



# **Ameren Low-Income Weatherization Program**

## **Final Evaluation Report**

**December 2009**

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## Executive Summary

AmerenUE has partnered with the Missouri Department of Natural Resources Energy Center and other utilities to provide weatherization services to low-income households through the Low Income Weatherization Program (LIWP). The goal of the program is to provide energy efficient improvements to low-income customers to reduce their utility bills and help them prepare for the heating and cooling seasons.

### ***Introduction***

AmerenUE has agreed to conduct a process and impact evaluation and measurement and verification of the weatherization program. The goals of this research are to assess the effectiveness of the program and to identify opportunities for program improvement. This report presents the findings from the evaluation of the program.

The key objectives of the LIWP evaluation are to:

1. Provide estimates of the net energy impacts achieved for winter and summer.
2. Identify potential opportunities for improving the program to increase effectiveness.
3. Identify how evaluation research should be revised in the future.
4. Comply with the Missouri Public Service Commission's order for the program evaluation.

The evaluation consisted of the following activities.

1. *Informant Interviews* – We conducted interviews with organizations that have responsibilities for the LIWP.
  - *AmerenUE*: We conducted interviews with Ameren managers and staff who are responsible for overseeing the program.
  - *Missouri Department of Natural Resources*: The Missouri Department of Natural Resources, Environmental Improvement and Energy Resources Authority (EIERA) is responsible for administering the LIWP. We conducted telephone interviews with managers and staff at EIERA to document how the program is managed and implemented.
  - *Community Action Agency Interviews*: A network of Community Action Agencies is responsible for providing weatherization services to eligible clients. The agencies are also responsible for conducting quality control to assess the completeness and quality

of the work. We conducted interviews with managers and staff at these agencies to document how the program is implemented in the field.

2. *Review of specifications and procedures:* We collected and reviewed all available documents related to the LIWP. We reviewed program protocols to determine whether they can effectively provide energy efficiency services and education to low-income households. The review focused on comprehensiveness of the procedures in installing all cost-effective measures, effectiveness of the energy measures and installation procedures, whether the procedures are clearly specified for consistent application, and quality control procedures.
3. *Customer Survey:* We conducted 15-minute telephone interviews with a sample of customers who received LIWP services. The interviews provided information on understanding and satisfaction with program services, usage reduction education received, and changes in customer energy use behavior that resulted from the education.
4. *Service delivery data:* We collected service delivery data from the weatherization agencies to analyze the characteristics of program participants and measures provided by the program.
5. *Usage impacts:* We analyzed raw and weather-normalized energy usage before and after program services were received to determine the extent to which the LIWP reduced the energy usage of program participants.
6. *Payment impacts:* We analyzed customer payments and bill coverage rates before and after program services were received to determine the extent to which the LIWP improved the energy affordability for program participants.

### ***Low Income Weatherization Program***

As part of Ameren's 2007 electric rate case, the Missouri Public Service Commission (MPSC) ordered Ameren to provide \$1.2 million annually for a residential weatherization grant program including energy education for lower income customers. The program must serve Ameren's electric only or electric and gas combination customers.

### **Management and Administration**

The program is administered through the Missouri Department of Natural Resources Energy Center (DNR). DNR administers the Missouri Low Income Weatherization Assistance Program (WAP) that is funded by the Federal Department of Energy (DOE), as well as other low-income energy efficiency programs that are funded by other utilities. When DNR was given responsibility for program administration, they were told that the funds should be utilized under the same guidelines as the DOE WAP and that they should only be expended on Ameren's electric customers.

For Fiscal Year 2009, (Program Year 2008) the DOE guidelines state that the average cost per home is \$2966. However, this average is per funding source. DNR encourages the subgrantees to blend DOE and other sources of funding, such as utility funds, so that additional weatherization measures can be completed on a home without exceeding the average per home cost for the funding source. All measures must be installed and follow guidelines according to DOE and state specifications as well as be cost tested through the NEAT and MHEA energy audit software.

Eleven Community Action Agencies, one nonprofit, and one City Government receive funds to implement LIWP in Ameren's service territory. Allocations to the agencies are based upon the percentage of the low-income households in each agency's service area.

### **Eligibility**

Households are eligible for LIWP if they meet the following requirements.

1. The household is income-eligible, with income at or below 150 percent of the Federal Poverty Level.
2. The home has not been previously serviced through WAP since September 30, 1993.
3. The household resides in the area to be served.

### **Process**

The process for LIWP services is specified below.

1. Customers fill out a program application at a subgrantee.
2. Customers must provide income documentation to prove that they are eligible for the program.
3. The agency auditor will conduct an inspection of the home to assess what should be done to reduce energy usage.
4. The agency crew or contractor installs the measures.
5. A quality control inspector examines the home for quality of work and completeness.

### **Measures**

The LIWP uses the National Energy Audit Tool (NEAT) a computerized auditing program developed by the Oak Ridge National Laboratory to select the most cost-effective weatherization measures. In program year 2008, LIWP began using the Manufactured Home Energy Audit (MHEA) as well.

The operational manual contains a list of mandatory, optional, and “not considered” measures, as shown in the table below.

**Table ES-1**  
**Program Measures**

<b>Mandatory</b>	<b>Optional</b>	<b>Not Considered</b>
Attic insulation R-11	Thermal vent damper	Floor insulation R-30
Attic insulation R-19	Electric vent damper	Window sealing
Attic insulation R-30	IID	Window replacement
Attic insulation R-38	Electric vent damper IID	Low E windows
Fill ceiling cavity	Flame retention burner	Window shading
Sillbox insulation	High efficiency furnace	Sun screen fabric
Foundation insulation	Smart Thermostat	Sun screen louvered
Floor insulation R-11	Replace heatpump	Window film
Floor insulation R-19	Low flow showerheads	Tune-up AC
Wall insulation	Water heater replacement	Replace AC
Wall insulation R-11 batt	Lighting retrofits	Evaporative cooler
Duct insulation		Refrigerator replacement
Storm windows		
Furnace tune-up		
Replace heating system		
Water heater tank insulation		
Water heater pipe insulation		

Measures must have an SIR of 1 to be installed. Health and safety measures do not have to be cost tested. They do not have an individual SIR and do not get included with cumulative SIR. Repair measures, such as window and doors, are not required to have an individual SIR, but are included with the cumulative SIR.

Other important measure limitations are summarized below.

- According to a DOE requirement, agencies cannot use the program funds to replace electric heating systems.
- Furnace and hot water heater replacements are prohibited in rental units because they are seen as undue enhancements.
- There is also a \$600 incidental material repair limit per home that the weatherization agencies and DNR monitor closely.



- DNR does not allow refrigerator replacement. This is something that DNR and the weatherization network may consider adding in the future.
- DNR considers Missouri a heating system state and concentrates on heating system work. Air conditioning work is approved on a case by case basis if it is related to client health issues. Air conditioner work is also something that DNR and the weatherization network may consider adding in the future.
- DNR began allowing CFLs as an option for agencies in mid 2008.
- There are no requirements that Ameren funds be used for measures that address electric usage.

### Service Delivery Statistics

The table below provides service delivery statistics for three program periods that are studied in this evaluation. There are gaps between the first program year and the second program year because of delays in contract approval.

**Table ES-2**  
**Service Delivery Statistics**

	<b>4/1/06 – 3/31/07</b>	<b>7/1/07 – 6/30/08 (Interest Earnings)</b>	<b>2/15/08 – 10/31/08</b>
<b>Number of Homes Treated</b>	650	339	493
<b>Job Cost</b>	\$859,537	\$367,995	\$1,048,300
<b>Average Job Cost</b>	\$1,322	\$1,086	\$2,126

### Agency Training and Certification

DNR has a Memorandum of Agreement with Linn State Technical (LSTC). Under this agreement, LSTC serves as the subgrantee to provide training for the network of local agency weatherization technicians. DNR requires the weatherization technicians to be trained in building science principals, advanced building diagnostics, combustion heating systems, and whole house best practices approach to cost-effective energy efficiency measures.

DNR also encourages subgrantees to use the Training and Technical Assistance (T&TA) sub category in the DOE budget to attend the Affordable Comfort and the U.S. DOE conferences. The weatherization agencies also attend quarterly Energy Professional Housing Alliance (EHPA) meetings and the annual Missouri Association for Community Action (MACA) training conference.

In Fiscal Year 2006 each agency was required to have at least one BPI certified auditor on staff. BPI certified auditors are required to have a certain number of continuing education

hours each year and must be recertified every three years. Any subgrantee that does not meet this requirement is required to submit a corrective action plan before DNR will award a grant for the next program year.

Lead-Safe Work Practices training is required for both direct hire and contractor crew workers. New crew members are required to be trained within a six-month period. Re-training needs to be completed within a three-year period.

Contractors must have all required insurances (liability and POI) as well as a Lead Safe Certification.

### **Quality Control**

DNR is responsible for monitoring the performance of the subgrantees. The purpose of the monitoring is to determine if clients are adequately served and to determine if the program is operated in compliance with federal and state regulations and requirements.

The activities that are implemented are as follows.

1. Desk Monitoring – DNR reviews required monthly reports that includes clients' names, job numbers, and other required information.
2. Fiscal and Procedural Monitoring – DNR visits each subgrantee at least once per year to review procedural, fiscal, and compliance issues.
3. Housing Quality Monitoring – DNR housing quality monitors conduct on-site visits at least once each program year. They select a sample of completed homes for inspection and use an inspection checklist. Follow-up reviews of homes may be conducted where additional work or corrective measures were required.
4. Independent Monitoring – A subgrantee is required to have an annual fiscal audit that documents expenditures and compliance with regulations and requirements. Findings are compared to the subgrant and monthly reports.

DNR/EC has found that overall energy efficiency measures have been installed correctly and according to DOE and state requirements. Occasionally, additional follow up or rework is required.

### ***Agency Interviews***

The evaluation research included in-depth telephone interviews with weatherization managers at the agencies that implement the LIWP. Twelve of the thirteen agencies complied with the evaluation request for an interview. This section summarizes the findings from these interviews.

## Agency Administration

Eight of the twelve agencies reported that all client and program data are maintained in paper client files. Four of the agencies reported that some data are electronic and some are in client files. Due to the way that the data are maintained, it was a time-consuming process for the agencies to provide data on clients, homes, and service delivery that were needed for the LIWP evaluation.

Several managers noted that DNR is very supportive and provides information whenever needed.

## Measures and Education

The Ameren funds are from an electric rate case settlement and most of the agencies serve clients who have a gas utility other than Ameren. However, when asked specifically about measures that would address electric usage – refrigerator replacement, air conditioning repair and replacement, and CFL replacements for incandescent light bulbs, most managers reported that these measures were not part of the program. Table ES-3 displays the manager responses.

**Table ES-3**  
**Electric Measure Installation**

Measure	Number of Agencies		Comments
	Yes	No	
Refrigerator replacement	0	12	<ul style="list-style-type: none"> <li>One agency noted that DNR does not allow refrigerator replacement.</li> </ul>
Air conditioner repair/replacement	2	10	<ul style="list-style-type: none"> <li>One agency manager noted that they only do air conditioning repair/replacement if it is related to the heating system and this is the only case in which DNR allows this work.</li> <li>Another agency manager noted that they had asked DNR but had not received a clear answer, so had decided not to do this measure.</li> </ul>
CFLs	4	8	<ul style="list-style-type: none"> <li>One agency manager noted that they replace any bulb used more than 3 hours per day.</li> <li>One agency manager noted that they leave it up to the client since the client will have to deal with the disposal issue. She noted that they replace the lights that are used most but that they do not have a standard for a certain number of hours of use to be replaced.</li> <li>One agency manager noted that they replace all the incandescent with CFLs.</li> <li>One agency manager said that they hand out ten CFLs to each client and tell the client to install the CFLs in the bulbs that are used most. She said that she installs the CFLs if the client is elderly or disabled.</li> </ul>

Discussions with the weatherization managers revealed that there were different amounts of emphasis placed on the energy education provided to the customer. Several of the managers focused on pamphlets and other materials that are handed to the clients at the time of the

audit. A couple of the managers reported that they have an interview form that is used to obtain information and educate the customer at the same time. A few others specifically described the education process.

### **Funding Sources**

All of the agencies said that they coordinate the funding that they have to provide comprehensive services to the clients. Many of the agencies have three sources of funding – the Ameren electric funds, gas utility funds, and DOE WAP funds. This allows them to spend up to triple what they would have been able to spend under the DOE WAP funding alone. Some of the managers specifically mentioned that this was important in the case of home repairs (often window and door work) where the DOE WAP limits spending to \$600 per home and the combination of programs allows the agency to double or triple that amount.

The weatherization managers were asked whether the clients know that the services are funded by Ameren. Six of the managers said that clients were informed, four said that the clients did not know this, and two stated that they were not sure whether or not clients were aware that the program was funded by Ameren.

### **Successes and Barriers**

When asked about the successes of the program, the most common response was that the additional funds from Ameren allow the agency to serve more clients and/or treat the homes more thoroughly (7 agencies). One manager noted that the additional funding and work allows the agency to maintain a trained staff to do the weatherization work and one noted that because of the additional funding, clients on the waiting list do not have to wait as long for services. Several managers noted that the work helps reduce clients' energy bills and make their homes more comfortable (5 agencies).

### ***Participant Survey***

APPRISE conducted surveys with Ameren customers who received LIWP services to provide information on understanding and satisfaction with program services, usage reduction education received, and changes in customer energy use behavior that resulted from the education.

### **Program Participation**

Most respondents learned about the program through a community agency or a friend or relative. The greatest motivations for program participation were to reduce energy bills and to increase the home's comfort.

## Energy Behavior

The survey found that there is room for improvement on customer education. However, many customers said that they did take actions to reduce their energy usage as a result of the program.

- *Provider education:* Only 54 percent of the respondents said that the provider gave them information about how to reduce energy usage.
- *Energy actions:* When prompted, 75 percent said they reduced use of heat, 49 percent said they reduced the amount of hot water that they use, 17 percent said that they reduced the use of their electric space heater, and 44 percent said that they reduced the use of their air conditioning as a result of the program.

## Program Measures

The survey found that satisfaction with some of the key measures, insulation and air sealing, was lower than has been found with some other programs.

## Program Impact

The survey found the Ameren program did as well or better than other programs in improving the winter and summer temperature of the respondents' homes.

- *Winter Temperature:* Sixty-three percent of the Ameren respondents said that the winter temperature of their home had improved.
- *Summer Temperature:* Forty percent of the Ameren respondents said that the summer temperature of their home had improved.

## Program Benefits

The survey found that program participants felt the program benefited them by reducing their bills, improving the safety and comfort of their home, lowering their energy use, and providing energy education. Ameren's program compared favorably to the other programs in terms of lower energy bills and improved safety and comfort. Ninety-one percent of the Ameren respondents agreed that the program resulted in lower energy bills and 95 percent of the Ameren respondents agreed that the program resulted in a safer or more comfortable home.

## Program Satisfaction

The survey found lower levels of satisfaction with the Ameren program than with other low-income weatherization programs.

- *Satisfaction with Energy Education:* Fifty-nine percent of the Ameren participants said that they were very satisfied with the energy education provided by the program.

- *Provider's Knowledge About Energy Usage:* Sixty-five percent of the Ameren participants said that they felt the provider was very knowledgeable about energy usage.
- *Program Satisfaction:* Respondents were asked how satisfied they were with the program overall. Sixty-two percent said they were very satisfied and 25 percent said that they were somewhat satisfied.

## **Summary**

The survey found that Ameren's LIWP provides some important benefits to the participants. The participants believe that it has reduced their energy usage and made their homes safer and more comfortable. Comparisons to other programs found that Ameren LIWP participants were more likely to say that the program improved the winter and summer comfort than some of these other program participants. Ameren respondents were also more likely to agree that lower energy bills and a safer or more comfortable home were benefits of the program compared to some of the other low-income weatherization programs that have been studied. However, comparisons on measure installation and energy education, as well as overall program satisfaction, show room for improvement.

## ***Participant and Service Delivery Statistics***

This analysis provided information on the clients, homes, and services provided through Ameren's LIWP. Because most of the program information required for the evaluation is not maintained electronically, obtaining and cleaning these data was a time-consuming endeavor. However, these data are important for program analysis and for interpreting the usage impacts of the program. DNR should develop a database to collect and manage the program data. These data will be useful for both program management and future program evaluation efforts.

Some of the key findings from the analysis are summarized below.

- *Client characteristics:* Clients are likely to have vulnerable household members. Eighty-nine percent of the clients served by the program have a senior, child, or disabled household member. The majority of the clients served by the program, 63 percent, have income below the poverty level.
- *Home characteristics:* Eighty-five percent of the clients served by the program own their homes. Most of the homes are single family detached units, most are fewer than 1,500 square feet, and most are more than 50 years old. The homes had high air leakage rates prior to treatment, and the agencies achieved large reductions in air leakage. Half of the homes had a 25 percent or greater reduction in the CFM50 air leakage rate.
- *Home equipment:* The majority of the clients use natural gas for heating and about one quarter use electricity for heating. Fifty-seven percent have Laclede as their natural gas company and 11 percent have Ameren as their natural gas company. Forty-two percent

use electric supplemental heat. Many of the clients have air conditioning, but these data were not available for the majority of the clients served.

- *Service delivery statistics:* While 16 percent of the jobs were completed in two weeks or less, 23 percent took more than three months from the date of the audit until the date of the final measure installation. Eighty-six percent of the clients had more than \$1,000 spent on their homes. Just over half of the jobs had at least half of the total costs paid for through other program funds.
- *Program measures:* The most common program measures are air sealing, health and safety measures, repairs, window/door replacement or repair, and attic insulation. The highest cost measures are furnace replacement, floor and attic insulation, and window and door repair. Only a few of the agencies provide CFLs to the clients served by the program.

There is wide variety in the types of clients and homes served by the program, and the types of measures that were installed.

### ***Usage Analysis***

The usage impact analysis measured net weather normalized electric and gas savings for participants who were treated by the LIWP between July 2007 and September 2008. Only a handful of customers were included in the gas impact analysis because most customers receive gas service from a different utility, and analyses of these data were not within the scope of this evaluation.

As expected, the electric usage impacts of the program were low, due to the focus on measures that reduce fossil fuel consumption. Net electric savings averaged 6.8 percent, lower than many other low-income energy efficiency programs that we have evaluated that place a greater emphasis on electric efficiency measures. Net gas savings, at 14 percent, were in the expected range, but were only estimated for a small number of customers who have Ameren gas service.

### ***Payment Analysis***

Energy costs declined by approximately \$60 or 4.3 percent for program participants, compared to the comparison group. While cash payments increased, assistance payments declined, resulting in a net decline in total payments made. Cash coverage rates increased by 8.5 percentage points, but total coverage rates declined by 3.5 percent.

### ***Summary of Findings***

Findings related to program management, administration, and procedures; agency weatherization staff training; program impacts; and satisfaction are summarized below.

**Program Management, Administration, and Procedures**

- Coordination with other low income energy efficiency programs increases efficiency in program delivery and allows for more comprehensive services. This is beneficial for program clients and reduces the fixed costs of returning to the home to deliver additional services under a separate program.
- The LIWP is delivered the same way as the Missouri WAP model, and therefore does not emphasize electric measures. Air conditioner work, refrigerator replacements, and replacements of electric heating systems are explicitly prohibited. CFLs were only introduced in mid-2008 and are not typically provided.
- Many clients are not aware that the services they receive are at least partially funded by Ameren.
- Agencies do not have adequate data systems in place to allow for tracking program services and managing the program.
- Households are only eligible for LIWP if the home has not been previously serviced through WAP since September 30, 1993. However, most of these households would not have received electric efficiency measures that are not provided through WAP. The LIWP could offer electric efficiency measures to previously treated WAP customers.
- Ameren customer service representatives refer payment troubled clients to agencies for energy assistance. They should also educate the clients to contact agencies and request services through the LIWP.

**Agency Weatherization Staff Training**

- The program infrastructure provides good training for program staff. DNR encourages conference attendance and has begun requiring BPI certification.
- One area of weakness in program training is with respect to client education.

**Program Impact**

- Most of the agency weatherization managers reported that they install CO detectors and many reported that they install smoke detectors, conduct CO testing, and take care of water heater issues. These measures should result in significant health and safety benefits for program participants.
- The survey found that program participants felt the program benefited them by reducing their bills, improving the safety and comfort of their home, lowering their energy use, and providing energy education. Ameren's program compared favorably to the other programs in terms of lower energy bills and improved safety and comfort.



- As expected, the electric usage impacts of the program were low, due to the focus on measures that reduce fossil fuel consumption. Net electric savings averaged 6.8 percent, lower than many other low-income energy efficiency programs that we have evaluated that place a greater emphasis on electric efficiency measures.
- Energy costs declined by approximately \$60 or 4.3 percent compared to the comparison group. While cash payments increased, assistance payments declined, resulting in a net decline in payments made. The small decline in bills relates to the fact that most clients have gas services, the more heavily impacted use, with other utility companies.
- Participant satisfaction with air sealing and insulation was not as high as in some other programs and many customers did not say they were “very satisfied” with the condition in which the contractor left their home. Satisfaction with Ameren’s program was otherwise on par with satisfaction from other low-income weatherization programs. The survey found that Ameren’s customers were somewhat more likely to say that they did not get everything that they expected than in some of the other programs we have studied.

## **Recommendations**

Recommendations related to program management, administration, and procedures; agency weatherization staff training; program impacts; and satisfaction are summarized below.

