

**STATE OF ARKANSAS
ARKANSAS PUBLIC SERVICE COMMISSION**

IN THE MATTER OF THE APPLICATION FOR)
APPROVAL OF THE ARKANSAS)
WEATHERIZATION PROGRAM SUBMITTED)
BY ENTERGY ARKANSAS, INC.,)
SOUTHWESTERN ELECTRIC POWER)
COMPANY, OKLAHOMA GAS AND)
ELECTRIC COMPANY, THE EMPIRE)
DISTRICT ELECTRIC COMPANY,)
CENTERPOINT ENERGY ARKANSAS GAS,)
SOURCE GAS COMPANY AND)
ARKANSAS OKLAHOMA GAS CORPORATION)

DOCKET NO. 07-079-TF

IN THE MATTER OF THE)
ARKANSAS WEATHERIZATION)
PROGRAM)

DOCKET NO. 08-065-RP

ARKANSAS WEATHERIZATION PROGRAM

**Annual Report – 2013
filed by**

**ARKANSAS COMMUNITY ACTION AGENCIES ASSOCIATION, INC.
March 31, 2014**

ARKANSAS WEATHERIZATION PROGRAM Annual Report - 2013

PART 1. NARRATIVE REPORT

1.0 EXECUTIVE SUMMARY

Historical Background

To bring sustainable energy practices to the state and reduce electricity, natural gas, and/or other fuel consumption, the Commission opened Docket 06-004-R, directing the utilities to propose “Quick-Start” energy efficiency programs to begin saving energy in the state as quickly as possible, with a further mandate to file a slate of more comprehensive energy efficiency programs later. Through a productive collaborative process, the electric and gas utilities, along with the Arkansas Community Action Agencies Association, Inc. (ACAAA), proposed the Arkansas Weatherization Program (AWP). The AWP targets severely energy-inefficient homes in Arkansas, is open to all residential customers of participating utilities, and is “piggy-backed” onto the federally-funded U.S. Department of Energy’s Weatherization Assistance Program (“DOE WAP”) for low-income Americans.

On September 19, 2007, the PSC approved the AWP in Order No. 4, at 11, in Docket No. 07-079-TF, as a Quick Start program which began on October 1, 2007. On July 1, 2009, pursuant to the Rules for Conservation and Energy Efficiency Programs (“CEE Rules”) and as required by the Commission, the utilities filed a set of Comprehensive Energy Efficiency programs to be implemented in 2010. In its “roadmap order” of February 3, 2010, the Commission approved the AWP, along with several other programs, “for continued and expanded program implementation for 18 months beginning on January 1, 2010, and continuing through June 2011.” In a subsequent order on June 30, 2011 (Order No. 20 in 07-079-TF), the Commission approved the AWP for the remainder of 2011 through 2013.

In Docket No. 13-002-U, Order No. 7, at 80-82, the Commission approved an extension of the AWP through 2014, while directing the utilities and program administrators to participate in a “weatherization collaborative” that would develop “uniform whole house program offerings for all residential customers, including those in severely energy inefficient homes, for implementation by January, 2015...” Such a program design was to be submitted to the Commission by April 1, 2014, for implementation beginning January 1, 2015. Upon the request of the Parties Working Collaboratively (“PWC”), the Commission in Order No. 15 at 5-6, approved extension of the filing date for the uniform weatherization program until October 1, 2014, and the utilities’ three-year program portfolio filing date until June 1, 2015. Both of these decisions will have ramifications for the AWP going forward.

The most significant change to implementation of the AWP in 2013 was as a result of an act of the Arkansas General Assembly. The General Assembly enacted Act 1111 which authorized the transfer of the DOE WAP from the Arkansas Department of Human Services (“DHS”), which had been administering it, to the Arkansas Energy Office (“AEO”). The AEO reduced the

number of agencies providing services under the WAP (and, therefore, under the AWP) from 15 to six, while still providing statewide coverage. The WAP was essentially shut down between April 2013 and October 2013, due to the transfer from one state agency to another, the reduction/consolidation of implementing agencies, and the late execution of grant awards for the federal funds. Evaluation results of the 2013 program year reflect these disruptions to the WAP and, therefore, to the AWP. Despite these upheavals, two of the agencies expanded the penetration of the AWP to non-WAP-eligible homes, comprising nearly 10 percent of the completed homes.

The participating “AWP Utilities” are Arkansas Oklahoma Gas Corporation (“AOG”), SourceGas Arkansas, CenterPoint Energy Arkansas Gas, Empire Electric District Company, Entergy Arkansas, Inc., Oklahoma Gas & Electric Company (“OG&E”),¹ and Southwestern Electric Power Company. Through a Weatherization Services Agreement with the AWP Utilities, the AWP administrator for 2013 was Central Arkansas Development Council, Inc. (“CADC”), of Benton, Arkansas. AWP collaborative activities are coordinated by ACAA. Together with the implementing agencies, this group is known as the “Weatherization Network.”

AWP assistance is available to customers of AWP Utilities whose homes are severely energy inefficient. To qualify for the AWP, the customer’s home must meet certain specified criteria related to age of the home and energy inefficiency. Through a computerized energy audit of the home and advanced diagnostic technology, appropriate energy-efficiency measures are determined that can provide cost-effective energy savings. The Weatherization Network provider installs the approved measures in the home. Part of the cost of the audit and installation is covered by the customer’s AWP Utility, and the balance is the responsibility (co-payment) of the customer. Customers eligible for the DOE WAP have their co-payment covered by that federal program.

Major Accomplishments

From January 1, 2013, through December 31, 2013, the Weatherization Network conducted AWP home energy audits and installed energy efficiency measures in 297 homes, representing 25% of production targets. While 26 non-WAP eligible customers were served in the AWP in 2013 (nearly 10% of the total), AWP customers largely continued to be low-income ratepayers, primarily due to the required co-pays.

According to the utilities’ independent evaluator ADM & Associates (“ADM”), who calculated savings estimates from utility contractor Frontier Associates, annual energy savings from homes treated in this period are 636,467 kilowatt-hours (kWh) (including savings from electric co-ops and municipals) and 68,820 gas therms (including savings of propane). Lifetime equivalent savings are 8,655,227 kWh and 999,852 therms. These savings represent electric peak demand savings of 255 kilowatts (KW) and peak gas demand savings of 1595 therms.

¹ OG&E and AOG operate a complementary joint weatherization program for their residential customers who are not eligible for the DOE WAP co-pay.

In 2013, AWP Utilities expended \$510,413 on AWP weatherization and energy efficiency projects through CADC.² All but 26 customers had co-payments made on customers' behalf by the federally-funded DOE WAP. Total non-utility payments, including WAP and private customer payments, equaled \$2,175,166. The AWP Utilities paid a percentage of total costs, with the share depending on whether the customer had only one participating utility (gas or electric), two participating utilities (both gas and electric), or lived in an all-electric house.

There were no company co-payments from propane dealers, electric co-ops, or municipals, which do not participate in the AWP. However, using data from Frontier Associates, ADM calculated lifetime savings of 71,732 gas therms (propane) in homes with an AWP electric utility but no AWP natural gas utility and 1,142,144 lifetime kWh from electric co-ops and municipals.

Savings have been achieved very cost-effectively. Counting AWP utility costs, including AWP administrative costs, and assuming measure lives from the Arkansas TRM for each measure, savings have been purchased at a lifetime cost to the utilities of only three cents (3¢) per kWh and 23 cents (23¢) per therm.

Progress Achieved vs. Goals and Objectives

The unduplicated number of houses is an important metric in measuring success of the AWP. As noted above, in 2013, 297 AWP homes had energy audits and energy efficiency measures installed.

In 2013, a program goal was to complete a total of 1,920 "projects" (i.e., audits and installation of measures in a "whole-house" approach). In a house with service from two AWP utilities, or with electric heat ("all-electric"), the work at one house is counted as two "projects." In 2013, the actual number of AWP projects completed was 480, or 25% of the target.

Summary of 2013 AWP Utility savings goals:

- 291,045 annual therms (normal weather conditions)
- 6.6 therms per day per home (peak gas demand conditions)
- 2,239,030 annual kWh (normal weather conditions)
- 0.6 average kW per home (peak electric demand conditions)

Summary of 2013 AWP Utility savings results:

- 63,788 annual therms (normal weather conditions)
- 6.25 therms per home (peak gas demand conditions)
- 550,250 annual kWh (normal weather conditions)
- 0.875 kW per home (peak electric demand conditions)

² In addition, utilities had internal administration, marketing, EM&V and other costs. Differences between utility payments to CADC and CADC actual expenses for the AWP are primarily due to timing issues and balances, either positive or negative, both at the start of 2013 and at the end of the year. These differences are noted in the Reconciliation Table in the Workbook.

Savings, Participation Levels, Prior Year Comparisons, and Trends

The participation and, therefore, savings decrease in the AWP in 2013 was due primarily to the nearly complete work stoppage in the WAP between April and October, as explained above. Most of this stoppage can be attributed to carrying out the mandate of the legislation that transferred administration and oversight of the WAP from DHS to the AEO. In addition, delays in execution of the grant awards for federal funding and subsequent WAP/AWP agency contracts contributed to the shortfall in production during 2013.

