 20% more than those without a SmartTemp.

The benefit of switching to SmartHours now and receiving a SmartTemp Thermostat is that you won't have to wait during the summer rush for your thermostat installation. This will prepare you for next summer and allow you the opportunity to familiarize yourself with your new thermostat.

So get ahead of the crowd and enroll in SmartHours today! Visit [oge.com](http://oge.com) or contact OG&E at 877-898-3834.



## Improve the efficiency of your home

With the help of OG&E's Weatherization Program you can reduce energy consumption and lower the cost of your energy, all while increasing the comfort of your home. By making your home more energy efficient, you can help OG&E delay the need for additional incremental power generation, which helps keep energy costs low.

Weatherization services include:

- Attic insulation
- Window caulking
- Weather stripping
- CFL installation

In addition, customers receive educational information on other energy efficiency techniques that can be continued after initial program services. To see if you are eligible for all the great benefits of the OG&E Weatherization Program, please contact a call center representative at 800-272-9741.



### Test your knowledge

How well do you know the OG&E energy efficiency programs? Visit [surveymonkey.com/s/ogecurrents](http://surveymonkey.com/s/ogecurrents) to answer one simple question for a chance to win a pair of tickets to a Thunder game.


A new question will be presented each month for a chance to win a different set of tickets.

www.aogc.com :: Rebate Information 888.838.8858

## 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. 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 Arkansas Oklahoma Gas Company.




**efficiency rebates are in saving is in and excess is out**

Arkansas Oklahoma Gas Company has a host of programs for Arkansas customers to help you cut the excess including low cost energy saving tips and residential, commercial and industrial rebates. To choose a program that's right for you, see details inside or visit [www.aogc.com](http://www.aogc.com).

**excess is out™**  
[www.aogc.com](http://www.aogc.com)  
 479.784.2002



**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





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](http://tightenuparkansas.org)

**AOG weatherization**  
—program

A comprehensive residential weatherization program targeting severely energy inefficient homes to improve comfort and reduce energy costs by upgrading the thermal envelope and appliances. This program is delivered in association with the Ft. Smith region electric distribution company, Oklahoma Gas and Electric (OG&E) to see if you are eligible visit [aogc.com](http://aogc.com) or call 479-784-2002.

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.cadcc.com](http://www.cadcc.com) or call 479-785-2303 x110.

**Commercial and Industrial Solutions**  
—program

This program is designed to encourage our commercial and industrial customers to implement energy efficiency improvements that will reduce natural gas consumption. The program will provide cash and non-cash incentives for a variety of direct install or custom natural gas energy efficiency projects. To get details on how your business can take advantage of this opportunity, contact Jason Brannen at [jbrannen@aogc.com](mailto:jbrannen@aogc.com) or 479-784-2004.



reduce  
AND  
rebate

Cutting excess energy use has never been easier. Arkansas Oklahoma Gas Company proudly offers rebates for Arkansas customers on qualifying heating and water-heating equipment.

Here's how it works:

- STEP 1:** Schedule your energy-efficient heating and water heating equipment installation with a local contractor.
- STEP 2:** Download and fill out a rebate form from [www.aogc.com](http://www.aogc.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  
For more rebate info call 888.838.8858.
- 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 LEVEL*	CUSTOMER REBATE	DEALER/INSTALLER REBATE
Natural Gas Water Heater	.62 EF or higher .67 EF or higher	\$50 \$100	\$100
Natural Gas Furnace	.82 EF or 90% TE or higher	\$300	\$100

\* Efficiency Level: EF = Energy Factor, TE = Thermal Efficiency

EQUIPMENT	EFFICIENCY LEVEL	CUSTOMER REBATE	DEALER/INSTALLER REBATE
High Efficiency Commercial Boiler	84% to 93.9% efficient	\$250	\$50
Commercial/Industrial Burner Replacement (6 step modulation or fully modulating)	94% efficient or higher	\$350	\$100
Commercial Boiler Reset Control			\$150
Commercial Boiler Cut Out Control			\$150
Commercial Boiler Vent Damper			\$250

Rebate qualifications and amounts are subject to change. Rebate funds are limited. Completed rebate forms will be processed in the order in which they are received. Arkansas Oklahoma Gas Rebate programs may be cancelled or changed at any time.



## Appendix B: Annual Report Summary of Program Budgets and Goals

This section presents tables summarizing AOG and OG&E's annual budgets, expenses, and energy savings goals for the AOG-OG&E Weatherization Program. These tables were extracted directly from the utilities' 2012 energy efficiency annual reports<sup>14</sup> and are included in this report for reference purposes.

Achieved savings values shown are based on the Evaluators' prior program evaluation report results. Further detail and narrative regarding the information presented in these tables may be found in the full versions of each utility's annual reports.

Weatherization											
<b>2010</b>			Plan Savings		Evaluated Savings		% of Plan		2010		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	kW	kWh	kW	kWh	kW	kWh	Plan	Actual	Plan
\$1,129,500	\$1,103,808	98%	611	1,557,324	782	1,994,946	128%	128%	500	699	140%
<b>2011</b>			Plan Savings		Evaluated Savings		% of Plan		2011		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	kW	kWh	kW	kWh	kW	kWh	Plan	Actual	Plan
\$1,964,321	\$1,645,000	84%	642	2,721,699	544	1,595,413	85%	59%	1,300	953	73%
<b>2012</b>			Plan Savings		Evaluated Savings		% of Plan		2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	kW	kWh	kW	kWh	kW	kWh	Plan	Actual	Plan
\$2,324,460	\$2,324,406	100%	516	2,994,261	1,006	3,638,503	195%	122%	1,620	1,631	101%
<b>3 Year Program Average</b>			Plan Savings		Evaluated Savings		% of Plan		2010 - 2012		
Annual	Actual	% of	Demand*	Energy*	Demand*	Energy*	Demand*	Energy*	Number of Participants		% of
RBudget	Expenses	Budget	kW	kWh	kW	kWh	kW	kWh	Plan	Actual	Plan
\$1,806,094	\$1,691,071	94%	590	2,424,428	777	2,409,621	132%	99%	1,140	1,094	96%

\*Net Annual Savings

Figure B-1 OGE 2012 Annual Report: Weatherization Program Budgets and Goals

<sup>14</sup> AOG table obtained from: <http://www.apscservices.info/EEInfo/EEReports/AOG%202012.pdf>

OG&E table obtained from: <http://www.apscservices.info/EEInfo/EEReports/OG&E%202012.pdf>

AOG Weatherization Program											
<b>2011</b>			<b>Plan Savings</b>		<b>Evaluated Savings</b>		<b>% of Plan</b>		<b>2011</b>		
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
\$557,249	\$559,324	100%	0	67,591	1,391	67,758	-	100%	338	482	143%
<b>2012</b>			<b>Plan Savings</b>		<b>Evaluated Savings</b>		<b>% of Plan</b>		<b>2012</b>		
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
\$1,575,404	\$1,604,379	102%	n/a	182,343	4,509	223,453	-	123%	1,300	1,360	105%
<b>2 Year Program Average</b>			<b>Plan Savings</b>		<b>Evaluated Savings</b>		<b>% of Plan</b>		<b>2011 - 2012</b>		
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
\$1,066,327	\$1,081,851	101%	0	124,967	2,950	145,606	-	117%	819	921	112%

\*Net Annual Savings

Figure B-2 AOG 2012 Annual Report: Weatherization Program Budgets and Goals

## **5.0 Attachment E**



EVALUATION OF ENERGY EFFICIENCY  
PROGRAMS  
Arkansas Program Year 2013

Report Number 1383-2013

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EnerNOC Utility Solutions  
EnerNOC, Inc  
500 Ygnacio Valley Road  
Suite 450  
Walnut Creek, CA 94596  
Tel: 925.482.2000  
[www.enernoc.com](http://www.enernoc.com)

*Prepared for:*  
OG&E

*Prepared by:*  
EnerNOC, Inc.

*Presented on:*  
March 1, 2014

Project Manager:  
Gay Cook

Project Director:  
Craig Williamson

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This report was prepared by

EnerNOC Utility Solutions  
500 Ygnacio Valley Blvd., Suite 450  
Walnut Creek, CA 94596

Principal Investigator(s):

P. Ignelzi  
D. Dragon  
I. Zhao  
D. Burdjalov

## EXECUTIVE SUMMARY

As per regulatory requirements, in 2013 OG&E Arkansas implemented programs as per its approved DSM plan for 2011-2013. EnerNOC Utility Solutions ("EnerNOC") evaluated six of the programs implemented by OG&E in Arkansas: 1) Student Energy Education, 2) HVAC Tune-Up and Duct Repair, 3) Window Air Conditioning, 4) Commercial Lighting, 5) Commercial and Industrial Standard Offer, and 6) Commercial Tune-Up. This report covers the evaluated savings for PY2012 and actual program costs.

### Approach

EnerNOC's evaluation of the PY 2013 programs was limited by a small budget and focused mainly on the impact of the programs. In addition to providing adjusted estimates of peak demand and annual energy savings, EnerNOC's evaluation activities included a study to assess distribution system efficiency changes, a focused literature review of net-to-gross savings for similar programs implemented in Arkansas, limited engineering reviews of program results, checking compliance with the Arkansas Technical Reference Manual (TRM 2.0 or TRM 3.0), and applying net-to-gross values to EnerNOC-adjusted savings. Process evaluation activities included in-depth interviews with program staff and comparing database tracking to recommendations from Protocol A (Program Tracking and Database Development).

### Results

Table ES-1-1 shows the reported gross savings and evaluated gross and net savings. Reported demand reductions were 1,820 kW, with a gross savings realization rate of 102% and net evaluated demand reduced was 1,726 kW. OG&E reported energy savings of 10,615 MWh with a gross savings realization rate of 99% and net evaluated savings were 9,701 MWh.

**Table ES-1-1 OG&E Arkansas PY 2013 Results by Program**

Program	Demand (kW)			Annual Energy (MWh)		
	OG&E Claimed	EnerNOC-adjusted	Net Savings	OG&E Claimed	EnerNOC-adjusted	Net Savings
HVAC Tune-Up/Duct Repair	73	144	130	183	393	354
Window Unit A/C	3	3	3	4	4	3
Student Energy Education	40	19	15	322	151	126
C&I Standard Offer	590	572	570	2,692	2,552	2,536
Commercial Tune-Up	37	42	41	359	359	357
Commercial Lighting	1,077	1,075	967	7,056	7,028	6,325
<b>Totals</b>	<b>1,820</b>	<b>1,855</b>	<b>1,726</b>	<b>10,615</b>	<b>10,487</b>	<b>9,701</b>
<b>Realization Rates</b>		<b>102%</b>			<b>99%</b>	

#### **Greater than expected participation and savings in the residential programs.**

Participation in all three residential programs was higher than OG&E had anticipated in the program plans. The PY 2013 residential programs achieved evaluated gross savings 166 peak kW and 548 annual MWh with realization rates of 143% and 108% and net savings of 148 kW and



483 annual MWh. With these results, OG&E achieved 88% of net program goals for demand savings and exceeded energy savings goals by 137%.

**Greater than expected participation in the C&I programs overall but savings were much lower than goals.** Participation in C&I Standard Offer was much higher than expected due the direct installation of measures; the other programs fell short of participation goals. The PY 2013 C&I programs achieved evaluated gross savings of 1,689 peak kW and 9,939 annual MWh with realization rates of 99% and 98% and net savings of 1,578 kW and 9,218 annual MWh. With these results, OG&E achieved 36% of net program goals for demand savings and 54% of net goals for energy savings.

**Most savings are from commercial lighting and direct installation of measures.** Most of the savings were from commercial lighting, primarily T5 and T8 fixtures but also a lot of savings were from LED lighting. Standard Offer resulted in the next highest level of savings but mainly from the direct installation of vending misers. As reported by the program manager, custom projects under SOP and CTU did not provide savings expected due to problems with level of incentives provided and availability of efficient equipment. Residential HVAC Tune-up and Duct Repair program provided strong savings mainly because of the evaluated distribution system efficiency value of 12.7%, which is much higher than the TRM default value of 5%. However, contractors show little interest installing the duct repair measures.

**Actual data tracked and savings calculations are not easily accessed.** It was difficult to pin down the program goals as some of them had changed. The use of multiple databases because of problems with the official database (Saratoga) is confusing, e.g. the initial summary savings reports from Saratoga for Commercial Lighting contained errors (i.e. energy savings summations were incorrect) and all files contained overlapping projects. Values are hard coded and sometimes rounded, e.g. EERs of 12 instead of 11.5. OG&E has developed a body of information about each program and associated measures, including Excel-based savings calculators that apply the algorithms from the TRMs. However, for some programs, EnerNOC found it difficult to readily assess what is tracked and how to replicate savings estimates, e.g. needed climate zone information per project for Window AC program calculations. In addition, reporting seems to be done only at an aggregate level, i.e. not broken down by measure.

**Quality control procedures were not adequate.** OG&E currently uses a tracking system (Saratoga database) to document savings and provide saving reports for all OG&E programs. We identified issues with the provided Saratoga reports and found quite a number of cases where data were not fully entered or entered incorrectly. The Saratoga system itself or the queries to it often understate the actual level of program activity. Based on data retrieved from the Saratoga system for this evaluation, we find that the system is not sufficiently reliable in its present state.

Most of the required data is tracked but not all is inputted in the database in a timely fashion, i.e. EnerNOC had to keep requesting updated/corrected reports. Provided reports were missing data or values, e.g. Residential HVAC Tune-up HVAC projects not entered in database and one of the measure descriptions for an SOP project was '????'. In addition EnerNOC found incorrect data for Residential Window AC, and for Residential HVAC Tune-Up and Duct Repair projects; some project entries were somewhat convoluted and led to issues such as separate projects grouped together, rounding issues, and project lines duplicated 2 to 3 times. EnerNOC also had some difficulty in getting information on the calculations underlying the savings values and the correct savings summary reports for custom projects under SOP and CTU.