### **Program Management, Administration, and Procedures**

- *Maintain joint program implementation through DNR.*
- *Revise the rules for expenditure of Ameren program funds so that electric usage reduction measures are allowed and emphasized.*
- *Provide a program information sheet for agencies to distribute during the energy audit with Ameren’s logo.*
- *DNR should develop a database for agencies to collect and manage the program data. These data will be useful for both program management and future program evaluation efforts.*
- *Allow customers who previously received Weatherization Assistance Program (WAP) services to receive LIWP targeted at electric reduction measures.*
- *Ameren customer service representatives should be trained to refer low-income, high usage customers to LIWP.*

### **Agency Weatherization Staff Training**

- *DNR should continue to provide training and technical support and require BPI certifications.*
- *Additional training should be required on customer energy education and education about customer actions should be required during the audit visit.*

### **Program Impact**

- *Health and safety measures should continue to be provided through the program.*
- *The program should increase its focus on electric reduction measures. This will have a greater impact on usage, affordability, and payment for Ameren customers.*

### **Satisfaction**

- *Ameren should require the agencies to provide customers with information about how they can reduce their energy usage.*
- *Ameren could provide a program information sheet for agencies to distribute during the energy audit with energy efficiency tips and Ameren's logo.*
- *Ameren should require additional training and inspections with respect to air sealing and insulation work.*
- *Agency weatherization staff should be given more training on how to discuss what to expect from the program with the customers.*

## I. Introduction

AmerenUE has partnered with the Missouri Department of Natural Resources Energy Center and other utilities to provide weatherization services to low-income households through the Low Income Weatherization Program (LIWP). The goal of the program is to provide energy efficient improvements to low-income customers to reduce their utility bills and help them prepare for the heating and cooling seasons.

AmerenUE has agreed to conduct a process and impact evaluation and measurement and verification of the weatherization program. The goals of this research are to assess the effectiveness of the program and to identify opportunities for program improvement. This report presents the findings from the evaluation of the program.

### A. Evaluation

The key objectives of the LIWP evaluation are to:

1. Provide estimates of the net energy impacts achieved for winter and summer.
2. Identify potential opportunities for improving the program to increase effectiveness.
3. Identify how evaluation research should be revised in the future.
4. Comply with the Missouri Public Service Commission's order for the program evaluation.

The evaluation consisted of the following activities.

1. *Informant Interviews* – We conducted interviews with organizations that have responsibilities for the LIWP.
  - *AmerenUE*: We conducted interviews with Ameren managers and staff who are responsible for overseeing the program.
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of the work. We conducted interviews with managers and staff at these agencies to document how the program is implemented in the field.

2. *Review of specifications and procedures:* We collected and reviewed all available documents related to the LIWP. We reviewed program protocols to determine whether they can effectively provide energy efficiency services and education to low-income households. The review focused on comprehensiveness of the procedures in installing all cost-effective measures, effectiveness of the energy measures and installation procedures, whether the procedures are clearly specified for consistent application, and quality control procedures.

Documents that were reviewed included the following.

- U.S. Department of Energy Weatherization Annual File Worksheet, Program Year 2008
  - U.S. Department of Energy State Plan/ Master File Worksheet, Program Year 2008
  - Missouri Department of Natural Resources, Low Income Weatherization, Energy Center fact sheet
  - Weatherization Field Guide for Missouri, Missouri Department of Natural Resources
  - State of Missouri, Department of Natural Resources Energy Center, Weatherization Program Operational Manual
3. *Customer Survey:* We conducted 15-minute telephone interviews with a sample of customers who received LIWP services. The interviews provided information on understanding and satisfaction with program services, usage reduction education received, and changes in customer energy use behavior that resulted from the education.
  4. *Service delivery data:* We collected service delivery data from the weatherization agencies to analyze the characteristics of program participants and measures provided by the program.
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  6. *Payment impacts:* We analyzed customer payments and bill coverage rates before and after program services were received to determine the extent to which the LIWP improved the energy affordability for program participants.

## **B. Organization of the Report**

Seven sections follow this introduction.

- 1) *Section II – Low Income Weatherization Program*: Provides a detailed description of the LIWP.
- 2) *Section III – Agency Interviews*: Provides a summary of the findings from the agency interviews.
- 3) *Section IV – Participant Survey*: Provides a summary of the findings from the survey of LIWP recipients.
- 4) *Section V – Participant and Service Delivery Statistics*: Provides a description of the data collected from agencies and analysis of participant and service delivery statistics.
- 5) *Section V – Usage Impacts*: Furnishes a summary of the impact that LIWP has had on the energy usage of program participants.
- 6) *Section VI – Payment Impacts*: Furnishes a summary of the impact that LIWP has had on the payment behavior of program participants.
- 7) *Section VII – Summary of Findings and Recommendations*: Provides a summary of the findings and recommendations from all of the evaluation activities.

APPRISE prepared this report under contract to Ameren. Ameren facilitated this research by furnishing program data to APPRISE. Any errors or omissions in this report are the responsibility of APPRISE. Further, the statements, findings, conclusions, and recommendations are solely those of analysts from APPRISE and do not necessarily reflect the views of Ameren.

## **II. Low Income Weatherization Program**

AmerenUE has partnered with the Missouri Department of Natural Resources Energy Center and other utilities to provide weatherization services to low-income households through the Low Income Weatherization Program (LIWP). The goal of the program is to provide energy efficient improvements to low-income customers to reduce their utility bills and help them prepare for the heating and cooling seasons.

### **A. Background**

As part of Ameren's 2007 electric rate case, the Missouri Public Service Commission (MPSC) ordered Ameren to provide \$1.2 million annually for a residential weatherization grant program including energy education for lower income customers. The program must serve Ameren's electric only or electric and gas combination customers.

### **B. Management and Administration**

The program is administered through the Missouri Department of Natural Resources Energy Center (DNR). DNR administers the Missouri Low Income Weatherization Assistance Program (WAP) that is funded by the Federal Department of Energy (DOE), as well as other low-income energy efficiency programs that are funded by other utilities. When DNR was given responsibility for program administration, they were told that the funds should be utilized under the same guidelines as the DOE WAP and that they should only be expended on Ameren's electric customers.

The only differences between the rules as to how the DOE funds are spent and how the Ameren funds are spent are that the Ameren funds must be spent on Ameren electric customers; the Ameren funds do not allow leveraging, training, and technical assistance; and the Ameren funds cannot be used for program administration purposes. The DOE funds may be used for these other purposes.

Reporting requirements and guidelines are consistent for all funding sources. The agencies must track each funding source separately and send separate reports to DNR about the expenditure of each program's funds. Agencies are required to send in monthly reports, which is also their payment request. They provide information on the number of homes completed, expenditures, clients served, type of weatherization measures installed, energy savings, and blower door testing data.

For Fiscal Year 2009, (Program Year 2008) the DOE guidelines state that the average cost per home is \$2966. However, this average is per funding source. DNR encourages the subgrantees to blend DOE and other sources of funding, such as utility funds, so that additional weatherization measures can be completed on a home without exceeding the average per home cost for the funding source. All measures must be installed and follow

guidelines according to DOE and state specifications as well as be cost tested through the NEAT and MHEA energy audit software.

The decision to expend the Ameren funds under the same rules as the DOE WAP funds was made to allow uniform administration of the weatherization program. In this way, all of the programs, including DOE, Ameren, and gas utility programs, have the same rules. This was the Collaborative's interpretation of the MPSC order.

Eleven Community Action Agencies, one nonprofit, and one City Government receive funds to implement LIWP in Ameren's service territory. Allocations to the agencies are based upon the percentage of the low-income households in each agency's service area.

Agencies are permitted to maintain data electronically or in paper files. DNR requests that the providers keep the information for three years after the grant period ends.

### **C. Documentation**

When DNR announces the distribution of utility grant allocations to subgrantees, a detailed budget document and budget instructions are included. Once the budget documentation is received, reviewed, and approved by DNR, a subgrant agreement packet is mailed to each subgrantee. The subgrant agreement, Scope of Services, and reporting forms are included in the packet. Rules and Regulations are outlined in the Weatherization Program Operational Manual.

The Scope of Services agreement describes the activities that agencies are required to undertake as part of their responsibilities in providing services under the weatherization agreement. These tasks include:

- Providing client outreach necessary to serve potentially eligible dwelling units.
- Determining and documenting the eligibility of dwelling units in accordance with current criteria established by the federal regulations, and the Missouri Weatherization State Plan that has been approved by DOE, and the Weatherization Program Operational Manual. The Scope of Services notes that all homes weatherized must be current AmerenUE electric customers.
- Utilizing the approaches to weatherization specified in the Missouri Weatherization State Plan and the Weatherization Program Operational Manual.
- Purchasing weatherization materials that meet or exceed standards established by program regulations and federal statutes in accordance with the Weatherization Program Operational Manual.
- Planning, organizing, and directing the physical retrofit of eligible dwelling units including labor, transportation and supervision for the minimum number of dwellings in the subgrantee approved proposal.

- Insuring quality retrofit through on-site final inspection of all completed work.
- Completing work within the budget and within the project period.
- Reporting programmatic and expenditure information to DNR using established procedures on a monthly and annual basis.

DNR attends and participates in quarterly meetings that are attended by the weatherization directors, administrators, and technical staff. At this time, they meet and discuss any changes to the program or the procedures. Periodic updates are made to the Weatherization Program Operational Manual as needed. Public Hearings are held each year to review and discuss changes made to the State Plan.

#### ***D. Eligibility***

Households are eligible for LIWP if they meet the following requirements.

- (1) The household is income-eligible, with income at or below 150 percent of the Federal Poverty Level.
- (2) The home has not been previously serviced through WAP since September 30, 1993.
- (3) The household resides in the area to be served.

Subgrantees may serve clients whose names appear on Low-Income Home Energy Assistance Program (LIHEAP) lists. Subgrantees are instructed that the Family Support Division (FSD) LIHEAP list should be used when waiting list have an insufficient number of clients within any priority to meet the agency's approved client targets. LIHEAP clients must meet the weatherization income guidelines.

There is a requirement that at least 66 percent of the units in multi-family buildings are occupied by income-eligible households, and 50 percent of the units in duplexes and four-unit buildings are occupied by income-eligible households. However, as few as 50 percent of the units may be certified as eligible to qualify a large multi-family building for weatherization if the investment would result in significant energy-efficiency improvements.

Eligible clients who are renters must have a signed landlord agreement before work can begin. The landlord must agree to the following conditions.

- (1) The landlord will not raise the rent on the weatherized units for two years after weatherization is complete without just cause.
- (2) The tenant will not be evicted during the two-year period without just cause.
- (3) Tenants with utility costs included in the rent will receive a reduction in their rent when their utility costs are reduced as a result of weatherization.



- (4) The landlord will not sell the apartment for two years unless the buyer assumes these obligations.

The subgrantee is required to negotiate with the landlord for a matching financial contribution. The amount of the contribution is left to the judgment of the subgrantee, but landlords must contribute a minimum of five percent of the project cost. For multi-family structures that have five or more units, the owner/landlord is required to contribute at least 25 percent of the weatherization cost. This requirement will be waived if the owner/landlord's annual taxable income is at or below 200 percent of the Federal Poverty Level.

### ***E. Outreach and Targeting***

Subgrantees are required to publicize WAP within their geographic areas through the following outreach methods.

- Placement of WAP information on applications for other services.
- Public outreach through presentations to local civic groups, churches, schools and others.
- Media efforts through television, radio and newsprint.

Subgrantees may use either the Fuel Consumption Weighted Priority System or the Demographic Priority System for prioritizing clients. The selected method must be used for the entire program year, except as provided otherwise under the WAP procedures. The purpose of the methods are to assure that the vulnerable are given priority for program services.

- The fuel consumption system adds a weighted value regarding fuel consumed to the criteria for ranking and selecting clients. Other categories for receiving values include
  - Elderly (defined as 60 years or older)
  - Handicapped
  - Large families
  - Very low income households
  - Households with heating costs over 50 percent of monthly income
  - Length of time on any applicable waiting list
  - Other unusual circumstances
- The demographic priority method, used by most grantees, selects clients in chronological order, according to the client's application date. Elderly, handicapped and children are prioritized based on its past experience and the current service area demographics.

## **F. Process**

The process for LIWP services is specified below.

1. Customers fill out a program application at a subgrantee.
2. Customers must provide income documentation to prove that they are eligible for the program.
3. The agency auditor will conduct an inspection of the home to assess what should be done to reduce energy usage.
4. The agency crew or contractor installs the measures.
5. A quality control inspector examines the home for quality of work and completeness.

Subgrantees are not permitted to report units as complete until all weatherization measures have been installed in accordance with the work plan, or as documented in a change order request and the subgrantee has conducted a final inspection and certified that the work was completed in accordance with WAP standards.

## **G. Measures**

The LIWP uses the National Energy Audit Tool (NEAT) a computerized auditing program developed by the Oak Ridge National Laboratory to select the most cost-effective weatherization measures. At the start of each program year, the subgrantees are required to update their NEAT audit with the most recent version, enter updated fuel costs, and update other applicable costs. In program year 2008, LIWP began using the Manufactured Home Energy Audit (MHEA) as well.

The operational manual contains a list of mandatory, optional, and “not considered” measures, as shown in the table below.

**Table II-1  
Program Measures**

<b>Mandatory</b>	<b>Optional</b>	<b>Not Considered</b>
Attic insulation R-11	Thermal vent damper	Floor insulation R-30
Attic insulation R-19	Electric vent damper	Window sealing
Attic insulation R-30	IID	Window replacement
Attic insulation R-38	Electric vent damper IID	Low E windows
Fill ceiling cavity	Flame retention burner	Window shading
Sillbox insulation	High efficiency furnace	Sun screen fabric
Foundation insulation	Smart Thermostat	Sun screen louvered

<b>Mandatory</b>	<b>Optional</b>	<b>Not Considered</b>
Floor insulation R-11	Replace heatpump	Window film
Floor insulation R-19	Low flow showerheads	Tune-up AC
Wall insulation	Water heater replacement	Replace AC
Wall insulation R-11 batt	Lighting retrofits	Evaporative cooler
Duct insulation		Refrigerator replacement
Storm windows		
Furnace tune-up		
Replace heating system		
Water heater tank insulation		
Water heater pipe insulation		

Measures must have an SIR of 1 to be installed. Health and safety measures do not have to be cost tested. They do not have an individual SIR and do not get included with cumulative SIR. Repair measures, such as window and doors, are not required to have an individual SIR, but are included with the cumulative SIR.

Other important measure limitations are summarized below.

- According to a DOE requirement, agencies cannot use the program funds to replace electric heating systems.
- Furnace and hot water heater replacements are prohibited in rental units because they are seen as undue enhancements.
- There is also a \$600 incidental material repair limit per home that the weatherization agencies and DNR monitor closely.
- DNR does not allow refrigerator replacement. This is something that DNR and the weatherization network may consider adding in the future.
- DNR considers Missouri a heating system state and concentrates on heating system work. Air conditioning work is approved on a case by case basis if it is related to client health issues. Air conditioner work is also something that DNR and the weatherization network may consider adding in the future.
- DNR began allowing CFLs as an option for agencies in mid 2008.
- There are no requirements that Ameren funds be used for measures that address electric usage.

## ***H. Energy Education***

There are few requirements regarding client education that is provided during the audit and measure installation. The program documentation shows that the auditor does an initial interview with the client and DNR reported that they encourage client education when the auditor is assessing the home.

Some of the agencies offer energy education classes. In St. Louis they have courses where they instruct customers on energy efficiency.

Auditors are required to provide a lead save pamphlet to the client if the home was built prior to 1978.

## ***I. Service Delivery Statistics***

The table below provides service delivery statistics for three program periods that are studied in this evaluation. There are gaps between the first program year and the second program year because of delays in contract approval.

**Table II-2**  
**Service Delivery Statistics**

	<b>4/1/06 – 3/31/07</b>	<b>7/1/07 – 6/30/08 (Interest Earnings)</b>	<b>2/15/08 – 10/31/08</b>
<b>Number of Homes Treated</b>	650	339	493
<b>Job Cost</b>	\$859,537	\$367,995	\$1,048,300
<b>Average Job Cost</b>	\$1,322	\$1,086	\$2,126

## ***J. Agency Training and Certification***

DNR has a Memorandum of Agreement with Linn State Technical (LSTC). Under this agreement, LSTC serves as the subgrantee to provide training for the network of local agency weatherization technicians. DNR requires the weatherization technicians to be trained in building science principals, advanced building diagnostics, combustion heating systems, and whole house best practices approach to cost-effective energy efficiency measures.

Training courses focus on Auditor, Shell Specialist, and Heating/Cooling certifications. Training includes the following topics:

- Building Science Principals
- Basic Auditing Procedures
- Advanced Building Diagnostics
- Air Sealing, Insulation Materials, and Techniques

- Combustion Heating Systems
- Combustion Appliances
- Duct System Diagnostics and Repair
- Whole House Best Practices
- Health and Safety
- Mold and Mold Hazards Awareness
- Using NEAT to Establish Weatherization Priorities
- Blower Door
- Lead-Safe Work Practices
- Mobile Home Energy Audit Training

DNR/EC sends out an annual survey to the agencies to determine their satisfaction and their need for additional types of training. The LSTC trainer advises BPI on their standards and attends the Affordable Comfort conference each year.

DNR also encourages subgrantees to use the Training and Technical Assistance (T&TA) sub category in the DOE budget to attend the Affordable Comfort and the U.S. DOE conferences. The weatherization agency managers also attend quarterly Energy Professional Housing Alliance (EHPA) meetings and the annual Missouri Association for Community Action (MACA) training conference.

In Fiscal Year 2006 each agency was required to have at least one BPI certified auditor on staff. BPI certified auditors are required to have a certain number of continuing education hours each year and must be recertified every three years. Any subgrantee that does not meet this requirement is required to submit a corrective action plan before DNR will award a grant for the next program year.

Lead-Safe Work Practices training is required for both direct hire and contractor crew workers. New crew members are required to be trained within a six-month period. Re-training needs to be completed within a three-year period.

Contractors must have all required insurances (liability and POI) as well as a Lead Safe Certification.

## ***K. Quality Control***

DNR is responsible for monitoring the performance of the subgrantees. The purpose of the monitoring is to determine if clients are adequately served and to determine if the program is operated in compliance with federal and state regulations and requirements.

DNR uses the same monitoring protocol as used with DOE homes. In many instances utility grant funds are used in conjunction with DOE funded homes.

The DNR monitoring activities examine four areas of program operations:

1. Housing quality inspections
2. Production and expenditure reviews
3. Fiscal and program operations
4. Oversight of federal/state requirements and regulations

The activities that are implemented to address these issues are as follows.

1. Desk Monitoring – DNR reviews required monthly reports that includes clients’ names, job numbers, and other required information. They can use these reports to determine compliance with the following regulations.
  - Federally designated expenditure categories.
  - Actual versus planned expenditures.
  - Expenditure rates.
  - Characteristics of completed homes.
  - Number of completed units per month.
  - Number of persons and households by WAP targets.
2. Fiscal and Procedural Monitoring – DNR visits each subgrantee at least once per year to review procedural, fiscal, and compliance issues. DNR conducts a review of the subgrantees’ procedures using a standardized monitoring protocol. DNR reviews the subgrantees’ compliance with federal/state regulations, requirements specified in the Missouri WAP Annual and Master files, the Missouri WAP Competitive Procurement Standards, and the DNR General Terms and Conditions for Federal Subgrants. DNR also reviews the subgrantees’ annual independent audits for consistency with financial reports submitted during the year.
3. Housing Quality Monitoring – DNR housing quality monitors conduct on-site visits at least once each program year. They select a sample of completed homes for inspection and use an inspection checklist to assess the following.
  - Compliance with allowable WAP measures.
  - Quality of work.
  - Accuracy of reporting on home installation materials.
  - Appropriateness, accuracy, and completeness of the initial energy audit and final inspection.

Follow-up reviews of homes may be conducted where additional work or corrective measures were required.

4. Independent Monitoring – A subgrantee is required to have an annual fiscal audit that documents expenditures and compliance with regulations and requirements. Findings are compared to the subgrant and monthly reports.

DNR/EC has found that overall energy efficiency measures have been installed correctly and according to DOE and state requirements. Occasionally, additional follow up or rework is required.

### **III. Agency Interviews**

The evaluation research included in-depth telephone interviews with weatherization managers at the agencies that implement the LIWP. Twelve of the thirteen agencies complied with the evaluation request for an interview. This section summarizes the findings from these interviews.

#### **A. Agency Administration**

Eight of the twelve agencies reported that all client and program data are maintained in paper client files. Four of the agencies reported that some data are electronic and some are in client files. Due to the way that the data are maintained, it was a time-consuming process for the agencies to provide data on clients, homes, and service delivery that were needed for the LIWP evaluation.

#### **B. Agency Staff and Training**

All of the agencies reported that their own staff members are responsible for the program audit. Most of the agencies had BPI certified auditors or auditors who were currently working on their BPI certification.

Seven of the agencies reported that they use contractors for all of the measure installation work, four agencies reported that their own staff do the measure installation work and they hire contractors for the furnace work, and one agency reported that they use a combination of their own staff and contractors for weatherization work and contractors for furnace work.