As changes to the WAP continue, coordination with the AWP will also evolve. In addition, the Weatherization Collaborative, formed under the Commission's directive, will help to determine the future direction of the AWP as Arkansas weatherization programs become more standardized.

For 2013, savings estimates were developed by calculating 2012 achieved savings per home by utility and multiplying those by the number of homes projected for each utility for 2013. Results from 2012 were evaluated and verified by ADM through an impact evaluation.

Highlights

See "Major Accomplishments" above.

What's Working and What's Not

A true strength of the AWP has been the collaborative effort and coordination among the seven AWP Utilities, the Weatherization Network providers, CADC as the network administrator, ACAAA, (originally) the Department of Human Services Office of Community Services ("DHS/OCS") as an external monitor, and AWP Utilities' contractor Frontier Associates. While coordination among all of these parties has been a challenge, planning, assessing progress, and responding to and overcoming identified obstacles in a collaborative fashion has set the foundation for achievement of substantial energy savings currently and in succeeding years.

Continued strengthening of communications and collaboration was a goal for 2013, when the external monitoring function shifted to the Arkansas Energy Office (AEO). As noted above, this transfer has not gone as smoothly as hoped, and there have been many changes to the WAP, which are still ongoing. The WAP has been modified in ways that can enhance program delivery, both for the WAP and for the AWP, once it is settled. Also as noted, based on the Commission's Order in Docket No. 13-002-U, all of the utility weatherization programs, including the AWP, may be revised through the Collaborative process outlined in that Order.

A continuing problem, however, is that many customers who inquire about the AWP are not eligible for the DOE WAP, which is based on income, so they are unable to access DOE WAP federal funds to cover their customer co-payment. Yet, they do not have enough income to meet the co-payment amount themselves. Through determined outreach by two of the implementing agencies in 2013, nearly one-tenth of participating AWP customers provided their own co-pays

for weatherization measures. A restructured program design, as noted above, may provide other financing options that will encourage even greater participation.

Planned Changes to Program or Budget

The current program is approved through 2015, as noted above. At this time, ACAA proposes no changes to the AWP for 2014. However, pursuant to the Commission Order in Docket No. 13-002-U, all of the utility weatherization programs, including the AWP, may be revised through the Collaborative process outlined in that Order for program years 2016 through 2018.

Training Achievements

During 2013, external training sessions for the Weatherization Network were held in various locations around the state, including at the Weatherization Training Centers at Pulaski Technical College and Northwest Arkansas Community College. A total of 222 trainees attended 36 training sessions.³ Certificates were awarded in almost all of the courses, with 220 certificates awarded to trainees. Training sessions averaged over 43 hours in length, resulting in 1559 person-hours in training.

Some of the classes covered skills and applications specific to weatherization (*e.g.*, auditing, insulation, air infiltration) or installation of equipment (*e.g.*, HVAC), while other classes dealt with related topics of health and safety issues (*e.g.*, lead, mold). Yet other classes covered driving, communication and fiscal matters.

In addition to these sessions, internal training sessions covered the transfer of the WAP to a different state agency; 2013 goals; coordination of the AWP and WAP; software; the TRM; EM&V issues; Commission Orders; and a unified statewide weatherization program, among other topics. See the workbook for a detailed listing of sessions and participation levels.

Summary of EM&V Activities Completed

- The Weatherization Network maintains financial and operational data for each AWP home. Relevant data were provided to the AWP Utilities' contractor Frontier Associates for calculating deemed savings and tracking. Utility-specific data were provided to each AWP Utility.
- The utilities contracted with ADM to conduct an impact evaluation of AWP implementation in 2013. See attached Evaluation Report.
- Commission-approved deemed savings included in the Arkansas TRM were used by ADM to estimate energy savings and demand savings for both natural gas and electricity for each AWP utility. Where data were not included in the TRM for some specific measures delivered through the AWP, the DOE WAP National

³ The total number of attendees is a duplicated count. In other words, some of the same people may have attended more than one of these sessions.

Energy Audit Tool (NEAT) or Mobile Home Energy Audit (MHEA) software were used to estimate savings.

- Consistent with DOE WAP protocols, the Weatherization Network audited 100% of their own AWP projects and DHS OCS, AEO and/or CADC audited at least 10% of all AWP projects.
- ACAAA is reporting AWP EM&V data consistent with rules and procedures established by the Commission.
- In addition to providing data on energy and demand savings, productivity, program costs, and other quantitative data, as part of the annual reporting process, to assess customer satisfaction with the AWP, the Weatherization Network providers surveyed each household that received AWP services during 2013. (See Appendices C and D.) Results were overwhelmingly positive.
- ACAAA participated in several workshops, conference calls, webinars and meetings as part of the EM&V Parties Working Collaboratively throughout 2013.
- ACAAA staff were interviewed by ADM personnel for their evaluation report of the AWP.

Planning and Goal-Setting Process

The AWP is a collaborative effort among the seven AWP Utilities, the six Weatherization Network providers, CADC as the network administrator, ACAAA, the Arkansas Energy Office (AEO) as an external monitor, and the AWP Utilities' contractor Frontier Associates. The AWP Collaborative has remained intact since the inception of the AWP as a "quick-start" program. The work group has met periodically (generally at least quarterly) to set or revise goals, assess progress, address barriers, and propose changes to program design, with conference calls, e-mail exchanges, and other contact added, as needed. Members of the Public Service Commission ("PSC") general staff and the Attorney General's (AG's) office usually have participated in the meetings or conference calls.

Process for Estimating Long-Term, Cost-Effective EE Savings

Estimated energy savings and estimated demand savings for AWP-installed measures resulted from use of Commission-approved deemed savings estimates developed by Frontier Associates. These estimates were developed on a measure basis and were aggregated by Frontier for each home weatherized by the Network, based on a determination of their cost-effectiveness during a whole-house audit, and taking into account interactivity of measures. Once energy and demand savings estimates were determined for each utility for program year 2012, an average of these estimates was applied to each home projected to be treated in 2013. Measure lifetimes for each measure installed were based on measure lifetimes included in the Arkansas TRM as determined

by ADM. The number of homes to be treated was developed through the Collaborative process described above.

Table 1 - 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 ⁴	49	42.91	86,217	1,142,144	82%
Total	291	254.66	636,467	8,655,227	82%

Table 2 - 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%
Total	291	1,595.39	68,820	999,852	91%

2.0 PROGRAM IMPACTS

The AWP is designed to have a high probability of providing aggregate ratepayer benefits to the majority of utility customers. The AWP:

- Encourages and enables utility customers to make the most efficient use of utility capacity and energy and discourage inefficient and wasteful use of energy;
- Achieves energy efficiency improvements to severely energy-inefficient homes;
- Achieves meaningful energy and demand savings of both electricity and natural gas that potentially contribute to:
 - Reduced energy costs for owners of severely energy-inefficient homes;
 - Improved affordability of energy for all ratepayers through:
 1. Downward pressure on energy prices
 2. Avoided system capacity costs
 3. Reduced collections costs and bad debt write-offs
 4. Improved customer retention

⁴ 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.

- Energy security benefits;
- Environmental benefits;
- Economic development/competitiveness benefits;
- Permanent peak electric and gas demand reductions; and
- Long-term changes in customer behavior, attitudes, awareness, and knowledge of energy efficiency and energy efficiency technology.
- Enables the AWP Utilities to implement a weatherization program in an efficient manner; and
- Provides a comprehensive, consistent, quality-controlled, weatherization program serving severely energy-inefficient homes in utility service territories.

Further:

- The AWP Utilities individually conduct benefit/cost analyses of the AWP based on deemed savings estimates provided by Frontier Associates and evaluated by ADM Associates, compared to each utility's avoided energy and demand costs. The Utilities' analyses, and ADM's evaluation report, show that the AWP provides aggregate ratepayer benefits to utility customers. Realization rates calculated by ADM, based on impact evaluation, reduce the estimates provided by Frontier.
- National and international research studies show that weatherizing severely energy inefficient homes provides considerable benefits to society in addition to energy and demand savings.

2.1.1 Program Budget, Savings & Participants

Table 3 – Program Budget, Savings, & Participants – 2013 Electric Utilities

Electric Utility Name	Cost			Savings (kWh)			Participants		
	Budget	Actual	%	Plan	Evaluated	%	Plan	Actual	%
Entergy	\$ 1,051,392	\$ 210,243	20%	1,693,982	444,779	26%	768	177	23%
SWEPCO	\$ 417,000	\$ 36,324	9%	433,780	47,714	11%	300	29	10%
OG&E	\$ 80,771	\$ 32,999	41%	100,822	54,516	54%	59	35	59%
Empire	\$ 6,047	\$ 2,116	35%	10,446	3,240	31%	5	1	20%
Regulatory	\$ -	\$ -	-			-			-
	\$ 1,555,210	\$ 281,682	18%	2,239,030	550,249	25%	1,132	242	21%

Table 4 – Program Budget, Savings, & Participants – 2013 Natural Gas Utilities

Natural Gas Utility Name	Cost			Savings (Therms)			Participants		
	Budget	Actual	%	Plan	Evaluated	%	Plan	Actual	%
CenterPoint	\$ 655,960	\$ 174,394	27%	245,595	49,858	20%	620	177	29%
SourceGas	\$ 120,000	\$ 24,068	20%	35,161	7,829	22%	113	23	20%
AOG	\$ 58,190	\$ 23,068	40%	10,289	6,100	59%	55	36	65%
Regulatory	\$ -	\$ -	-			-			-
	\$ 834,150	\$ 221,530	27%	291,045	63,787	22%	788	236	30%

2.2 PROGRAM INFORMATION

2.2.1 Program Description

See the program description in Appendix B.