## Recommendations

### Create and implement QA/QC procedures

- OG&E should develop a set of procedure/quality control steps in order to report consistent and accurate savings results. For example, OG&E can create a check list and have a supervisor initial and verify that check list tasks were completed before documents are provided to the evaluation

team. An example check list is provided below and is not limited to the following (EnerNOC recommends that OG&E create a checklist that is suited to their protocols and procedures, the following is purely an example):

- Read previous Evaluation reports to better understand what information is needed.
- Review saving reports before submitting and:
  - ✓ Check savings values; does the PM agree with savings values included in report?
  - ✓ Check all measures to see if anything (goals, measures, etc.) are missing
  - ✓ Check to see if there is enough information in the report to figure out the savings algorithms and replicate the savings
  - ✓ If any of the above information is missing or incorrect, fix the report and/or provide supplemental information (see Improve Documentation and Reporting sections below) so that the savings can be evaluated

### **Improve Documentation**

- A data dictionary should be developed for all database maintained by OG&E, CLEAResult, and DirectOptions. A data dictionary is a set of information describing the contents, format, and structure of a database and the relationship between its elements, used to control access to and manipulation of the database.
- In addition, for each program, OG&E should consolidate all backup documentation and explanations for each parameters tracked, as well as the calculations and methods including the relevant TRM sections for each program measure. Improving the program documentation such that all the key elements of savings calculations and assumptions are included will improve confidence in and efficient verification of OG&E's claimed savings.

### **Reporting**

- Savings summary sheets provided for the evaluation should include all parameters used to calculate savings to the second decimal (or third if parameter used was taken to the third decimal).
- Create monthly reports with details by measure for each program to provide feedback to program managers and allow corrections and changes to be made during the program year rather than during the evaluation.

### **Residential HVAC Tune-Up Program**

- Replace distribution system efficiency (DSE) TRM default value with field-verified value in claimed savings calculations and urge APSC to adopt in next TRM version.
- Address contractors' disinterest in installing measures by either providing better or different support to increase their interest or move to using direct installation to achieve savings.
- Investigate—perhaps as part of the statewide potential study—whether Arkansas customers need adjustments to refrigerant charges; there may not be much opportunities for savings from this measure as the program manager noted that many of the customers did not need a change of refrigerant charge.

### **Window AC Program**

- The program seems to be working as planned. May want to consider expanding the program to cover other efficiency products if they are cost-effective.

- Use climate zone appropriate deemed savings. The claimed savings used the TRM but some projects were assigned values from the incorrect zone. While the effect is small, the correction is easy and will increase confidence in OG&E's savings claims.

### **Student Energy Education**

- Check in with teachers during the participation period to ensure kit distribution and encourage installation of measures in kits. We believe that the implementer should provide this level of monitoring as part of the turn-key service.
- Eliminate sending duplicate kits to teachers who repeatedly enroll in the program. This would reduce program costs by about 2%. These free-up funds could be used to increase participation by additional students.

### **Commercial Lighting Program**

- The tracking tool used for the Commercial Lighting program seems comprehensive and well maintained. It would be a good idea to have Direct Options create data dictionary and set up procedures to extract usable data and provide
- Ensure all new equipment for custom applications, i.e. rebated on the basis of kW savings, is captured, perhaps with a drop down menu that requires a response.
- Create monthly program reports with measure details, participant information, as well as demand and energy savings, and enhance the ability to create ad hoc reports as needed. This will provide valuable feedback to program managers.

### **Standard Offer and Commercial Tune-Up Programs**

- For PY 2014, add or reallocate funds to enable independent estimation of direct install measures over custom measures if they again comprise the majority of savings OG&E claims for the program.
- Focus outreach and recruitment on customers with larger energy savings opportunities. While the number of projects processed under the program was far higher than expected in PY 2013, in order to reach the kW and kWh goals, recruitment needs to focus on achieving larger and/or more comprehensive projects. One suggestion is to introduce tiered incentives which would provide higher per-kW for projects above a threshold level.
- Claim kW savings for vending misers in addition to kWh savings, as indicated in the TRM.
- As part of the upcoming market potential study assess the focus and appeal of the custom projects components of these programs. This program is underperforming in terms of both peak kW reductions and annual kWh savings. The program either needs to include more measures that interest customers or a different outreach approach to reach the target market. Very few of the participants in the Commercial Tune-Up Program installed the high-impact measures promoted or expected by the program.

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## CHAPTER | 1

**INTRODUCTION****Background for OG&E Arkansas DSM Program**

In January 2006, the Arkansas Public Service Commission (APSC) began the rulemaking for developing and implementing energy efficiency programs for Arkansas's four electric utilities. By May of 2007, these rules were finalized, adopting protocols and procedures for testing the cost-effectiveness of energy efficiency (EE) programs and conducting evaluation, measurement, and verification (EM&V) of claimed savings. In October 2007, OG&E introduced a Quick Start Program in the Arkansas jurisdiction. Two of the Quick Start measures, Weatherization and Education, are collaborative efforts by all Arkansas utilities.

In June 2011, the APSC approved OG&E's portfolio of energy efficiency programs for that program year (2011-2013 Energy Efficiency and Load Management Plan). In Sept 2011, OG&E filed a revised proposal to achieve the energy savings goals required by the Order for the 2012 and 2013 program years, Oklahoma Gas & Electric's 2011-2013 Arkansas Energy Efficiency Program Analysis and Plan prepared by Frontier Associates, Sept 2011 ("the Plan").

OG&E Electric Services offers retail electric service in Oklahoma and Arkansas, servicing approximately 65,000 residential customers in Arkansas. OG&E's Arkansas service area encompasses the City of Fort Smith and several nearby municipalities. In 2010, OG&E's Arkansas retail customer classes used 2,700,703 MWh which is 10.8% of all OG&E energy.

In December 2011, OG&E engaged EnerNOC Utility Solutions (EnerNOC) to evaluate following programs:

- Residential
  - HVAC Tune-up and Duct Repair
  - Window AC Tune-up
  - Student Energy Education Program (LivingWise<sup>®</sup>)
- Commercial & Industrial
  - Commercial Lighting
  - Standard Offer
  - Commercial Tune-up

**2013 Program Goals Compared to Reported**

This evaluation covers six of the programs implemented by OG&E in Arkansas—HVAC Tune-Up and Duct Repair, Window Air Conditioning, Student Energy Education, Commercial Lighting, Commercial and Industrial Standard Offer, and Commercial Tune-Up.

In total, the program participation was higher than expected (139%), but OG&E-reported savings for both demand and energy fell below projections. The programs achieved 32% of planned demand reductions and 49% of energy savings.

Table 1-1 below compares planned and reported participation, gross demand reduction, and gross energy savings for these programs.

**Table 1-1 2013 Program Participation and Gross Savings (Planned vs. Reported Savings)**

Program	Participation		Demand (kW)		Annual Energy (kWh)	
	Planned	Reported	Planned	Reported	Planned	Reported
HVAC Tune-Up/Duct Repair	300	510	194	73	286,281	182,551
Window Unit A/C	25	30	2	3	2,423	3,748
Student Energy Education	1,840	2,006	15	40	152,120	321,962
C&I Standard Offer	984	2,469	2,452	590	8,972,138	2,691,590
Commercial Tune-Up	483	140	140	37	949,961	359,174
Commercial Lighting	215	186	2,844	1,077	11,262,681	7,056,125
<b>Totals</b>	<b>3,847</b>	<b>5,341</b>	<b>5,647</b>	<b>1,820</b>	<b>21,625,604</b>	<b>10,615,150</b>

## Structure of the Report

This report is structured as shown below:

Chapter 1, Introduction

Chapter 2, Evaluation Methods

Chapter 3, NTG Study

Chapter 4, Residential Programs

Chapter 5, Commercial & Industrial Programs

Chapter 6, Process Evaluation and Response to PY 2012 Recommendations

Chapter 7, Findings and Recommendations

Appendices



## CHAPTER | 2

## EVALUATION METHODS

### Introduction

The methods EnerNOC used for the PY 2013 evaluation were limited by a small budget. OG&E assigned a budget of 7% of total program budgets for the evaluation of the three-year program cycle (2011-2013) which began in July 2011. EnerNOC assigned the work by year as follows:

- 22% for PY 2011 evaluation – programs were relatively new in the market and less than 10% of overall participation was expected in this period.
- 62% for PY 2012 evaluation – assigned most of the budget for this evaluation in order to provide timely input to planning for the next program cycle.
- 17% for PY 2013 evaluation – expected to use results from PY 2012 evaluation for the work which would have been completed by Dec 2013.

Due to developments in the Arkansas regulatory climate, the program cycle has been extended to the end of 2014. However, there was no more funding available for the PY 2013 evaluation. There was only one major change in the programs for PY 2013. As both the custom programs (SOP and CTU) were underperforming, OG&E engaged ClearResult to implement a direct installation program using some of the funds from SOP/CTU.

Here's what we did:

- Reviewed calculators and other tools developed by OG&E for tracking custom project savings before they were implemented in the tracking system.
- Provided input to OG&E for the redevelopment of the online Commercial Lighting tracking system used in both Oklahoma and Arkansas.
- Repeated the DSE study with a sample of Arkansas homes to develop a combined DSE factor for Oklahoma and Arkansas.
- Applied realization rates for PY 2012 evaluations to PY 2013 results.
- Conducted a focused literature review of net-to-gross findings for programs similar to those offered in Oklahoma and Arkansas.
- Interviewed residential program manager, C&I program manager, and LivingWise® program manager
- Collected detailed program data to assess compliance with TRM
- Assessed compliance with the appropriate TRM
- Adjusted for load factors, errors in data entry, and climate zones
- Reviewed databases provided by OG&E and implementers and reconciled where necessary

## Process Evaluation

### ***Review of Databases/Protocol A***

EnerNOC reviewed the tracking databases in reference to recommendations in Protocol A. In addition, as part of the evaluation process, EnerNOC identified several issues with the databases and quality control processes and procedures.

### ***Interviews with Program Managers***

EnerNOC interviewed three program managers involved with the delivery of the DSM programs, the manager in charge of implementing the C&I programs, the manager in charge of delivering the Window AC and Residential HVAC Tune-up and Duct Repair Program and the manager responsible for the Student Energy Education program.

## Impact Evaluation

The impact evaluation focused on assessing adherence to the TRM and spot-checking for errors. EnerNOC also reviewed calculators for custom project measures such as chillers and HVAC equipment. Other studies conducted for OG&E for both Oklahoma and Arkansas are discussed below.

### ***Distribution System Efficiency Study***

Duct blaster tests were conducted under the Oklahoma Home Energy Efficiency Program (HEEP) for PY 2011. The Arkansas program was designed based on HEEP. A total of 32 homes (24 Oklahoma HEEP 2011 study participants and eight homes tested in 2010) were included in this program and associated results were used to calculate estimated Distribution System Efficiency (DSE) per ton. Similarly, duct blaster tests were conducted with homes participating in the 2013 AOG Weatherization program in Arkansas.

As described in Chapter 4, participants in the Arkansas Residential HVAC Tune-up and Duct Repair Program were not interested in the duct/plenum seal measure so OG&E used the program funds to implement these measures in the AOG Weatherization program with results counted under the original program.

A total of 25 homes were included in this study and associated results were used to calculate estimated DSE per ton. The average DSE per ton is calculated based on the average pre-seal, post-seal, and total system cubic feet per minute (CFM), and is estimated to be 13.5% and 11.6% for Oklahoma 2011 and Arkansas 2013, respectively, as shown in Table 2-1. The stratified estimate used previously resulted in a DSE value of 13.2%. The average DSE for all 57 homes was 12.7%<sup>1</sup>. EnerNOC recommends that OG&E use a DSE factor of 12.7% in the formula to calculate energy savings from sealing plenums in eligible homes in both Oklahoma and Arkansas.

**Table 2-1 DSE Factors by State and Combined Across All Homes**

State	# of Homes in Sample	DSE Factor
Oklahoma	32	13.5%
Arkansas	25	11.6%
<b>Combined</b>	<b>57</b>	<b>12.7%</b>

<sup>1</sup> Cook, G., Zhao, I, Marrin, K., and Dragon, D. OG&E Distribution System Efficiency Study, Dec. 2013.

### **Net To-Gross Factors**

For both PY 2011 and PY 2012, EnerNOC applied the default NTG factor of 0.8 to most program results. Although EnerNOC conducted primary research with some program participants, with such limited participation (18 respondents for C&I programs and 52 respondents for the residential HVAC tune-up program) we did not feel comfortable applying the results from very small samples. EnerNOC conducted a study to support use of more appropriate NTG factors for OG&E's programs.

We started with research completed by Navigant<sup>2</sup> for the two largest Ontario gas utilities in early 2013 designed to investigate approaches to determining NTG across the continent. The focus was on custom programs but the study was helpful in identifying a range of options for estimating NTG that are used in North America. The options listed in the table below from least to most costly, ranging from as low as \$3,000 for the first two options to over \$500,000 for option 5.

### **Assigning NTG Values to Energy Efficiency Programs**

1. **Transfer NTG Values from Other Research.** There is some clustering of values which could be used to inform a deemed value.
2. **Adjust NTG Values based on Program Factors.** Select a NTG value accounting for comparable program factors such as utility-type, program-type, targeted sector, program maturity, program marketing and region.
3. **Align NTG Values using Limited Primary Data.** Enhance the precision of comparative NTG values by applying a small set of selected primary data gathered during program implementation and/or evaluation. Interviews with trade allies (both participating and non-participating) can provide insight into free riders and spillover with relatively limited data collection requirements.
4. **Full NTG Research Study – After Program Year.** These studies are done for each program and use various methods including surveys of participants and non-participants, interviews with trade allies and other market actors, as well as econometric modeling such as discrete choice.
5. **Integrated/Fast Feedback NTG Estimation.** This reduces the bias in NTG estimates by collecting data frequently over time and getting fast feedback which can reduce recall bias by surveying participants closer to when decisions are made.

In fall 2013, EnerNOC conducted a literature review of NTG approaches for programs in other jurisdictions that are similar to those implemented in Oklahoma and Arkansas. Sources used included: EnerNOC's internal database of evaluation reports; CALMAC; NEEP Repository of State and Topical EM&V Studies; CEE database; multiple state and utility websites; and general internet searches.

Based on this research, we assess which of the Navigant NTG approaches that could be used for each OG&E programs including comparing program factors such as maturity, location, target markets, etc. EnerNOC then recommended approaches and research to refine NTG values for each program where needed.

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<sup>2</sup> Navigant Consulting, "Custom Free Ridership and Participant Spillover Jurisdictional Review," prepared for Enbridge and Union Gas, May 2013.

## CHAPTER | 3

**NTG STUDY RESULTS**

This chapter shows the results of the net-to-gross literature review<sup>3</sup> for the following programs:

- Commercial Lighting
- Custom Rebates (SOP and CTU)
- Residential HVAC and Tune-Ups

EnerNOC did not find any relevant evaluation studies for the Window AC program so we applied the default NTG ratio of 0.8.