All but one of the agencies reported that they receive training at Linn State Technical College through DNR. They reported that the training is provided on a variety of topics and provides the information that is needed. One of the weatherization managers reported that they attend quarterly and some that they attend less frequently. Two mentioned that the auditors are required to attend a certain number of hours of training each year, so they are sent on an annual basis. Other types of training that were mentioned by a minority of the weatherization managers were:

- The annual WAP conference – 3 agencies.
- The annual Affordable Comfort Conference – 3 agencies.
- EPHA – Energy Professional Housing Alliance where all the weatherization managers and directors and agencies get together quarterly to discuss new things and changes to the guidelines – 3 agencies.
- The Kansas Building Science Institute – 1 agency.
- They provide their own training at the agency – 1 agency.
- HVAC training at local community colleges – 1 agency.



One manager noted that she would like more training from DNR on reports for deemed electric and gas savings.

Several managers noted that DNR is very supportive and provides information whenever needed. One manager noted DNR provides needed technical support and answers questions about the NEAT audit.

### **C. LIWP Measures**

All of the managers reported that they follow the DNR guidelines for the LIWP. One manager stated that they do have some basic agency guidelines in addition to the DNR guidelines. A couple of others reported that they have some agency procedural guidelines in addition to the DNR technical guidelines.

Table III-1 lists the measures that the agencies described that they provide through the LIWP. The most common measures, mentioned by all or almost all of the agencies were infiltration work such as caulking and door sweeps, heating system repair and/or replacement, and insulation.

**Table III-1**  
**Measure Installation Reported by Agency Managers**

Measure	Number of Agencies
Infiltration work	12
Heating system repair/replacement	11
Insulation	10
Window and/or door repair/replacement	8
Furnace clean and tune	3
Water heater repair/replacement	3
Water heater wrap	2
Space heater replacement	1
Vent attic	1
Repair flooring if rotting out	1

One of the agency managers noted that she is careful not to use Ameren program funds for natural gas appliances except for in the one county that the agency served where Ameren also provided gas service. However, none of the other agencies made this distinction.

The Ameren funds are from an electric rate case settlement and most of the agencies serve clients who have a gas utility other than Ameren. However, when asked specifically about measures that would address electric usage – refrigerator replacement, air conditioning repair and replacement, and CFL replacements for incandescent light bulbs, most managers reported that these measures were not part of the program. Table III-2 displays the manager responses.

**Table 2**  
**Electric Measure Installation**

Measure	Number of Agencies		Comments
	Yes	No	
Refrigerator replacement	0	12	<ul style="list-style-type: none"> <li>One agency noted that DNR does not allow refrigerator replacement.</li> </ul>
Air conditioner repair/replacement	2	10	<ul style="list-style-type: none"> <li>One agency manager noted that they only do air conditioning repair/replacement if it is related to the heating system and this is the only case in which DNR allows this work.</li> <li>Another agency manager noted that they had asked DNR but had not received a clear answer, so had decided not to do this measure.</li> </ul>
CFLs	4	8	<ul style="list-style-type: none"> <li>One agency manager noted that they replace any bulb used more than 3 hours per day.</li> <li>One agency manager noted that they leave it up to the client since the client will have to deal with the disposal issue. She noted that they replace the lights that are used most but that they do not have a standard for a certain number of hours of use to be replaced.</li> <li>One agency manager noted that they replace all the incandescent with CFLs.</li> <li>One agency manager said that they hand out ten CFLs to each client and tell the client to install the CFLs in the bulbs that are used most. She said that she installs the CFLs if the client is elderly or disabled.</li> </ul>

Weatherization managers were asked what health and safety measures are provided as part of the weatherization work. Table III-3 shows that most of the managers reported that they install CO detectors and many reported that they install smoke detectors, conduct CO testing, and take care of water heater issues.

**Table III-3**  
**Health and Safety Measures**

Measure	Number of Agencies
CO Detectors	10
Smoke Detectors	7
CO Testing	7
Water Heater Issues	7
Gas Leak Testing	4
Furnace Repair and Replacement	4
Moisture and Mold Issues	4
Check for Proper Ventilation	2
Furnace Clean and Tune	1
Furnace Filter Replacement	1
Electric Box Covers	1

Measure	Number of Agencies
Check Supply Vents	1
Replace Door if Missing	1

#### ***D. Energy Education***

Discussions with the weatherization managers revealed that there were different amounts of emphasis placed on the energy education provided to the customer. Several of the managers focused on pamphlets and other materials that are handed to the clients at the time of the audit. A couple of the managers reported that they have an interview form that is used to obtain information and educate the customer at the same time. A few others specifically described the education process. Some of these descriptions are excerpted below.

- When the auditor sets up the blower door, she talks to the client and shows them where the air leaks are. A lot of times people have open windows or storm windows up. They leave their door open for the light and lose heat. We talk to people about how to save energy and where to set the thermostat. A lot of times have them set way up so heat source cycles a longer cycle. We talk to the clients about their appliances and tell them to use the energy saving settings on their appliances. We also discuss the CFLs and how much they can save with the CFLs.
- Our home auditor makes an appointment with the owner or occupant. At the time, there is an extensive interview and the auditor asks clients specifically about any problems in the home, the kinds of systems that might be associated with a gas leak, explains what we plan to do and why. The auditor explains the blower door test, that it is a measure that improves the infiltration. The auditor answers questions. We also recommend energy saving approaches for the future.
- Education is provided at the front end and tail end. When we walk through the home, we provide advice on how to not waste energy, covering ducts, turning the water tank thermostat down, and changing the filter. We recommend programs and forums throughout the community.
- We talk to the clients about the thermostat and whatever the auditor sees that needs to be discussed with the homeowner. If we put in a new furnace, we explain the efficiency and the energy star ratings.
- As they go through the home, they are supposed to talk to the client, tell them about the different measures and how the client can save in the different areas of the home. The education is usually done more at the time of the audit versus the time of the final.

- We go through the process, tell them what we are looking at, what we are going to be changing, and how to take care of it. At the end, we make sure that they agree we've done everything we said that we would do and that it looks correct to them.

### ***E. Coordination of Funding Sources***

All of the agencies said that they coordinate the funding that they have to provide comprehensive services to the clients. Many of the agencies have three sources of funding – the Ameren electric funds, gas utility funds, and DOE WAP funds. This allows them to spend up to triple what they would have been able to spend under the DOE WAP funding alone. Some of the managers specifically mentioned that this was important in the case of home repairs (often window and door work) where the DOE WAP limits spending to \$600 per home and the combination of programs allows the agency to double or triple that amount.

### ***F. Waiting Lists***

Nine of the twelve managers reported that they do have a waiting list for weatherization. The wait ranged from a couple of weeks, to a few months (3 agencies), to more than one year (4 agencies). Three of the agencies reported that Ameren clients are moved to the top of their list so they do not have to wait for service delivery. One agency reported that seniors are treated first and another reported that there is no wait for elderly and disabled clients.

### ***G. Ameren Funding***

The weatherization managers were asked whether the clients know that the services are funded by Ameren. Six of the managers said that clients were informed, four said that the clients did not know this, and two stated that they were not sure whether or not clients were aware that the program was funded by Ameren.

### ***H. Successes and Barriers***

When asked about the successes of the program, the most common response was that the additional funds from Ameren allow the agency to serve more clients and/or treat the homes more thoroughly (7 agencies). One manager noted that the additional funding and work allows the agency to maintain a trained staff to do the weatherization work and one noted that because of the additional funding, clients on the waiting list do not have to wait as long for services. Several managers noted that the work helps reduce clients' energy bills and make their homes more comfortable (5 agencies).

Agency weatherization managers were also asked about the barriers they face in providing services. The table below displays the barriers that were mentioned. The most common barrier mentioned was a limitation on the type of work that could be done in the home.

**Table III-4**  
**Barriers Noted by Managers**

Category	Barrier	Number of Agencies
Limitation on Types of Work	Inability to do air conditioning work	3
	Inability to improve appliances	1
	Inability to replace electric furnaces, even if the client has no heat. Replacements are limited to natural gas, propane, and oil fired systems.	1
Funding	Need to be able to do more work in the home	2
	Need more money to provide program services	1
Client Outreach	Ameren customers are only in two of their eight counties so it is difficult to get Ameren customers to apply for services	1
	Getting applicants within the income guidelines	1
	Ameren needs to tell customers in need about the program	1
Other Issues	Educating the client that some time will pass between the audit and measure installation	1
	Requires additional reporting, but not a significant barrier	1
	The housing stock that they work with	1

## **I. Recommendations**

Agency managers made several recommendations regarding the program.

**Table III-5**  
**Agency Recommendations**

Category	Recommendation	Number of Agencies
Program Funding	Increase the amount of funds they can spend in a home.	2
	Provide more funding so they can do additional measures in the home.	1
	Provide information on funding plan if it is multi-year, as this will help the agencies with their planning.	1

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Category	Recommendation	Number of Agencies
Program Outreach	Ameren should refer households to the program.	1
	Provide funding for the agencies to educate the community about energy conservation and the services that are available.	1
Other	Allow them to re-weatherize homes. Right now they can only go back to homes that were done prior to 9/30/1993.	1

## IV. Participant Survey

APPRISE conducted surveys with Ameren customers who received LIWP services to provide information on understanding and satisfaction with program services, usage reduction education received, and changes in customer energy use behavior that resulted from the education. This section provides a description of the survey methodology and the findings from the survey.

### ***A. Survey Methodology***

This section describes the methodology for the survey, including procedures for sample selection and survey implementation.

#### **Survey Sample**

A sample of 518 active Ameren customers who received LIWP services between March 31, 2007 and June 30, 2008 was selected for the survey. Customers on the Ameren Do Not Call List were removed from the list prior to sample selection.

#### **Survey Implementation**

A survey advance letter was sent to all 518 potential respondents. This letter announced the survey, notified potential respondents that they might be called to participate in the survey, explained the purpose of the survey, and gave potential respondents the option to call the phone center to complete the survey at their convenience.

APPRISE retained TMR Inc. to conduct the telephone survey through its call center. A researcher from APPRISE trained TMR's employees on the survey instrument and monitored survey implementation. TMR's manager in charge of the survey instructed interviewers how to use the computerized version of the survey to record customer responses.

Interviewer training consisted of two hour-long sessions – one for daytime and one for evening interviewers. The training provided interviewers with an overview of the study, purpose behind questions asked, and strategies to provide accurate clarification and elicit acceptable responses through neutral probing techniques.

Interviewer monitoring allowed APPRISE researchers to both listen to the way interviewers conducted surveys and review the answers they chose on the computerized data entry form. There were two methods for monitoring the quality of the survey implementation. First, the initial implementation of the survey was monitored in person at the telephone center, where the monitor could listen to the interviews as they were conducted and observe the answers as they were recorded. After the first day, live monitoring was conducted by telephone, where the monitor could listen to the live survey and provide feedback on survey implementation (but could not observe the answers being recorded by the interviewer.) To

provide an additional check on the accuracy of interviewers' data entry, we received daily recordings of a sample of interviews with the accompanying data file. The monitor listened to the interview while checking the data file to ensure that questions were accurately coded and entered into the database.

Telephone interviews were conducted between March 4, 2009 and March 16, 2009. During this time period, 273 interviews were completed.

### **Survey Response Rates**

This section describes the response rates for the survey.

- **Number selected:** In total, 518 customers were selected for the survey.
- **Unusable:** There were 73 cases deemed unusable because no one was present in the home during the survey who was able to complete the survey, or because phone numbers were unavailable, disconnected, or incorrect. These households are not included in the denominator of the response rate or the cooperation rate. They are included in the denominator of the completed interview rate.
- **Non-Interviews:** There were 45 cases classified as non-interviews because the qualified respondent refused to complete the interview, or because the respondent asked the interviewer to call back to complete the interview at a later time, but did not complete the interview during the field period. These households are included in the denominator of the cooperation rate, the response rate, and the completed interview rate.
- **Ineligible:** There were 12 cases deemed to be ineligible because the respondent did not remember receiving services or because the members of the respondent's household had moved. These households are not included in the denominator of the response rate or the cooperation rate. They are included in the denominator of the completed interview rate.
- **Unknown eligibility:** There were 115 cases that were determined to have unknown eligibility to complete the interview, due to answering machines, no answers, and language barriers, or due to reaching the maximum number of calling attempts.<sup>1</sup> These households are not included in the denominator of the cooperation rate. They are included in the denominator of the response rate and the completed interview rate.
- **Completed interviews:** The completed interviews are households that were reached and that answered the full set of survey questions by telephone. In total, 273 interviews were completed.

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<sup>1</sup>The telephone interview center conducted interviews with respondents with a language barrier by arranging a callback with an English-speaking member of household whenever possible. However, there were 3 cases in which an interview could not be completed due to a language barrier.



- **Cooperation rate:** The cooperation rate is the percent of eligible households contacted who completed the survey. This is calculated as the number of completed interviews divided by the interviews plus the number of non-interviews (refusals plus non-completed callbacks<sup>2</sup>). Overall, this survey achieved an 86 percent cooperation rate.
- **Response rate:** The response rate is the number of completed interviews divided by the number of completed interviews plus the number of non-interviews (refusals plus non-completed callbacks) plus all cases of unknown eligibility (due to answering machines, language barriers or maximum calling attempts reached). This survey attained a 63 percent response rate.
- **Completed Interview Rate:** The completed interview rate is the percentage of households selected that completed the survey. This survey attained a 53 percent completed interview rate.

**Table IV-1**  
**Sample and Response Rates**

	<b>Total Sample</b>
<b>Number Selected</b>	518
<b>Unusable</b>	73
<b>Non-Interviews</b>	45
<b>Ineligible</b>	12
<b>Unknown Eligibility</b>	115
<b>Completed Interviews</b>	273
<b>Cooperation Rate</b>	86%
<b>Response Rate</b>	63%
<b>Completed Interview Rate</b>	53%

## **B. Demographics**

This section provides information on the demographics of the survey respondents. Table IV-2 shows that 37 percent of the respondents live in single person households. Eleven percent have more than four in the household.

<sup>2</sup> Non-completed callbacks include respondents who asked the interviewer to call back at a later time to complete the interview, but did not complete the interview by the end of the field period.

**Table IV-2**  
**Number of Household Members**

Number of Household Members	Percent of Respondents
<b>1</b>	37%
<b>2</b>	23%
<b>3</b>	15%
<b>4</b>	14%
<b>5</b>	8%
<b>6 or more</b>	3%

Table IV-3 displays the percentage of households with vulnerable members. The table shows that 45 percent have a senior in the home, 55 percent have a disabled household member, 44 percent have a child in the home, and 21 percent are single parent households.

**Table IV-3**  
**Vulnerable Groups**

	Household With Senior (Age 60 or older)	Household With Disabled	Household With Child (Age 18 or under)	Household With Young Child (Age 5 or under)	Single Parent Household <sup>1</sup>
<b>Yes</b>	45%	55%	44%	13%	21%
<b>No</b>	55%	45%	56%	87%	79%
<b>Don't Know/ Refused</b>	0%	0%	0%	0%	0%

<sup>1</sup> Defined as households with only one adult residing with one or more children.

Table IV-4 displays the percent of households that have at least one vulnerable household member, an elderly individual, a disabled individual, or a child. The table shows that 95 percent of the households that were served have at least one vulnerable member.

**Table IV-4**  
**Households With At Least One Vulnerable Member**

	Percent of Respondents
<b>At Least One Vulnerable Member</b>	95%
<b>No Vulnerable Members</b>	5%

Table IV-5 displays the annual income that respondents reported in the survey. The table shows that 29 percent have income below \$10,000, 47 percent have income between \$10,000 and \$20,000, 18 percent have income between \$20,000 and \$30,000 and only six percent have income of more than \$30,000.

**Table IV-5**  
**Annual Income**

Annual Income	Percent of All Respondents	Percent of Respondents Who Provided Income Data
Less than \$ 10,000	26%	29%
\$ 10,001 - \$ 20,000	41%	47%
\$ 20,001 - \$ 30,000	16%	18%
\$ 30,001 - \$ 40,000	4%	5%
More than \$ 40,000	1%	1%
Don't Know/Refused	12%	--

Table IV-6 displays the household poverty level computed from the income and number of household members that respondents reported in the survey. The table shows that ten percent reported income at or below 50 percent of the poverty level, 45 percent reported income between 50 and 100 percent of poverty, 28 percent reported income between 100 and 150 percent of poverty, and 17 percent reported income above 150 percent of poverty.

**Table IV-6**  
**Poverty Level**

Poverty Level	Percent of All Respondents	Percent of Respondents Who Provided Income Data
0%-50%	8%	10%
51%-100%	40%	45%
101%-150%	25%	28%
More than 150%	15%	17%
No Income Information	12%	--

Table IV-7 displays the types of income and benefits that respondents reported they received in the past year. The table shows that only 29 percent reported employment income, 48 percent reported retirement income, 34 percent reported public assistance income, 56 percent reported non-cash benefits, and 34 percent reported LIHEAP benefits.

**Table IV-7**  
**Types of Income and Benefits Received**

	Wages or Self-Employment Income	Retirement Income	Public Assistance	Non-cash benefits	LIHEAP benefits
Yes	29%	48%	34%	56%	34%
No	70%	52%	64%	43%	61%
Don't Know /Refused	1%	1%	1%	1%	5%

Respondents were asked whether any member of the household had been unemployed and looking for work in the past 12 months. Table IV-8 shows that 29 percent of the respondents said that they someone in the household had been unemployed and looking for work.

**Table IV-8**  
**Unemployed During the Year**

<b>Unemployed</b>	<b>Percent of Respondents</b>
<b>Yes</b>	29%
<b>No</b>	70%
<b>Don't Know/Refused</b>	1%

Respondents were asked about the highest level of education reached by any member of the household. Table IV-9 shows that 54 percent of the respondents had not received education past high school.

**Table IV-9**  
**Highest Level of Education Reached By Any Member of Household**

<b>Highest Level of Education</b>	<b>Percent of Respondents</b>
<b>Less Than High School</b>	16%
<b>High School Diploma or Equivalent</b>	38%
<b>Some College/Associates Degree</b>	31%
<b>Bachelor's Degree</b>	7%
<b>Master's Degree or Higher</b>	3%
<b>Vocational Training</b>	3%
<b>Other</b>	2%
<b>Don't Know/Refused</b>	<1%

Respondents were asked whether any member of the household has a medical condition that requires additional use of energy. Table IV-10 shows that 30 percent of respondents reported that someone in the household had such a condition.

**Table IV-10**  
**Household Member With a Medical Condition**  
**That Requires Additional Use of Energy**

Medical Condition	Percent of Respondents
Yes	30%
No	70%
Don't Know/Refused	0%

### ***C. Reasons for Participation***

This section explores how households found out about the program and why they participated. Table IV-11 shows that 41 percent reported that they found out about the program through a community agency and 30 percent learned about the program through a friend or relative. Other common sources were a social service or government agency and an advertisement.

**Table IV-11**  
**How Did You Find Out About The Program?**

Found Out About the Program	Percent of Respondents
Community Agency	41%
Friend or Relative	30%
Social Service or Government Agency	13%
Advertisement (Newspaper, Flyer, Bulletin Board, TV)	8%
Utility Company	3%
Previous Experience	2%
Bill Insert	1%
Don't Know/Refused	3%

Customers were asked whether the main reason that they wanted to receive weatherization services, was to reduce their energy bills, reduce the amount of energy they use, improve the comfort of their home, or for another reason. Table IV-12 shows that 60 percent reported that the main reason was to reduce their energy bills, 23 percent reported it was to improve the comfort of their home, 10 percent reported that it was to reduce their energy use, and 6 percent reported that it was because a new furnace or a repair was needed.

**Table IV-12**  
**Main Reason For Applying For LIWP**

Main Reason For Applying for LIWP	Percent of Respondents
Reduce Energy Bills	60%

Main Reason For Applying for LIWP	Percent of Respondents
Improve Comfort of Home	23%
Reduce Energy Use	10%
New Furnace Needed	4%
Repair Needed	2%
Other	<1%
Don't Know/Refused	<1%

### ***D. Energy Behavior***

This section examines the impact of the program on respondents' energy usage behavior. Respondents were asked whether they were home for the service provider's visit and whether they were home for the entire visit. Table IV-13 shows that 97 percent reported that they were home at the time of the visit and 85 percent reported that they were home for the entire visit.

**Table IV-13**  
**At Home At the Time of the Service Provider's Visit**

	Home at the Time of the Visit	Home for the Entire Visit
Yes	97%	85%
No	3%	14%
Don't Know/Refused	0%	1%

Respondents were asked whether the provider gave them information about how to reduce the amount of energy that they use. Table IV-14 shows that only 54 percent of the respondents said that the provider gave them such information.

**Table IV-14**  
**Providers Gave Information About How To Reduce Energy Use**

	Percent of Respondents
Yes	54%
No	39%
Don't Know/Refused	7%

Table IV-15 compares information provided about energy use reduction to that from other program surveys. The table shows that the Ameren program was about the same as the New Hampshire weatherization program, but respondents to the PPL WRAP survey were much more likely to say that the provider gave them information about how to save energy.

**Table IV-15**  
**Providers Gave Information About How To Reduce Energy Use**  
**Comparison to Other Programs**

	<b>New Hampshire Weatherization Program</b>	<b>PPL WRAP</b>
<b>Provider Left Information About Saving Energy</b>	53%	80%

Respondents were then asked what energy saving actions they had been able to take since the service provider's visit. Table IV-16 shows that 57 percent of respondents provided at least one action. The most commonly reported actions were turning down the heating temperature, insulating windows and doors, turning off unused lighting, and keeping windows and doors closed.