2.2.2 Program Highlights

- For program year 2013, 297 homes were weatherized, which was 25% of the overall production goal for the year.
- Annual evaluated savings from homes treated in this period were 550,250 kilowatt-hours (kWh) and 63,788 natural gas therms for AWP utilities.
- These savings represent electric peak KWs of 0.875 per home and peak gas demand of 6.25 therms per home, on average.
- In 2013, payments by AWP Utilities for audits and weatherization through the AWP totaled \$510,413.
- All but 26 of the co-payments were made on customers' behalf by the federally-funded DOE WAP. Non-utility co-payments for 2013 totaled \$2,175,166.
- There were no co-payments from propane dealers or electric co-ops and municipals, which do not participate in the AWP. However, ADM calculated additional annual savings of 5,032 gas therms (propane) in homes with an AWP electric utility but no AWP natural gas utility and 86,217 kWh from electric co-ops and municipals.
- Savings have been achieved very cost-effectively. Counting AWP utility costs, including AWP administrative costs, and assuming measure lives as determined for each measure by ADM, savings have been purchased by the AWP utilities at a lifetime cost of only three cents (3¢) per kWh and 23 cents (23¢) per therm.

2.2.3 Description of Participants

Participants in the AWP are residential customers of AWP Utilities living in severely energy-inefficient homes built before 1997 that meet three of seven efficiency criteria. There are no income eligibility criteria to participate. However, those participants eligible for the DOE WAP will have their required co-payments made by the WAP.

2.2.4 Program Events & Training

In 2013, a total of 222 members of the Weatherization Network and AWP Collaborative participated in program events and training. In addition, the Weatherization Network and AWP Collaborative held several meetings to discuss the WAP transfer between state agencies; coordinate reporting and filing efforts regarding the AWP; and to assess AWP progress.

- Weatherization Network personnel and contractors participated in 36 training sessions encompassing over 1500 person-hours.
- Training included topics such as use of NEAT/MHEA audits, HVAC, blower door use, quality assurance/inspections, multiple weatherization applications, and health and safety issues.
- ACAA coordinated three AWP Collaborative meetings and/or conference calls.
- Network agencies as well as ACAA participated in a conference on cost-effectiveness hosted by AEO.
- Network Agencies and ACAA participated in PWC meetings throughout the year.
- ACAA and CADC conducted training and planning sessions with Weatherization Network personnel, and CADC worked with individual agencies throughout the year.

2.2.5 Savings

According to ADM, evaluating data from Frontier Associates, annual savings to AWP utilities from homes treated in 2013 were 550,250 kilowatt-hours (kWh) and 63,788 natural gas therms. These savings represent electric peak KWs of 0.875 per home and peak natural gas demand of 6.25 therms per home. Frontier also reported additional annual savings of 5,032 gas therms (propane) in homes with an AWP electric utility but no AWP natural gas utility and 86,217 kWh from electric co-ops and municipals.

2.2.6 Challenges & Opportunities

The AWP had overcome significant barriers to become a highly successful energy efficiency program. As described in previous ACAA AWP Annual Reports to the Commission, obstacles were confronted during the Quick Start AWP in late 2007 through 2009, in creating this first-in-the-state joint effort among the utilities and the Network. However, a major challenge in 2013, as detailed above, has been the transfer of the WAP from DHS to the AEO. The transfer process and subsequent changes to the WAP instituted by the AEO resulted in a cessation of production between April and October – usually the most productive time of the year for weatherization activity. The challenges for 2014 AWP implementation will be to maximize the positive changes made by the AEO while

continuing to provide consistent, high-quality service to customers and utilities through the AWP.

Periodic meetings among the collaborative parties, convened by ACAAAA, have helped the AWP to respond to problems as they arise and to address productivity challenges. A goal for 2014 is to continue strengthening communication, collaboration, and coordination to achieve target results.

Finally, as a collaborative effort, coordination among the seven AWP Utilities, the six Weatherization Network providers, CADC as the network administrator, ACAAAA, the AEO as an external monitor, and AWP Utilities' contractor Frontier Associates is in itself a challenge. Yet responding to and overcoming these obstacles in a collaborative fashion has set the foundation for achievement of substantial energy savings currently and in succeeding years.

A continuing problem, though, is that many customers who inquire about the AWP are not eligible for the WAP, which is based on income, so they are unable to access WAP federal funds to cover their customer co-payment. Yet, they do not have enough income to meet the co-pay amount themselves. In addition, as noted in the attached ADM evaluation report, marketing to this customer sector needs improvement, which will continue to be addressed by the Weatherization Network and AWP collaborative in 2014. New financing initiatives instituted through the Weatherization Collaborative may be a partial solution to this problem.

2.2.7 Outlook for Continuation, Expansion, Reduction, or Termination

In collaboration with the AWP Utilities and the PWC, the Commission approved ACAAAA's petition to continue the AWP through 2015. For 2014, goals and budgets will remain at 2013 levels. Levels for 2015 have yet to be negotiated.

There continues to be a severe and continuing need for this service by customers and a demonstrated ability of the program to successfully achieve desired energy and demand savings when adequately funded and coordinated with WAP.

The Weatherization Network capacity will remain as an asset to the AWP. It will be important for the AWP to have sustained utility support and to implement approaches to attract customers who are not eligible for DOE WAP co-payment assistance to participate in the AWP, if their homes are eligible. The design of a statewide, uniform weatherization program should incorporate the best elements of the AWP.

2.2.8 Planned or Proposed Changes to Program and/or Budget

There are no planned or proposed changes to the AWP and/or its budget for 2014, except those brought about by the transfer of the WAP to the AEO, as described above. Going forward, changes may arise from the Weatherization Collaborative's planning process. If the AWP is changed due to the statewide process, details will be provided in the 2014 Annual Report.

3.0 SUPPLEMENTAL REQUIREMENTS

3.1 Staffing

CADC employs one full-time staff assigned to the AWP, and another staff member spends 30% of her time on the AWP. Other CADC staff, ACAA staff, and Weatherization Network staff involved in AWP activities spend less than 50% of their time on the AWP.

3.2 Stakeholder Activities

Since the design of the AWP is a coordinated, statewide program, input from many stakeholders is an integral component of the program. Regular meetings are held to present and resolve problems, share information, and train implementers. See the detailed report on training activities in the Workbook.

3.3 Information Provided to Consumers to Promote EE

During the auditor's initial visit to the AWP customer household, the network provides information on ways to save energy beyond the weatherization measures to be installed. Depending on the agency, this can be done verbally during the walk-through or through written materials that the auditor provides to the client. An example of the type of material provided is included as Attachment E.

4.0 APPENDICES

- A ADM Independent Evaluator Report
- B. AWP Program Description
- C. Results of Customer Satisfaction Survey
- D. Customer service response form
- E Information provided to AWP customers

Appendix A

ADM Independent Evaluation Report

Evaluation of 2013 Arkansas Weatherization Program

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

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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

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.¹

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.² 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

¹ 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).

² 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"> • ACAA, CADC and utilities discuss program delivery and make design changes. • Necessary modifications made to program structure and operations. • Key parties meet to discuss program expectations and goals.
Training and Implementation Planning	<ul style="list-style-type: none"> • Community action agencies, contractors, and other program operations staff attend program-relevant training sessions. • ACAA, CADC, and local agencies discuss implementation and program updates.
Program Promotion	<ul style="list-style-type: none"> • Community action agencies market the program to local customers. • Utility representatives may cross-promote the AWP with other programs.
Program Participation	<ul style="list-style-type: none"> • Customers apply for the AWP and home eligibility is determined. • WAP eligibility is determined. • Participants receive in-home audits and measures are identified. • Contractors install measures that are either stipulated based on NEAT or MHEA software or are agreed upon with the customer (depending on whether or not WAP funds are used for the co-pay).

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

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 ACAAA). 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 ³	49	42.91	86,217	1,142,144	82%
Total	291	254.66	636,467	8,655,227	82%

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%
Total	291	1,595.39	68,820	999,852	91%

³ 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%
Total	254.66	636,467	8,655,227	1,595.39	68,820	999,852	82%	91%

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

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

<i>Group</i>	<i>Annual Regression Model kWh Savings</i>	<i>% kWh Savings</i>	<i>TRM Based kWh Savings</i>	<i>kWh RR</i>	<i>Annual Regression Model Therms Savings</i>	<i>% Therms Savings</i>	<i>TRM Based Therms Savings</i>	<i>Therms RR</i>
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 ACAAA, 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.	<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>

1.6 Report Organization

The report is organized as follows:

- Chapter 2 presents the impact findings and discusses the methods used for, and the results obtained from, estimating gross 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

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

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

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
Total	322.87	779,170	1,709.97	75,745

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	-	-
Total	0.30	5,952

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
Total	203.42	526,161

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
Total	34.82	60,567

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
Total	55.84	105,095

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
Total	291	1,709.97	75,745

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	-	-
Total	189.37	6,715

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
Total	1,248.68	55,538

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
Total	151.59	8,439

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
Total	120.33	5,053

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 CFM₅₀ before air infiltration reduction and a leakage rate of 7,220 CFM₅₀ after, then the residence would have an annual gross savings of 2,120 kWh.

$$\text{Air Infiltration Savings} = 0.2387 \frac{\text{kWh Savings}}{\text{CFM}_{50}} \cdot 16,100 \text{ CFM}_{50 \text{ pre}} - 7,220 \text{ CFM}_{50 \text{ post}}$$

$$\text{Air Infiltration Savings} = 2,120 \text{ kWh}$$

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.