EnerNOC also found no comparable program NTG values for the Student Energy Education program. For PY 2012, however, we had identified and gained IEM approval for applying individual measure NTGs supported by other studies or mandated by the IEM, and calculated a savings-weighted average NTG for the program. Again with approval by the IEM, we applied these same individual values to the PY 2013 savings. The individual measure values are: 1.0 for faucet aerators and low-flow showerheads, and 0.63 for CFLs. Based on the realized savings for PY 2013, the program NTG is 0.83

**Commercial Lighting**

The table below shows the results of the literature review for evaluations of commercial lighting programs implemented in Arkansas. For Arkansas PY 2013 commercial lighting program we used the findings from two evaluations done by Cadmus in 2013 for Entergy's Small Business Program<sup>4</sup> and SWEPCO's C&I Prescriptive Program<sup>5</sup>. Both of these programs have a similar target market and maturity as the OG&E program. Although the programs are not exclusively lighting programs they both include a strong lighting component. EnerNOC applied a NTG ratio of 0.9 for these program results.

**Table 3-1 NTG Results for Commercial Lighting Programs**

Program	Location	Target Market	Program Year (s)	Maturity of Program	NTG Approach	Includes Spillover?	NTG Ratio
Small Business Program	Arkansas	C&I less than 100 kW	2012	Early (1 <sup>st</sup> year)	Full NTG research	Yes	1.0
C&I Prescriptive Program	Arkansas	Nonresidential customers	2012	Early (1 <sup>st</sup> year but based on an existing program)	Full NTG research	Yes	.89

<sup>3</sup> Ryan, B., Cook, G., Ignelzi, P., and Shah, T. *Approach to Net Savings: Oklahoma & Arkansas*, Dec 2013.

<sup>4</sup> Cadmus. (2013). *Energy-Efficiency Portfolio Evaluation Report; 2012 Program Year*. Entergy Arkansas.

<sup>5</sup> Cadmus. (2013). *Energy-Efficiency Portfolio Evaluation Report; 2012 Program Year*. Southwestern Electric Power Company.

## Custom Projects (SOP and CTU)

The following table shows the results of the literature review for evaluation of custom programs implemented in Arkansas. For Arkansas PY 2013 Commercial Lighting Program EnerNOC used the findings from two evaluations done by Cadmus in 2013 for Entergy's CitySmart and C&I Custom Solutions Programs<sup>3</sup> and SWEPCO's C&I Energy Efficiency Program<sup>4</sup>. These programs have a similar target market and maturity as the OG&E program. For the results of the custom projects implemented in PY 2013 EnerNOC applied a NTG ratio of 0.98.

**Table 3-2 NTG Results for C&I Custom Rebate Programs**

Program	Location	Target Market	Program Year (s)	Maturity of Program	NTG Approach	Includes Spillover?	NTG Ratio
CitySmart	Arkansas	Institutional and Public Entities	2012	Early (3 <sup>rd</sup> year)	Full NTG Research	Yes	1.0
C&I Custom Solutions Program	Arkansas	Large C&I (over 100 kW)	2012	Early (2 <sup>nd</sup> year)	Full NTG Research	Yes	.98
C&I Energy Efficiency Program	Arkansas	Large C&I (over 50 kW)	2012	Early (1 <sup>st</sup> year)	Full NTG Research	Yes	.97

The other component of the SOP/CTU programs is direct installation of selected measures at no cost to the customer; these measures include CFLs, vending machine controllers and water-saving equipment, such as faucet aerators and low-flow pre-rinse valves, for customers with electric hot water. An implementation contractor, CLEAResult, recruits and trains trade allies, processes applications, conducts inspections before and after implementation, installs DI measures, and makes incentive payments. This is the same initiative as Entergy used in its Small Business Program for which the Cadmus evaluation found a NTG ratio of 1.0 (as shown in Table 3-3). EnerNOC will apply a NTG ratio of 1.0 for OG&E results from the direct installation component.

## Residential HVAC Tune-Up and Duct Repair

The following table shows the results of the literature review for evaluation of residential HVAC tune-up programs implemented in Arkansas. For Arkansas PY 2013 we used the findings from two evaluations done by Cadmus in 2013 for Entergy's Home Energy Solutions Program<sup>3</sup> and SWEPCO's Cool Saver Program<sup>4</sup> and an evaluation done by Navigant for Public Service of Oklahoma's Residential AC Tune-Up Program<sup>6</sup>. These programs have a similar target market and maturity as the OG&E program. For the results of the custom projects implemented in PY 2013 EnerNOC applied a NTG ratio of 0.9.

<sup>6</sup> Navigant. (2012). *Public Service Company Report on the Performance of Energy Efficiency and Demand Response Programs; Program Year 2011*.

**Table 3-3 NTG Approaches used for HVAC Tune Up and Duct Repair Program**

Program	Location	Target Market	Program Year (s)	Maturity of Program	NTG Approach	Includes Spillover?	NTG Ratio
Home Energy <sup>1</sup> Solutions	Arkansas	Residential	2012	Early (2 <sup>nd</sup> Year)	Full NTG Research	Yes	.89
Cool Saver Program	Arkansas	Residential	2012	Early (2 <sup>nd</sup> Year)	Full NTG Research	No	.91
Residential AC Tune Up	Oklahoma	Residential	2011	Early (2 <sup>nd</sup> Year)	Full NTG Research	Yes	.95

<sup>1</sup>This program includes additional measures that the OG&E program does not offer.

## NTG Ratios for PY 2013 Arkansas Programs

The table below outlines our recommended NTG ratio for each program.

**Table 3-4 Recommended NTG Values for Arkansas DSM Programs**

Program	Components	PY 2013 NTG Ratio
Commercial Lighting		.9
C&I Custom	Custom projects for SOP and CTU	0.98
	Direct Installation	1.0
Residential HVAC Tune Up and Duct Repair		0.9
Window AC		0.8
Student Energy Education	Self-installed aerators, showerheads, and CFLs	0.83

### Sources

- ADM. (2010). *Residential Living Wise Program Measurement & Verification Report, 2009 Program Year*. El Paso Electric Company; and IEM directive for CFLs (2013).
- Cadmus. (2013). *Energy-Efficiency Portfolio Evaluation Report; 2012 Program Year*. Entergy Arkansas.
- Cadmus. (2013). *Energy-Efficiency Portfolio Evaluation Report; 2012 Program Year*. Southwestern Electric Power Company.
- Navigant. (2012). *Public Service Company Report on the Performance of Energy Efficiency and Demand Response Programs; Program Year 2011*.

## RESIDENTIAL PROGRAMS

This section describes the findings from the evaluation of the impacts of the three residential programs, the HVAC Tune-Up and Duct Repair Program, the Window AC Program, and the Student Energy Education Program (LivingWise®). The LivingWise program is delivered and tracked in a different way than are the other two programs.

### HVAC Tune-Up and Duct Repair

The HVAC Tune-Up and Duct Repair program was launched July 2011 and continued through 2013. This program targeted single family residential customers with central HVAC systems and worked towards improving the efficiency of these units. The program contained two major components: (1) HVAC inspection and tune-up and (2) duct repair including plenum sealing. In order to pursue either measure, the customer was required to contract work from an OG&E approved local, certified, and licensed HVAC contractor. At the completion of each project, the results were documented through the use of the OG&E Post-Inspection Survey Form completed by the licensed contractor. This program was based on an existing program offered in Oklahoma, called the Home Energy Efficiency Program or HEEP.<sup>7</sup> As program participants were not interested in the duct repair measure, program funds were used to install the measure in homes participating in the AOG Weatherization program and savings were counted under this program.

#### *HVAC Inspection and Tune-Up*

In completing the first component, a technician certified in the use of an approved diagnostic system will analyze the air conditioner or heat pump's refrigerant charge, using superheat, subcooling, or another approach per the equipment manufacturer's recommendation. The following pre- and post-service measurements shall be recorded and reported to the utility:

- Condenser air entering temperature
- Return plenum dry bulb and wet bulb temperatures
- Supply plenum dry bulb temperature
- Refrigerant suction line and liquid line temperatures
- Refrigerant suction and discharge pressures

These tune-ups will be done using utility-approved diagnostic equipment or protocols, such as: Honeywell Service Assistant™, Proctor Engineering CheckMe!, Enalasis™, Verified RCA™ or other approved diagnostic system. Airflow may either be measured directly or estimated using the temperature split method. OG&E will pay the \$75 incentive directly to the contractor to off-set inspection and tune-up costs. If any repair is needed to the HVAC equipment whose cost exceeds \$75, the customer will be responsible for payment of any such repairs.

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<sup>7</sup> The major difference between Oklahoma HEEP and Arkansas HVAC Tune-Up and Duct Repair program is that HEEP offered a free 1 lb refrigeration charge and the Arkansas program did not.

### *Duct Repair*

Duct repair measures involved the assistance of sealing or repairing HVAC duct work. The customer was required to contract duct inspection services for a certified technician to identify loose duct connections, collapsed ducts, or uninsulated ducts. If such faulty ducts were found, OG&E paid up to \$300 directly to the contractor to offset the cost of the duct repair.

### **Summary of Program Results**

This section includes a summary of program participation, demand and energy savings, and program costs. Goals for 2013 included implementing 300 projects for a total gross savings of 194 kW and 286,281 kWh per year. With the exception of meeting and exceeding the participation goals, goals were not met. A total of 510 projects were reported as implemented with demand and energy savings of 73 kW and 182,551 kWh per year, respectively.

Table 4-1 below shows the total participation and gross claimed savings in the tracking database for PY 2013 as well as gross savings goals.

**Table 4-1 2013 HVAC Tune Up and Duct Repair Program Summary Results**

<i>Metric</i>	<i>Participation (AC Units)</i>	<i>Demand Savings (kW)</i>	<i>Energy Savings (kWh/yr)</i>
OG&E Reported	510	73	182,551
OG&E Goal	300	194	286,281
<b>Goal %</b>	<b>170%</b>	<b>37%</b>	<b>64%</b>

### **Program Evaluation**

Based on conversations with OG&E and spot checks with submitted data, the methods used to estimate savings are in-line with TRM 2.0 methods for HVAC Tune-Ups and Duct Repair measures. OG&E confirmed that all Residential projects were implemented in homes located in Climate Zone 8. For the HVAC Tune-Up projects, one entry had an error and used Climate Zone 7 effective full load hours for cooling season instead of hours for Climate Zone 8. This finding resulted in a slightly lower evaluated gross energy savings for HVAC Tune-Up projects. Please note that all the HVAC Tune-Up projects considered that the baseline system was undercharged by 20% and had an EER of 10.235. Supporting documentation for this claim was not provided and the evaluated savings assume that the certified technician was able to prove the baseline claims. For the Duct Repair projects, the evaluated savings consider that all units have default efficiency ratings of: 11.5 SEER (all unit types) and 7.3 HSPF (for heat pumps).<sup>8</sup> Evaluated savings for the Duct Repair projects consider the following updates:

1. Distribution System Efficiency (DSE) of 12.7% (from the 2013 study) instead of the TRM 2.0 default value of 0.05%.
2. Corrected the savings estimates for two projects that over estimated annual energy savings by about 30 kWh.
3. Included annual energy savings for one project that was missing an estimated annual energy savings value.

For the program as a whole, EnerNOC found realization rates of 197% for the demand savings and 216% for the energy savings. The NTG ratio of 90% from Chapter 3 was applied to the gross savings. Table 4-2 below shows the reported savings, evaluated savings, realization rates for the gross impact estimates, and net savings for the implemented projects.

<sup>8</sup> SEER and HSPF are the abbreviations for seasonal energy efficiency ratio and heating seasonal performance factor, respectively.



**Table 4-2 2013 Impact Results for HVAC Tune Up and Duct Repair**

Measure	Net Savings	Gross Impacts			Net Impact
		Reported	Evaluated	Realization Rate	
HVAC Tune-up	Demand Savings (kW)	27	27	100%	24
	Annual Energy (kWh)	45,870	45,589	99%	41,030
Duct Repair	Demand Savings (kW)	46	117	254%	105
	Annual Energy (kWh)	136,681	347,809	254%	313,028
<b>Totals</b>	<b>Demand Savings (kW)</b>	<b>73</b>	<b>144</b>	<b>197%</b>	<b>130</b>
	<b>Annual Energy (kWh)</b>	<b>182,551</b>	<b>393,398</b>	<b>216%</b>	<b>354,058</b>

## Window AC Program

The Window Air Conditioner (Window AC) program was launched in July 2011 and continued through 2013. This program targeted single family residential homes without central HVAC systems and worked towards influencing these customers to purchase high-efficiency window air conditioners. To qualify for this program, the new window AC unit energy efficiency ratio (EER) was required to exceed corresponding Nation Appliance Energy Conservation Act (NAECA) baseline standards by 10% or more. The baseline is assumed to be a new air conditioning unit with an EER rating meeting current NAECA standards. In order for a customer to receive a \$40 rebate per high-efficiency window AC unit, the installation of the new unit was required to be installed by a certified third-party contractor and the customer was required to submit an invoice.

### Summary of Program Results

This section includes a summary of program participation, demand and energy savings, and program costs. Goals for 2013 included implementing 25 projects for a total savings of 2.5 kW and 3,029 kWh/yr. Goals were met and exceeded in 2013 with a total of 30 projects reported with demand and energy savings of 3.3 kW and 3,748 kWh per year, respectively. Table 4-3 below compares goals to the total participation and claimed savings in the tracking database for PY 2013.

**Table 4-3 Window AC PY 2013 Program Summary Results**

Metric	Participation (projects)	Demand Savings (kW)	Energy Savings (kWh/yr)
OG&E Reported	30	3.3	3,748
OG&E Goal	25	2.5	3,029
<b>Goal %</b>	<b>120%</b>	<b>132%</b>	<b>124%</b>

### Program Evaluation

The reported net energy and demand savings are based on deemed saving values provided in Section 2.1.10 Window Air Conditioner Replacement of the Arkansas TRM 2.0. Applying TRM 2.0 deemed savings for this measure is consistent with EnerNOC's proposed method for the Window AC PY 2012 evaluation; this included applying deemed savings per unit size and project climate zone. Project locations or associated climate zones were not provided in the 2013 Window AC database. However, OG&E confirmed that all considered projects were implemented in Climate Zone 8 (even though some of the projects' reported savings were based on deemed savings of other Arkansas climate zones: 6, 7, and 9). EnerNOC updated the gross savings estimates based on Climate Zone 8 deemed savings and corrected values that were entered incorrectly.

Table 4-4 includes the 2013 impact results for the Window AC program and shows that the reported savings were underestimated with demand and energy saving realization rates of 103%. The NTG ratio of 80% was applied to the gross savings. The reported savings values have a net impact of 2.7 kW and 3,075 kWh per year.