**Table IV-16**  
**Energy Saving Actions Taken Since the Providers' Visit**

<b>Energy Saving Actions Taken</b>	<b>Percent of Respondents</b>
<b>Turn Down Heat Temperature</b>	26%
<b>Insulate Windows and Doors</b>	19%
<b>Turn Off All Unused Lighting</b>	5%
<b>Keep Windows and Doors Closed</b>	5%
<b>Replaced Windows/Doors</b>	4%
<b>Change Furnace Filter</b>	3%
<b>Turn Off Unused Appliances/ Entertainment</b>	2%
<b>Open Blinds During Day/Close At Night</b>	2%
<b>Keep Thermostat on One Setting</b>	2%
<b>Insulation</b>	2%
<b>Wrapped Water Heater/Pipes</b>	1%
<b>Use Less Hot Water</b>	1%
<b>Use Cold Water For Washing Clothes</b>	1%
<b>Use Air Conditioner Less</b>	1%
<b>Turn Down Water Heater Temperature</b>	1%
<b>Closed Off Part of Home</b>	<1%
<b>Clean Dryer Filter</b>	<1%
<b>Avoid Use of Space Heaters</b>	<1%
<b>Wash Only Full Loads in Clothes Washer</b>	<1%
<b>Use Programmable Thermostat</b>	<1%
<b>None</b>	38%

Energy Saving Actions Taken	Percent of Respondents
Don't Know/Refused	5%

\*The answers in this table may add up to more than 100 percent because respondents may have provided more than one response.

After the unprompted question, respondents were asked several questions about particular end uses that their changes in behavior may have addressed. Table IV-17 shows that 75 percent said that they reduced their heat setting on the thermostat or reduced how often they use their heat as a result of the program.

**Table IV-17**  
**Reduced Heat Setting on Thermostat or Reduced How Often Heat is Used**  
**As a Result of the Program**

	Percent of Respondents
Yes	75%
No	22%
Don't Know/Refused	2%

When asked to report specifically how they changed their use of heat, 50 percent said that they turned down their thermostat and 14 percent said that they use their heat less.

**Table IV-18**  
**Change in Using Main Source of Heat**  
**As a Result of the Program**

Change in Using Main Source of Heat	Percent of Respondents
Turn Down Thermostat	50%
Use Heat Less	14%
Keep Thermostat on One Setting	5%
Use Timer or Programmable Thermostat	3%
Use Heat Fewer Days Per Year	1%
Use Heat Fewer Hours Per Day	1%
Heat Fewer Rooms	1%
Repaired/Replaced Primary Heating System	1%
Use Space Heater Less Often/Stopped Using Space Heater	1%
Clean/Change Furnace Filter	1%
Use Supplemental Heat	1%
Other	2%
Don't Know/Refused	1%



Change in Using Main Source of Heat	Percent of Respondents
Did Not Reduce Heating Use	29%

\*The answers in this table may add up to more than 100 percent because respondents may have provided more than one response.

Table IV-19 shows that 49 percent reported that they reduced the amount of hot water that they use as a result of the program.

**Table IV-19**  
**Reduced Amount of Hot Water Used**  
**As a Result of the Program**

	Percent of Respondents
Yes	49%
No	46%
Don't Know/Refused	5%

Respondents were most likely to report that they turned down their hot water heating temperature or that they use cold water for clothes washing. Other responses included reduced length of showers, using less hot water, not letting the water run, and not washing clothes as often.

**Table IV-20**  
**Actions Taken to Reduce Amount of Hot Water Used**  
**As a Result of the Program**

Actions Taken to Reduce Amount of Hot Water Used	Percent of Respondents
Turned Down Water Heater Temperature	18%
Use Cold Water for Washing Clothes	10%
Reduced Length of Showers	5%
Use Less Hot Water	5%
Don't Let Water Run	4%
Don't Wash Clothes As Often	4%
Reduced Number of Baths/Showers	3%
Don't Run Dishwasher As Often	2%
Wrapped Water Heater/Pipes	2%
Use Timer for Water Heater/Reduce Time It Is On	1%
New Water Heater	1%
Use Low-Flow Showerhead/Aerator	0%
Don't Know/Refused	4%

Actions Taken to Reduce Amount of Hot Water Used	Percent of Respondents
Not Reduced Hot Water Use	54%

\*The answers in this table may add up to more than 100 percent because respondents may have provided more than one response.

Table IV-21 shows that 42 percent of the respondents said they have an electric space heater in the home.

**Table IV-21**  
**Do You Have an Electric Space Heater in Your Home?**

	Percent of Respondents
Yes	42%
No	57%
Don't Know/Refused	1%

While 17 percent of the respondents said that they use the space heater less since receipt of weatherization services, nine percent said that they use the space heater more, and 14 percent said that they use it about the same amount.

**Table IV-22**  
**Usage of Electric Space Heater**  
**Since Participating in the Program**

Usage of Electric Space Heater	Percent of Respondents
More	9%
Less	17%
About the Same	14%
Don't Know/Refused	2%
Does Not Have A Space Heater	58%

Table IV-23 shows that 91 percent of the respondents reported that they use some type of air conditioning.

**Table IV-23**  
**Respondent Uses Central, Window, or Wall Air Conditioner**

	Percent of Respondents
Yes	91%
No	9%
Don't Know/Refused	0%

Respondents were asked whether they reduced the amount of the air conditioning that they use as a result of the program. Table IV-24 shows that 44 percent of the respondents said that they did reduce their air conditioning usage as a result of the program.

**Table IV-24**  
**Reduced Amount of Air Conditioning Used**  
**As a Result of the Program**

	Percent of Respondents
<b>Yes</b>	44%
<b>No</b>	31%
<b>Don't Know/Refused</b>	15%
<b>Does Not Have an AC</b>	9%

When asked how they changed their use of air conditioning as a result of the program, 20 percent said that they use the air conditioner less and 15 percent said that they set it at a higher temperature. A few percent said that they reduced it in other ways.

**Table IV-25**  
**Change in Using Air Conditioning**  
**As a Result of the Program**

Change in Using Air Conditioning	Percent of Respondents
<b>Use Air Conditioner Less</b>	20%
<b>Turn Up Thermostat/Use Lower Setting</b>	15%
<b>Don't Use Air Conditioning</b>	3%
<b>Use Air Conditioning in Fewer Rooms</b>	3%
<b>Keep Thermostat on One Setting</b>	3%
<b>Use Air Conditioning Fewer Days Per Year</b>	2%
<b>Use Air Conditioning Fewer Hours Per Day</b>	1%
<b>Other</b>	1%
<b>Don't Know/Refused</b>	2%
<b>Not Changed/Does Not Have an AC</b>	58%

\*The answers in this table may add up to more than 100 percent because respondents may have provided more than one response.

## ***E. Program Measures***

This section examines reported satisfaction with specific work that was done on the home. Table IV-26 shows that 68 percent of the respondents reported that the providers installed insulation.

**Table IV-26**  
**Providers Added to Home's Insulation**

	Percent of Respondents
<b>Yes</b>	68%
<b>No</b>	29%
<b>Don't Know/Refused</b>	3%

Of those who reported that they had insulation installed by the program, 61 percent reported that they were very satisfied, 25 percent reported they were somewhat satisfied, seven percent reported that they were somewhat dissatisfied, and 4 percent reported that they were very dissatisfied.

**Table IV-27A**  
**Satisfaction With the Insulation Work**

	Satisfaction with Insulation Work
<b>Number of Respondents</b>	187
<b>Very Satisfied</b>	61%
<b>Somewhat Satisfied</b>	25%
<b>Somewhat Dissatisfied</b>	7%
<b>Very Dissatisfied</b>	4%
<b>Don't Know/Refused</b>	3%

Below we compare the satisfaction with the insulation work to satisfaction from two other low-income weatherization programs. The table shows that satisfaction with insulation for these other programs was somewhat higher than for Ameren's LIWP. While 61 percent of the LIWP participants were very satisfied with the insulation work, 77 percent of the NH WAP participants were very satisfied with the insulation work and 77 percent of the PPL WRAP participants were very satisfied with the sealing and insulation work.

**Table IV-27B**  
**Satisfaction With the Insulation Work**  
**Comparison Programs**

	New Hampshire Weatherization Program	PPL WRAP
	Satisfaction with Insulation Work	Satisfaction with Sealing and Insulation Work
<b>Very Satisfied</b>	77%	77%
<b>Somewhat Satisfied</b>	14%	15%
<b>Somewhat Dissatisfied</b>	5%	5%

	<b>New Hampshire Weatherization Program</b>	<b>PPL WRAP</b>
	<b>Satisfaction with Insulation Work</b>	<b>Satisfaction with Sealing and Insulation Work</b>
<b>Very Dissatisfied</b>	2%	3%
<b>Don't Know/Refused</b>	3%	0%

Respondents were asked whether they were satisfied with the condition in which the service provider left the home. Table IV-28 shows that 61 percent reported that they were very satisfied, 21 percent said that they were somewhat satisfied, 13 percent said that they were somewhat dissatisfied, and 4 percent said they were very dissatisfied with the condition in which the service provider left their home.

**Table IV-28**  
**Satisfaction With the Condition**  
**In Which the Service Provider Left Home**

	<b>Satisfaction with Condition in Which Provider Left Home</b>
<b>Number of Respondents</b>	187
<b>Very Satisfied</b>	61%
<b>Somewhat Satisfied</b>	21%
<b>Somewhat Dissatisfied</b>	13%
<b>Very Dissatisfied</b>	4%
<b>Don't Know/Refused</b>	1%

Table IV-29 shows that 74 percent of respondents reported that the providers did air sealing work in their home.

**Table IV-29**  
**Providers Did Air Sealing or Seal Gaps Letting Cold Air**

	<b>Percent of Respondents</b>
<b>Yes</b>	74%
<b>No</b>	23%
<b>Don't Know/Refused</b>	3%

Table IV-30A shows that 57 percent said that they were very satisfied, 29 percent said they were somewhat satisfied, 9 percent said they were somewhat dissatisfied, and four percent said that they were very dissatisfied with the air sealing work that the provider did.

**Table IV-30A**  
**Satisfaction With the Air Sealing Work**

	Satisfaction with Sealing Work
<b>Number of Respondents</b>	201
<b>Very Satisfied</b>	57%
<b>Somewhat Satisfied</b>	29%
<b>Somewhat Dissatisfied</b>	9%
<b>Very Dissatisfied</b>	4%

Below we compare the satisfaction with the air sealing work to satisfaction from two other low-income weatherization programs. The table shows that satisfaction with air sealing for these other programs was somewhat higher than for Ameren's LIWP. While 57 percent of the LIWP participants were very satisfied with the air sealing work, 78 percent of the NH WAP participants were very satisfied with the air sealing work and 77 percent of the PPL WRAP participants were very satisfied with the sealing and insulation work.

**Table IV-30B**  
**Satisfaction With the Air Sealing Work**  
**Comparison Programs**

	<b>New Hampshire Weatherization Program</b>	<b>PPL WRAP</b>
	<b>Satisfaction with Air Sealing Work</b>	<b>Satisfaction with Sealing and Insulation Work</b>
<b>Very Satisfied</b>	78%	77%
<b>Somewhat Satisfied</b>	12%	15%
<b>Somewhat Dissatisfied</b>	5%	5%
<b>Very Dissatisfied</b>	3%	3%
<b>Don't Know/Refused</b>	2%	0%

Respondents were asked whether they were satisfied with the condition in which the service provider left the home. Table IV-31 shows that 67 percent said that they were very satisfied, 24 percent said that they were somewhat satisfied, 6 percent said that they were somewhat dissatisfied, and 3 percent said that they were very dissatisfied.

**Table IV-31**  
**Satisfaction With the Condition**  
**In Which the Service Provider Left Home**

	Satisfaction with Condition in Which Provider Left Home
Number of Respondents	201
Very Satisfied	67%
Somewhat Satisfied	24%
Somewhat Dissatisfied	6%
Very Dissatisfied	3%
Don't Know/Refused	0%

Table IV-32 shows that 41 percent of respondents said that the providers repaired or replaced their primary heating system.

**Table IV-32**  
**Providers Repaired or Replaced Primary Heating System**

	Percent of Respondents
Yes	41%
No	58%
Don't Know/Refused	1%

Respondents who had their heating system repaired or replaced were asked how satisfied they were with this work. Table IV-33 shows that 81 percent said that they were very satisfied, eight percent said that they were somewhat satisfied, five percent said they were somewhat dissatisfied, and six percent said that they were very dissatisfied. This is approximately the same as satisfaction with heating system work in the NH Weatherization Assistance Program, where 77 percent said that they were very satisfied and 11 percent said that they were somewhat satisfied with the heating system work.

**Table IV-33**  
**Satisfaction With the Completion of the**  
**Repair or Replacement of Your Heating System**

	Satisfaction with Completion of Repair or Replacement Work
Number of Respondents	113
Very Satisfied	81%
Somewhat Satisfied	8%

	<b>Satisfaction with Completion of Repair or Replacement Work</b>
<b>Number of Respondents</b>	113
<b>Somewhat Dissatisfied</b>	5%
<b>Very Dissatisfied</b>	6%
<b>Don't Know/Refused</b>	0%

Respondents who had heating system work were asked how satisfied they were with the condition in which the service provider left the home. Table IV-34 shows that 79 percent said they were very satisfied, 13 percent said that they were somewhat satisfied, four percent said they were somewhat dissatisfied, and four percent said they were very dissatisfied.

**Table IV-34**  
**Satisfaction With the Condition**  
**In Which the Service Provider Left Home**

	<b>Satisfaction with Condition in Which Provider Left Home</b>
<b>Number of Respondents</b>	113
<b>Very Satisfied</b>	79%
<b>Somewhat Satisfied</b>	13%
<b>Somewhat Dissatisfied</b>	4%
<b>Very Dissatisfied</b>	4%

Respondents were asked whether the winter temperature in the home improved, worsened, or stayed the same as before service delivery. Table IV-35A shows that 63 percent said that the winter temperature improved and three percent said that it worsened since service delivery.

**Table IV-35A**  
**Winter Temperature in Home**  
**Since Receiving Weatherization Services**

	<b>Percent of Respondents</b>
<b>Improved</b>	63%
<b>Worsened</b>	3%
<b>No Change</b>	33%
<b>Don't Know/Refused</b>	1%

Table IV-35B compares responses to other surveys of low-income weatherization program participants. The table shows that 62 percent of New Hampshire WAP and 58 percent of PPL



WRAP participants said that the winter temperature in their home improved following receipt of service delivery, approximately the same as the 63 percent of Ameren's participants.

**Table IV-35B**  
**Winter Temperature in Home**  
**Since Receiving Weatherization Services**  
**Comparison to Other Programs**

	<b>New Hampshire Weatherization Program</b>	<b>PPL WRAP</b>
<b>Improved</b>	62%	58%
<b>Worsened</b>	4%	1%
<b>No Change</b>	31%	46%
<b>Don't Know/Refused</b>	3%	1%

Respondents were asked whether the summer temperature in the home improved, worsened, or stayed the same as before service delivery. Table IV-36A shows that 40 percent said that the summer temperature improved and one percent said that it worsened since service delivery.

**Table IV-36A**  
**Summer Temperature in Home**  
**Since Receiving Weatherization Services**

	<b>Percent of Respondents</b>
<b>Improved</b>	40%
<b>Worsened</b>	1%
<b>No Change</b>	58%
<b>Don't Know/Refused</b>	1%

Table V-11B compares responses about improved summer comfort to other surveys of low-income weatherization program participants. The table shows that 36 percent of New Hampshire WAP and 38 percent of PPL WRAP participants said that the summer temperature in their home improved following receipt of service delivery, approximately the same as the 40 percent of Ameren's participants.

**Table IV-36B**  
**Summer Temperature in Home**  
**Since Receiving Weatherization Services**  
**Comparison to Other Programs**

	New Hampshire Weatherization Program	PPL WRAP
<b>Improved</b>	36%	38%
<b>Worsened</b>	0%	3%
<b>No Change</b>	63%	59%
<b>Don't Know/Refused</b>	1%	0%

Respondents were asked whether there were other changes in the comfort of the home since receipt of weatherization services. Table IV-37 shows that just over half of the respondents said that there were no other changes. However, 12 percent said that there was reduced air leakage and/or drafts in the home, 12 percent said that they felt the home was safer or more comfortable, and ten percent said that the home temperature had improved.

**Table IV-37**  
**Other Changes in Home's Comfort**  
**Since Receiving Weatherization Services**

Other Changes in Home's Comfort	Percent of Respondents
<b>No Air Leaks/Drafts</b>	12%
<b>Safer/More Comfortable Home</b>	12%
<b>Home Temperature Improved</b>	10%
<b>Complaint about Work Done</b>	5%
<b>Uncomfortable Home</b>	3%
<b>Other</b>	3%
<b>None</b>	53%
<b>Don't Know/Refused</b>	1%

## ***F. Program Understanding, Impact, and Usage***

This section examines the respondents' understanding of program benefits, and their difficulty in meeting their energy needs.

Table IV-38A shows that 92 percent of the respondents reported that they felt they had a good understanding of the benefits provided by the program.

**Table IV-38A**  
**Good Understanding of the Benefits**  
**Provided by the Weatherization Program**

	Percent of Respondents
<b>Yes</b>	92%
<b>No</b>	6%
<b>Don't Know/Refused</b>	2%

Table IV-38B provides a comparison with other low-income energy efficiency programs. The table shows that all of the programs had similar reported levels of understanding, ranging from 88 percent to 92 percent.

**Table IV-38B**  
**Good Understanding of the Benefits**  
**Provided by the Weatherization Program**  
**Comparison to Other Programs**

	New Hampshire Weatherization Program	PPL WRAP	Niagara Mohawk LICAP	NJ Comfort Partners Program	Ohio Electric Partnership Program
<b>Yes</b>	91%	88%	88%	92%	88%
<b>No</b>	6%	10%	11%	7%	7%
<b>Don't Know/Refused</b>	2%	2%	2%	1%	6%

Respondents were asked whether they felt the main benefit of the program was lower energy bills, lower energy use, a safer or more comfortable home, or something else. Table IV-39A shows that 46 percent said that the main benefit was lower energy bills, 24 percent said it was a safer or more comfortable home, 14 percent said it was lower energy use, and seven percent said it was energy education. Respondents were then asked whether they agreed that each was a benefit of the program. The table showed that 95 percent agreed that a safer or more comfortable home was a benefit, 91 percent agreed that lower energy bills were a benefit of the program, 90 percent agreed that lower energy use was a benefit of the program, and 89 percent agreed that energy education was a benefit of the program.

**Table IV-39A**  
**Program Benefits**

Program Benefits	Main Benefit	All Benefits
<b>Lower Energy Bills</b>	46%	91%
<b>Safer/More Comfortable Home</b>	24%	95%
<b>Lower Energy Use</b>	14%	90%

Program Benefits	Main Benefit	All Benefits
Energy Education	7%	89%
Repairs/Replacements	3%	
Complaint About Program	3%	
Don't Know/Refused	3%	

Table IV-39B shows the results for the percent of respondents who agreed that that particular benefits resulted from other low-income weatherization programs. The table shows that results for the other programs are similar to those for Ameren's program, but that Ameren is at the higher end for achieving lower energy bills and a safer or more comfortable home. While 91 percent of Ameren's respondents agreed that lower energy bills were a benefit of the program, 89 percent of PECO LIURP respondents, 88 percent of PPL WRAP respondents, but only 83 percent of the New Hampshire weatherization program respondents agreed that lower energy bills were a benefit of the program.<sup>3</sup> While 95 percent of Ameren's respondents agreed that a safer or more comfortable home was a benefit of the program, 92 percent of NH Weatherization participants, 92 percent of PPL WRAP participants, and 86 percent of PECO LIURP participants agreed that a safer or more comfortable home was a benefit of the program.

**Table IV-39B**  
**Program Benefits**  
**Comparison to Other Programs**

Program Benefits	New Hampshire Weatherization Program	PPL WRAP	PECO LIURP
Lower Energy Bills	83%	88%	89%
Safer/More Comfortable Home	92%	92%	86%
Lower Energy Use	86%	91%	94%
Energy Education	85%	95%	100%

Respondents were asked how difficult it is for them to pay their monthly energy bill Table IV-40 shows that 36 percent said it is very difficult and 42 percent said that it is somewhat difficult.

<sup>3</sup> This may relate to changes in prices that occurred at that time.

**Table IV-40**  
**Difficulty of Paying Energy Bills**

	Percent of Respondents
<b>Very Difficult</b>	36%
<b>Somewhat Difficult</b>	42%
<b>Not Too Difficult</b>	16%
<b>Not At All Difficult</b>	7%
<b>Don't Know/Refused</b>	0%

Low-income households sometimes use their kitchen stove or oven to provide heat when one of their fuels has been shut off or their heating system is not working properly. This is a dangerous practice that signals the household is having serious problems meeting their energy needs. Table IV-41 shows that 29 percent of the respondents reported that they used their oven or stove to provide heat in the past year.

**Table IV-41**  
**Used Kitchen Stove or Oven to Provide Heat**  
**During Past Year**

	Percent of Respondents
<b>Yes</b>	29%
<b>No</b>	71%
<b>Don't Know/Refused</b>	0%

Table IV-42 provides more information about how and why respondents used their kitchen oven or stove for heating. Fourteen percent reported that they use the oven or stove on the coldest days, indicating that their home is drafty or that their heating system is not doing a good enough job of heating their home. Six percent indicated that they use this heating source when their main source of heat is not available. Four percent said that they use the oven or stove for heat all winter and five percent said they use it sometimes during the winter.