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

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

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	-	-	-	-	-	-
Total	254.66	636,467	8,655,227	1,595.39	68,820	999,852

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%
Total	291	254.66	636,467	8,655,227	82%

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	-	-	-	-
Total	18.50	47,714	664,523	59%

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	-	-	-	-
Total	0.36	3,240	33,577	54%

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%
Total	161.48	444,779	5,909,257	85%

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

Measure	Peak Demand Savings (kW)	Annual Savings (kWh)	Lifetime Savings (kWh)	Realization Rate
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%
Total	31.41	54,516	905,726	90%

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%
Total	42.91	86,217	1,142,144	82%

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%
Total	291	1,595.39	68,820	999,852	91%

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	-	-	-	-
Total	179.26	6,100	97,852	91%

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%
Total	1,152.43	49,858.14	706,563	90%

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%
Total	144.20	7,829.02	123,705	93%

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%
Total	119.50	5,032.24	71,732	100%

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:

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

⁴ 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	
HDD65	0.00125	**	0.00126	**	0.00131	**	0.00123	**
	-0.00008		-0.00008		-0.00009		-0.00007	
CDD65	0.00215	**	0.00215	**	0.00218	**	0.0021	**
	-0.00008		-0.00008		-0.00009		-0.00007	
HDD65*Post	-0.00047	**	-0.00041	**	-0.0006	**	-0.00035	**
	-0.00013		-0.00013		-0.00015		-0.00012	
Dependent Variable Mean	6.722		6.7125		6.7235		6.7036	
Sample Size	1,684		1,612		1,359		2,013	
R-Squared	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	
HDD65	0.003	**	0.00285	**	0.00291	**	0.00293	**
	-0.00009		-0.0001		-0.00011		-0.00008	
CDD65	-0.00129	**	-0.00142	**	-0.00153	**	-0.00124	**
	-0.00009		-0.00011		-0.00012		-0.00008	
HDD65*Post	-0.00028	**	-0.00038	**	-0.00043	**	-0.00027	**
	-0.00013		-0.00014		-0.00017		-0.00012	
Dependent Variable Mean	3.3288		3.3195		3.3084		3.3353	
Sample Size	1,651		1,565		1,367		1,874	
R-Squared	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

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

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

Issue	Consequences	Recommendation	Utility/ACAAA Response	Status of Issue
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&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 CADDC 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

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.⁵

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:⁶

- 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

⁵ 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).

⁶ Eligibility requirements are taken from AWP program design filed March 15, 2011 with the Commission. These can be found at: http://www.apscservices.info/pdf/07/07-079-tf_62_1.pdf. The Commission Order approving the design was order # 20 located at: http://www.apscservices.info/pdf/07/07-079-tf_76_1.pdf issued on June 30, 2011.

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 CADDC, 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

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.

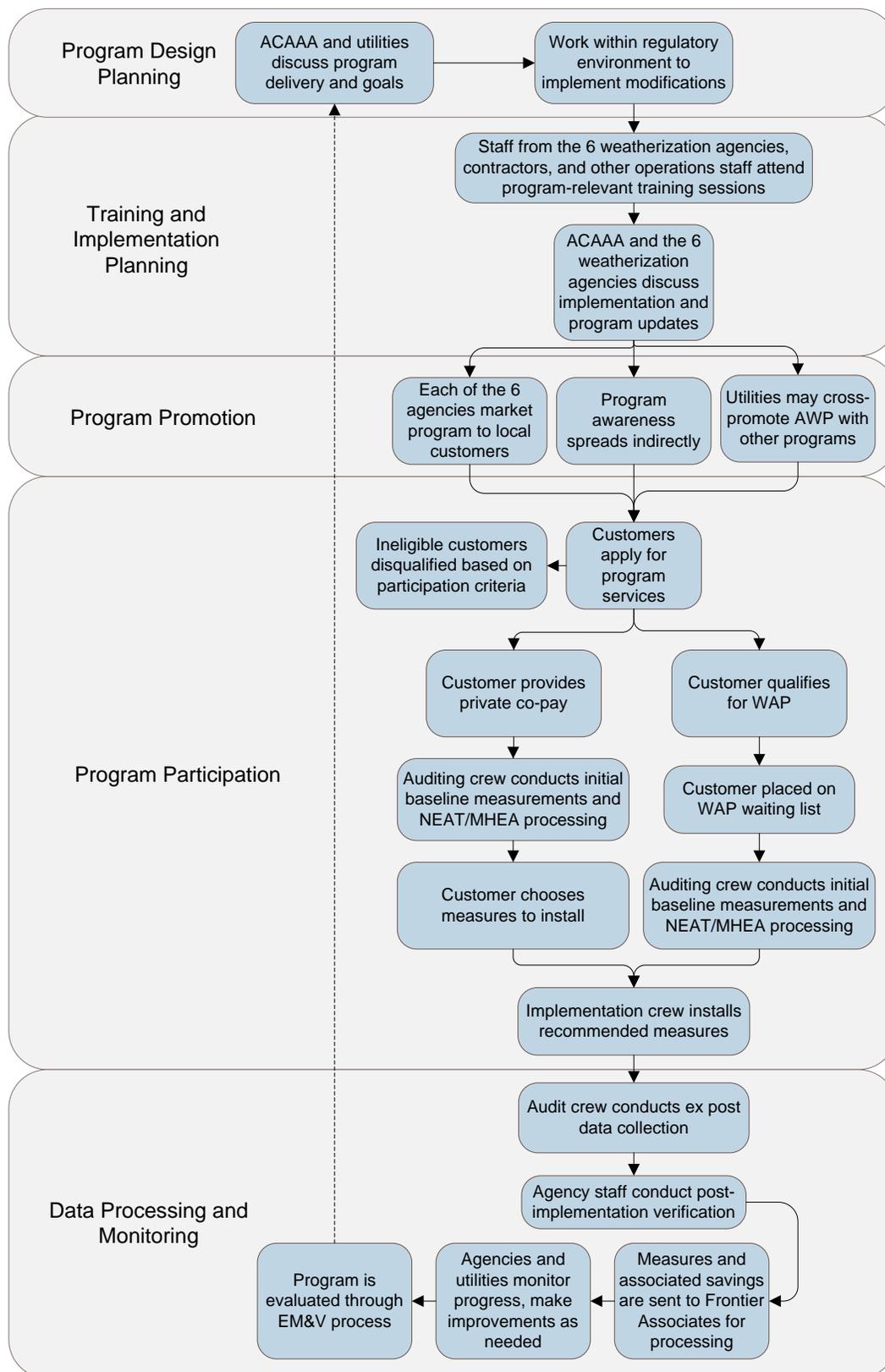


Figure 3-1 Arkansas Weatherization Program Logic Model

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	46
OG&E	29	-	-	4	2
AEP-SWEPCO	3	3	15	5	6
Empire Electric	-	-	-	-	1
N/A	4	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.

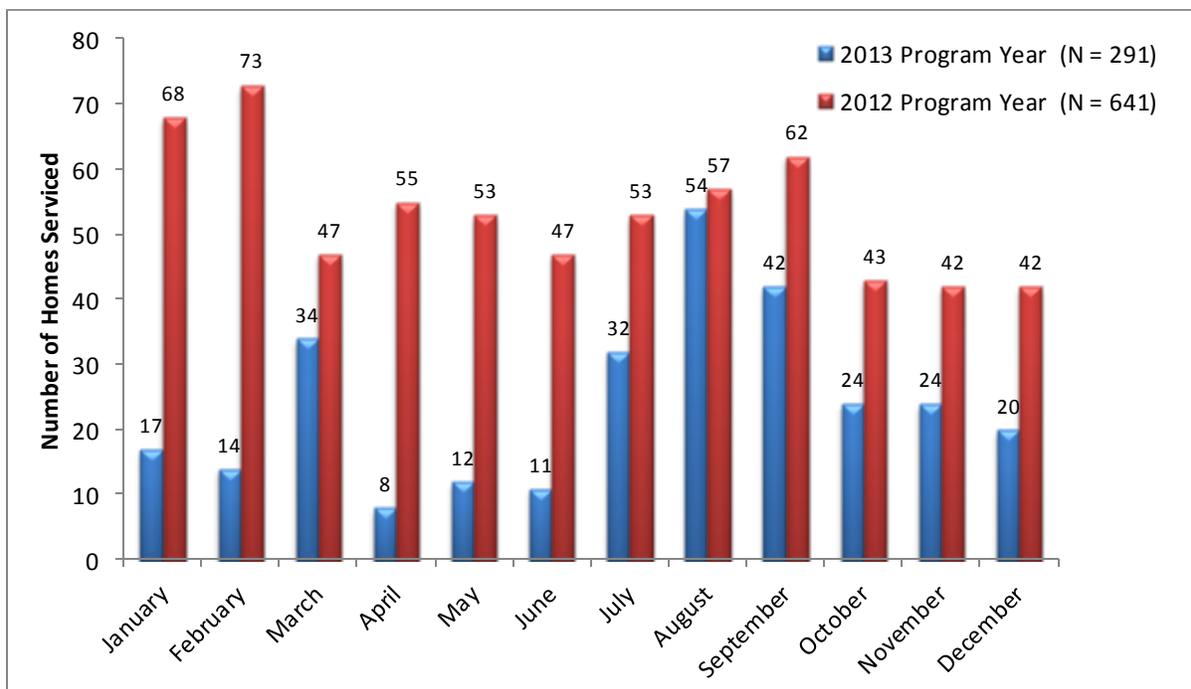


Figure 3-2 Participation Rates by Month, 2012 vs. 2013

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 CAD/C, 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: ACAA 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. ACAA 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. ACAAA 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

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

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.⁷ 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:⁸

- 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)

⁷ 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>)

⁸ 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.⁹
- **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.¹⁰ 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);

⁹ 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.