**Table 4-4 2013 Impact Results for Window AC**

Savings	Gross Impacts			Net Impact
	Reported	Evaluated	Realization Rate	
Demand Savings (kW)	3.3	3.4	103%	2.7
Annual Energy (kWh)	3,748	3,844	103%	3,075

## Student Energy Education

The SEE is a turnkey program, with all activities managed directly by the provider, RAP. Nothing in the design or delivery of the program in PY 2013 changed from the previous year. So, our findings about the program and its compliance with Arkansas guidelines are the same. For completeness, we largely repeat them here from the previous year's evaluation report.

The tables, figures, and related text have all been updated to reflect results for the PY 2013 program. The key differences between this report and PY 2012 are:

- The savings for PY 2013 have been calculated using TRM 3.0. The new TRM yields notably different per-unit savings for faucet aerator and showerhead measures in the kit.
- The savings have been calculated based on PY 2013 participant data. They incorporate updated measure installation rates and water and space heating fuel shares of this year's participants.
- We were able to confirm that the faucet aerators included in the PY 2013 kit were the more efficient 1.5 gpm model (which was not unequivocally confirmed in previous year).
- Based on findings in a recently conducted study, these results include the embedded savings associated with treatment of drinking water and wastewater for the faucet and showerhead measures, in addition to savings by participants.

### **Program Description**

The purpose of the Student Energy Education (SEE) program is to shape household behaviors about resource use and encourage reduced energy use through a combination of information about resource efficiency and access to efficient products.

The program has been in operation since before this 2011-2013 program cycle. Under the program, 6<sup>th</sup> grade students in participating schools are each provided with a take-home kit containing energy and water efficiency devices and are exposed to information about energy efficiency, both in the classroom and through materials in the kit.

SEE is operated as a turn-key program. Under contract to OG&E, Resource Action Programs (RAP) implements its LivingWise<sup>®</sup> program by enrolling schools and furnishing the materials and training to teachers who then conduct the in-classroom lessons and provide the students with take-home kits that contain several energy and water savings devices, along with additional information about how to install the devices and save resources. The OG&E program manager and the RAP website confirm that the LivingWise<sup>®</sup> kits include: a low-flow showerhead, a CFL, a kitchen faucet aerator, an LED nightlight, and other items designed to help families check for inefficiencies in their homes. Both the kits and the RAP website contain explicit instructions on how to install each of the items.

**Figure 4-1 LivingWise® Kit**



The Plan shows the participation goals for the three-year cycle. A participant is defined as a student. Under the program, each participant is issued a kit with the above noted items. The savings the program expects to realize and that OG&E is claiming, derive from the installation of three of the items in the kit: the low-flow showerhead, the CFL, and the kitchen faucet aerator.

Table 4-5 shows the participation and savings that OG&E anticipates the program will achieve annually during this program cycle.

**Table 4-5 Student Education Energy Participation and Savings Projections**

Program Year	Annual Participants	Annual Savings (kW)	Annual Savings (kWh)
2011	1,240 students	10.3	102,516
2012	1,840 students	15.2	152,120
2013	1,840 students	15.2	152,120

Source: Oklahoma Gas & Electric's 2011-2013 Arkansas Energy Efficiency Program Analysis and Plan, Table 7, p. 16.

**Summary of Program Operations**

As noted, the SEE is operated by the contracted implementer, RAP, as a turnkey program, under the brand name LivingWise®. To meet the program objectives and savings goals, OG&E provides RAP with a list of potential schools who have indicated a willingness to participate. RAP has the following responsibilities:

**Conduct outreach and enroll schools**

The OG&E program manager said that RAP researches the number of eligible students/schools in the area and allows teachers to enroll in many ways, i.e. via telephone, email, and website. RAP also mails letters to the schools and even call the schools each year. Teachers can also contact RAP or OG&E to request inclusion of their classes in the program. In interviews with both the OG&E program manager and a RAP manager, we learned that RAP had no trouble enrolling teachers into the program to meet the goal for number of kits distributed. That number of kits distributed is strictly capped by the program budget. Both indicated that, once the quota is reached each year, RAP stops recruitment. Part of what makes it easy for RAP to meet the participation goal is that they return to the same schools and teachers each year. According to the RAP annual report, teachers are pleased with the program<sup>9</sup>, and are interested in participating again. While not confirmed, the full enrollment readily achieved each year suggests it is possible that some interested teachers are turned away. It does appear that teacher interest in the program is high and the program budget is the limitation to program participation.

One note about the participation limits. OG&E's participation goal for PY 2013 was 1840 participants. As Table 4-6 shows RAP delivered and billed for a total of 2,050 kits. Of these, only 2,006 were for distribution to students. This means that 2% of kits paid for by the program were very likely not installed. As in past years, a substantial number of teachers participated in both years and received kits both years. The cost of each kit to OG&E is \$40. While the total cost of the teacher kits is not especially large, it is unlikely that they result in any savings. Eliminating delivery of kits to teachers or having them reuse ones from previous year would allow the program budget to add more participants. We recommend that, unless the contents of the kit have changed or the teacher no longer has his/her kit, RAP should not send a kit to repeat-participant teachers each year.

**Table 4-6 Distribution of Kits in PY 2013**

Number of Kits Distributed	Spring 2013	Fall 2013	Total
RAP delivered to classrooms	1,100	950	2,050
For teachers	28	16	44
For students	1,072	934	2,006

### **Develop and assemble all materials and deliver them to the participating classrooms**

As indicated in the program description above, RAP has created a set of instructional materials and measures for students to install at home. They also provide an educational curriculum for the teachers to use. In a quick review of the student materials, we found that the installation instructions seem complete and easy to follow. The kits come with specialty tools to install and measure the low-flow showerheads; the faucet aerator and CFL require common or no tools to install.

The information RAP has provided to OG&E in equipment spec sheets and in savings estimates in the annual report now seems to match what is in the kits. All three of the measures have efficiency levels at or above the minimum required by TRM 3.0.

### **Provide support to participating teachers throughout the program**

The RAP manager told us that the company is available to answer any questions from the participating teachers. Teachers have a phone number to contact RAP. Teachers are encouraged to use the curriculum, distribute the kits to students, and then have them return a survey that indicates what measures they installed at home. It does not appear that RAP initiates contact

<sup>9</sup>It is not clear how many teachers provided a program evaluation, but 100% of those who did said they would conduct the program again, given the chance. Reported in *OG&E Arkansas LivingWise Program Summary Report 2012*, prepared by Resource Action Programs, January 2013.

with the teachers after delivery of the kits. RAP apparently does not confirm whether the kits are distributed, the curriculum is taught, or the students are encouraged to install the measures. Based on the results and comments in the student surveys returned, it is evident that a very high percentage of the teachers did do those things. But in PY 2013, as in previous years, some teachers had no students return surveys. We recommend that RAP include a question on the teacher survey that explicitly asks whether the teacher taught the curriculum, distributed the kits, and/or encouraged students install the measures.

### **Request return of audit forms and evaluations of the program from participants**

As part of enrollment, RAP asks teachers to have students complete a survey about their installation of the measures and to complete a survey of their own satisfaction with the program. As inducement, teachers whose students do return surveys are offered a nominal gift card for purchase of educational materials or supplies for their classrooms. In PY 2013, 1,168 of the 2,006 students who were provided kits returned completed surveys, a response rate of 58%.

### **Provide OG&E with an annual report of results, in time for inclusion in OG&E report to the APSC**

According to the OG&E program manager, RAP provides OG&E with monthly reports on the number of kits delivered to classrooms. RAP provided a full-year summary and results of the participant survey for use in this evaluation. RAP also provides OG&E with a complete report after the program year is complete that shows the number of kits delivered, as well as their own estimates of savings associated with each of the measures.

### ***Review of Program Tracking and Database***

OG&E maintains a tracking system that shows the number of participants in the program each year and recorded savings. With the exception of the expected electric savings, all the data are provided by RAP and transferred into the Saratoga tracking system by OG&E. According to the OG&E program manager, RAP sends monthly electronic reports that show of the number of students enrolled and the number of kits shipped to schools. OG&E enters its own estimate of per-participant savings, using the results from the most recent estimate of per-participant realized savings.

### ***Use of Technical Reference Manual (TRM) Values***

The TRM 3.0 provides algorithms for the estimation of savings for all three of the claimed savings measures in the program. It also provides default values for all of the inputs in the algorithms. The IEM has advised the use of default values in cases where there is no reliable data from participant sites.

EnerNOC was able to replicate the example results in the TRM for the faucet aerator, low-flow showerhead, and CFL measures, ensuring that we could properly apply them. We then used the algorithms to estimate the savings in OG&E's Arkansas service territory, using default input values for OG&E's service territory in Arkansas (Ft. Smith) and program-specific data from participants. The algorithms and resulting estimates in Table 4-7 represent savings per measure installed. That is, they do not adjust for the installation rate of each measure or the relative share of participants' homes with electric versus natural gas water heating.

**Table 4-7 TRM-Calculated Savings by Measure, Per Unit Installed**

Measure	Annual kWh	kW	Annual Therms
Faucet Aerator	34.26	0.0036	1.47
Low-Flow Showerhead	137.20	0.0143	5.88
13-watt CFL	44.40	0.0070	--

We show how the algorithms were applied in the results for each measure in the following subsection.

To estimate the overall program savings and savings realized per participant, we followed guidelines from the IEM regarding the use of as much reliable program-specific data as possible to inform the impact estimates. We used the following data from the participant surveys to estimate the per-participant and total program savings by measure reported below:

- Wattage of the lamp replaced by the CFL in the kit (in the per-unit savings above)
- Installation rate of the measure (for aerator, showerhead, and CFL)
- Share of electric versus natural gas water heating (for aerator and showerhead)
- Share of electric versus natural gas space heating (for CFL interactive effects)

### ***Program Year 2013 Results***

Documentation for 2013 from OG&E shows that the implementer sent 2,050 kits to serve 2,006 students in 24 Arkansas schools. Using data provided by OG&E and the implementer, the TRM-based per-unit measure energy savings estimates, and information from the participant surveys, we estimated total program savings for each of the measures in the PY 2013 program. These are summarized in Table 4-8.

While OG&E does not provide natural gas to customers in Arkansas and has no goals for natural gas savings, 41% of the participants said they have gas water heat and realized significant natural gas savings from installation of the aerator and showerhead measures. In Btu equivalents, the natural gas savings for those measures are as high as the electric savings. We include those savings here as well.

The measures vary considerably in their contribution to the total savings. Low-flow showerheads and CFLs yield similar kWh energy but peak kW is notably higher for CFLs. The relative contribution of each measure differs considerably from PY 2012. This is due to several factors, key among them: changes in the TRM allowances and changes in the participant installation rates of the measures. Combining the savings from all measures for all participants, the average savings per participant is 75.3 annual kWh, .01 kW, and 1.2 annual therms.

**Table 4-8** *SEE Realized Program Savings by Measure, Total and Per Participant*

	Annual kWh	kW	Annual Therms
Aerator	19,073	1.99	544
Showerhead	64,368	6.72	1,838
CFL	67,687	10.71	--
<b>Total</b>	<b>151,128</b>	<b>19.41</b>	<b>2,382</b>
<b>Per Participant</b>	<b>75.3</b>	<b>0.010</b>	<b>1.2</b>

In addition to the end-user savings, the values in the table above include water supply and wastewater treatment savings accrued to local water agencies due to reduced water usage from faucet aerators and low-flow showerheads. Each gallon of water saved reduces the drinking water or wastewater utility's energy requirements for functions such as collecting, treating, storing, and transporting water/wastewater. We refer to these as embedded savings and apply them based on a recent report prepared for OG&E by EnerNOC.<sup>10</sup>

<sup>10</sup> Parmenter, K., Ehrhard, R., Cook, G. and Williamson, C. *Embedded Energy Savings from Water Saving Measures: Electricity Savings Due to Avoided Water Supply and Wastewater Treatment*, Jan. 2014.

The study involved interviewing local water and wastewater agencies to determine typical energy intensity values for representative cities in Oklahoma and Arkansas and a literature review of energy intensity values as a function of water and wastewater plant characteristics to validate interview findings. Based on the research, the project team determined energy and average demand savings per unit of avoided water as a function of location across the electric utility’s service territory. The research revealed that water treatment in the part of Arkansas that OG&E serves has lower energy intensity than other parts of the service territory. We used the lower Fort Smith, Arkansas per-gallon kWh and kW intensities rather than the regional averages, resulting in a more conservative estimate of the embedded savings. Using the same TRM water reduction values as for the end-user savings, we calculated the following embedded energy savings, which are reflected in the savings in Table 4-8.