**Table IV-42**  
**Frequency of Using Kitchen Stove or Oven to Provide Heat**  
**During Past Year**

Used Kitchen Stove	Percent of Respondents
<b>Never</b>	71%
<b>On the Coldest Days</b>	14%
<b>When Main Heat Source Not Working or Ran Out of Fuel</b>	6%

Used Kitchen Stove	Percent of Respondents
Sometimes	5%
All Winter	4%
Don't Know/Refused	0%

Respondents were asked how important the program has been in helping them meet their needs. Table IV-43A shows that 60 percent said the program has been very important and 21 said the program has been somewhat important.

**Table IV-43A**  
**How Important Has the Program Been in Helping You Meet Your Needs?**

Importance of LIWP	Percent of Respondents
Very Important	60%
Somewhat Important	21%
Of Little Importance	8%
Not At All Important	10%
Don't Know/Refused	1%

Table IV-43B compares responses about the importance of the program from responses to other low-income weatherization program surveys. The table shows that Ameren respondents were somewhat less likely to say that the program was very important in helping them to meet their needs. While 60 percent of Ameren respondents said that the program was very important, 66 percent of New Hampshire WAP and 66 percent of PPL WRAP respondents said that the program was very important in helping them to meet their needs.

**Table IV-43B**  
**How Important Has the Program Been in Helping You Meet Your Needs?**  
**Comparison to Other Programs**

Importance of Program	New Hampshire Weatherization Program	PPL WRAP
Very Important	66%	66%
Somewhat Important	25%	20%
Of Little Importance	5%	8%
Not At All Important	3%	1%
Don't Know/Refused	0%	5%

## G. Program Satisfaction

Respondents were asked how satisfied they were with the energy education provided by the program, defined as "...the explanation of the Program, referrals to other programs or services, and recommendations for what you can do to reduce your energy use." Table IV-44A shows that 59 percent said that they were very satisfied, 26 percent said they were somewhat satisfied, four percent said they were somewhat dissatisfied, and four percent said they were very dissatisfied.

**Table IV-44A**  
**Satisfaction with Energy Education**

	Percent of Respondents
<b>Very Satisfied</b>	59%
<b>Somewhat Satisfied</b>	26%
<b>Somewhat Dissatisfied</b>	4%
<b>Very Dissatisfied</b>	4%
<b>Don't Know/Refused</b>	1%
<b>Didn't Receive Energy Education</b>	6%

Table IV-44B compares responses about satisfaction with energy education to other low-income weatherization programs. The table shows that the Ameren program is on the low end of the satisfaction scale. While 59 percent of Ameren respondents were very satisfied with the program, 59 percent of New Hampshire WAP participants, 64 percent of PECO LIURP participants, 65 percent of PPL WRAP participants, and 71 percent of Niagara Mohawk LICAP participants were very satisfied with the program.

**Table IV-44B**  
**Satisfaction with Energy Education**  
**Comparison With Other Programs**

	New Hampshire Weatherization Program	PPL WRAP	Niagara Mohawk LICAP	PECO LIURP
<b>Very Satisfied</b>	59%	65%	71%	64%
<b>Somewhat Satisfied</b>	29%	28%	26%	26%
<b>Somewhat Dissatisfied</b>	5%	4%	2%	9%
<b>Very Dissatisfied</b>	4%	2%	1%	0%
<b>Don't Know/Refused</b>	3%	0%	1%	0%

Respondents were asked how helpful the program was in teaching them about energy usage and ways to reduce energy costs. Table IV-45 shows that 55 percent said the program was very helpful and 26 percent said it was somewhat helpful.

**Table IV-45**  
**Helpfulness of Program in Teaching**  
**About Energy Use and Ways to Reduce Energy Costs**

	Percent of Respondents
<b>Very Helpful</b>	55%
<b>Somewhat Helpful</b>	26%
<b>Of Little Help</b>	8%
<b>Not At All Helpful</b>	10%
<b>Don't Know/Refused</b>	1%

Respondents were asked how knowledgeable they felt they provider was about energy usage. Table IV-46A shows that 65 percent said they felt the provider was very knowledgeable and 26 percent said they felt the provider was somewhat knowledgeable.

**Table IV-46A**  
**Provider's Knowledge About Energy Usage**

	Percent of Respondents
<b>Very Knowledgeable</b>	65%
<b>Somewhat Knowledgeable</b>	26%
<b>Not At All Knowledgeable</b>	5%
<b>Don't Know/Refused</b>	4%

Table IV-46B compares responses about the energy knowledge of the provider to responses from other low-income weatherization surveys. The table below shows that the Ameren program providers are not doing as well as some of the other program providers in sharing their knowledge about energy usage with the customers. While 65 percent of the Ameren participants said that the provider was very knowledgeable, 73 percent of the New Hampshire respondents, 81 percent of the PECO LIURP respondents, 83 percent of the PPL WRAP respondents, and 89 percent of the Niagara Mohawk LICAP respondents said that the provider was very knowledgeable about energy usage.

**Table IV-46B**  
**Provider's Knowledge About Energy Usage**  
**Comparison to Other Programs**

	New Hampshire Weatherization Program	PPL WRAP	Niagara Mohawk LICAP	PECO LIURP
<b>Very Knowledgeable</b>	73%	83%	89%	81%
<b>Somewhat Knowledgeable</b>	19%	14%	10%	16%



	New Hampshire Weatherization Program	PPL WRAP	Niagara Mohawk LICAP	PECO LIURP
<b>Not At All Knowledgeable</b>	3%	1%	1%	1%
<b>Don't Know/Refused</b>	5%	4%	1%	3%

Respondents were asked whether they felt the provider who came to their home was friendly and polite. Table IV-47 shows that 98 percent of the respondents said that they did feel the provider was friendly and polite. The responses for New Hampshire were approximately the same as for Ameren's program. Ninety-five percent of the New Hampshire respondents said that the provider was friendly and polite.

**Table IV-47**  
**Do You Feel the Provider Who Came to Your Home Was Friendly and Polite?**

	Percent of Respondents
<b>Yes</b>	98%
<b>No</b>	2%
<b>Don't Know/Refused</b>	<1%

Respondents were asked whether the work was done very soon after it was promised, somewhat soon, or not at all soon. Table IV-48A shows that 59 percent said the work was done very soon and 33 percent said it was done somewhat soon.

**Table IV-48A**  
**Completion of the Promised Work**

	Percent of Respondents
<b>Very Soon</b>	59%
<b>Somewhat Soon</b>	33%
<b>Not At All Soon</b>	8%
<b>Don't Know/Refused</b>	<1%

Table IV-48B compares the respondents' timeliness ratings to other low-income weatherization programs. The table shows that the Ameren providers are better than some of the other programs but not as good as some of the others. While 59 percent of the Ameren respondents said the work was done very soon after it was promised, 51 percent of the LIURP respondents, 65 percent of the New Hampshire respondents, and 67 percent of the PPL WRAP respondents said that the work was done very soon after it was promised.

**Table IV-48B**  
**Completion of the Promised Work**  
**Compared to Other Programs**

	<b>New Hampshire Weatherization Program</b>	<b>PPL WRAP</b>	<b>PECO LIURP</b>
<b>Very Soon</b>	65%	67%	51%
<b>Somewhat Soon</b>	24%	19%	15%
<b>Not At All Soon</b>	8%	6%	11%
<b>Don't Know/Refused</b>	4%	8%	23%

One of the problems that is often faced in weatherization programs is that customers have expectations for what they will receive based on reports from friends and acquaintances about the program. Customers may then be dissatisfied if they did not receive something that their neighbor did. The providers must try to educate the customer about what they should expect, but this can often be a challenge. Table IV-49A shows that 65 percent of the Ameren respondents said that they received everything they expected to receive from the program.

**Table IV-49A**  
**Did You Receive Everything That You Expected Under the Program?**

	<b>Percent of Respondents</b>
<b>Yes</b>	65%
<b>No</b>	33%
<b>Don't Know/Refused</b>	1%

Table IV-49B compares the response about expectations with other programs. The table shows that the Ameren providers are not doing quite as well as some of the other programs. While 65 percent of the Ameren respondents said that they received everything that they expected to receive from the program, 72 percent of the New Hampshire respondents and 80 percent of the PPL WRAP respondents said that they received everything they expected from the program.

**Table IV-49B**  
**Did You Receive Everything That You Expected Under the Program?**  
**Comparison to Other Programs**

	<b>New Hampshire Weatherization Program</b>	<b>PPL WRAP</b>
<b>Yes</b>	72%	80%
<b>No</b>	26%	19%
<b>Don't Know/Refused</b>	2%	1%

Customers who said they did not receive everything that they expected were asked what they expected to receive that they did not receive. Table IV-50 shows that the most common response was new windows and doors, as is common in weatherization programs. The table shows that 16 percent said they expected but did not receive new windows or doors, seven percent said they expect to receive air sealing or duct sealing, four percent said they expect to receive repairs, and four percent said they expected to receive insulation.

**Table IV-50**  
**What Did You Expect to Receive That You Did Not Receive?**

	Percent of Respondents
New Windows/Doors	16%
Air Sealing/Duct Sealing	7%
Repairs	4%
Insulation	4%
New Furnace	3%
New Cooling System	2%
Water Heater	1%
Siding	1%
Other	3%
Received Everything Expected Under the Program	67%

\*The answers in this table may add up to more than 100 percent because respondents may have provided more than one response.

Respondents were asked how satisfied they were with the weatherization program overall. Table IV-51A shows that 62 percent said they were very satisfied, 25 percent said they were somewhat satisfied, eight percent said they were somewhat dissatisfied, and four percent said they were very dissatisfied.

**Table IV-51A**  
**Satisfaction with the Weatherization Program**

	Percent of Respondents
Very Satisfied	62%
Somewhat Satisfied	25%
Somewhat Dissatisfied	8%
Very Dissatisfied	4%
Don't Know/Refused	<1%

Table IV-51B compares responses about overall program satisfaction with other programs. The table below shows that Ameren's program was rated lower than some of the other programs.

While 62 percent of Ameren’s respondents said they were very satisfied, 62 percent of PECO’s respondents said they were very satisfied, 68 percent of Niagara Mohawk’s respondents said they were very satisfied, and 71 percent of New Hampshire and PPL WRAP respondents said they were very satisfied.

**Table IV-51B**  
**Satisfaction with the Weatherization Program**  
**Comparison with Other Programs**

	<b>New Hampshire Weatherization Program</b>	<b>PPL WRAP</b>	<b>Niagara Mohawk LICAP</b>	<b>PECO LIURP</b>
<b>Very Satisfied</b>	71%	71%	68%	62%
<b>Somewhat Satisfied</b>	20%	22%	24%	27%
<b>Somewhat Dissatisfied</b>	5%	4%	5%	7%
<b>Very Dissatisfied</b>	3%	2%	2%	3%
<b>Don’t Know/Refused</b>	1%	1%	0%	0%

Respondents were asked whether they had recommendations for improvements to the program. These recommendations are shown in Table IV-52. The table shows that 20 percent said the program should provide what is needed or expected, 18 percent said that the provider should do better quality or a better job of cleaning up after the work is completed, and a few percent said that the program should have more funding.

**Table IV-52**  
**Recommendations for Improvements to the Program**

<b>Recommendations</b>	<b>Percent of Respondents</b>
<b>Provide What is Needed/Expected</b>	20%
<b>Better Quality Work/Clean Up After Completion of Work</b>	18%
<b>More Funding</b>	4%
<b>More Program Outreach</b>	1%
<b>Energy Education</b>	1%
<b>None</b>	53%
<b>Don’t Know/Refused</b>	2%

## **H. Summary**

This section provides a summary of the key findings from the participant survey.

**Program Participation:** Most respondents learned about the program through a community agency or a friend or relative. The greatest motivations for program participation were to reduce energy bills and to increase the home's comfort.

**Energy Behavior:** The survey found that there is room for improvement on customer education. However, many customers said that they did take actions to reduce their energy usage as a result of the program.

- *Provider education:* Only 54 percent of the respondents said that the provider gave them information about how to reduce energy usage. This is about the same as for the New Hampshire weatherization program, but compares to 80 percent in the PPL WRAP program.
- *Energy actions:* When prompted, 75 percent said they reduced use of heat, 49 percent said they reduced the amount of hot water that they use, 17 percent said that they reduced the use of their electric space heater, and 44 percent said that they reduced the use of their air conditioning as a result of the program.

**Program Measures:** The survey found that satisfaction with some of the key measures, insulation and air sealing, was lower than has been found with some other programs.

- *Insulation:* The survey found that 61 percent of the Ameren respondents were very satisfied with the insulation work that was provided by the program. This compares to 77 percent in the New Hampshire WAP and the PPL WRAP programs who were very satisfied with the insulation work. Only 61 percent said that they were very satisfied with the condition in which the providers left the home.
- *Air sealing:* The survey found that 57 percent of the Ameren respondents were very satisfied with the air sealing work that was provided by the program. This compares to 78 percent in the New Hampshire WAP and 77 percent in the PPL WRAP program who were very satisfied with the air sealing work. Sixty-seven percent said they were very satisfied with the condition in which the service provider left their home.
- *Heating System Repair or Replacement:* There was higher satisfaction with the heating system work. The survey found that 81 percent were very satisfied with the heating system repair or replacement and 79 percent said they were very satisfied with the condition in which the provider left the home.

**Program Impact:** The survey found the Ameren program did as well or better than other programs in improving the winter and summer temperature of the respondents' homes.

- *Winter Temperature:* Sixty-three percent of the Ameren respondents said that the winter temperature of their home had improved, compared to 62 percent of the New Hampshire WAP participants and 58 percent of the PPL WRAP participants.

- *Summer Temperature:* Forty percent of the Ameren respondents said that the summer temperature of their home had improved, compared to 36 percent of the New Hampshire WAP participants and 38 percent of the PPL WRAP participants.

**Program Benefits:** The survey found that program participants felt the program benefited them by reducing their bills, improving the safety and comfort of their home, lowering their energy use, and providing energy education. Ameren's program compared favorably to the other programs in terms of lower energy bills and improved safety and comfort. Ninety-one percent of the Ameren respondents agreed that the program resulted in lower energy bills, compared to 83 percent of New Hampshire WAP respondents, 88 percent of PPL WRAP respondents, and 89 percent of PECO LIURP respondents. Ninety-five percent of the Ameren respondents agreed that the program resulted in a safer or more comfortable home, compared to 92 percent of New Hampshire WAP respondents, 92 percent of PPL WRAP respondents, and 86 percent of PECO LIURP respondents.

**Program Satisfaction:** The survey found lower levels of satisfaction with the Ameren program than with other low-income weatherization programs.

- *Satisfaction with Energy Education:* Fifty-nine percent of the Ameren participants said that they were very satisfied with the energy education provided by the program, compared to 59 percent of the New Hampshire WAP participants, 64 percent of the PECO LIURP participants, 65 percent of the PPL WRAP participants, and 71 percent of the Niagara Mohawk LICAP participants.
- *Provider's Knowledge About Energy Usage:* Sixty-five percent of the Ameren participants said that they felt the provider was very knowledgeable about energy usage, compared to 73 percent of New Hampshire WAP participants, 81 percent of PECO LIURP participants, 83 percent of PPL WRAP participants, and 89 percent of Niagara Mohawk LICAP participants.
- *Program Satisfaction:* Respondents were asked how satisfied they were with the program overall. Sixty-two percent said they were very satisfied and 25 percent said that they were somewhat satisfied. This compares to 62 percent in PECO's LIURP, 68 percent in the Niagara Mohawk LICAP, 71 percent in the New Hampshire WAP and 71 percent in the PPL WRAP.

**Summary:** The survey found that Ameren's LIWP provides some important benefits to the participants. The participants believe that it has reduced their energy usage and made their homes safer and more comfortable. Comparisons to other programs found that Ameren LIWP participants were more likely to say that the program improved the winter and summer comfort than some of these other program participants. Ameren respondents were also more likely to agree that lower energy bills and a safer or more comfortable home were benefits of the program compared to some of the other low-income weatherization programs that have been studied.

However, comparisons on measure installation and energy education, as well as overall program satisfaction, show room for improvement. Some recommendations for improving program outcomes and customer satisfaction are as follows.

- *Energy Education:* Only 54 percent of the respondents said that the provider gave them information about how to reduce energy usage. Ameren should require the agencies to provide customers with information about how they can reduce their energy usage.
- *Measure Installation:* Satisfaction with air sealing and insulation was not as high as in some other programs and many customers did not say they were “very satisfied” with the condition in which the contractor left their home. Ameren should require additional training and inspections in this area.

**Overall Satisfaction:** The overall satisfaction with Ameren’s program was lower than in some of the other programs studied. The most common program recommendations related to cleaning up after the work was done and provision of expected measures. The survey found that Ameren’s customers were somewhat more likely to say that they did not get everything that they expected than some of the other programs. Providers should be given more training on how to discuss what to expect from the program with the customers.

## V. Participant and Service Delivery Statistics

Eleven Community Action Agencies, one nonprofit, and one city government agency receives funds to implement LIWP in Ameren's service territory. The agencies are required to track funds spent on Ameren's LIWP separately from their other weatherization funding and send separate reports to DNR about the expenditure of each program's funds. Agencies are required to send in monthly reports, which is also their payment request. They provide information on the number of homes completed, expenditures, clients served, type of weatherization measures installed, energy savings, and blower door testing data.

Agencies are permitted to maintain data electronically or in paper files. DNR requests that the providers keep the information for three years after the grant period ends.

### A. Agency Data

The evaluation requires that detailed client and home data be collected for clients served by Ameren's program. While some of the required data are collected from the agencies by DNR and maintained in a DNR database, most of the needed data were only available at the agency level. Initial discussions with agency staff revealed that while most of the requested data were available, they were usually in paper files. Therefore, APPRISE developed and sent excel data collection spreadsheets to each agency with a list of clients served during the study period, data received from DNR, and blank data fields for the agencies to complete. The data fields that the agencies were asked to complete are shown in the Table V-1.

**Table V-1**  
**Agency Data Request**

<b>Client Contact Information</b>	<b>Client Demographics</b>	<b>Service Delivery</b>	<b>Measures Installed (Y/N) and Cost</b>	<b>Testing Data</b>
Ameren account number	Household poverty level	Audit date	Air sealing	Ambient CO – pre
Street address 1	Elderly member	Measure install begin date	Attic insulation	Ambient CO – post
Street address2	Child member	Measure install end date	Wall insulation	Flue CO – pre
City	Disabled member	Ameren job cost	Floor insulation	Flue CO - post
State	Health issue	Total labor cost	Kneewall insulation	
Zip code	Own or rent	Total material cost	Basement insulation	
Phone number	Home type	Total job cost	Duct sealing / insulation	
	Home age		Furnace replacement	
	Main heating fuel		Furnace repair	
	Water heating fuel		Furnace cleaning	
	Air conditioning		Water heater repair / replacement	
	Supplemental heat		Thermostat replacement	
	Gas utility		Air conditioner replacement	



Client Contact Information	Client Demographics	Service Delivery	Measures Installed (Y/N) and Cost	Testing Data
			Air conditioner repair	
			Window repair / replacement	
			Door repair / replacement	
			Other repairs	
			CFLs (number)	
			Health and safety measures	
			Other major measures	

With the exception of the testing data, the majority of the agencies were able to provide most of these data fields for most of the clients served by the program. However, many contacts and reminders were required to obtain these data from the agencies and many additional requests were made to fill in missing data. While the agencies were given an original deadline of January 30, 2009 (more than one month), complete data were not received by all of the agencies until May 2009.

We recommend that DNR creates a database to maintain these data to assist in program management and in future evaluation research.

## ***B. Production Statistics***

Program reporting spreadsheets were provided by DNR for three Ameren program periods.

- Period 1: April 2006 – March 2007.
- Period 2: February 2008 – October 2008.
- Period 3: July 2007 – June 2008. These jobs were completed with interest that was earned on the deposited Ameren program funds.

Table V-2 shows the number of jobs that were reported by each agency and the total number of jobs completed in the three periods. According to these reports, a total of 1,482 clients were served during these time periods. DNR also provided data files with individual client information for these jobs. Some of the agencies had a greater number of clients in the files than what had been reported in the spreadsheets. However, after removing duplicates for one of the agencies, there appeared to be a total of 1,437 unique clients served by Ameren's program between April 2006 and October 2008. (Duplicates were removed conservatively. It was not possible to identify all of the duplicates because of errors in the Ameren account number and in the assigned job number.)

**Table V-2**  
**Number of Jobs by Program Year and Agency**

	DNR Reports – Number of Ameren Jobs				DNR Data File
Agency	Period 1	Period 2	Period 3	Total	Duplicates Removed
	April 2006 – March 2007	February 2008 – October 2008	July 2007 – June 2008		
CAASTLC	194	194	194	582	587
CMCA	28	15	4	47	47
CSI	0	4	1	5	5
DAEOC	38	27	6	71	71
EMAA	26	34	12	72	72
GHCAA	7	6	1	14	14
JFCAC	92	67	24	183	183
KCNCSD	114	0	71	185	129
MOCA	22	13	6	41	41
NECAC	36	40	6	83	83
NMCAA	10	12	0	22	25
ULMSL	75	80	13	168	170
WCMCAA	8	1	1	10	10
<b>TOTAL</b>	650	493	339	1,482	1,437

Table V-3 compares the number of clients in the DNR database to the number of clients that agencies provided data for. Data were received for a total of 1,288 clients. This number is lower than the 1,437 in DNR's database for the following reasons.