¹⁰ 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.¹¹

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

¹¹ 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 5.01.¹² 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.¹³ 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.

¹² 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>

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

4. Conclusions & Recommendations

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 ACAAA, 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!

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

6. Appendix B: Sample AWP Marketing Materials

ARKANSAS WEATHERIZATION PROGRAM
For more information visit caefc.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:

- Insulation 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

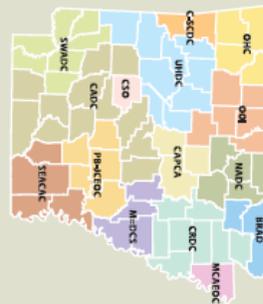
How are Utility Funds Allocated?

- 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
BRAD	BLACK RIVER AREA DEVELOPMENT CORPORATION Day, Lawrence, Randolph	870-692-2119 Ext. 246 rdito@bradcorp.org
CADC	CENTRAL ARKANSAS DEVELOPMENT COUNCIL Calloway, Clark, Columbia, Dallas, Hot Springs, Lonoke, Montgomery, Ouachita, Pike, Pulaski, Saline, Union	501-315-1121 bpallme@cadc.cc
CAPCA	COMMUNITY ACTION PROGRAM FOR CENTRAL ARKANSAS DeWitt, Fulton, White	501-429-3891 Ext. 135 amy.byrd@capcainc.org
CRDC	GROWER'S RIDGE DEVELOPMENT COUNCIL Craighead, Crittenden, Cross, Greene, Jackson, Poinsett, St. Francis, Woodruff	870-6802-7100 Ext. 120 kennygunn@crdca.com
CSCDC	GRANT-ROD-SEBASTIAN COMMUNITY DEVELOPMENT COUNCIL Crawford, Sebastian	479-785-2303 Ext. 111 lesamlee@cscdca.org
CSO	COMMUNITY SERVICES OFFICE Garland	501-624-5724 jbatte@csob.org
MCAECC	MISSISSIPPI COUNTY ARKANSAS ECONOMIC OPPORTUNITY COMMISSION Mississippi	870-776-1054 sam.schuggs@cbghal.net
MDCS	MID-DELTA COMMUNITY SERVICES Lee, Monroe, Phillips, Prairie	870-295-3897 sue.gatche@cbghal.net
NADC	NORTH-CENTRAL ARKANSAS DEVELOPMENT Fulton, Izard, Sharp, Stone, Independence	870-935-705 nadc_bill@yaho.com
OHC	OFFICE OF HUMAN CONCERN Benton, Carroll, Madison, Washington	479-638-7301 jdutton@ohc.org
OOL	OZARK OPPORTUNITIES, INCORPORATED Baker, Boone, Marion, Newton, Searcy, Van Buren	870-741-2544 oo@ohc.net
PAJCECC	PIKE BLUFF - JEFFERSON CITY ECONOMIC OPPORTUNITIES COMMISSION Arkansas, Cleveland, Jefferson, Lincoln, Grant	870-536-0046 pjcecc@cbghal.net
SEACAC	SOUTHEAST ARKANSAS COMMUNITY ACTION CORPORATION Ashby, Bradford, Chicot, Desha, Drew	870-226-0668 bettyforrester@seacac.com
SWADC	SOUTHWEST ARKANSAS DEVELOPMENT COUNCIL Hempstead, Little River, Miller, Lafayette, Howard, Sevier, Nevada	870-775-5204 latwillson@shlcone.net
UHDC	UNIVERSAL HOUSING DEVELOPMENT CORPORATION Conway, Franklin, Johnson, Logan, Pope, Perry, Scott, Van	479-686-5201 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 2012¹⁴, 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	-
	Total	317,210	444,131	140%	551,671	530,425	96%	770,670	512,657	67%

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

¹⁴ 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%
Total	192,958	260,382	135%	288,227	241,779	84%	302,520	187,530	62%

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%
Total	2,557	4,131	162%	4,632	4,547	98%	5,576	3,329	60%

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	-
Total	998,738	743,049	74%	1,168,024	734,815	63%	1,360,148	659,073	48%

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%
Total	2,413,164	3,280,898	136%	4,339,208	2,612,490	60%	5,222,984	1,152,105	22%

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%
Total	1,052	914	87%	1,209	847	70%	1,803	311	17%

Figure C-4 AWP 2012 Annual Report: Weatherization Program Savings Goals, Electric Utilities

Appendix B – AWP Program Description as of July 1, 2011 – as approved

Arkansas Weatherization Program (“AWP”) For Severely Energy-Inefficient Homes

AWP Collaborative

In 2007, the following utility companies (“AWP Utilities”) collaborated with the Arkansas Community Action Agencies Association (“ACAAA”) and the Arkansas Department of Human Services Office of Community Services (“DHS OCS”) weatherization providers (collectively, the “AWP Collaborative”) to develop the Arkansas Weatherization Program for Severely Energy Inefficient Homes (“AWP”) to comply with the *Rules for Conservation and Energy Efficiency Programs* (“CEE Rules”) established by the Arkansas Public Service Commission (“Commission”) in Docket No. 06-004-R:

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

The AWP Collaborative has remained intact into the comprehensive phase of implementation of the AWP Utilities’ approved energy efficiency portfolios. The AWP has evolved since its original approval in October 2007 as a “quick-start” program.

Benefits and Objectives

The AWP program is designed to have a high probability of providing aggregate ratepayer benefits to the majority of utility customers. Continued implementation of the AWP will potentially:

- Encourage and enable utility customers to make the most efficient use of utility capacity and energy and discourage inefficient and wasteful use of energy;
- Achieve energy efficiency improvements to severely energy-inefficient homes;
- Achieve meaningful energy and demand savings of both electricity and natural gas that contribute to:
 - Reduced energy costs for owners of severely energy-inefficient homes;
 - Improved affordability of energy for all ratepayers through:
 1. Downward pressure on energy prices
 2. Avoided system capacity costs
 3. Reduced collections costs and bad debt write-offs
 4. Improved customer retention
 - Energy security benefits;
 - Environmental benefits;
 - Economic development/competitiveness benefits;
 - Permanent peak electric and gas demand reductions;

- Long term changes in customer behavior, attitudes, awareness, and knowledge of energy efficiency and energy efficiency technology;
- Enable the AWP Utilities to implement a weatherization program in an efficient manner; and
- Provide a comprehensive, consistent, quality-controlled, weatherization program serving energy-inefficient homes in utility service territories.

Program Design

- Target severely energy-inefficient homes using the following selection criteria:
 - Residential heating or cooling customers of at least one AWP Utility, to which savings can be attributed.
 - Site-constructed or mobile homes
 - Homes built prior to 1997 must meet three of the following seven criteria. Homes built in 1997 or later do not qualify for the AWP.
 1. Attic insulation equal to or less than R-30
 2. Wall insulation equal to R-0
 3. Floor insulation equal to R-0
 4. Single pane windows with no storm windows attached
 5. Non-working heating system or heating system with less than 70% efficiency
 6. Non-working cooling system or cooling system with Seasonal Energy Efficiency Rating (“SEER”) of 8 or less
 7. Air infiltration problems identified through:
 - a) visual inspection of ductwork, walls, floors, ceilings, doors, and windows; or
 - b) pre-blower door test resulting in: i) greater than 2,200 CFM at 50 pa (for households of five persons or fewer); or ii) greater than 2,700 CFM at 50 pa (for households of more than five persons)
 - Pre and post carbon monoxide (CO) readings must meet the health and safety regulation specified by the U.S. Department of Energy (“DOE”).
- AWP is modeled on the DOE Weatherization Assistance Program (“WAP”); however, it is open to all AWP Utility residential customers living in homes meeting the above selection criteria.
- AWP is implemented by the WAP delivery network of DHS OCS and Community Action Agencies/Service Providers with support and coordination from ACAA (collectively, the “Weatherization Network”).
- DOE WAP protocols, standards, and quality control provisions are followed.
- The following list of measures are approved for use in the AWP:
 - Attic insulation
 - Floor insulation
 - Wall insulation
 - Duct insulation
 - Duct sealing/repair
 - Sillbox insulation
 - Foundation insulation