<b>Embedded Energy Savings</b>	
<b>Annual water savings per unit installed</b>	
•	Faucet aerator = 381 gal/yr
•	Showerhead = 1457 gal/yr
<b>Water &amp; wastewater energy and demand savings</b>	
•	2.4 Watt-hr/gal
•	0.0003 Watt/gal
<b>Total embedded energy and demand savings</b>	
Units installed x gallons saved x savings/gal	
•	Faucet aerators = 824 kWh, .09 kW
•	Showerheads = 2,662 kWh, .30 kW

**Faucet Aerators**

The per-unit installed savings for faucet aerators were calculated using the following TRM 3.0 algorithm:

$$\text{Deemed kWh or Therms} = (\rho \times C(p) \times V \times (T_{\text{mixed}} - T_{\text{supp}}) \times 1/\text{RE})/\text{CF}$$

where:

$\rho$  = Water density, 8.33 lbs./gal. (TRM default)

$C(p)$  = Specific heat of water, 1 BTU/lb·°F (TRM default)

$V$  = Gallons of water saved per year per faucet = 381, for aerator rated 1.5 gpm (TRM default)

$T_{\text{mixed}}$  = Mixed water temperature at faucet (TRM default)

$T_{\text{supp}}$  = Average supply water temperature (TRM Water Main Temperature for Ft. Smith)

RE = Recovery Efficiency of water heater, excluding standby losses (TRM default)

CF = 3,412 BTU/kWh for electric water heating or 100,000 BTU/Therm for gas water heating

**Table 4-9      Faucet Aerator Realized Savings**

Realized Gross Savings	Per Unit Installed	Per Participant	Participant Total
Annual kWh	34.26	9.508	19,073
Peak kW	0.0036	0.00099	1.99
Annual Therms	1.48	0.271	544

We calculated the per-participant and total savings using the TRM 3.0 algorithm and the following information:

- Each kit contained one faucet aerator.
- The per-participant savings reflect adjustments to the per-unit installed savings we made based on program-specific information from the PY 2013 participants. These include:
  - Aerator installation or in-service rate (ISR) = 45%
  - Water heat fuel shares = 59% electric and 41% natural gas
- They also include drinking water and wastewater treatment savings accrued from the reduced water use, as identified in report on embedded savings.<sup>11</sup>
  - Energy intensity of treatment = 2,397 kWh and .27 kW per million gal. water
  - Embedded savings total from aerators = 824 kWh/yr and .09 peak kW
  - Treatment is electric and applies to all water used by installed units, regardless of water heat fuel

### Low-Flow Showerheads

The per-unit installed savings for low-flow showerheads were calculated using the following TRM 3.0 algorithm:

$$\text{Deemed kWh or Therms} = (\rho \times C(p) \times V \times (T_{\text{mixed}} - T_{\text{supp}}) \times 1/\text{RE})/\text{CF}$$

where:

$\rho$  = Water density, 8.33 lbs./gal. (TRM default)

$C(p)$  = Specific heat of water, 1 BTU/lb·°F (TRM default)

$V$  = Gallons of water saved per year per showerhead  
(showerhead in kit = 2.0 gpm; other inputs TRM default)

$T_{\text{mixed}}$  = Mixed water temperature at showerhead (TRM default)

$T_{\text{supp}}$  = Average supply water temperature (TRM Water Main Temperature for Ft. Smith)

RE = Recovery Efficiency of water heater, excluding standby losses (TRM default)

CF = 3,412 BTU/kWh for electric water heating or 100,000 BTU/Therm for gas water heating

**Table 4-10 Low-Flow Showerhead Realized Savings**

Realized Gross Savings	Per Unit Installed	Per Participant	Participant Total
Annual kWh	137.20	32.088	64,368
Peak kW	0.0143	0.00335	6.72
Annual Therms	5.88	.916	1,838

We calculated the per-participant and total savings using the TRM 3.0 algorithm and the following information:

- Each kit provided one low-flow showerhead.
- The per-participant savings reflect adjustments to the per-unit installed savings we made based on program-specific information from the PY 2013 participants. These include:
  - Low-flow showerhead installation or in-service rate (ISR) = 38%

<sup>11</sup> "Embedded Energy Savings From Water Saving Measures: Electricity Savings Due to Avoided Water Supply and Wastewater Treatment," prepared by EnerNOC for OG&E, January 21, 2014.



- Water heat fuel shares = 59% electric and 41% natural gas
- They also include drinking water and wastewater treatment savings accrued from the reduced water use, as identified in report on embedded savings.<sup>12</sup>
  - Energy intensity of treatment = 2,397 kWh and .27 kW per million gal. water
  - Embedded savings total from showerheads = 2,662 kWh/yr and .30 peak kW
  - Treatment is electric and applies to all water used by installed units, regardless of water heat fuel

### Compact Fluorescent Lamps

The per-unit installed savings for CFLs were calculated using the following TRM 3.0 algorithm:

$$\text{Deemed kWh} = (\text{base Wattage} - \text{CFL Wattage}) * \text{Annual Operating Hours} * \text{IEF}$$

$$\text{Deemed kW} = (\text{base Wattage} - \text{CFL Wattage}) * \text{Coincidence Factor} * \text{IEF}$$

where:

base Wattage = wattage of lamp replaced by the CFL from the kit (participant survey average)

CFL Wattage = 13 watts (verified by visual inspection of measures in the kit)

Annual Operating Hours = TRM value for indoor applications

Coincidence Factor = Peak demand coincidence factor (TRM default for indoor applications)

IEF = Interactive effects factor to account for the effect on heating and cooling loads associated with the replacement of incandescent lamps (TRM defaults)

**Table 4-11 CFL Realized Savings**

Realized Gross Savings	Per Unit Installed	Per Participant	Participant Total
Annual kWh	44.40	33.742	67,687
Peak kW	0.0070	0.00534	10.71

- Each kit provided one 13-watt CFL.
- The per-participant savings reflect adjustment to the per-unit installed savings we made based on the participant-reported CFL installation or in-service rate (ISR) = 76%
- Fully complies with TRM 3.0, including
  - Calculation of different impacts in homes with electric heat and gas heat (weighted average is reported in table above; share of homes with electric and gas heat reported by participants)
  - Assessment of baseline, based on survey info about lamp replaced and assumption that it was in an indoor fixture and working or would have been replaced with the same
  - TRM annual operating hours (AOH) = 803.6

### Net Savings

The IEM confirmed support for using the same net-to-gross (NTG) values in PY 2013 as last year. Since the approved values differ by measure type, we applied them to the measure totals and calculated the net savings for the program as the measure savings weighted average.

<sup>12</sup> Ibid.

Table 4-12 shows the effects of applying these NTG ratios to the Realized Gross Savings estimates for each measure. The overall program net-to-gross ratio is 0.83.

**Table 4-12 Student Education Energy Net Program Savings by Measure**

Measure	NTG Ratio	Annual kWh	kW
Faucet Aerator	1.0	19,073	1.99
Low-Flow Showerhead	1.0	64,368	6.72
13-watt CFL	0.63	42,643	6.75
<b>Total</b>	<b>0.83</b>	<b>126,084</b>	<b>15.45</b>

The final estimated impacts from the PY 2013 Student Energy Education Program are shown in Table 4-13. While the program met or exceeded all of its goals, the realized savings are below the tracking system values. The lower than expected savings are due to a combination of lower measure installation rates and changes in the TRM 3.0 calculations. Installation of aerators declined from 59% in PY 2012 to 45% in PY 2013, showerheads from 58% to 38%, and CFLs from 81% to 76%.

**Table 4-13 PY 2013 Student Education Energy Program Goals and Savings**

Metric	Goal	Reported (Gross)	Realized (Gross)	Realization Rate	Net Savings
Participants	1,840	2,006	2,006	109%	n/a
Energy kWh/year	152,120	321,962	151,128	48%	126,084
Demand kW	15	40	19	47%	15

### **Recommendations**

*Check in with teachers during the participation period to ensure kit distribution and encourage installation of measures in kits, and ask teachers to note their activities.*

- We learned that no one tracks teacher activities or asks them to report on whether they actually taught the curriculum, distributed the kits, or encouraged their use at home. At the end of the participation period, teachers are asked to rate their experience with the program, but are not asked what steps they took. We recommend adding a simple checklist of items to the teacher survey that allows them to report whether they taught the curriculum, distributed the kits, and/or encouraged students install the measures
- The program could likely achieve higher measure installation rates if every teacher is pro-active. Adding a checklist to the instructions and the teacher evaluation questionnaire could help assess and encourage teacher activity.

*Eliminate sending duplicate kits to teachers who repeatedly enroll in the program.*

- Many teachers enroll in successive years. Since there is no evidence that teachers install the measures in their kits, no savings are counted for them. But costs are incurred.
- Teachers' kits currently account for about 2% of annual kit cost invoice from RAP. The program could be made more cost effective if excess kits were eliminated.

*If more funds could be allocated to the SEE program, the program can multiply savings.*

- Not all Grade 6 students in OG&E's service territory have access to kits. Teachers decide whether to enroll. If they do, a kit is sent for every student (plus the teacher).
- The implementer easily meets its participation quota each year and participation is limited by program funding.

## CHAPTER | 5

## COMMERCIAL & INDUSTRIAL PROGRAMS

OG&E implemented three programs for C&I customers in PY 2013—Standard Offer, Commercial Tune-Up, and Commercial Lighting. This chapter describes the goals and OG&E reported savings, as well as the evaluation of each program including realization rates for gross savings and net savings achieved.

### Standard Offer Program

The Commercial & Industrial Standard Offer Program (SOP) offers financial incentives of \$250/kW for the installation of a wide range of measures that reduce customer energy costs, reduce peak demand, and/or save energy in non-residential facilities such as public authority buildings, schools, hospitals, and other industrial customers. Large individual customers, energy service companies (ESCOs), and qualified contractors are all eligible to participate in the SOP. The SOP provides incentives for many energy efficiency measures that are not covered under other OG&E programs. The Commercial & Industrial SOP PY 2013 custom projects included three high-efficiency measures: chillers, HVAC, and motors.

In addition, OG&E used some of the funds for this program to engage CLEAResult to install pre-rinse spray valves, CFLs, and faucet aerators under this program. Unit costs for the measures installed through CLEAResult were as follows:

Pre-rinse spray valves	\$140/unit
CFLs	\$4/unit
Faucet aerators	\$13/unit

Table 5-1 includes the breakdown of total projects by measure. Most of the custom projects (61%) consisted of motor retrofits, whereas most of the direct installation projects involved faucet aerators (58%) and CFLs (42%).

**Table 5-1 Standard Offer PY 2013 Program Projects by Type Measure**

Type of Project	Measure	Participation
Custom (projects)	Chillers	1
	HVAC	11
	Motors	19
Direct Installation (units)	Pre-rinse spray valves	20
	CFLs	1,014
	Faucet aerators	1,404
<b>Total</b>		<b>2,469</b>

### Summary of Program Results

This section includes a summary of program participation, demand and energy savings, and program costs for the SOP projects. Goals for 2013 included implementing 984 projects for a total savings of 2,452 kW and 8,972,138 kWh per year. A total of 2,469 projects were reported implemented with gross demand and energy savings of 590 kW and 2,691,590 kWh per year, respectively.

In Table 5-2 actual participation and savings are compared to program goals; savings are compared at the gross level.

**Table 5-2 PY 2013 SOP Comparison of Goals to Reported Savings**

Metric	Measure	Participation	Demand Savings (kW)	Energy Savings (kWh/yr)
OG&E Reported	Custom (projects)	31	155	994,173
	Pre-rinse spray valves	20	24	180,752
	CFLs	1,014	32	193,795
	Faucet Aerators	1,404	379	1,322,870
	<b>Total</b>	<b>2,469</b>	<b>590</b>	<b>2,691,590</b>
Goal	Custom (projects)	18		
	Pre-rinse spray valves	20		
	CFLs	473		
	Faucet Aerators	473		
	<b>Total</b>	<b>984</b>	<b>2,452</b>	<b>8,972,138</b>
<b>Goal %</b>		<b>251%</b>	<b>24%</b>	<b>30%</b>

### **Program Evaluation**

#### *Custom Projects*

OG&E provided EnerNOC with both SOP HVAC and Chiller TRM 2.0 Excel-based calculators to be reviewed. OG&E used the TRM 2.0 as the database was not able to be updated in time to report results using TRM 3.0. As a result of the review, EnerNOC recommended OG&E remove some descriptors that were not referenced and to update a formula that contained an error. The calculators assume that the HVAC and chiller units are sized correctly and use full-load TRM algorithms. EnerNOC collected the motor calculation algorithms and found that the final submitted savings summary report had entries entered correctly. However, the motor measures algorithms (that were not based on full-load analysis strategies) did not include load factors. It is assumed that motor's operation is not weather dependent and the evaluated energy and demand savings consider load factors of 0.75.

#### *Direct Installation*

Given the budget constraints, EnerNOC did not conduct an evaluation of the direct installation results for the SOP program. The evaluation of results for the same program implemented by CLEAResult for another Arkansas utility showed that realization rates were 100%; EnerNOC used these findings for the OG&E program for PY 2013.

In addition EnerNOC included an estimate of embedded energy savings for measures that decreased water use—faucet aerators and pre-rinse spray valves. The first step was to calculate the water savings for each measure for each sector using TRM 2.0 or TRM 3.0 as a source. The CLEAResult database included the efficiency level for each new measure which enabled the calculation of water savings in gallons per minute for each sector.

The next step was to apply the energy saved through reduced water use as discussed in Chapter 4 section for the Student Energy Education Program. Water and wastewater energy and demand savings in the part of Arkansas served by OG&E are 2.4 Watts-hr/gal and 0.0003 Watts/gal, respectively.

**Water saved (gal/year)**

$$= (\text{Baseline}_{\text{gpm}} - \text{Replaced}_{\text{gpm}}) * \text{water use (min/day)} * \text{days/year} * \# \text{ of measures installed}$$

**Demand reduced (kW)** = (0.0003 Watts/gal \* Water saved (gal/year)) / 1,000

**Energy saved (kWh)** = (2.4 Watts-hr/gal \* Water saved (gal/year)) / 1,000

**Faucet Aerators**

As shown in Table 5-3 below faucet aerators reduced water use by 14,197,601 gallons per year, reducing demand by an additional 4 kW and saving an additional 34,074 kWh per year in energy.

**Table 5-3 Calculations of Embedded Energy Savings for Commercial Faucet Aerators**

Sector	Water Use (min/day) <sup>13</sup>	# of Measures Installed	Water Saved (gal/min)	Water Saved (gal/min)	Days Per Year <sup>13</sup>	Water Saved (gal/year)
Hospital	30	35	55.5	1,665	365	607,725
Lodging	3	152	242.9	729	365	265,976
Commercial	30	660	1059	31,770	250	7,942,500
School	30	557	896.9	26,907	200	5,381,400
<b>Total</b>		<b>1,404</b>	<b>2,254.3</b>	<b>61,071</b>		<b>14,197,601</b>

**Demand Savings (kW)** = (0.0003 Watts \* 14,197,601) = 4 kW

**Energy Savings (kWh)** = (2.4 Watts-hr/gal \* 14,191,601) = 34,074 kWh

**Pre-Rinse Spray Valves**

As shown in Table 5-4 below pre-rinse spray valves reduced water use by 499,200 gallons per year, reducing demand by an additional 0.15 kW and saving an additional 1,198 kWh per year in energy.

**Table 5-4 Calculations of Embedded Energy Savings for Pre-Rinse Spray Valves**

Sector	Water Use (min/day) <sup>14</sup>	# of Measures Installed	Water Saved (gal/min)	Water Saved (gal/min)	Days Per Year <sup>14</sup>	Water Saved (gal/year)
Fast Food Restaurant	45	4	3	135	365	49,275
Casual Dining	105	9	7	735	365	268,275
Institutional	210	1	1	210	365	76,650
K-12 School	105	6	5	525	200	105,000
<b>Total</b>		<b>20</b>	<b>16</b>	<b>1605</b>		<b>499,200</b>

**Demand Savings (kW)** = (0.0003 Watts \* 499,200) = 0.15 kW

**Energy Savings (kWh)** = (2.4 Watts-hr/gal \* 499,200) = 1,198 kWh

<sup>13</sup> TRM 3.0 3.3.2 Table 220 Parameters for Annual Energy and Peak Demand Savings Calculations

<sup>14</sup> TRM 3.0 3.8.9 Table 310 Variables for the Deemed Savings Algorithm

### Net Savings

Table 5-5 shows the PY 2013 impact results for the SOP custom project and direct installation of measures. EnerNOC determined net savings by applying the NTG factors of 98% for custom projects and 100% for direct installation of measures as described in Chapter 3. Evaluated savings for custom and direct installation measures were 572 kW for demand and 2,552,360 kWh per year for energy. Realization rates for demand and energy were 97% and 95%, respectively. The net savings were 570 kW and 2,535,967 kWh per year.