1. While KCNCSD reported to DNR that they leveraged the program for 129 clients over this time period, they reported that only six of these clients were served with Ameren's funds.
2. ULMSL served a number of clients in multi-family housing through a pilot and did not report individual data for these clients.
3. Agencies identified additional duplicates in the data when obtaining the detailed client information.

This shows the need for more detailed and accurate program data reported through a database designed for program management.

**Table V-3**  
**Number of Ameren Jobs and**  
**Number of Jobs that Agencies Reported On**

Agency	DNR Total	Data Received from Agency
CAASTLC	587	581
CMCA	47	47
CSI	5	5
DAEOC	71	71
EMAA	72	72
GHCAA	14	14
JFCAC	183	183
KCNCSD	129	6
MOCA	41	41
NECAC	83	83
NMCAA	25	25
ULMSL	170	150
WCMCAA	10	10
<b>TOTAL</b>	<b>1,437</b>	<b>1,288</b>

Table V-3 shows the number of clients reported on by each agency. In the sections that follow, we provide aggregate statistics for Ameren’s program, and agency-level statistics for agencies that provided data for 50 or more clients. Individual agency data are shown for the following agencies:

- CAASTLC
- DAEOC
- EMAA
- JFCAC
- NECAC
- ULMSL

The following agencies are combined for the agency level analysis purposes in the “Other Agency” group.

- CMCA
- CSI
- GHCAA
- KCNCSD
- MOCA
- NMCAA

- WCMCAA

These agencies reported on a total of 148 clients.

### **C. Client Demographic Characteristics**

Agencies are required to use one of two prioritization methods to schedule clients for weatherization services. Both systems prioritize clients with seniors, children, and disabled household members. Table V-4 shows that 30 percent of the clients served have a senior household member, 49 percent have one or more children, and 43 percent have a disabled member. Almost 90 percent of the clients have at least one of these vulnerable household members.

**Table V-4A**  
**Percent of Clients with Vulnerable Members**

	Senior	Child	Disabled	Any Vulnerable
<b>Yes</b>	30%	49%	43%	89%
<b>No</b>	70%	51%	57%	11%
<b>Missing</b>	<1%	<1%	<1%	<1%

Table V-4B shows the percent of clients with vulnerable members by agency. The table shows that there is some variation by agency in the types of households served, but that the vast majority of clients served by all of the agencies have at least one vulnerable household member. For example, while 26 percent of the clients served by CAASTLC have a senior household member and 60 percent have a child, 59 percent of the clients served by DAEOC have a senior and 28 percent have a child.

**Table V-4B**  
**Percent with Vulnerable Members**  
**By Agency**

	Senior	Child	Disabled	Any Vulnerable
<b>CAASTLC</b>	26%	60%	39%	89%
<b>DAEOC</b>	59%	28%	37%	87%
<b>EMAA</b>	21%	26%	51%	81%
<b>JFCAC</b>	22%	46%	57%	93%
<b>NECAC</b>	30%	43%	52%	92%
<b>ULMSL</b>	43%	45%	43%	89%
<b>Other Agencies</b>	34%	36%	32%	86%
<b>All Agencies</b>	30%	49%	43%	89%

Initial interviews with agency weatherization managers revealed that one requested data item was not systematically collected by the agencies – whether the client has a household member with a health issue. Table V-5A shows that only about half of the clients had reports on this issue. The table shows that about ten percent of the clients have a noted health issue in the file. However, the actual number is likely to be higher, based on our experience with research in this area. In fact, nearly one third of the clients who responded to the Ameren LIWP client survey noted that there was a health issue in the home that required the additional use of energy.

**Table V-5A**  
**Client Health Issue**

	Percent of Clients
<b>Yes</b>	10%
<b>No</b>	39%
<b>Missing</b>	51%

Table V-5B displays the presence of client health issues by agency. The frequency ranges from none of the clients to 52 percent of the clients. However, the variability in frequency is probably related to data collection procedures that differ by agency.

**Table V-5B**  
**Client Health Issue**  
**By Agency**

	Health Issue		
	Yes	No	Missing
<b>CAASTLC</b>	1%	0%	99%
<b>DAEOC</b>	0%	100%	0%
<b>EMAA</b>	0%	100%	0%
<b>JFCAC</b>	21%	79%	0%
<b>NECAC</b>	0%	0%	100%
<b>ULMSL</b>	1%	99%	0%
<b>Other Agencies</b>	52%	48%	0%
<b>All Agencies</b>	10%	39%	51%

Household income was one of the variables that was reported by the agencies to DNR and received in the DNR data download. Therefore, these data were available for all but one of the clients in the database. Table V-6A shows that 39 percent have income below \$10,000, 42 percent have income between \$10,000 and \$20,000, and 15 percent have income between \$20,000 and \$30,000. Only three percent of the clients have annual income above \$30,000.

**Table V-6A**  
**Household Income**

	Percent of Clients
<\$10,000	39%
\$10,001 - \$20,000	42%
\$20,001 - \$30,000	15%
>\$30,000	3%
Missing	<1%

Table V-6B displays the annual household income by agency. The table shows some variability by agency in household income level. JFCAC clients are most likely to have income below \$10,000, with 51 percent of their clients in this income category. CAASTLC clients are most likely to have income in the \$20,000 and above range. This is consistent with the household composition of their clients; their clients more likely to be younger with children, and part of the working poor.

**Table V-6B**  
**Household Income**  
**By Agency**

	Household Income			
	<=\$10,000	\$10,001 - \$20,000	\$20,001 - \$30,000	>\$30,000
<b>CAASTLC</b>	33%	41%	21%	6%
<b>DAEOC</b>	49%	48%	3%	0%
<b>EMAA</b>	47%	44%	8%	0%
<b>JFCAC</b>	51%	35%	12%	2%
<b>NECAC</b>	42%	51%	6%	1%
<b>ULMSL</b>	35%	43%	19%	3%
<b>Other Agencies</b>	42%	47%	10%	1%
<b>All Agencies</b>	39%	42%	15%	3%

Agencies were asked to provide the household poverty level or the number of individuals in the household so that the poverty level could be constructed. Data were available for more than 80 percent of the clients. Table V-7A shows that 14 percent have income below 50 percent of poverty, 49 percent have income between 51 and 100 percent of poverty, and 35 percent have income between 101 and 150 percent of poverty.

**Table V-7A**  
**Household Poverty Level**

Household Poverty Level	Percent of Clients	Percent of Clients with Data
<=50%	12%	14%
51% - 100%	41%	49%
101% - 150%	29%	35%
>150%	2%	2%
Missing	17%	--

Table V-7B displays the household poverty level by agency. The table shows some variability by agency. While 43 percent of ULMSL clients have income above 100 percent of the poverty level, only 26 percent of the EMAA clients have income in this range.

**Table V-7B**  
**Household Poverty Level**  
**By Agency**

	Household Poverty Level			
	<=50%	51% - 100%	>100%	Missing
CAASTLC	13%	31%	37%	20%
DAEOC	21%	52%	27%	0%
EMAA	13%	61%	26%	0%
JFCAC	0%	72%	28%	1%
NECAC	0%	0%	0%	100%
ULMSL	15%	38%	43%	4%
Other Agencies	22%	49%	20%	9%
All Agencies	12%	41%	31%	17%

## ***D. Home Characteristics***

There are several barriers that agencies face when attempting to serve renters with weatherization services. Eligible clients who are renters must have a signed landlord agreement before work can begin. Additionally, the landlord must agree to the following conditions.

- The landlord will not raise the rent on the weatherized units for two years after weatherization is complete without just cause.
- The tenant will not be evicted during the two-year period without just cause.
- Tenants with utility costs included in the rent will receive a reduction in their rent when their utility costs are reduced as a result of weatherization.

- The landlord will not sell the apartment for two years unless the buyer assumes these obligations.

The subgrantee is required to negotiate with the landlord for a matching financial contribution. The amount of the contribution is left to the judgment of the subgrantee, but landlords must contribute a minimum of five percent of the project cost. This requirement will be waived if the owner/landlord's annual taxable income is at or below 200 percent of the Federal Poverty Level.

Table V-8A shows that renters are served less frequently than owners. The table shows that 85 percent of the clients served own their homes.

**Table V-8A  
Home Ownership**

	Percent of Clients
<b>Own</b>	85%
<b>Rent</b>	15%
<b>Missing</b>	<1%

Some agencies may be more successful in serving renters because they are more aggressive in pursuing this market, because there are more renters in their service territory, or because of a different norm in the rental market in the area. Table V-8B shows that there is variability in the percentage of renters served by agency. While 29 percent of the clients served by NECAC are renters, only seven percent of the clients served by DAEOC are renters.

**Table V-8B  
Home Ownership  
By Agency**

	Home Ownership	
	Own	Rent
<b>CAASTLC</b>	92%	8%
<b>DAEOC</b>	93%	7%
<b>EMAA</b>	88%	13%
<b>JFCAC</b>	87%	13%
<b>NECAC</b>	71%	29%
<b>ULMSL</b>	81%	19%
<b>Other Agencies</b>	64%	36%
<b>All Agencies</b>	85%	15%

Table V-9A displays the home types treated by the program. The table shows that the majority of the homes are single family detached homes. While 81 percent of the homes are single family



detached, 14 percent are mobile homes, three percent are multi-family homes, and only one percent are single family attached homes.

**Table V-9A**  
**Home Type**

	Percent of Clients
Single Detached	81%
Mobile Home	14%
Multi-Family	3%
Single Attached	1%
Missing	<1%

Table V-9B displays the types of homes treated by agency. The table shows that while some agencies serve almost all single family detached homes, one serves a majority of mobile homes and others serve a significant percentage of mobile homes or multi-family homes.

**Table V-9B**  
**Home Type**  
**By Agency**

	Home Type			
	Single Detached	Mobile Home	Multi-Family	Single Attached
CAASTLC	98%	0%	1%	1%
DAEOC	92%	8%	0%	0%
EMAA	100%	0%	0%	0%
JFCAC	30%	69%	1%	0%
NECAC	75%	24%	1%	0%
ULMSL	79%	0%	21%	0%
Other Agencies	71%	22%	0%	7%
All Agencies	81%	14%	3%	1%

Table V-10A displays the square footage of the clients' homes. Most of the clients live in homes that are 1,500 square feet or less. Only 17 percent are larger than 1,500 square feet.

**Table V-10A**  
**Home Square Footage**

Home Square Footage	Percent of Clients
<=750	13%
751 – 1,000	31%
1,001 – 1,500	39%

Home Square Footage	Percent of Clients
1,501 – 2,000	10%
>2,000	7%
Missing	<1%

Table V-10B displays home square footage by agency. The agencies are fairly similar in the size of homes that they treat. However, ULMSL and NECAC are more likely to serve clients who live in homes that are 1,000 or larger and JFCAC and EMAA are more likely to serve clients that live in smaller homes.

**Table V-10B**  
**Home Square Footage**  
**By Agency**

	Home Square Footage				
	<=750	751 – 1,000	1,000 – 1,500	1,501 – 2,000	>2,000
CAASTLC	10%	35%	38%	12%	5%
DAEOC	11%	25%	48%	10%	6%
EMAA	17%	24%	42%	15%	3%
JFCAC	18%	39%	36%	6%	1%
NECAC	7%	27%	42%	16%	8%
ULMSL	5%	19%	51%	7%	18%
Other Agencies	25%	26%	32%	7%	10%
All Agencies	13%	31%	39%	10%	7%

Table V-11A shows that most of the clients served live in homes that are more than 25 years old, and many live in homes that are more than 50 years old. Forty-two percent of clients live in homes that are more than 50 years old.

**Table V-11A**  
**Home Age**

Home Age	Percent of Clients	Percent of Clients (Excluding Missing Values)
<=25 Years	12%	15%
26 – 50 Years	34%	43%
51 – 75 Years	22%	28%
>75 Years	11%	14%
Missing	20%	--

Table V-11B displays home age by agency. The table shows that clients served by JFCAC are more likely to live in newer homes and clients served by EMAA and NECAC are more likely to live in older homes.

**Table V-11B**  
**Home Age**  
**By Agency**

	Home Age				
	<=25 Years	26 – 50 Years	51 – 75 Years	>75 Years	Missing
<b>CAASTLC</b>	4%	33%	30%	7%	25%
<b>DAEOC</b>	10%	39%	37%	4%	10%
<b>EMAA</b>	15%	40%	26%	18%	0%
<b>JFCAC</b>	46%	44%	4%	3%	3%
<b>NECAC</b>	18%	27%	20%	27%	8%
<b>ULMSL</b>	1%	7%	15%	22%	55%
<b>Other Agencies</b>	6%	50%	13%	21%	10%
<b>All Agencies</b>	12%	34%	22%	11%	20%

Agencies submit pre and post treatment air leakage data to DNR and these data are included in the DNR database, so they are available for most of the clients. Table V-5A shows that there is a significant reduction in the air leakage of homes treated by the program. While ten percent of homes had CFM50 air leakage rates of less than 2,000 prior to treatment, 34 percent had rates this low after treatment. While 50 percent had air leakage rates greater than 3,000 prior to treatment, only 19 percent had air leakage rates greater than 3,000 following treatment. This is an indication that the program reduced energy usage and increased comfort for the occupants. However, to have large impacts on energy usage, it is important for the air leakage at the top and the bottom of the envelope to be reduced, as opposed to air leakage in the neutral pressure pane.

**Table V-12A**  
**Air Leakage (CFM50)**

	Pre Treatment	Post Treatment
<b>&lt;=2,000</b>	10%	34%
<b>2,001 – 2,500</b>	16%	28%
<b>2,501 – 3,000</b>	18%	13%
<b>&gt;3,000</b>	50%	19%
<b>Missing</b>	6%	6%

Table V-12B shows the pre and post-treatment air leakage rates by agency. The table shows that some homes have worse pre-treatment conditions than others. While 82 percent of homes treated by ULMSL had air leakage rates of greater than 3,000, only 44 percent of the homes

treated by CAASTLC had such high leakage rates. There were also differences post-treatment. ULMSL homes were also more likely to have high leakage rates post treatment.

**Table V-12B**  
**Air Leakage**  
**By Agency**

	Air Leakage (CFM50)									
	Pre Air Leakage					Post Air Leakage				
	<=2,000	2,001-2,500	2,501-3,000	>3,000	Missing	<=2,000	2,001-2,500	2,501-3,000	>3,000	Missing
<b>CAASTLC</b>	6%	22%	27%	44%	2%	36%	43%	15%	4%	2%
<b>DAEOC</b>	1%	11%	17%	68%	3%	28%	21%	24%	24%	3%
<b>EMAA</b>	8%	10%	8%	58%	15%	51%	19%	3%	11%	15%
<b>JFCAC</b>	28%	19%	9%	20%	24%	44%	14%	8%	10%	24%
<b>NECAC</b>	12%	7%	12%	60%	8%	25%	8%	14%	43%	8%
<b>ULMSL</b>	1%	6%	7%	82%	5%	8%	15%	9%	63%	5%
<b>Other Agencies</b>	19%	11%	11%	58%	1%	36%	17%	13%	34%	1%
<b>All Agencies</b>	10%	16%	18%	50%	6%	34%	28%	13%	19%	6%

Table V-12C displays the change in the air leakage rate after program treatment. The table shows that seven percent of the clients had a CFM50 air leakage rate that decline by 2,000 or more, 21 percent had a rate that declined by 1,000 to 1,999, and 42 percent had a rate that decline by 500 to 999.

**Table V-12C**  
**Air Leakage Change (CFM50)**

Change	Percent of Clients
<b>Decline by &gt;=2,000</b>	7%
<b>Decline by 1,000 – 1,999</b>	21%
<b>Decline by 500 – 999</b>	42%
<b>Decline by 100 – 499</b>	19%
<b>Decline by &lt;100</b>	4%
<b>Increase</b>	1%
<b>Missing</b>	6%

Table V-12D displays the air leakage change by agency. The table shows that DAEOC, EMAA, and ULMSL were most likely to have declines in air leakage of 1,000 or more.

**Table V-12D**  
**Air Leakage Change**  
**By Agency**

	Leakage Change						
	Decline in CFM50					CFM50 Increase	Missing
	>=2,000	1,000 – 1,999	500 – 999	100 – 499	<100		
<b>CAASTLC</b>	1%	15%	71%	11%	0%	<1%	2%
<b>DAEOC</b>	27%	34%	17%	20%	0%	0%	3%
<b>EMAA</b>	18%	40%	18%	8%	0%	0%	15%
<b>JFCAC</b>	2%	5%	15%	45%	9%	0%	24%
<b>NECAC</b>	10%	19%	22%	33%	7%	1%	8%
<b>ULMSL</b>	14%	38%	22%	14%	3%	5%	5%
<b>Other Agencies</b>	14%	30%	18%	22%	16%	0%	1%
<b>All Agencies</b>	7%	21%	42%	19%	4%	1%	6%

Table V-12E displays the percent reduction in air leakage. The table shows that five percent of clients had a reduction of 50 percent or more, 18 percent had a reduction of 35 to 49 percent, and 27 percent had a reduction of 25 to 34 percent.

**Table V-12E**  
**Air Leakage Percent Change (CFM50)**

Change	Percent of Clients
<b>&gt;=50% Decline</b>	5%
<b>35% - 49% Decline</b>	18%
<b>25% - 34% Decline</b>	27%
<b>15% - 24% Decline</b>	27%
<b>5% - 14% Decline</b>	11%
<b>&lt;5% Decline</b>	4%
<b>Increase</b>	1%
<b>Missing</b>	6%

Table V-12F displays the percent change in air leakage by agency. The table shows that DAEOC and EMAA were most likely to have clients with a reduction in air leakage of 35 percent or more.

**Table V-12F**  
**Air Leakage Percent Change**  
**By Agency**

	Leakage Change						
	Decline in CFM50					CFM50 Increase	Missing
	>=35%	25-34%	15-24%	5-14%	<5%		
<b>CAASTLC</b>	22%	43%	32%	<1%	0%	<1%	2%
<b>DAEOC</b>	47%	17%	15%	18%	0%	0%	3%
<b>EMAA</b>	56%	14%	11%	3%	1%	0%	15%
<b>JFCAC</b>	6%	7%	28%	27%	8%	0%	24%
<b>NECAC</b>	17%	12%	25%	28%	8%	1%	8%
<b>ULMSL</b>	18%	21%	28%	17%	7%	5%	5%
<b>Other Agencies</b>	26%	16%	22%	20%	16%	0%	1%
<b>All Agencies</b>	23%	27%	27%	11%	4%	1%	6%

### ***E. Home Equipment Characteristics***

Table V-13A displays the main heating fuel for the clients served by the program. The table shows that 69 percent heat with natural gas, 23 percent heat with electricity, and six percent heat with propane.

**Table V-13A**  
**Main Heating Fuel**

	Percent of Clients
<b>Natural Gas</b>	69%
<b>Electricity</b>	23%
<b>Propane</b>	6%
<b>Other</b>	1%
<b>Missing</b>	1%

Table V-13B displays the main heating fuel by agency. The table shows that CAASTLC and ULMSL clients are most likely to heat with natural gas and JFCAC and EMMA clients are most likely to heat with electricity.

**Table V-13B**  
**Main Heating Fuel**  
**By Agency**

	Main Heating Fuel				
	Natural Gas	Electricity	Propane	Other	Missing
<b>CAASTLC</b>	96%	4%	0%	<1%	<1%
<b>DAEOC</b>	76%	15%	3%	6%	0%
<b>EMAA</b>	24%	56%	15%	6%	0%
<b>JFCAC</b>	9%	70%	16%	4%	0%
<b>NECAC</b>	51%	39%	10%	1%	0%
<b>ULMSL</b>	89%	2%	0%	0%	9%
<b>Other Agencies</b>	43%	40%	16%	1%	0%
<b>All Agencies</b>	69%	23%	6%	1%	1%

Table V-14A displays the natural gas company that serves the clients. The table shows that 11 percent of the clients receive gas (as well as electricity) from Ameren and 57 percent receive Gas from Laclede. Fifteen percent have no gas service and 12 percent did not have these data available.

**Table V-14A**  
**Natural Gas Company**

	Percent of Clients
<b>Ameren</b>	11%
<b>Laclede</b>	57%
<b>Atmos</b>	4%
<b>Empire</b>	1%
<b>None</b>	15%
<b>Missing</b>	12%

Table V-14B displays how the natural gas service territories vary with the agency service territories. The table shows that all of the CAASTLC clients with natural gas are served by Laclede, and the EMMA and NECAC clients who have natural gas are served by Ameren.

**Table V-14B**  
**Natural Gas Company**  
**By Agency**

	Natural Gas Company					
	Ameren	Laclede	Atmos	Empire	None	Missing
<b>CAASTLC</b>	0%	96%	0%	0%	1%	2%
<b>DAEOC</b>	23%	0%	52%	0%	25%	0%
<b>EMAA</b>	47%	11%	0%	0%	42%	0%
<b>JFCAC</b>	0%	8%	0%	0%	13%	79%
<b>NECAC</b>	47%	2%	1%	0%	49%	0%
<b>ULMSL</b>	0%	99%	0%	0%	1%	0%
<b>Other Agencies</b>	34%	0%	9%	5%	51%	1%
<b>All Agencies</b>	11%	57%	4%	1%	15%	12%

Table V-15A displays the percentage of clients who use supplemental heat. The table shows that 42 percent use electric supplemental heat, two percent use another fuel for supplemental heat, and 46 percent do not use supplemental heat.