- Air infiltration
- Window sealing
- Window replacements
- Storm windows
- Low flow shower heads
- Furnace replacements
- Furnace tune-ups
- Air conditioner replacements
- Air conditioner tune-ups
- Heat pump replacements
- Heat pump tune-ups
- Refrigerator replacements
- Lighting retrofits
- Water heater tank insulation
- Water heater pipe insulation
- Water heater replacement
- Smart thermostats
- Energy efficiency information will be provided to each participant as a part of the AWP.
- AWP cost of services (for energy audits, health and safety, materials and labor to install measures, and program support) will be capped at \$8,000 for each home.
- The AWP Utilities will pay a percentage of the costs, with the share depending on whether the customer has only one participating utility (gas or electric), two participating utilities (both gas and electric), or lives in an all-electric house, provided that savings can be attributed to the respective utility.
- Weatherization Network administrative expenses will be 14% of the AWP cost of services for each home, with each customer co-payment amount and utility co-payment amount grossed up proportionately for Weatherization Network administrative expenses.
- As illustrated in Attachment C:
 - Where there is one participating AWP Utility (gas or electric):
 1. The AWP Utility will pay \$146 toward the pre-installation audit, and the customer co-payment will be \$196.
 2. The AWP Utility will pay up to \$855 (of a targeted average cost of \$3,420) for installation of determined energy-efficiency measures, and the customer co-payment will be the remaining cost of installation.
 3. The AWP Utility will pay \$57 toward the post-installation audit, and the customer co-payment will be \$57.
 - Where there are two participating AWP Utilities (gas and electric):
 1. Each of the AWP Utilities will pay \$146 toward the pre-installation audit, and the customer co-payment will be \$50.
 2. Each AWP Utility will pay up to \$855 for installation of determined energy-efficiency measures, and the customer co-payment will be the remaining cost of installation.
 3. Each AWP Utility will pay \$57 toward the post-installation audit, and the customer co-payment will be \$0.
 - Where the customer lives in an all-electric AWP Utility home (i.e., electric space heat):

1. The electric AWP Utility will pay \$292 toward the pre-installation audit, and the customer co-payment will be \$50.
 2. The electric AWP Utility will pay up to \$1,710 for installation of determined energy-efficiency measures, and the customer co-payment will be the remaining cost of installation.
 3. The electric AWP Utility will pay \$114 toward the post-installation audit, and the customer co-payment will be \$0.
- For customers served by an electric cooperative and with AWP gas utility space heat, the payment breakdown will be that of the scenario above for one participating AWP Utility.
 - For customers served by an electric AWP Utility but with no AWP Utility space heat (*e. g.*, propane space heat), the payment breakdown will be that of the scenario above for one participating AWP Utility.
 - Customers will be responsible for 100% of AWP cost of services beyond AWP Utility maximum payment amounts, up to the total cap of \$8,000 per home.
 - Low-income customers qualifying for the WAP may have DOE funds used to pay for the customer's AWP co-payment and for the customer's responsibility for costs up to the maximum allowed under DOE.
 - Customers not eligible for DOE WAP assistance will make their applicable pre-installation energy audit co-payment in "good funds" to the Weatherization Network prior to their energy audit.
 - Customers not eligible for DOE WAP assistance and making their own co-payments will be able to choose which measures will be installed after energy-savings potential has been determined by the audit. These customers will make full payment in "good funds" for their applicable co-payment for cost of AWP services to the Weatherization Network prior to the delivery of measures. All work will be done on a fixed price basis. AWP Utilities will hold Weatherization Network harmless from loss with respect to customer payments.
 - "Good funds" include: bank certified check, bank cashier check, credit union certified check, or money order.
 - Attachment B is the funding model for the AWP for the period of July 1, 2011 through December 31, 2011, for 2012, and for 2013. For the period July 1 through December 31, 2011, the target would be 620 homes weatherized, for a total utility spending target of \$1,051,771. In 2012, there will be a 10% increase from the 2011 annualized number, to 1,259 homes and a total utility spending target of \$2,130,818. There will be another 11% increase in 2013, to 1,402 homes, for a total utility spending target of \$2,389,360.
 - Under-spending of an AWP Utility's annual spending target in any program year will be carried over and added to the AWP annual spending target for the following program year, where demand and Network capacity indicate.
 - Each AWP Utility will make utility co-payments each year up to at least its spending target amount, provided there exists both demand for AWP services by its customers and capacity for delivery of AWP services by the Weatherization Network.
 - Total AWP Utilities' co-payments during a year may not exceed 120% of that year's AWP spending target.
 - Any home can receive AWP benefits only one time.
 - AWP Utilities' administrative costs resulting from the AWP are not included in the spending targets shown in Attachments B or C. Each AWP Utility has included utility

administrative costs for the AWP in its Comprehensive Energy Efficiency program filing to include incremental program costs not included in its base rates.

Administration and Implementation

- All AWP Utilities will have one “joint” contract with Central Arkansas Development Council (“CADC”) for delivery of all AWP services through the Weatherization Network.
- The AWP Collaborative will meet as necessary during the term of the AWP to review progress of the AWP and to provide guidance and support to the Weatherization Network.
- By utilizing the existing Weatherization Network for statewide training, administration, coordination, delivery and quality control activities, the AWP administrative costs will be less than if each AWP Utility developed its own individual delivery system.
- A single point of delivery will remove the significant market barrier of customers having to coordinate utility programs on their own.

Promotion

- Each AWP Utility may, but is not required to, promote the AWP locally using targeted marketing techniques designed to create demand for the AWP to match the capacity of the Weatherization Network to deliver AWP services.
- AWP Utilities agree to not use statewide promotion of AWP unless targeted marketing is not successful in meeting the objective in the previous bullet.
- AWP Utilities agree that promotion of AWP will include the following message elements: 1) the local AWP Utility is, or AWP Utilities are, offering to assist customers in making cost-effective energy efficiency improvements to their homes, to save them money while helping to improve the environment by weatherizing their homes and providing other energy efficiency measures; 2) customers will receive services on a first-come-first-served basis; 3) customers will be required to contribute to the cost of energy audits and to the cost of energy efficiency improvements to their homes, although those eligible for the low-income WAP may have federal funds used to pay their contribution; and 4) program design and availability of AWP services may be changed with approval of the PSC.
- Should the AWP be under-subscribed, as it has been in some areas previously, the program will be analyzed for barriers to participation, and those barriers will be addressed collaboratively with an appropriate marketing and promotion strategy.
- Should the AWP become severely over-subscribed (waiting time for service of more than one year), this situation will be addressed by:
 - Suspending all promotional activities;
 - Sending letters to all customers on the AWP waiting list explaining the situation;
 - Analyzing the cause of over-subscription of the AWP; and
 - Collaboratively considering appropriate strategies for addressing the over-subscription.

Barriers and How They Are Being Addressed

- As barriers or challenges arise, they are being addressed by the AWP Collaborative through periodic meetings and other contact.
- Affordability of home weatherization services for many customers is being addressed through utility co-payments toward energy audit AWP services on each home.
- Limited utility experience with weatherization programs is being addressed through the AWP Collaborative process (seven investor-owned utilities in partnership with the Weatherization Network).
- Inefficiency of utility administration for individual smaller utility weatherization programs is being addressed through: 1) the AWP Collaborative process to design and file the AWP, and 2) “joint” contract with CADC for delivery of all AWP services through the Weatherization Network as described in this AWP design template.
- Multiple points of contact by customers with both AWP gas service and AWP electric service for individual utility weatherization programs is being addressed through one AWP with one customer point of contact for all AWP services.

Estimated Annual Energy Savings and Estimated Demand Savings

- For AWP weatherization measures installed in 2010 and costing a total of approximately \$1,315,948 (utility co-payments only), estimated energy savings and estimated demand savings at the customers’ meters are:
 - 125,183 therms (normal weather conditions)
 - 6.4 therms per day per home (peak demand conditions)
 - 3,670,098 kWh (normal weather conditions)
 - 1.12 kW per home (peak demand conditions)
- Estimates of energy and demand savings for the period of implementation covered by this design, *i.e.*, July through December 2011, 2012 and 2013, based on measured results from 2009, follow:¹
 - July–December 2011
 - 146,495 therms (normal weather conditions)
 - 6.4 therms per day per home (peak demand conditions)
 - 2,541,906 kWh (normal weather conditions)
 - 1.12 kW per home (peak demand conditions)
 - Program year 2012
 - 302,120 therms (normal weather conditions)
 - 6.4 therms per day per home (peak demand conditions)
 - 5,155,668 kWh (normal weather conditions)
 - 1.12 kW per home (peak demand conditions)
 - Program year 2013
 - 327,020 therms (normal weather conditions)
 - 6.4 therms per day per home (peak demand conditions)

¹ These estimates of energy and demand savings were up-dated once results from implementation of the AWP during 2010, 2011 and 2012 were reviewed and analyzed.

- 5,748,480 kWh (normal weather conditions)
- 1.12 kW per home (peak demand conditions)

Funding and Cost Recovery

- Each AWP Utility will deposit funds into the AWP working fund quarterly or more frequently as necessary to assure a positive balance always exists in the AWP working fund.
- The AWP working fund shall be an interest bearing account.
- Each AWP Utility will incur AWP costs as a result of its customers' participation in the AWP and its resulting utility co-payments for energy audits, measures, and Weatherization Network administrative expenses.
- For those low-income customers eligible for the WAP, federal funds may be applied towards customer co-payments.
- Each AWP Utility may apply for recovery of its AWP costs through an approved adjustment to rates in its own Comprehensive Energy Efficiency docket.