**Table 5-5 2013 Impact Results for SOP**

Type	Measure	Metric	Gross Impacts			Net Impact
			Reported	Evaluated	Realization Rate	
Custom	Chiller	Demand Savings (kW)	9	9	100%	9
		Annual Energy (kWh)	126,233	126,233	100%	123,708
	HVAC	Demand Savings (kW)	59	59	100%	58
		Annual Energy (kWh)	169,930	169,930	100%	166,531
	Motors	Demand Savings (kW)	87	65	75%	64
		Annual Energy (kWh)	698,010	523,508	75%	513,038
Direct Installation	Pre-Rinse Spray Valves	Demand Savings (kW)	24	24	100%	24
		Annual Energy (kWh)	180,752	181,950	101%	181,950
	CFLs	Demand Savings (kW)	32	32	100%	32
		Annual Energy (kWh)	193,795	193,795	100%	193,795
	Faucet Aerators	Demand Savings (kW)	379	383	101%	383
		Annual Energy (kWh)	1,322,870	1,356,944	100%	1,356,944
<b>Totals</b>		<b>Demand Savings (kW)</b>	<b>590</b>	<b>572</b>	<b>97%</b>	<b>570</b>
		<b>Annual Energy (kWh)</b>	<b>2,691,590</b>	<b>2,552,360</b>	<b>95%</b>	<b>2,535,967</b>

### Commercial Tune-Up Program

The Commercial Tune-Up Program offers financial incentives of \$250/kW for the implementation of improvements to commercial air conditioning, food service, refrigeration, and/or ventilation systems that result in efficiency improvements. The target markets are food sales (groceries, butcher shops), food service (restaurants), and industrial facilities where food is processed, packed, shipped, etc.

Eligible measures under the Commercial Tune-Up Program include mostly individual pieces of equipment such as evaporator fan ECM motors, floating head pressure controls, defrost controls, etc. For industrial facilities, there is a set of additional measures that includes variable frequency drives, compressor plant upgrades, heat recovery and programmable logic controllers. In addition, OG&E engaged CLEAResult to install vending misers in commercial facilities at a cost of \$225/unit.

### **Summary of Program Results**

This section includes a summary of program participation, gross demand and energy savings, and program costs. Goals for 2013 were provided by OG&E and included implementing 10 custom projects and installation of 473 vending misers for a total gross savings of 140 kW and 949,961 kWh per year. OG&E reported that nine custom projects were implemented and 150 vending misers were installed resulting demand and energy savings of 37 kW and 359,174 kWh per year, respectively.

As shown in Table 5-6 below participation was 33% of expected with reported demand savings achieving 26% of the goal and energy savings achieving 38% of goals.

**Table 5-6 CTU PY 2013 Program: OG&E Reported Savings and Gross Savings Goals**

<b>Metric</b>	<b>Measure</b>	<b>Participation (projects)</b>	<b>Demand Savings (kW)</b>	<b>Energy Savings (kWh/yr)</b>
OG&E Reported	Custom	9	37	117,374
	Vending Misers	150	0	241,800
	<b>Total</b>	<b>159</b>	<b>37</b>	<b>359,174</b>
OG&E Goal	Custom	10	140	949,961
	Vending Misers	473	n/a	n/a
	<b>Total</b>	<b>483</b>	<b>140</b>	<b>949,961</b>
<b>Goal %</b>		<b>33%</b>	<b>26%</b>	<b>38%</b>

### **Program Evaluation**

#### *Custom Projects*

EnerNOC spot checked a few entries and found that the entered projects' information matched with data in the provided calculators, invoices and photographs of the pre- and post-case units.

#### *Vending Misers*

EnerNOC applied the TRM 3.0 deemed savings values for vending misers of 0.03 kW and 1,612 kWh per year to the reported participation (Section 3.7.4). The database used 0.0 kW for vending misers but applied the correct values for energy savings.

#### *Net Savings*

As discussed in Chapter 3, EnerNOC applied the NTG value of 98% to both energy and demand savings for custom projects and 100% to the direct installation of vending misers. Table 5-7 includes the OG&E reported results compared to the EnerNOC evaluated results and the realization rates for gross savings of 114% for demand savings and 100% for energy savings. Net savings for the CTU program were 41 kW and 356,827 kWh per year.

**Table 5-7 Reported, Gross and Net Savings for CTU Projects in PY 2013**

Savings	Measure	Gross Impacts			Net Impact
		Reported	Evaluated	Realization Rate	
Demand Savings (kW)	Custom	37	36	100%	36
	Vending Miser	0	5	n/a	5
	<b>Total</b>	<b>37</b>	<b>41</b>	<b>114%</b>	<b>41</b>
Energy (kWh/year)	Custom	117,374	117,374	75%	115,027
	Vending Miser	241,800	241,800	100%	241,800
	<b>Total</b>	<b>359,174</b>	<b>359,174</b>	<b>100%</b>	<b>356,827</b>

## Commercial Lighting Program

The Commercial Lighting program provides incentives to Arkansas commercial and industrial (C&I) customers who purchase and install energy efficient indoor and outdoor lighting, lighting controls, light emitting diode (LED) exit lights in both retrofit and new construction applications. Incentive levels for the measures are shown below.

- *Replace T12 with T8 or T5 Lamps (4 foot fixtures only)*
  - \$4/fixture for one- or two-lamp fixtures
  - \$8/fixture for three- or four-lamp fixtures
  - Other fixtures rebated at 16 cents per Watt of reduced demand
- *Replace HID fixtures with High-Efficiency Fluorescent Fixtures*
  - \$52 per 400 Watt HID Fixture Replaced
  - \$102 per >750 Watt HID Fixture Replaced
- *Replace Inefficient Incandescent Lamps with Hard-wired Compact Fluorescent Lamps*
  - \$8 per Fluorescent Fixture of 26 Watts or Less
  - \$11 per Fluorescent Fixture of Greater than 26 Watts
- *Replace Inefficient Incandescent Exit Fixtures with Energy Efficient LED Fixtures*
  - \$5 per LED Fixture
- *Lighting, Sensors or Controls Not Specified*
  - \$160 per kW of Reduced Peak Demand

The incentives are based on the kW and kWh savings calculated from a lighting survey that takes into account the type and quantity of lighting fixtures replaced, the new fixtures installed, the building type, and any control technologies in place.

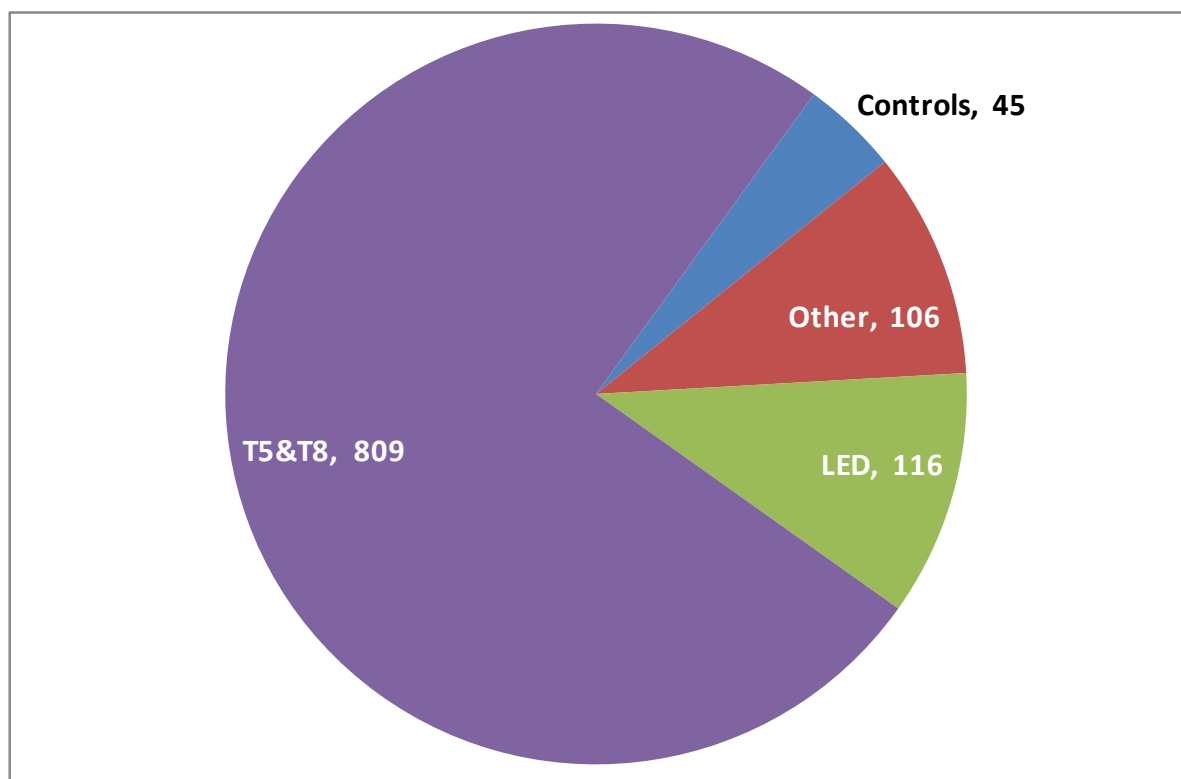
Most of the projects (91%) consisted of high-efficiency fluorescent lighting with a total of 103 projects, followed by LED lighting with 58 total projects. Table 5-8 below includes a summary of all the commercial lighting projects reported in 2013, with associated demand and energy savings.

Figure 5-1 shows the breakdown of demand savings reported by measure with T5 & T8 measures providing 75% of OG&E's reported savings, followed by LEDs with 14% of savings. Energy savings show the same pattern.



**Table 5-8 2013 Commercial Lighting Measure Descriptions and Total Projects Reported**

Category	Lighting Measure	Participation (projects)	Demand Savings (kW)	Energy Savings (kWh/yr)
Other	HID	4	8.24	29,121
	New Construction	7	65.20	343,379
	Hardwired CFL	6	1.29	12,882
	Unknown	2	2.63	9,466
	Parking lot Lighting	1	29.00	117,266
Controls	Controls	5	45.40	444,487
T8 & T5	High Bay T8 & T5	32	347.82	2,656,298
	T8 & T5	71	461.36	2,453,796
LED	LED	58	115.58	989,430
<b>TOTAL</b>		<b>186</b>	<b>1,077</b>	<b>7,056,125</b>



**Figure 5-1 Breakdown of OG&E-Reported Lighting Demand (kW) Savings by Measure**

**Summary of Program Results**

This section includes a summary of program participation, net demand and energy savings, and program costs. Goals for 2013 included implementing 215 projects for a total gross savings of 2,844 kW and 11,262,681 kWh per year. OG&E implemented 186 projects and achieved demand and energy savings of 1,077 kW and 7,056,125 kWh per year, respectively. Participation was

87% of the goal however demand savings were only 38% of the goal and energy savings 63% of the goal.

Table 5-9 below shows the total participation and claimed savings from the OG&E Saratoga database for the first four months and from DirectOptions Commercial Lighting Program tracking database for the remainder of PY 2013.

**Table 5-9 Commercial Lighting PY 2013 Program: Participation and Claimed Savings**

Metric	Participation (projects)	Demand Savings (kW)	Energy Savings (kWh/yr)
Actual	186	1,077	7,056,125
Goal	215	2,844	11,262,681
<b>Goal %</b>	<b>87%</b>	<b>38%</b>	<b>63%</b>

### **Program Evaluation**

The lighting projects were entered by OG&E in a web-based tool at [www.ogelighting.com](http://www.ogelighting.com). DirectOptions supports this website and was able to provide up-to-date dataset for the 2013 Commercial Lighting program. Entered projects included information about pre- and post-cases and most entered projects were accompanied by invoices and/or pre- and post-case photographs. EnerNOC spot checked a few entries and found that most of the reported savings were accurate. Because not all the projects could be evaluated due to the low budget and because the spot checks that were performed found that the entered savings were mostly accurate, EnerNOC applied the PY 2012 Commercial Lighting program demand and energy realization rates of 99.6% and 99.8%, respectively to the gross savings achieved in PY 2013.

Table 5-10 includes the PY 2013 impact results for the Commercial Lighting program. EnerNOC applied the NTG ratio of 90% (from Chapter 3) to the gross savings resulting in net impacts of 967 kW and 6,325,111 kWh per year.

**Table 5-10 PY 2013 Impact Results for Commercial Lighting**

Savings	Gross Impacts			Net Impact
	Reported	Realization Rate (PY 2012)	Evaluated	
Demand Savings (kW)	1,077	99.8%	1,075	967
Annual Energy (kWh)	7,056,125	99.6%	7,027,901	6,325,111

## PROCESS EVALUATION AND RESPONSE TO PY 2102 RECOMMENDATIONS

### Process Evaluation

#### ***Interviews with Program Managers***

The following are the key points from the in-depth interview with program managers.

- *HVAC tune up program – customers are interested; contractors are not.* OG&E is reaching the target market but not overcoming barriers to participation. Contractors are not offering 1 lb of free refrigerant charge, so customers are not having this done. Also a lot of customers already had the correct refrigerant charge. Contractors are not interested in sealing plenums, even with the rebate. Since contractors were not interested in doing the duct sealing and repair, OG&E used program funds to have the measures installed as part of the Weatherization program but counted the savings achieved under this program.
- *Window AC - increased awareness and product availability.* The program, which is offered to allow customers without central air-conditioning to participate in DSM offerings, has exceeded its goal of 25 participants.
- *Student Energy Education – participation goals easily met but no tracking of what teachers do with the curriculum or kits.* Every aspect of the program, from recruitment through reporting of installations, is left in the hands of the implementer. The OG&E project manager has no contact with the teachers who enroll in the program and does not ask the implementer to check in with teachers regarding whether they teach the curriculum, distribute the kits, or encourage students to install the measures.
- *SOP/CTU – difficult to overcome barriers to participation.* The TRM promotes the use of efficient equipment but efficient equipment is not stocked. Incentives are too low to overcome financial concerns, especially for industrial projects. Sometimes too much time is spent chasing down small opportunities. Both mechanical and HVAC contractors work with the participants.
- *Direct Installation – CLEAResult achieving success with several measures.* In 2013, OG&E transferred money from the SOP and CTU programs to engage ClearResult to implement vending misers, pre-rinse spray valves, and faucet aerators with C&I customers. This began in June. In mid-August, OG&E extended the contract to include CFL installation; ClearResult identified this opportunity.
- *Commercial Lighting – the improved economy has increased participation.* Participation has been increasing steadily since May. Companies are starting to release capital funds and lighting upgrades are seen as providing instant savings.