**Table V-15A**  
**Supplemental Heat**

	Percent of Clients
<b>Electric</b>	42%
<b>Other</b>	2%
<b>None</b>	46%
<b>Missing</b>	9%

Table V-15B displays the use of supplemental heat by agency. The table shows that CAASTLC and EMAA clients are most likely to use electric supplemental heat.

**Table V-15B**  
**Supplemental Heat**  
**By Agency**

	Supplemental Heat			
	Electric	Other	None	Missing
<b>CAASTLC</b>	55%	2%	41%	2%
<b>DAEOC</b>	27%	6%	68%	0%
<b>EMAA</b>	64%	0%	36%	0%



	Supplemental Heat			
	Electric	Other	None	Missing
<b>JFCAC</b>	30%	3%	66%	1%
<b>NECAC</b>	1%	2%	96%	0%
<b>ULMSL</b>	23%	3%	0%	73%
<b>Other Agencies</b>	43%	2%	55%	0%
<b>All Agencies</b>	42%	2%	46%	9%

Table V-16A displays the clients' water heating fuel. The table shows that 65 percent use gas for water heating and 33 percent use electricity for water heating.

**Table V-16A**  
**Water Heating Fuel**

	Percent of Clients	Percent of Clients with Non Missing Data
<b>Gas</b>	60%	65%
<b>Electric</b>	31%	33%
<b>Other</b>	2%	2%
<b>Missing</b>	8%	--

Table V-16B displays the water heating fuel type used by agency. The table shows that CAASTLC clients are most likely to use gas for water heating (as they did for the main heating fuel) and JFCAC and EMAA clients are most likely to use electricity for water heating.

**Table V-16B**  
**Water Heating Fuel**  
**By Agency**

	Water Heating Fuel			
	Gas	Electric	Other	Missing
<b>CAASTLC</b>	92%	7%	0%	1%
<b>DAEOC</b>	27%	27%	0%	46%
<b>EMAA</b>	24%	67%	10%	0%
<b>JFCAC</b>	10%	87%	3%	1%
<b>NECAC</b>	42%	58%	0%	0%
<b>ULMSL</b>	71%	7%	0%	22%
<b>Other Agencies</b>	28%	48%	5%	18%
<b>All Agencies</b>	60%	31%	2%	8%

Table V-17A displays the type of air conditioning used by clients. The table shows that these data are missing for the majority of clients because air conditioning is not addressed by the program. However, among those who have data available, 48 percent have central air conditioning, 40 percent have window or wall air conditioning, and 12 percent do not have air conditioning.

**Table V17A**  
**Air Conditioning**

	Percent of Clients	Percent of Clients with Non Missing Data
Central	16%	48%
Window/Wall	13%	40%
None	4%	12%
Missing	67%	--

Table V-17B displays the type of air conditioning used by agency. The table shows that for the agencies that have data available, the majority of clients do have some form of air conditioning.

**Table V-17B**  
**Air Conditioning**  
**By Agency**

	Air Conditioning			
	Central	Window/Wall	None	Missing
CAASTLC	0%	0%	0%	100%
DAEOC	31%	61%	8%	0%
EMAA	42%	35%	24%	0%
JFCAC	36%	2%	0%	62%
NECAC	42%	35%	23%	0%
ULMSL	0%	0%	0%	100%
Other Agencies	37%	49%	6%	8%
All Agencies	16%	13%	4%	67%

## **F. Service Delivery Statistics**

The DNR database only contains information on the date that the job was reported. Therefore, agencies were asked to report the date that the audit was conducted, the data that measure installation began, and the data that measure installation was completed. Table V-18A shows the job duration based on these reported dates. The table shows that only 16 percent of the jobs are completed within two weeks and 36 percent of the jobs are completed within one month.

Twenty-three percent of the jobs take more than three months for completion. However it appears that there is a long lag between the audit date and the measure installation date, as only seven percent of the jobs take more than three months between the time that the measure installation begins and the measure installation completion date.

**Table V-18A**  
**Job Completion Time**

	<b>Audit Date to Final Measure Installation</b>	<b>Measure Installation Begin Date to End Date</b>
<b>&lt;=14 Days</b>	16%	38%
<b>15-30 Days</b>	19%	20%
<b>31-60 Days</b>	26%	20%
<b>61-90 Days</b>	13%	10%
<b>91-180 Days</b>	15%	5%
<b>&gt;180 Days</b>	8%	2%
<b>Missing</b>	4%	5%

Table V-18B displays the job completion time from the audit date to the final measure installation by agency. The table shows that there is some wide variation by agency. While 46 percent of JFCAC jobs are completed within two weeks, 80 percent of EMAA jobs take more than three months.

**Table V-18B**  
**Job Completion Time**  
**From Audit Date to Final Measure Installation**  
**By Agency**

	<b>Days for Job Completion</b>						
	<b>&lt;=14</b>	<b>15-30</b>	<b>31-60</b>	<b>61-90</b>	<b>91-180</b>	<b>&gt;180</b>	<b>Missing</b>
<b>CAASTLC</b>	14%	27%	30%	13%	10%	3%	3%
<b>DAEOC</b>	17%	28%	32%	10%	3%	10%	0%
<b>EMAA</b>	0%	1%	7%	11%	29%	51%	0%
<b>JFCAC</b>	46%	8%	10%	10%	19%	5%	1%
<b>NECAC</b>	0%	1%	31%	20%	43%	2%	1%
<b>ULMSL</b>	6%	11%	29%	17%	15%	3%	20%
<b>Other Agencies</b>	8%	22%	26%	13%	11%	17%	3%
<b>All Agencies</b>	16%	19%	26%	13%	15%	8%	4%

Agencies are required to report the Ameren job cost to DNR, as these reports also serve as the agency payment request. Because of duplication in several reported accounts with different DNR costs, there was some uncertainty as to the client's actual Ameren cost from the DNR data.

Agencies reported that they are likely to leverage funding from other programs including WAP and other utility programs, on Ameren jobs. APPRISE's data request included both the Ameren job cost and the total job cost. Some of the agencies reported the total job cost equal to the Ameren job cost for all of their clients. When asked whether there was no leveraging on any of the jobs, these agencies reported that they did not have the total job cost available. Table VII-2A displays the Ameren job cost as reported in the DNR database, the Ameren job cost reported by the agencies to APPRISE, and the total job cost reported by the agencies to APPRISE.

The table shows that the DNR cost has a distribution that is nearly identical to the Ameren job cost. About 20 percent of the jobs have Ameren costs of \$500 or less, 28 percent have costs between \$500 and \$1,000, 31 percent have costs between \$1,001 and \$2,000, and 19 percent have costs over \$2,000. The total job costs are much higher. Twenty-eight percent of the jobs have total costs of \$2,000 to \$3,000 and one third of the jobs have total costs of more than \$3,000.

**Table V-19A**  
**Job Cost**

	<b>DNR Cost</b>	<b>Ameren Job Cost</b>	<b>Total Job Cost</b>
<b>&lt;=\$500</b>	23%	20%	5%
<b>\$501 - \$1,000</b>	29%	28%	8%
<b>\$1,001 - \$2,000</b>	31%	31%	25%
<b>\$2,001 - \$3,000</b>	12%	12%	28%
<b>&gt;\$3,000</b>	4%	7%	33%
<b>Missing</b>	<1%	3%	1%
<b>Average Job Cost</b>	\$1,191	\$1,312	\$2,559

Table V-19B displays the Ameren and the total job cost by agency. The table shows that EMAA and NECAC are most likely to have Ameren job costs of more than \$3,000. However, CAASTLC is most likely to have total job costs over \$3,000.

**Table V-19B**  
**Ameren and Total Job Cost**  
**By Agency**

	Job Cost											
	Ameren Job Cost						Total Job Cost					
	<=\$500	\$501-\$1,000	\$1,001-\$2,000	\$2,001-\$3,000	>\$3,000	Missing	<=\$500	\$501-\$1,000	\$1,001-\$2,000	\$2,001-\$3,000	>\$3,000	Missing
<b>CAASTLC</b>	15%	34%	33%	9%	3%	7%	2%	4%	15%	32%	46%	2%
<b>DAEOC</b>	34%	23%	31%	13%	0%	0%	7%	10%	27%	24%	32%	0%
<b>EMAA</b>	0%	6%	32%	28%	35%	0%	0%	6%	29%	29%	36%	0%
<b>JFCAC</b>	46%	33%	17%	3%	1%	0%	5%	14%	34%	37%	9%	0%
<b>NECAC</b>	1%	4%	30%	37%	28%	0%	1%	2%	20%	36%	40%	0%
<b>ULMSL</b>	15%	29%	31%	16%	8%	1%	2%	10%	39%	17%	31%	0%
<b>Other Agencies</b>	22%	20%	37%	11%	9%	0%	22%	19%	34%	11%	13%	0%
<b>All Agencies</b>	20%	28%	31%	12%	7%	3%	5%	8%	25%	28%	33%	1%

Table V-20A displays the Ameren job costs as a percentage of the total job costs. The table shows that for 24 percent of the clients, the Ameren job costs are less than or equal to 25 percent of the total costs, for 28 percent they are 26 to 50 percent of total job costs, for 15 percent they are 51 to 75 percent of job costs, and for 9 percent they are 76 to 99 percent of job costs. Ameren job costs are equal to total job costs for 20 percent of the jobs. For some of these jobs, the leveraged dollars were not reported.

**Table V-20A**  
**Ameren Job Cost as a Percentage of Total Job Cost**

Percent of Total Job Cost	Percent of Clients
<b>&lt;=25%</b>	24%
<b>26% - 50%</b>	28%
<b>51% - 75%</b>	15%
<b>76% - 99%</b>	9%
<b>100%</b>	20%
<b>Missing</b>	3%

Table V-20B displays the Ameren job cost as a percentage of the total job cost by agency. The table shows that CAASTLC, DAEOC, and JFCAC are most likely to leverage a large percentage of funds on the Ameren jobs, more than 75 percent of the funds come from non-Ameren sources on more than a third of the jobs at these agencies.

**Table V-20B**  
**Ameren Job Cost as a Percent of Total Job Cost**  
**By Agency**

	Percent of Total Job Cost					
	<=25%	26%-50%	51%-75%	76%-99%	100%	Missing
<b>CAASTLC</b>	34%	38%	18%	1%	2%	7%
<b>DAEOC</b>	37%	23%	18%	17%	6%	0%
<b>EMAA</b>	0%	1%	1%	3%	94%	0%
<b>JFCAC</b>	38%	38%	19%	3%	2%	0%
<b>NECAC</b>	1%	7%	11%	10%	71%	0%
<b>ULMSL</b>	12%	33%	20%	29%	5%	1%
<b>Other Agencies</b>	0%	1%	3%	26%	70%	0%
<b>All Agencies</b>	24%	28%	15%	9%	20%	3%

Agencies were also asked to report the total labor cost and the total material cost for their completed jobs. Table V-21A shows that 30 to 60 percent of the costs were for labor on most of the jobs.

**Table V-21A**  
**Labor Costs as a Percentage of Total Job Cost**

Percent of Total Job Cost	Percent of Clients
<=30%	9%
31% - 40%	15%
41% - 50%	28%
51% - 60%	34%
61% - 100%	8%
Missing	6%

Table V-21B displays the labor cost as a percent of the total job cost by agency. The table shows that DAEOC and JFCAC are more likely to have a lower percentage of labor costs. ULMSL has the highest percent of labor costs.

**Table V-21B**  
**Labor Cost as a Percent of Total Job Cost**  
**By Agency**

	Percent of Total Job Cost					
	<=30%	31%-40%	41%-50%	51%-60%	61%-100%	Missing
<b>CAASTLC</b>	<1%	1%	38%	55%	3%	4%
<b>DAEOC</b>	42%	37%	18%	1%	1%	0%
<b>EMAA</b>	11%	22%	40%	24%	1%	1%
<b>JFCAC</b>	37%	52%	6%	0%	4%	1%
<b>NECAC</b>	1%	0%	6%	5%	29%	59%
<b>ULMSL</b>	1%	9%	21%	48%	21%	0%
<b>Other Agencies</b>	8%	22%	33%	18%	18%	0%
<b>All Agencies</b>	9%	15%	28%	34%	8%	6%

### ***G. Measures Installed***

Agencies were asked to report whether each of many measures were installed in each client's home and the cost of each measure. Table V-22 displays the percent of clients who received each measure and the mean and median measure costs for the clients who received the measure.

The most common measures that are provided in the program are air sealing, health and safety measures, repairs, window/door replacement or repair, and attic insulation. The highest cost measures are furnace replacement, floor and attic insulation, and window and door repair.

**Table V-22**  
**Installed Measures**

Measure	Percent with Measure	Measure Cost	
		Mean	Median
<b>Air Sealing</b>	93%	\$425	\$301
<b>Attic Insulation</b>	46%	\$707	\$706
<b>Wall Insulation</b>	5%	\$456	\$408
<b>Floor Insulation</b>	16%	\$755	\$756
<b>Kneewall Insulation</b>	1%	\$224	\$168
<b>Basement Insulation</b>	6%	\$193	\$135
<b>Duct Sealing and Insulation</b>	1%	\$292	\$95
<b>Furnace Replacement</b>	34%	\$1677	\$1367
<b>Furnace Repair</b>	16%	\$274	\$248
<b>Furnace Cleaning</b>	36%	\$94	\$83

Measure	Percent with Measure	Measure Cost	
		Mean	Median
Water Heater Repair or Replacement	13%	\$386	\$450
Thermostat Replacement	10%	\$87	\$80
Air Conditioning Replacement	0%	--	--
Air Conditioning Repair	<1%	\$850	\$850
Window Repair or Replacement	56%	\$628	\$515
Door Repair or Replacement	64%	\$525	\$474
Other Repairs	69%	\$137	\$86
CFLs	7%	\$23	\$15
Health and Safety Measures	82%	\$163	\$135
Other Major Measures	6%	\$287	\$160

Table V-23 displays the percentage of jobs with air sealing and insulation work by agency. The table shows that there is variability in the frequency of these measures by agency. While most of the agencies provide air sealing work in more than 95 percent of the homes treated, JFCAC provides air sealing work in less than 70 percent of the treated homes. JFCAC is more likely to provide floor insulation than the other agencies. ULMSL is more likely to provide basement insulation, but less likely to provide other types of insulation.

**Table V-23**  
**Percent of Jobs with Air Sealing and Insulation Work**  
**By Agency**

	Measure						
	Air Sealing	Insulation					
		Attic	Wall	Floor	Kneewall	Basement	Duct Sealing/Insulation
CAASTLC	98%	58%	1%	1%	2%	6%	0%
DAEOC	97%	61%	4%	1%	0%	0%	1%
EMAA	97%	75%	28%	54%	0%	3%	4%
JFCAC	69%	27%	5%	61%	0%	0%	1%
NECAC	98%	37%	16%	31%	0%	0%	0%
ULMSL	99%	15%	0%	0%	1%	23%	1%
Other Agencies	89%	41%	9%	20%	0%	3%	5%
All Agencies	93%	46%	5%	16%	1%	6%	1%

Table V-24 displays the percent of jobs with furnace work by agency. The table shows that CAASTLC replaces furnaces on 52 percent of their jobs and DAEOC replace furnaces on 37 percent of their jobs. However, JFCAC replaces furnaces on only six percent of their jobs. This



replacement rate is related to the clients' main heating fuel, as agencies are not permitted to replace electric heating systems.

**Table V-24**  
**Percent of Jobs with Furnace Work**  
**By Agency**

	Measure		
	Furnace Replacement	Furnace Repair	Furnace Cleaning
CAASTLC	52%	21%	43%
DAEOC	37%	0%	51%
EMAA	28%	6%	7%
JFCAC	6%	18%	0%
NECAC	20%	30%	55%
ULMSL	29%	5%	69%
Other Agencies	15%	11%	15%
All Agencies	34%	16%	36%

Table V-25 displays the percent of jobs with repair work by agency. The table shows that NECAC and ULMSL are most likely to do window repair or replacement and CAASTLC and EMMA are most likely to do door repair or replacement work.

**Table V-25**  
**Percent of Jobs with Repair Work**  
**By Agency**

	Measure		
	Window Repair or Replacement	Door Repair or Replacement	Other Repairs
CAASTLC	57%	75%	97%
DAEOC	34%	61%	56%
EMAA	64%	78%	63%
JFCAC	60%	48%	27%
NECAC	83%	37%	93%
ULMSL	75%	57%	48%
Other Agencies	23%	57%	27%
All Agencies	56%	64%	69%

Table V-26 displays the percent of jobs with CFLs and the average number of CFLs provided to these clients by agency. The table shows that only two of the listed agencies and the other

agencies provide CFLs. The average number provided ranges from two to 15, and the overall average is nine bulbs.

**Table V-26**  
**Percent of Jobs with CFLs**  
**And Average Number of CFLs**  
**By Agency**

	Measure	
	Percent with CFLs	Average Number of CFLs For Clients Who Received CFLs
<b>CAASTLC</b>	0%	--
<b>DAEOC</b>	0%	--
<b>EMAA</b>	100%	10
<b>JFCAC</b>	9%	2
<b>NECAC</b>	0%	--
<b>ULMSL</b>	0%	--
<b>Other Agencies</b>	3%	15
<b>All Agencies</b>	7%	9

## **H. Summary**

This analysis provided information on the clients, homes, and services provided through Ameren's LIWP. Because most of the program information required for the evaluation is not maintained electronically, obtaining and cleaning these data was a time-consuming endeavor. However, these data are important for program analysis and for interpreting the usage impacts of the program. DNR should develop a database to collect and manage the program data. These data will be useful for both program management and future program evaluation efforts.

Some of the key findings from the analysis are summarized below.

- *Client characteristics:* Clients are likely to have vulnerable household members. Eighty-nine percent of the clients served by the program have a senior, child, or disabled household member. The majority of the clients served by the program, 63 percent, have income below the poverty level.
- *Home characteristics:* Eighty-five percent of the clients served by the program own their homes. Most of the homes are single family detached units, most are fewer than 1,500 square feet, and most are more than 50 years old. The homes had high air leakage rates prior to treatment, and the agencies achieved large reductions in air leakage. Half of the homes had a 25 percent or greater reduction in the CFM50 air leakage rate.

- *Home equipment:* The majority of the clients use natural gas for heating and about one quarter use electricity for heating. Fifty-seven percent have Laclede as their natural gas company and 11 percent have Ameren as their natural gas company. Forty-two percent use electric supplemental heat. Many of the clients have air conditioning, but these data were not available for the majority of the clients served.
- *Service delivery statistics:* While 16 percent of the jobs were completed in two weeks or less, 23 percent took more than three months from the date of the audit until the date of the final measure installation. Eighty-six percent of the clients had more than \$1,000 spent on their homes. Just over half of the jobs had at least half of the total costs paid for through other program funds.
- *Program measures:* The most common program measures are air sealing, health and safety measures, repairs, window/door replacement or repair, and attic insulation. The highest cost measures are furnace replacement, floor and attic insulation, and window and door repair. Only a few of the agencies provide CFLs to the clients served by the program.

There is wide variety in the types of clients and home served by the program, and the types of measures that were installed. The usage impact analysis will examine the relationship between these factors and program savings.

## VI. Usage Analysis

The section describes the methodology for the usage impact analysis and the findings from the analysis.

### **A. Methodology**

Customers who had their service delivery completed between July 1, 2007 and September 30, 2008 were treated as the analysis group for this evaluation. We examine electric impacts for all of these participants with adequate data and gas impacts for Ameren gas customers with adequate data.

When measuring the impact of an intervention, it is necessary to recognize other exogenous factors that can impact changes in outcomes. Changes in a client's energy usage, between the year preceding service delivery and the year following service delivery, may be affected by many factors other than program services received. Some of these factors include changes in household composition or health of family members, and changes in weather. The weather normalization process controls for changes in weather between the pre and post treatment periods. To control for other exogenous factors, we examine the change in outcomes for program participants compared to the change in outcomes for another group of households. This group of households is called a comparison group. The comparison group is designed to be as similar as possible to the treatment group, those who received services and who we are evaluating, so that the exogenous changes for the comparison group are as similar as possible to those of the treatment group.

In the evaluation of the LIWP, we use a random sample of LIHEAP recipients as the comparison group. These participants serve as a good control because they are lower income households who would be eligible for the program. We assign quasi treatment dates to these households at the midpoint of each calendar quarter included in the treatment group. We then use these dates to construct the quasi pre and post analysis periods for the comparison group.

In this evaluation, we examine pre and post-treatment usage statistics. The difference between the pre and post-treatment usage for the treatment group is considered the gross change. This reflects the actual change in behaviors and outcomes for those participants who were served by the program. Some of these changes may be due to the program, and some of these changes are due to other exogenous factors, but this change in energy use is the customer's actual experience. The net change in energy use is the difference between the change for the treatment group and the change for the comparison group, and represents our best estimate of the actual impact of the program, controlling for other exogenous changes.

Energy usage was analyzed for the year prior to the audit and the year after service delivery was completed. The analysis included as close to a full year of data pre and post-treatment as possible. Table VII-1 displays the attrition statistics for the degree day adjusted usage analysis. The table shows that there were 602 electric customers and 29 gas customers who were treated

during the time period included in the impact evaluation. Customers were included in the analysis if their pre and post usage data each spanned between 300 and 400 days. Some additional customers were removed from the analysis if their usage was below 1,200 kWh or 300 ccf, or if their change in usage was greater than 65 percent. After these eliminations, we include 78 percent of the treated population and 40 percent of the comparison population in the usage analysis.