Evaluation, Measurement and Verification (“EM&V”)

- The Weatherization Network will maintain financial and operational data for each AWP home for the duration of the AWP and will deliver all utility-specific data to each AWP Utility at least quarterly.
- Commission-approved deemed savings for both energy savings and demand savings for both natural gas and electricity will be used to estimate AWP energy savings and demand savings for each AWP utility.
- Estimated energy savings and estimated demand savings for AWP-installed measures will result from use of Commission-approved deemed savings estimates developed by Frontier Associates.
- Consistent with WAP protocol, Community Action Agencies/Service Providers will audit 100% of their own AWP projects and DHS OCS and/or CADC will audit at least 10% of all AWP projects with a DOE WAP co-payment annually.
- Minimum data to be reported to each AWP utility and to the PSC for each program year to determine whether the AWP is meeting its stated objectives include:
 - Number of energy audits completed;
 - Number of home weatherization projects completed;
 - Number of customers who requested AWP services and have not yet received AWP services (i.e., the backlog);
 - Summary analysis of customer satisfaction survey results;
 - Total AWP utility co-payments for AWP services (energy audits and measures) including 14% markup for Weatherization Network administrative expenses;
 - Total customer co-payments for AWP services (energy audits and measures) including 14% markup for Weatherization Network administrative expenses;
 - Estimated annual energy savings for kWh and for therms; and
 - Estimated peak demand savings for kW and for therms per day.
- AWP utilities and ACAA will annually report AWP EM&V data consistent with rules and procedures established by the Commission.

Benefit/Cost Evaluation

- The AWP Utilities individually conduct benefit/cost analyses of the AWP based on deemed savings estimates provided by Frontier Associates and each utility's avoided energy and demand costs.
- The Utilities' analyses show that the AWP provides aggregate ratepayer benefits to utility customers.
- National and international research studies show that weatherizing severely energy inefficient homes provides considerable benefits to society in addition to energy and demand savings.

Appendix C - AWP Customer Satisfaction Survey Results 2013

In addition to providing data on energy and demand savings, productivity, program costs, and other quantitative data, as part of the annual reporting process, to assess customer satisfaction with the AWP, the Weatherization Network providers survey each household that has received AWP services during that year. In 2013, two different questionnaires were used. Samples of these questionnaires are in Appendix D:

- **Client Response Form** (asked participants to confirm that work done through the AWP was completed and if any measures were not implemented at the request of the client) One question asked participants to rate the quality of materials and workmanship involved in the program. Additional comments were also solicited.
- **Home Weatherization Program Satisfaction Survey/AWP Satisfaction Survey** (confirming that work has been completed; rating energy audit information, materials used, workmanship, speed of delivery of services, overall satisfaction with the AWP; comments) This survey was prepared for use in both the AWP and DOE WAP.

The Home Weatherization Program Satisfaction Survey/AWP Satisfaction Survey represented over 94% of the surveys submitted, making these results more uniform than in the past. Additionally, for the first time there were at least 26 customers who were private co-pay customers.

A total of 210 completed and usable responses were received:

- 11 Client Response Forms
- 199 Home Weatherization Program Satisfaction Surveys/AWP Satisfaction Surveys

Summary results by type of questionnaire are reported below.

Client Response Form

1. How would you rate the overall work on your residence?

Overall Rating (11 responses):

Excellent 10 (91%)
 Good 1 (9%)
 Fair 0 (0%)
 Poor 0 (0%)
 No response 0 (0%)

Home Weatherization Program Satisfaction Survey/ AWP Satisfaction Survey

Were you satisfied with the information supplied in the **Energy Audit** (199 responses):

Very Satisfied 185 (93%)
 Satisfied 12 (6%)
 Dissatisfied 2 (1%)
 Very Dissatisfied 0 (%)
 No Response 0 (%)

Were you satisfied with the **Material Used** for the weatherization work? (199 responses):

Very Satisfied 186 (93%)
Satisfied 13 (7%)
Dissatisfied 0 (0%)
Very Dissatisfied 0 (0%)
No Response 0 (0%)

Were you satisfied with the **Workmanship** of the delivered service? (199 responses):

Very Satisfied 183 (92%)
Satisfied 15 (7.5%)
Dissatisfied 0 (0%)
Very Dissatisfied 0 (0%)
No Response 1 (0.5%)

Were you satisfied with the **Speed of Delivered Services** (199 responses):

Very Satisfied 180 (90%)
Satisfied 14 (7%)
Dissatisfied 5 (3%)
Very Dissatisfied 0 (0%)
No Response 0 (%)

Were you satisfied with the weatherization Program as a whole? (199 responses):

Very Satisfied 183 (92%)
Satisfied 15 (7.5%)
Dissatisfied 1 (0.5%)
Very Dissatisfied 0 (0%)
No Response 0 (0%)

Please provide an explanation for any comments you scored a 1 or 2:

- All the consultants and workers were so considerate and nice
- Refrigerator not delivered in timely manner
- Work performed was good quality
- Did an awesome job. Thank you!
- We really appreciate all your work. It has been a real blessing to have a warmer home. Everyone was friendly, courteous, and kept informed about everything.
- Took more time than I thought.
- Better communication with the home owners would be my only suggestion. I was confused on what was going on a lot of the time.

Please provide any additional comments or suggestions: A total of 29 comments were received. Of those, 26 comments (90%) were positive. Some examples:

- Our house is warmer – thank you!
- Great work, nice people, very friendly and respectful.
- Am very pleased and satisfied with all the work done. Thank you so much.
- Smartest thing I ever did with my tax return!
- Excellent program to help people that can't do the repairs or pay someone to do.

- Any questions I had were addressed and taken care of or corrected when the final inspection was done.
- Thank you! I'm very pleased with the program.

Of the remaining comments under this query 3 (10%) were negative.

How did you hear about the program? (Question on UHDC's surveys only)

- Neighbor (3)
- Through a friend/family friend (2)
- Spouse/Immediate Family Member (3)
- Through Franklin County Department of Human Services
- ARVAC

This confirms that work has been completed and the following measures were not done at the request of the occupant:

- Thresholds on entry not raised at my request due to health and safety reasons – trip hazard door was lowered at bottom.
- When they came they checked everything and went to work. In no time I had a new house inside.
- The work was complete.
- The work was completed quickly and everything done. Thanks very much very appreciated.
- All the work was well done and information was told to us.
- Thank you it's all good! ☺

Appendix D Customer Survey Response Form

CLIENT RESPONSE FORM

NAME: _____

DATE: _____

JOB NO: _____

The occupant(s) of the dwelling located at:

Confirms that the work done by the WEATHERIZATION ASSISTANCE PROGRAM of CENTRAL ARKANSAS DEVELOPMENT COUNCIL has been completed.

_____ The following measures were not done due to the request of the client.

Please check one of the following categories, which describe the quality of materials and workmanship involved.

- | | |
|--------------------------|-----------|
| <input type="checkbox"/> | EXCELLENT |
| <input type="checkbox"/> | GOOD |
| <input type="checkbox"/> | FAIR |
| <input type="checkbox"/> | POOR |

ADDITIONAL COMMENTS:

Signature of Occupant _____

AWP Satisfaction Survey	Agency: CADC
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Date of Satisfaction Survey: ____ / ____ / ____
 Customer Name: _____ Job Number _____
 Customer Address: _____
 City: _____ State: _____ Zip: _____
 County: _____

Please use the following scale to answer the question below:

- | | | | |
|--------------------|---------------|------------------|-----------------------|
| 4 - Very Satisfied | 3 - Satisfied | 2 - Dissatisfied | 1 - Very dissatisfied |
|--------------------|---------------|------------------|-----------------------|
- Were you satisfied with the information supplied in the energy audit? 4 3 2 1
- Were you satisfied with the material used for the weatherization work? 4 3 2 1
- Were you satisfied with the workmanship of the delivered service? 4 3 2 1
- Were you satisfied with the speed of delivered services? 4 3 2 1
- Were you satisfied with the Weatherization Program as a whole? 4 3 2 1

Please provide an explanation for any responses you scored a 1 or a 2:

Please provide any additional comments or suggestions:

This confirms that work has been completed and the following measures were not done at the request of the occupant.