Refer to Appendix A for a copy of the interview guide used for the program managers.

#### ***Adherence to Protocol A***

The tracking systems for each of the databases conform reasonably well to the tracking system protocol developed for use in Arkansas.

Table 6-1 shows a summary of how well the residential program tracking systems meets the components of the protocol and Table 6-2 shows the same information for the C&I programs.

**Table 6-1 Adherence to Protocol A: Residential Programs**

Student Energy Education
<p><b>Participating Customer Information</b> - not provided for individual participants; only for teachers. Customer milestone tracked is the date kits are shipped.</p> <p><b>Measure Specific Information</b> - not applicable as all kits the same and info provided by implementer on spec sheets. Estimated savings are included as well as equipment useful life. Kits are provided by OG&amp;E at no cost to participants. Reported measure type of equipment replaced is tracked by participant surveys from implementer.</p> <p><b>Measure Codes</b> - individual measures not identified; all kits provided to participants are supposed to be the same.</p> <p><b>Vendor Specific Information</b> - n/a—measures self installed</p> <p><b>Program Tracking Information</b> - date of the initial program contact provided. Rebate information n/a; provided @ no cost to participants</p> <p><b>Marketing and Outreach Activities</b> - RAP conducts a well-established pattern of outreach activities. It is not known whether OG&amp;E keeps records of how many outreach letters the staff sends each year or to whom. RAP handles all other marketing.</p>
Residential Tune-up & Duct Repair
<p><b>Participating Customer Information</b> - includes customer identifier (account number) and customer contact information. Date/s of services provided is major customer milestone recorded.</p> <p><b>Measure Specific Information</b> – includes equipment type serviced, equipment fuel source, size (tons), and quantity as well as estimated savings. Identifies actions taken, e.g. plenum sealed. There is no equipment involved so information n/a for efficiency level, equipment useful life, and incremental measure cost, etc.</p> <p><b>Measure Codes</b> - not implemented; costs to change the database to include measure number and measure code would be relatively high compared to benefits. Need data dictionary for existing database fields.</p> <p><b>Vendor Specific Information</b> - contractor contact information collected on application forms; contractor type is always HVAC.</p> <p><b>Program Tracking Information</b> - includes amount of incentive paid to contractor and date measures implemented; application status is n/a.</p> <p><b>Marketing and Outreach Activities</b> – reaching the target market but not overcoming barriers to participation by the contractors.</p>
Window AC Replacement
<p><b>Participating Customer Information</b> - includes customer identifier (account number and name) but not contact information. Date of purchase is tracked.</p> <p><b>Measure Specific Information</b> - includes window A/C model #, size, quantity and efficiency level, as well as estimated savings.</p> <p><b>Measure Codes</b> - not implemented; costs to change the database to include measure number and measure code would be relatively high compared to benefits. Need data dictionary for existing database fields.</p> <p><b>Vendor Specific Information</b> - contractor information n/a; collect cost and efficiency level of windows purchased.</p> <p><b>Program Tracking Information</b> - tracks date and amount of incentive paid.</p> <p><b>Marketing and Outreach Activities</b> - increased public awareness with local outreach to large stores and in-store signage.</p>

**Table 6-2 Adherence to Protocol A: C&I Programs**

Standard Offer
<p><b>Participating Customer Information</b> - includes customer identifier (account number), location of building site, date completed and date rebate paid, but not customer contact information.</p> <p><b>Measure Specific Information</b> – includes new equipment type and description but not size, quantity or efficiency level; includes estimated savings, hours of operation, and some information on replaced equipment.</p> <p><b>Measure Codes</b> – n/a; description fields could be used for a measure description such as motors, chiller, HVAC, etc. Need data dictionary for existing database fields.</p> <p><b>Vendor Specific Information</b> – n/a.</p> <p><b>Program Tracking Information</b> – includes date of installation and date rebate paid as well as amount of rebate; application status is not included.</p> <p><b>Marketing and Outreach Activities</b> – working on influencing the engineering community to work in the market; CLEAResult is conducting cold calls for direct installation measures; at least 4 mails-outs this year.</p>
Commercial Tune-up
<p><b>Participating Customer Information</b> - includes customer identifier (account number), description of project, and date completed, but not customer contact information.</p> <p><b>Measure Specific Information</b> – includes new equipment type and description but not size, quantity or efficiency level; includes estimated savings and some information on replaced equipment.</p> <p><b>Measure Codes</b> – n/a; need data dictionary for existing database fields.</p> <p><b>Vendor Specific Information</b> – n/a.</p> <p><b>Program Tracking Information</b> – includes date rebate paid and amount of rebate; date of installation and application status not included.</p> <p><b>Marketing and Outreach Activities</b> – working on influencing the engineering community to work in the market; CLEAResult is conducting cold calls for vending miser measure; at least 4 mails-outs this year.</p>
Commercial Lighting (Direct Options Database)
<p><b>Participating Customer Information</b> – contains all information collected from the online application including customer identifier (account number), and customer contact information. Also includes milestone dates in terms of application, installation, approval, rebate sent.</p> <p><b>Measure Specific Information</b> – collects type of equipment (and measure name), quantity, existing and new wattage, hours of operation, and estimated savings. Some other information on replaced equipment is available but not consistently.</p> <p><b>Measure Codes</b> – all data is captured such that it can be used in reports; database's supporting materials should be developed and/or enhanced to include a data dictionary.</p> <p><b>Vendor Specific Information</b> - contractor information included on application such as contact name and phone number; could collect type of contractor (equipment or installation) on online application.</p> <p><b>Program Tracking Information</b> - tracks dates of program contacts (application, approval, rebate sent, etc.), amount of incentive, and application status.</p> <p><b>Marketing and Outreach Activities</b> - OG&amp;E has done extensive marketing over the years and with the improving economy customers are implementing projects that have been in the pipeline.</p>

### ***Tracking System Issues***

- Provided goals needed to be reviewed by OG&E again and updated
- Values in Saratoga are hard coded and some values are rounded in spreadsheets provided to EnerNOC, e.g. EERs of 12 instead of 11.5
- Confusion about what parameters are needed/available to verify calculations and adherence to TRM, e.g. needed climate zone information per project for Window AC program calculations
- Missing data or values, e.g. Residential HVAC Tune-up HVAC projects not entered in database and one of the measure descriptions for an SOP project was '????'
- Incorrect data for Window AC, and for Residential Tune-Up and Duct Repair some project entries were somewhat convoluted and led to issues such as separate projects grouped together, rounding issues, and project lines duplicated 2 to 3 times
- Some difficulty in getting information on the calculations underlying the savings values and the correct savings summary reports for custom projects under SOP and CTU
- Conflicting datasets, e.g. the initial summary savings reports from Saratoga for Commercial Lighting contained errors (i.e. energy savings summations were incorrect) and all files contained overlapping projects.
- Multiple data sources with values that did not always match, e.g. program manager tracking sheets and Saratoga
- Information not kept up to date in Saratoga for all programs

## **Response to PY 2012 Recommendations**

This section describes the recommendations from the PY 2012 evaluation report and OG&E response to each recommendation.

### ***General***

*Recommendation:* Develop a naming convention for project files that is consistent with the customer account or project ID number so that individual files can be readily located and to simplify tracking of program documentation. (Residential HVAC Tune-Up Program, Window AC Program, Commercial Lighting Program, Standard Offer).

*Response:* OG&E implemented a "Check ID" unique number to identify Commercial Lighting "Projects" in OK and AR. In 2014 the Check ID will be used to count projects as opposed to counting customers.

### ***Residential HVAC Tune-Up Program***

*Recommendation:* Repeat the DSE study with an appropriate sample to determine the percentage improvement in DSE in Arkansas.

*Response:* Undertaken and completed.

*Recommendation:* Conduct a NTG study to more accurately determine NTG.

*Response:* Undertaken and completed.

## ***Student Energy Education***

*Recommendation:* Include more efficient measure models in kits and review actual kit contents regularly.

*Response:* OG&E sent a copy of the kit to EnerNOC to review contents and is currently considering options for new or additional measures for kits in 2014.

*Recommendation:* Document savings in OG&E tracking system.

*Response:* Not completed.

*Recommendation:* Consider allocating more funds to the program to increase participation and savings.

*Response:* OG&E had been considering dropping the program but based on the savings achieved decided to keep offering it in the schools. In PY 2013, participation exceeded the goal.

None of the following recommendations have been implemented.

- Check in with teachers during the participation period to ensure kit distribution and encourage installation of measures in kits, and ask teachers to note their activities. This was not done because it would increase the cost of the program.
- Reduce program costs that don't contribute to savings. Eliminate or reuse teachers' kits which currently account for average 2% of annual kit cost invoice from RAP.
- Have the implementer stop reporting energy savings in its annual report since they are not based on TRM algorithms.
- Modify the student survey to get information about free riders. The implementer uses a standard battery of questions and changing it would increase the cost of the program.

## ***C&I Programs - General***

*Recommendation:* Increase or improve the marketing and advertising of the C&I programs.

*Response:* OG&E contracted with CLEARResult for PY 2013 for Direct Installation of measures and to provide additional marketing and advertising for C&I programs.

*Recommendation:* Conduct research with contractors in the area.

*Response:* The OG&E program manager met one-on-one with contractors and attended local events such as the Fort Smith HVACR Association Chapter meetings for input on program ideas.

*Recommendation:* Research the target market to find current market share of high efficiency equipment.

*Response:* Arkansas will be conducting a potential study which should provide this information.

### ***Commercial Lighting Program***

*Recommendation:* Calculate kW and kWh savings for future projects consistent with the most relevant TRM.

*Response:* Compliant with TRM 2.0 for PY 2013 projects and with TRM 3.0 for PY 2014 projects.

*Recommendation:* Make Commercial Lighting Rebate Submission Forms and other project documentation available to program evaluators for all projects.

*Response:* All supporting documents are uploaded on the Lighting website.

### ***Standard Offer Program***

*Recommendation:* Calculate kW and kWh savings for future projects based on the appropriate TRM.

*Response:* TRM 2.0 in 2013 HVAC-Chiller calculator and TRM 3.0 in 2014 calculator.

*Recommendation:* Ensure that HVAC units installed meet minimum federal standards listed in the TRM.

*Response:* This has been checked by the OG&E program manager for each project.

### ***Commercial Tune-Up Program***

*Recommendation:* Calculate kW and kWh savings for future projects based on the appropriate TRM.

*Response:* Completed.

*Recommendation:* Ensure that HVAC units installed as part of the program meet the minimum efficiency levels prescribed in the TRM.

*Response:* This has been checked by the OG&E program manager for each project.

*Recommendation:* Clearly label Rebate Submission Forms for the Commercial Tune-Up program so as not to confuse them with Rebate Submission Forms for the Standard Offer Program.

*Response:* Completed.



## FINDINGS AND RECOMMENDATIONS

### PY 2013 Program Impacts

This section presents the program impacts for each program for PY 2013. As shown in Table 8-1, OG&E reported 1,820 kW of demand reduced and 10,615 MWh in annual energy savings from the six programs evaluated. Overall, the EnerNOC-adjusted savings realization rates were 102% for demand and 99% for energy. Net savings were calculated by using the values outlined in Chapter 3. OG&E achieved 1,726 kW of net savings for demand and 9,701 MWh of annual energy savings.

**Table 8-1 PY 2012 Results by Program (Reported, Adjusted, Net Savings)**

Program	Demand (kW)			Annual Energy (MWh)		
	OG&E Reported	EnerNOC-adjusted	Net Savings	OG&E Reported	EnerNOC-adjusted	Net Savings
HVAC Tune-Up/Duct Repair	73	144	130	183	393	354
Window Unit A/C	3	3	3	4	4	3
Student Energy Education	40	19	15	322	151	126
C&I Standard Offer	590	572	570	2,692	2,552	2,536
Commercial Tune-Up	37	42	41	359	359	357
Commercial Lighting	1,077	1,075	967	7,056	7,028	6,325
<b>Totals</b>	<b>1,820</b>	<b>1,855</b>	<b>1,726</b>	<b>10,615</b>	<b>10,488</b>	<b>9,701</b>

### Key Findings

**Greater than expected participation and savings in the residential programs.**

Participation in all three residential programs was higher than OG&E had anticipated in the program plans. The PY 2013 residential programs achieved evaluated gross savings 166 peak kW and 548 annual MWh with realization rates of 143% and 108% and net savings of 148 kW and 483 annual MWh. With these results, OG&E achieved 88% of net program goals for demand savings and exceeded energy savings goals by 137%.

**Greater than expected participation in the C&I programs overall but savings were much lower than goals.** Participation in C&I Standard Offer was much higher than expected due the direct installation of measures; the other programs fell short of participation goals. The PY 2013 C&I programs achieved evaluated gross savings of 1,689 peak kW and 9,939 annual MWh with realization rates of 99% and 98% and net savings of 1,578 kW and 9,218 annual MWh. With these results, OG&E achieved 36% of net program goals for demand savings and 54% of net goals for energy savings.

**Most savings are from commercial lighting and direct installation of measures.** Most of the savings were from commercial lighting, primarily T5 and T8 fixtures but also a lot of savings were from LED lighting. Standard Offer resulted in the next highest level of savings but mainly from the direct installation of vending misers. As reported by the program manager, custom projects under SOP and CTU did not provide savings expected due to problems with level of

incentives provided and availability of efficient equipment. Residential HVAC Tune-up and Duct Repair program provided strong savings mainly because of the evaluated distribution system efficiency value of 12.7%, which is much higher than the TRM default value of 5%. However, contractors show little interest installing the duct repair measures.