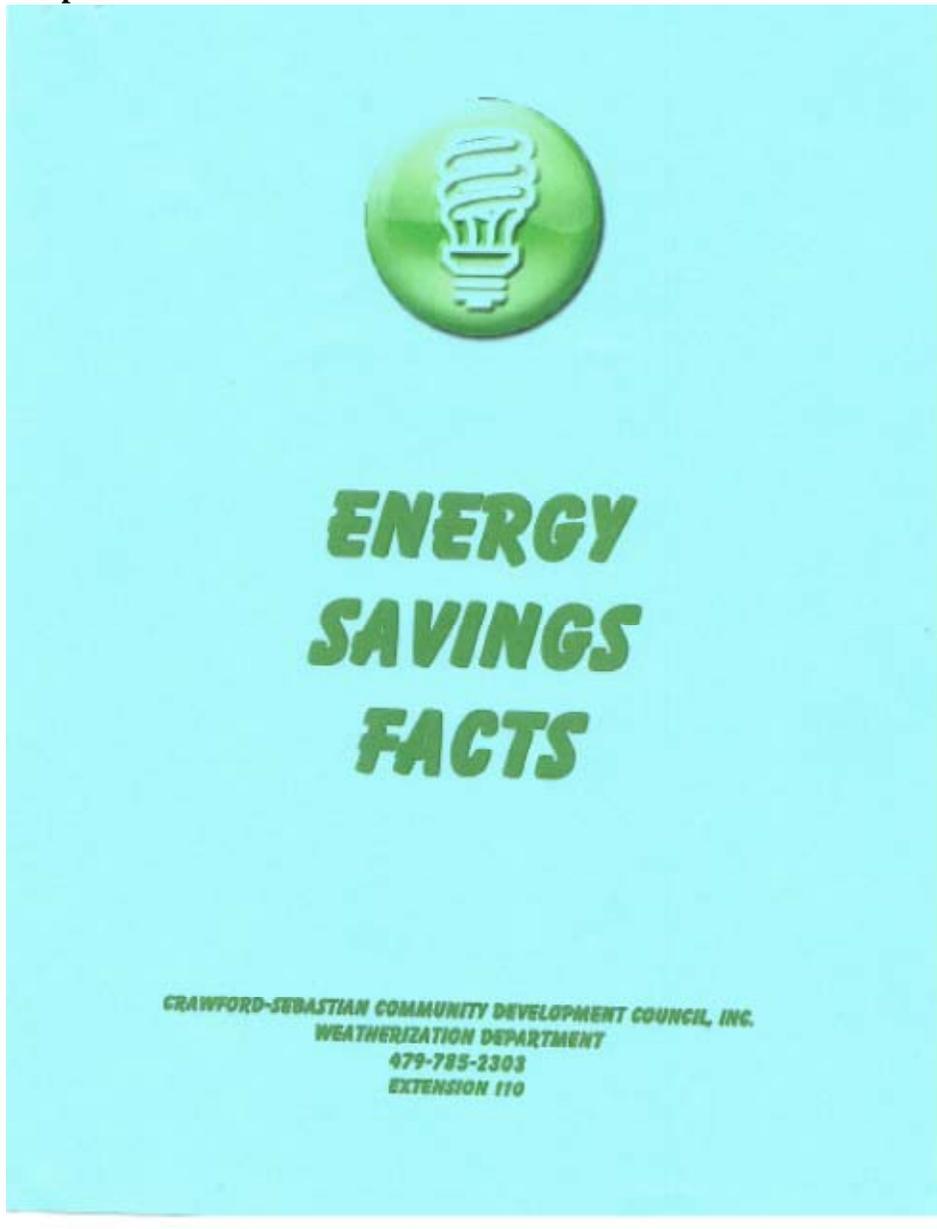
Client _____ Date _____

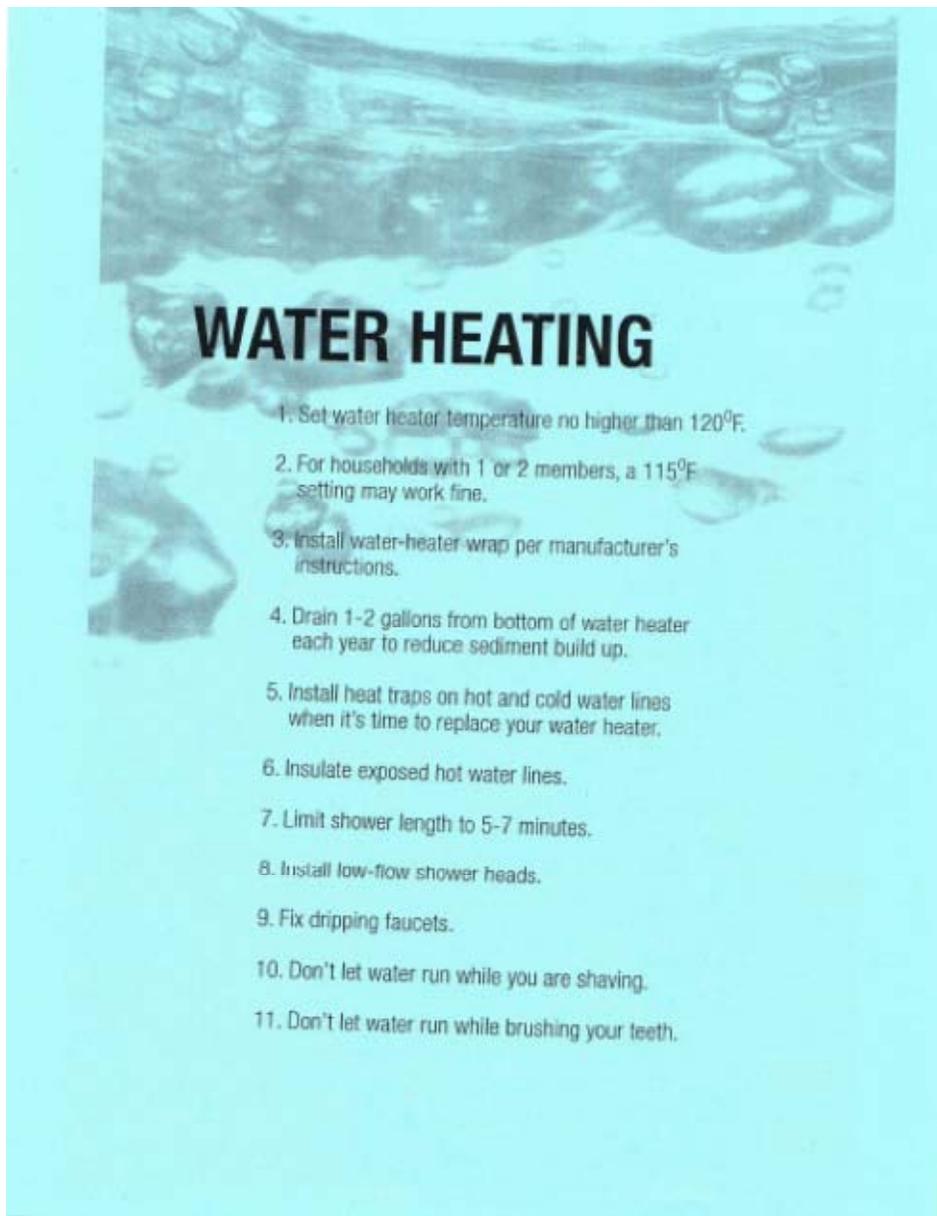
Appendix E

Information Provided to Clients

During the auditor's initial visit to the AWP customer household, the network provides information on ways to save energy beyond the weatherization measures to be installed. Depending on the agency, this can be done verbally during the walk through or through written materials that the auditor provides to the client. An example of a leave-behind follows.

Sample Packet from C-SCDC Given to Client



A graphic with a light blue background featuring a close-up of water with bubbles. The title "WATER HEATING" is prominently displayed in bold black letters. Below the title is a numbered list of eleven energy-saving tips for water heating.

WATER HEATING

1. Set water heater temperature no higher than 120°F.
2. For households with 1 or 2 members, a 115°F setting may work fine.
3. Install water-heater wrap per manufacturer's instructions.
4. Drain 1-2 gallons from bottom of water heater each year to reduce sediment build up.
5. Install heat traps on hot and cold water lines when it's time to replace your water heater.
6. Insulate exposed hot water lines.
7. Limit shower length to 5-7 minutes.
8. Install low-flow shower heads.
9. Fix dripping faucets.
10. Don't let water run while you are shaving.
11. Don't let water run while brushing your teeth.

KITCHEN

25. Use your refrigerator's anti-sweat feature only if necessary.
26. Switch your refrigerator's power-saver to "ON," if available.
27. Clean refrigerator coils annually.
28. Set the refrigerator temperature to 34° - 37°F and freezer temperature to 0° - 5°F.
29. Ensure gaskets around door seal tightly.
30. Unplug unused refrigerators or freezers.
31. Use microwave for cooking when possible.
32. When cooking on the oven range, use pot lids to help food cook faster.
33. If you are heating water, use hot tap water instead of cold.
34. Remember to use the kitchen exhaust fan when cooking and turn it off after cooking.
35. Use a crockpot instead of simmering foods on the stove.
36. If rinsing dirty dishes before putting them into the dishwasher, do so with cold water.
37. Use cold water for garbage disposal.
38. Only run dishwasher when fully loaded.
39. Use air-dry cycle instead of heat-dry cycle to dry dishes.

MISCELLANEOUS

45. Turn computers and monitors off when not in use.
46. Make sure electric blankets are turned off in the morning.
47. Turn waterbed heater off when not needed.
48. Turn large-screen TV's off completely when not in use.
49. Turn off stereos and radios when not in use.
50. Remember to turn off hair curling irons and hot rollers.
51. Turn off coffee makers when not in use.
52. Turn off pool pump and/or heater when not needed.
53. Verify livestock water tank heaters are off when not needed.
54. Make sure heat tape is off when not needed.
55. Unplug battery chargers when not needed.
56. Ensure all new appliances purchased are Energy Star approved.