**Actual data tracked and savings calculations are not easily accessed.** It was difficult to pin down the program goals as some of them had changed. The use of multiple databases because of problems with the official database (Saratoga) is confusing, e.g. the initial summary savings reports from Saratoga for Commercial Lighting contained errors (i.e. energy savings summations were incorrect) and all files contained overlapping projects. Values are hard coded and sometimes rounded, e.g. EERs of 12 instead of 11.5. OG&E has developed a body of information about each program and associated measures, including Excel-based savings calculators that apply the algorithms from the TRMs. However, for some programs, EnerNOC found it difficult to readily assess what is tracked and how to replicate savings estimates, e.g. needed climate zone information per project for Window AC program calculations. In addition, reporting seems to be done only at an aggregate level, i.e. not broken down by measure.

**Quality control procedures were not adequate.** OG&E currently uses a tracking system (Saratoga database) to document savings and provide saving reports for all OG&E programs. We identified issues with the provided Saratoga reports and found quite a number of cases where data were not fully entered or entered incorrectly. The Saratoga system itself or the queries to it often understate the actual level of program activity. Based on data retrieved from the Saratoga system for this evaluation, we find that the system is not sufficiently reliable in its present state.

Most of the required data is tracked but not all is inputted in the database in a timely fashion, i.e. EnerNOC had to keep requesting updated/corrected reports. Provided reports were missing data or values, e.g. Residential HVAC Tune-up HVAC projects not entered in database and one of the measure descriptions for an SOP project was '????'. In addition EnerNOC found incorrect data for Residential Window AC, and for Residential HVAC Tune-Up and Duct Repair projects; some project entries were somewhat convoluted and led to issues such as separate projects grouped together, rounding issues, and project lines duplicated 2 to 3 times. EnerNOC also had some difficulty in getting information on the calculations underlying the savings values and the correct savings summary reports for custom projects under SOP and CTU.

## Recommendations

### Create and implement QA/QC procedures

- OG&E should develop a set of procedure/quality control steps in order to report consistent and accurate savings results. For example, OG&E can create a check list and have a supervisor initial and verify that check list tasks were completed before documents are provided to the evaluation team. An example check list is provided below and is not limited to the following (EnerNOC recommends that OG&E create a checklist that is suited to their protocols and procedures, the following is purely an example):
  - Read previous Evaluation reports to better understand what information is needed.
  - Review saving reports before submitting and:
    - ✓ Check savings values; does the PM agree with savings values included in report?
    - ✓ Check all measures to see if anything (goals, measures, etc.) are missing
    - ✓ Check to see if there is enough information in the report to figure out the savings algorithms and replicate the savings
    - ✓ If any of the above information is missing or incorrect, fix the report and/or provide supplemental information (see Improve Documentation and Reporting sections below) so that the savings can be evaluated

## **Improve Documentation**

- A data dictionary should be developed for all database maintained by OG&E, CLEAResult, and DirectOptions. A data dictionary is a set of information describing the contents, format, and structure of a database and the relationship between its elements, used to control access to and manipulation of the database.
- In addition, for each program, OG&E should consolidate all backup documentation and explanations for each parameters tracked, as well as the calculations and methods including the relevant TRM sections for each program measure. Improving the program documentation such that all the key elements of savings calculations and assumptions are included will improve confidence in and efficient verification of OG&E's claimed savings.

## **Reporting**

- Savings summary sheets provided for the evaluation should include all parameters used to calculate savings to the second decimal (or third if parameter used was taken to the third decimal).
- Create monthly reports with details by measure for each program to provide feedback to program managers and allow corrections and changes to be made during the program year rather than during the evaluation.

## **Residential HVAC Tune-Up Program**

- Replace distribution system efficiency (DSE) TRM default value with field-verified value in claimed savings calculations and urge APSC to adopt in next TRM version.
- Address contractors' disinterest in installing measures by either providing better or different support to increase their interest or move to using direct installation to achieve savings.
- Investigate—perhaps as part of the statewide potential study—whether Arkansas customers need adjustments to refrigerant charges; there may not be much opportunities for savings from this measure as the program manager noted that many of the customers did not need a change of refrigerant charge.

## **Window AC Program**

- The program seems to be working as planned. May want to consider expanding the program to cover other efficiency products if they are cost-effective.
- Use climate zone appropriate deemed savings. The claimed savings used the TRM but some projects were assigned values from the incorrect zone. While the effect is small, the correction is easy and will increase confidence in OG&E's savings claims.

## **Student Energy Education**

- Check in with teachers during the participation period to ensure kit distribution and encourage installation of measures in kits. We believe that the implementer should provide this level of monitoring as part of the turn-key service.
- Eliminate sending duplicate kits to teachers who repeatedly enroll in the program. This would reduce program costs by about 2%. These free-up funds could be used to increase participation by additional students.

## **Commercial Lighting Program**

- The tracking tool used for the Commercial Lighting program seems comprehensive and well maintained. It would be a good idea to have Direct Options create data dictionary and set up procedures to extract usable data and provide

- Ensure all new equipment for custom applications, i.e. rebated on the basis of kW savings, is captured, perhaps with a drop down menu that requires a response.
- Create monthly program reports with measure details, participant information, as well as demand and energy savings, and enhance the ability to create ad hoc reports as needed. This will provide valuable feedback to program managers.

### **Standard Offer and Commercial Tune-Up Programs**

- For PY 2014, add or reallocate funds to enable independent estimation of direct install measures over custom measures if they again comprise the majority of savings OG&E claims for the program.
- Focus outreach and recruitment on customers with larger energy savings opportunities. While the number of projects processed under the program was far higher than expected in PY 2013, in order to reach the kW and kWh goals, recruitment needs to focus on achieving larger and/or more comprehensive projects. One suggestion is to introduce tiered incentives which would provide higher per-kW for projects above a threshold level.
- Claim kW savings for vending misers in addition to kWh savings, as indicated in the TRM.
- As part of the upcoming market potential study assess the focus and appeal of the custom projects components of these programs. This program is underperforming in terms of both peak kW reductions and annual kWh savings. The program either needs to include more measures that interest customers or a different outreach approach to reach the target market. Very few of the participants in the Commercial Tune-Up Program installed the high-impact measures promoted or expected by the program.

### **Comprehensive Factors**

This section describes EnerNOC's assessment of how effectively six of OG&E Arkansas programs (Student Energy Education, HVAC Tune-Up & Duct Repair, Window Unit A/C, Commercial Lighting, Commercial Tune-Up, and Standard Offer) have addressed the following comprehensive factors:

**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;

- OG&E has increased marketing and outreach which has had some success in addressing market barriers such as availability of efficient window air-conditioners and customer awareness of program opportunities. However marketing and outreach cannot overcome all market barriers such as level of incentives, lack of trade ally interest, and product availability for commercial and industrial applications. OG&E is increasing the level of incentives for some products in 2014 and has outsourced marketing and outreach for direct installation of measures which has led to increased program participation.

**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;

- Reported and EnerNOC-adjusted savings have increased steadily over the program cycle, by about 1,000 kW and by over 7,500 annual MWh from 2011 to 2013 with available resources. OG&E has moved budget dollars to optimize program delivery resources by outsourcing the marketing and installation of measures directly on customer premises and outsourcing the online commercial lighting tracking database to DirectOptions. EnerNOC believes this has increased OG&E's ability to oversee and evaluate the DSM programs. SOP and CTU custom projects are clearly not successful but not due to lack of management and resources.

- The two areas that EnerNOC suggests need more resources are quality assurance and program evaluation. Using existing or new OG&E staff resources to improve results tracking, reporting, and especially documentation, would expedite evaluation activities and allow for better program management and oversight. A larger EM&V budget than for PY 2013 would allow EnerNOC to assess the in-service rates for measures installed by CLEAResult and more detailed engineering review of program results.

**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 programs reasonably address all the major end uses for the commercial and industrial sectors as shown in the following table.

OG&E Program	Commercial End Uses	Industrial End Uses
Standard Offer	HVAC, Cooking, Refrigeration, Water Heating, Motors, Air Compressors, Process, Lighting	Refrigeration, Motors, Air Compressors, Pumps, Process
Commercial Tune-Up	HVAC, Cooking, Refrigeration, Water Heating, Motors, Air Compressors, Process	Refrigeration, Motors, Air Compressors, Pumps, Process
Commercial Lighting	Lighting	Lighting

- It is more difficult to affirm that the major end uses in the residential sector are reasonably addressed by the residential programs without a recent market and/or potential study to draw on. We expect that the move to statewide programs will address this in time for the new cycle of program designs. The programs do address the major end residential uses—HVAC (HVAC Tune-Up & Duct Repair), lighting and water heating (Student Energy Education), and appliances (Window AC, Weatherization).

**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 current mix of programs addresses individual customer needs and OG&E adjusts the program delivery options to minimize any lost opportunities, especially in the C&I sector. In the residential sector, OG&E offers programs that ensure all of its customers are able to participate, e.g. customers without central air-conditioning and thus unable to participate in the HVAC Tune-up and Duct Repair Program are eligible for the Window AC program.

**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);

- Both the Standard Offer and Commercial Tune-Up programs target a variety of sectors and the direct installation of measures by CLEAResult also focuses on sectors such schools, retail stores and restaurants to implement measures such as vending misers and faucet aerators. In addition, OG&E will leverage any non-utility resources such as tax credits where possible.

**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;

- We cannot address this since EnerNOC is not responsible for cost-effectiveness analysis.

**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 EM&V procedures are working quite well with the addition of a dedicated OG&E EM&V contact. The procedures would be greatly enhanced by implementing quality assurance procedures and more regular and detailed reports. More transparency in what is tracked and how calculations are applied will improve the quality of data as well as program management and improvement.



APPENDIX | **A**

**PROGRAM MANAGER INTERVIEW GUIDE**

Name \_\_\_\_\_

Date \_\_\_\_\_

Phone \_\_\_\_\_

Email \_\_\_\_\_

Interviewer(s) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Introduction**

*Thank you for talking with us today about OG&E’s Arkansas Energy Efficiency Programs. We will discuss the residential programs (HVAC tune up and window a/c) and non-residential programs (commercial lighting, commercial tune up, and standard offer).*

The areas we will be discussing are:

- Any changes in the programs since PY 2012
- Program components for the Residential and Commercial & Industrial (C&I) markets
- Administration and tracking
- Delivery, including marketing and outreach
- Program effectiveness

**Program Design and Development**

1. Have there been any changes or updates to the design of the programs in the last year?

<i>Program/Change</i>	<i>Description</i>	<i>Comments</i>
Direct Installation		
Commercial Lighting		
SOP		
CTU		
Window AC		
LivingWise		
Res HVAC Tune Up		



*Next, I'd like to discuss your views on how the programs are being implemented in 2013.*

**Program Implementation – Residential**

1. Overall, how effective do you feel the HVAC tune up program is in terms of the following:
  - a. Reaching the target market
  - b. Overcoming barriers to participation
  - c. Educating the target market
  - d. Achieving savings goals
  
2. What appear to be the most successful program components for HVAC tune up so far?
  - a. Use of contractors
  - b. AC-tunes and Duct work
  - c. Customer education
  - d. Contractor Rebates
  
3. For the Window AC rebate program, what did you change or improve in order to reach your participation goals?

**Program Implementation – Non-residential**

1. Overall, how effective do you feel the non- residential programs are in terms of the following:
  - a. Reaching the target market
  - b. Overcoming barriers to participation
  - c. Educating the target market
  - d. Achieving its savings goals
  - e. Coordinating with other agencies
  
2. What appear to be the most successful program components so far?
  - a. Use of contractors
  - b. On-site audits
  - c. Customer education
  - d. Customer follow up, including visits

**Program Tracking**

1. How do you feel about the current program tracking system?
  - a. Have you made changes to include the additional information identified in the 2012 evaluation?
  - b. Is there anything else that you would you improve/change?

*Next, I'd like to discuss your role in helping to deliver the programs in 2013.*

### **Program Administration**

1. Have you been able to maintain a high level of contact with contractors?
  - a. Is there anything that could be improved?
  - b. What type of feedback have you received from implementers and/or contractors?
2. Do you feel that the contractors are performing well on each of the programs?

*Now let's move to program delivery.*

### **Program Delivery**

1. Are there any specific aspects of a particular program(s) that are working very well? Any not working well? Program details.
2. What challenges have occurred during PY 2013? How were they overcome?
3. Are the programs efficient and well managed? Why or why not? How are problems resolved?
4. What could be done to improve the program?

*Let's move to discussion of how the market is made aware of the programs.*

### **Marketing and Outreach**

1. Have you been able to continue the grass roots hands-on approach to marketing? Does it continue to be effective? Given your level of staffing is this type of marketing sustainable?
2. What other marketing has been done?
3. What type of feedback have you received from customers about the programs?
  - a. What did they like?
  - b. What did they not like?

*Lastly, let's discuss program effectiveness.*

### **Program Effectiveness**

1. What is your impression regarding likely program free ridership? Meaning do you think customers would pay for the measures on their own, outside of the program. Why do you say that?
2. Do you think the programs are changing customers' energy efficiency attitudes and actions? What specifically has changed?

*These are all my questions. Do you have anything else you'd like to add?*

*Thank you again for taking the time to discuss these programs.*



## About EnerNOC

EnerNOC's Utility Solutions Consulting team is part of EnerNOC's Utility Solutions, which provides a comprehensive suite of demand-side management (DSM) services to utilities and grid operators worldwide. Hundreds of utilities have leveraged our technology, our people, and our proven processes to make their energy efficiency (EE) and demand response (DR) initiatives a success. Utilities trust EnerNOC to work with them at every stage of the DSM program lifecycle – assessing market potential, designing effective programs, implementing those programs, and measuring program results.

EnerNOC's Utility Solutions deliver value to our utility clients through two separate practice areas – Implementation and Consulting.

- Our Implementation team leverages EnerNOC's deep "behind-the-meter expertise" and world-class technology platform to help utilities create and manage DR and EE programs that deliver reliable and cost-effective energy savings. We focus exclusively on the commercial and industrial (C&I) customer segments, with a track record of successful partnerships that spans more than a decade. Through a focus on high quality, measurable savings, EnerNOC has successfully delivered hundreds of thousands of MWh of energy efficiency for our utility clients, and we have thousands of MW of demand response capacity under management.
- The Consulting team provides expertise and analysis to support a broad range of utility DSM activities, including: potential assessments; end-use forecasts; integrated resource planning; EE, DR, and smart grid pilot and program design and administration; load research; technology assessments and demonstrations; evaluation, measurement and verification; and regulatory support.

The team has decades of combined experience in the utility DSM industry. The staff is comprised of professional electrical, mechanical, chemical, civil, industrial, and environmental engineers as well as economists, business planners, project managers, market researchers, load research professionals, and statisticians. Utilities view EnerNOC's experts as trusted advisors, and we work together collaboratively to make any DSM initiative a success.