The table also shows the attrition of the accounts for the PRISM usage analysis. PRISM is a common software program used to weather normalize energy usage data. However, the PRISM software imposes greater constraints on the data that can be included in the analysis. The table shows that 67 percent of the treatment group and 37 percent of the comparison group can be included in the PRISM analysis.

**Table VI-1**  
**Usage Impact Attrition Analysis**

	<b>Electric</b>		<b>Gas</b>		<b>All Jobs</b>	
	Treatment	Comparison	Treatment	Comparison	Treatment	Comparison
Original Population	602	4,588	29	874	631	5,462
Not Enough or Too Many Pre-Treatment Days	80	2,424	2	539	82	2,963
Not Enough or Too Many Post-Treatment Days	32	162	0	17	32	179
Pre or Post Usage Below 1200 kWh or 300 ccf	4	2	6	40	10	42
Change in Total Usage > 65%	14	72	2	4	16	76
<b>Final Degree Day Sample</b>	<b>472</b>	<b>1,928</b>	<b>19</b>	<b>274</b>	<b>491</b>	<b>2,202</b>
<b>% Included in Degree Day Analysis</b>	<b>78%</b>	<b>42%</b>	<b>66%</b>	<b>31%</b>	<b>78%</b>	<b>40%</b>
PRISM Did Not Run	2	4	0	0	1	4
PRISM Model Not a Good Fit	69	174	0	1	69	175
<b>Final PRISM Sample</b>	<b>401</b>	<b>1,750</b>	<b>19</b>	<b>273</b>	<b>421</b>	<b>2,023</b>
<b>% Included for PRISM Analysis</b>	<b>67%</b>	<b>38%</b>	<b>66%</b>	<b>31%</b>	<b>67%</b>	<b>37%</b>

Energy usage data were weather normalized in the pre and the post usage period to ensure that changes in energy usage are due to changes in usage patterns, rather than due to changes in weather. We used a degree-day normalization process and the PRISM analysis software to conduct this analysis. This degree-day process involves the following steps.

1. Calculate the heating and cooling degree-days that are included in each usage period.
2. Determine whether periods should be classified as baseload periods, heating periods, or cooling periods, based on the number of heating and cooling degree-days in the period.
3. Calculate the total baseload period usage, heating period usage, and cooling period usage.

4. Calculate the relationship between heating usage minus baseload usage and degree- days. Use that slope and the average long-term heating degree-days to calculate normalized heating period usage.
5. Follow the same method to calculate normalized cooling period usage.
6. Add up the baseload usage, heating period usage, and cooling period usage to obtain the normalized annual usage.

This process yielded results that were similar to the PRISM analysis results, but allowed for a higher percentage of cases to be included in the analysis, due to fewer restrictions on data availability, and the fact that cases did not need to be removed because the model did not run or the model had a poor fit.

We have chosen to conduct the normalization process on the baseload usage as well as the heating and cooling usage. Baseload usage may vary with weather because of the use of air conditioning, the gas furnace's electric fan, the refrigerator, and use of electric space heaters.

## ***B. Impacts***

Table VI-2 displays the results from the usage impact analysis for electric and gas usage. The table shows that the weather normalized electric savings was approximately 500 kWh, or three percent of pre-treatment usage. However, electric usage has been increasing over time for many households due to increased plug loads. Usage for the comparison group, that did not receive program services, increased over this time period. Therefore, the net change in electric usage, the difference between the change for the treatment group and the change for the comparison group is approximately 1,000 kWh or six percent of pre-treatment usage.

Table VI-2 also shows the gas savings, although they are for a small group of Ameren customers. The table shows gross and net savings of approximately 120 ccf or about 15 percent of pre-treatment gas usage.

**Table VI-2**  
**Average Usage and Savings**

<b>ELECTRIC USAGE IMPACTS</b>							
	<b>Treatment Group</b>			<b>Gross Savings</b>		<b>Net Savings</b>	
	<b>#</b>	<b>Pre-Use</b>	<b>Post-Use</b>	<b>kWh</b>	<b>% Savings</b>	<b>kWh</b>	<b>% Savings</b>
<b>Non Normalized</b>	472	15,771	14,515	1,256*	8.0%	1,130*	7.2%
<b>Degree Day Normalized</b>	472	15,454	14,932	522*	3.4%	1,051*	6.8%
<b>Degree Day Normalized With PRISM accounts</b>	401	15,606	15,130	476*	3.1%	988*	6.3%
<b>Prism Normalized</b>	401	15,680	15,084	596*	3.8%	950*	6.1%
<b>GAS USAGE IMPACTS</b>							
	<b>Treatment Group</b>			<b>Gross Savings</b>		<b>Net Savings</b>	
	<b>#</b>	<b>Pre-Use</b>	<b>Post-Use</b>	<b>ccf</b>	<b>% Savings</b>	<b>ccf</b>	<b>% Savings</b>
<b>Non Normalized</b>	19	864	780	84*	9.7%	111*	12.8%
<b>Degree Day Normalized</b>	19	831	725	106*	12.8%	116*	14.0%
<b>Prism Normalized</b>	19	854	714	141*	16.5%	137*	16.0%

\*Differences are statistically significant at the 90 percent confidence level.

Table VI-3 compares electric savings in Ameren's LIWP to other low-income programs that we and our partners have evaluated. The table shows that Ameren's electric savings are low compared to the other programs, which have similar or lower program expenditures. While Ameren's net savings are 6.8 percent, the other programs' savings range from 7.6 to 12.2 percent. Ameren's low electric savings are to be expected given the program's focus on gas measures.

**Table VI-3**  
**Average Usage and Savings**  
**Comparison with Other Programs**

<b>ELECTRIC USAGE IMPACTS</b>								
	<b>Treatment Group</b>			<b>Gross Savings</b>		<b>Net Savings</b>		<b>Average Cost</b>
	<b>#</b>	<b>Pre-Use</b>	<b>Post-Use</b>	<b>kWh</b>	<b>% Savings</b>	<b>kWh</b>	<b>% Savings</b>	
<b>Ameren</b>	472	15,454	14,932	522*	3.4%	1,051*	6.8%	\$2,559
<b>PPL Electric Utilities**</b>	1,019	17,912	17,129	783*	4.4%	1,767*	9.9%	\$2,613
<b>Ohio EPP – High Use Baseload**</b>	4,789	13,525	11,841	1,684*	12.5%	1,650*	12.2%	\$896
<b>Ohio EPP – Moderate Use Baseload**</b>	1,355	6,468	5,657	811*	14.3%	697*	10.8%	\$726
<b>Colorado ESP**</b>	892	7,225	6,681	543*	7.5%	636*	8.8%	\$2850
<b>NJ WAP</b>	122	7,989	7,529	460*	5.8%	611	7.6%	\$1163 <sup>#</sup>

<b>PECO - Baseload</b>	4,198	10,919	10,032	887*	8.1%			\$224
<b>PECO - Electric Heating</b>	162	21,017	19,888	1,129*	5.4%			\$1754

\*Differences are statistically significant at the 90 percent confidence level.

\*\*The usage impact for these analyses was conducted by M. Blasnik and Associates.

#Materials costs only.

Energy efficiency program savings are often found to correlate with the level of pre-treatment usage. This is because households with higher pre-treatment usage have greater opportunities for energy savings and often receive greater energy efficiency investments. Table VI-4 shows that the Ameren LIWP savings are consistent with this expectation. Customers with electric usage below 8,000 kWh have no savings, customers with usage between 8,000 and 12,000 kWh have 3.8 percent net savings, and customers with electric usage above 12,000 kWh have 8.1 percent net savings.

**Table VI-4**  
**Change in Usage**  
**By Pre Program Usage**

<b>ELECTRIC USAGE IMPACTS</b>							
	<b>Treatment Group</b>			<b>Gross Savings</b>		<b>Net Savings</b>	
	<b>#</b>	<b>Pre-Use</b>	<b>Post-Use</b>	<b>kWh</b>	<b>% Savings</b>	<b>kWh</b>	<b>% Savings</b>
<b>&lt; 8,000 kWh</b>	79	6,242	6,628	-386	-6.2%	-24	-0.4%
<b>8,000 – 12,000 kWh</b>	110	10,074	10,227	-153	-1.5%	378	3.8%
<b>&gt; 12,000 kWh</b>	283	20,116	19,078	1,038	5.2%	1,620	8.1%

Table VI-5 displays the seasonal analysis of energy savings for electric jobs. The table shows that 60 percent of the gross savings come from heating usage. This corresponds to the concentration of measures on heating equipment. However, a greater share of the net savings result from baseload usage, as this is the segment of usage that is increasing among the comparison group that received no program treatments.

**Table VI-5**  
**Seasonal Usage Change**

<b>ELECTRIC USAGE IMPACTS</b>									
	<b>Treatment Group</b>			<b>Gross Savings</b>			<b>Net Savings</b>		
	<b>#</b>	<b>Pre-Use</b>	<b>Post-Use</b>	<b>kWh</b>	<b>%</b>	<b>Share of Savings</b>	<b>kWh</b>	<b>% Savings</b>	<b>Share of Savings</b>
<b>Baseload</b>	472	9,078	8,932	146	1.6%	28%	510	5.6%	48.5%
<b>Heating</b>		3,735	3,422	313	8.4%	60%	384	10.3%	36.5%
<b>Cooling</b>		2,641	2,578	64	2.4%	12%	157	5.9%	15.0%



Table VI-6 displays electric savings by household characteristics. Differences by these characteristics are not statistically significant at the 90 percent confidence level.

**Table VI-6**  
**Electric Savings**  
**By Household Characteristics**

<b>ELECTRIC USAGE IMPACTS</b>							
	<b>Treatment Group</b>			<b>Gross Savings</b>		<b>Net Savings</b>	
	<b>#</b>	<b>Pre-Use</b>	<b>Post-Use</b>	<b>kWh</b>	<b>% Savings</b>	<b>kWh</b>	<b>% Savings</b>
<b>Home Ownership</b>							
<b>Own</b>	421	15,215	14,665	550	3.6%	1,080	7.1%
<b>Rent</b>	51	17,425	17,134	291	1.7%	820	4.7%
<b>Home Type</b>							
<b>Single Detached</b>	394	14,551	14,073	478	3.3%	1,007	6.9%
<b>Mobile Home</b>	53	23,610	22,386	1,224	5.2%	1,753	7.4%
<b>Other</b>	25	12,391	12,654	-263	-2.1%	267	2.2%
<b>Pre-Treatment Air Leakage</b>							
<b>&lt;=3,000 CFM</b>	237	15,107	14,544	562	3.7%	1,092	7.2%
<b>&gt;3000 CFM</b>	214	15,745	15,329	416	2.6%	945	6.0%
<b>Missing</b>	21	16,408	15,251	1,157	7.1%	1,686	10.3%
<b>Air Leakage Change</b>							
<b>Decline by &lt; 1,000</b>	350	15,334	14,877	457	3.0%	986	6.4%
<b>Decline by &gt;=1,000</b>	96	15,941	15,214	728	4.6%	1,257	7.9%
<b>Missing</b>	21	16,408	15,251	1,157	7.1%	1,686	10.3%
<b>Electric Heating</b>							
<b>Yes</b>	103	23,408	22,570	838	3.6%	1,367	5.8%
<b>No</b>	369	13,234	12,799	434	3.3%	963	7.3%
<b>Electric Supplemental Heat</b>							
<b>Yes</b>	207	14,640	14,081	559	3.8%	1,088	7.4%
<b>No</b>	234	16,229	15,676	553	3.4%	1,082	6.7%
<b>Missing</b>	31	15,039	14,996	42	0.3%	572	3.8%
<b>Water Heating Fuel</b>							
<b>Electric</b>	133	22,103	21,143	961	4.3%	1,490	6.7%
<b>Other</b>	325	12,845	12,485	361	2.8%	890	6.9%
<b>Missing</b>	14	12,845	12,731	114	0.9%	643	5.0%

Table VI-7 displays electric savings by job characteristics. The table shows that differences in savings by job characteristics are not statistically significant.

**Table VI-7  
Electric Savings  
By Job Characteristics**

<b>ELECTRIC USAGE IMPACTS</b>							
	<b>Treatment Group</b>			<b>Gross Savings</b>		<b>Net Savings</b>	
	<b>#</b>	<b>Pre-Use</b>	<b>Post-Use</b>	<b>kWh</b>	<b>% Savings</b>	<b>kWh</b>	<b>% Savings</b>
<b>Total Job Cost</b>							
<b>&lt;=\$2,000</b>	153	15,390	14,973	417	2.7%	946	6.1%
<b>\$2,001-\$3,000</b>	140	16,496	15,810	687	4.2%	1,216	7.4%
<b>&gt;\$3,000</b>	179	14,693	14,210	483	3.3%	1,013	6.9%
<b>Insulation</b>	300	16,336	15,712	623	3.8%	1,153	7.1%
<b>No Insulation</b>	171	13,960	13,609	350	2.5%	880	6.3%
<b>Attic Insulation</b>	231	15,343	14,790	553	3.6%	1,083	7.1%
<b>No Attic Insulation</b>	240	15,598	15,102	496	3.2%	1,025	6.6%
<b>Furnace Replacement</b>	130	14,347	13,642	705	4.9%	1,234	8.6%
<b>Furnace Repair</b>	40	16,929	16,515	413	2.4%	942	5.6%
<b>Furnace Cleaning</b>	189	13,898	13,529	369	2.7%	898	6.5%
<b>No Furnace Work</b>	113	18,808	18,202	607	3.2%	1,136	6.0%
<b>Water Heater Repair/Replacement</b>							
<b>Yes</b>	56	14,724	13,985	739	5.0%	1,269	8.6%
<b>No</b>	414	15,587	15,085	502	3.2%	1,031	6.6%
<b>Window Repair/Replacement</b>							
<b>Yes</b>	292	15,527	14,953	574	3.7%	1,103	7.1%
<b>No</b>	179	15,386	14,943	443	2.9%	972	6.3%
<b>Door Repair/Replacement</b>							
<b>Yes</b>	308	14,982	14,510	473	3.2%	1,002	6.7%
<b>No</b>	163	16,401	15,779	622	3.8%	1,151	7.0%

## **C. Summary**

The usage impact analysis measured net weather normalized electric and gas savings for participants who were treated by the LIWP between July 2007 and September 2008. Only a handful of customers were included in the gas impact analysis because most customers receive gas service from a different utility, and analyses of these data were not within the scope of this evaluation.

As expected, the electric usage impacts of the program were low, due to the focus on measures that reduce fossil fuel consumption. Net electric savings averaged 6.8 percent, lower than many other low-income energy efficiency programs that we have evaluated that place a greater emphasis on electric efficiency measures. Net gas savings, at 14 percent, were in the expected range, but were only estimated for a small number of customers who have Ameren gas service.

## VII. Payment Analysis

This section of the report examines the impact of Ameren's LIWP on customer bills and coverage rates. The purpose of this analysis is to determine whether the program reduces bills to the point that customers can meet their payment obligations.

### A. Methodology

The methodology used for the payment impact analysis is similar to that for the usage analysis. The same customers are included in the treatment and comparison groups. To control for exogenous factors outside of the program that may influence customer bills and payments, such as energy costs and the economy, we examine the change in outcomes for program participants compared to the change in outcomes for the comparison group. We use the same random sample of LIHEAP recipients for this comparison group as were used for the usage analysis' comparison groups.

Again, we examine gross and net program impacts. The difference between the pre and post-treatment statistics for the treatment group is considered the gross change. This reflects the actual change in outcomes for those participants who were served by the program. Some of these changes may be due to the program, and some of these changes are due to other exogenous factors, but this change in bills and payments is the customer's actual experience. The net change is the difference between the change for the treatment group and the change for the comparison group, and represents our best estimate of the actual impact of the program, controlling for other exogenous changes.

### B. Impacts

Table VII-1 displays billing revenue in the pre and post treatment periods. The table shows a small gross and net change in revenue for electric only customers. Costs declined by approximately four percent for these customers.

**Table VII-1**  
**Billing Revenue**

	#	Pre	Post	Gross Change	% Gross Change	Net Change	% Net Change
Electric Only							
Electric Revenue	453	\$1,038	\$990	-\$48*	-4.6%	-\$45*	-4.3%
Total Revenue		\$1,260	\$1,207	-\$53*	-4.2%	-\$52*	-4.1%
Electric and Gas							
Electric and Gas Revenue	25	\$1,880	\$1,970	\$90	4.8%	\$7*	0.3%
Total Revenue		\$2,072	\$2,211	\$139	6.7%	\$21	1.0%
All Job Types							

Electric and Gas Revenue	479	\$1,081	\$1,041	-\$40*	-3.7%	-\$48*	-4.4%
Total Revenue		\$1,302	\$1,260	-\$42*	-3.2%	-\$57*	-4.3%

\*Differences are statistically significant at the 90 percent confidence level.

Table VII-2 displays payments made in the pre and post treatment periods. The table shows that there was no significant change in the number of payments made. Total payments declined due to a decrease in the amount of assistance payments received.

**Table VII-2**  
**Annual Payments**

	#	Pre	Post	Gross Change	% Gross Change	Net Change	% Net Change
Electric Only							
# Payments	452	11	11	0	0.0%	0	0.0%
Cash Payments		\$1,123	\$1,082	-\$41	3.7%	\$46	4.1%
Assistance Payments		\$142	\$122	-\$20	-14.1%	-\$132*	-93.0%
Other Credits		\$88	\$131	\$43*	48.9%	-\$17	-19.3%
Total Credits		\$1,352	\$1,335	-\$17	-1.3%	-\$104*	-7.7%
Electric and Gas							
# Payments	25	14	12	-2	-14.3%	-1	-7.1%
Cash Payments		\$1,798	\$1,912	\$114	6.3%	\$204	11.3%
Assistance Payments		\$263	\$289	\$26	9.9%	-\$141*	-54.0%
Other Credits		\$121	\$272	\$151	124.8%	\$25	20.7%
Total Credits		\$2,182	\$2,473	\$291	13.3%	\$88	4.0%
All Job Types							
# Payments	478	11	11	0	0.0%	0	0.0%
Cash Payments		\$1,157	\$1,125	-\$32	-2.8%	\$54	4.8%
Assistance Payments		\$148	\$131	-\$18	-11.5%	-\$138*	-92.6%
Other Credits		\$90	\$138	\$49*	53.3%	-\$19	-22.2%
Total Credits		\$1,395	\$1,394	-\$1	-0.1%	-\$102*	-7.4%

\*Differences are statistically significant at the 90 percent confidence level.

Table VII-3 displays cash and total coverage rates in the year preceding and the year following receipt of program services. The table shows that there is a net increase in the cash coverage rate, but there is a decline in the net total coverage rate due to a decline in assistance payments compared to the change for the comparison group.

**Table VII-3  
Coverage Rates**

	#	Pre	Post	Gross Change	% Gross Change	Net Change	% Net Change
Electric Only							
Cash Coverage Rate	452	90.7%	91.1%	0.4%	0.4%	8.4% *	9.3%
Total Coverage Rate		104.1%	106.8%	2.7%*	2.6%	-3.9%*	-3.7%
Electric and Gas							
Cash Coverage Rate	25	87.4%	86.7%	-0.7%	-0.8%	7.9%*	9.0%
Total Coverage Rate		103.3%	106.8%	3.5%	3.4%	0.9%	0.9%
All Job Types							
Cash Coverage Rate	478	90.5%	90.9%	0.4%	0.4%	8.5%*	9.4%
Total Coverage Rate		104.1%	106.8%	2.7%*	2.6%	-3.5%*	-3.4%

\*Differences are statistically significant at the 90 percent confidence level.

### **C. Summary**

Energy costs declined by approximately \$60 or 4.3 percent compared to the comparison group. While cash payments increased, assistance payments declined, resulting in a net decline in payments made. Cash coverage rates increased by 8.5 percentage points, but total coverage rates declined by 3.5 percent.

## VIII. Summary of Findings and Recommendations

This section of the report summarizes the key findings and recommendations from all of the evaluation activities described in this report. Findings and recommendations are grouped into the categories of program management, administration, and procedures; agency weatherization staff training; program impact; and program satisfaction.

### A. *Program Management, Administration, and Procedures*

There are positive benefits that result from the way the program has been designed and implemented, but there are important ways that Ameren could modify the program to obtain increased impacts on their customers' energy usage. Findings are summarized below.

1. Coordination with other low income energy efficiency programs increases efficiency in program delivery.

Ameren's LIWP is administered through the Missouri Department of Natural Resources Energy Center (DNR), which also administers the Missouri Low Income Weatherization Assistance Program (WAP) that is funded by the Federal Department of Energy (DOE), as well as other low-income energy efficiency programs that are funded by other utilities. Because of the joint administration and delivery, the local agencies that delivery program services can effectively leverage funding from other programs to deliver more comprehensive services than otherwise would have been possible.

For Fiscal Year 2009, (Program Year 2008) the DOE guidelines state that the average cost expended per home should not exceed \$2,966. However, this average is for each funding source, as opposed to the total expenditures in the home. DNR encourages the subgrantees to blend DOE and other sources of funding so that additional weatherization measures can be completed on a home without exceeding the average per home cost for the funding source. All of the agencies said that they coordinate funding in this way in order to provide comprehensive services to the clients. Many of the agencies have three sources of funding – the Ameren electric funds, gas utility funds, and DOE WAP funds. This allows them to spend up to triple what they would have been able to spend under the DOE WAP funding alone. Some of the agency weatherization managers noted that this was important in the case of home repairs (often window and door work) where the DOE WAP limits spending to \$600 per home and the combination of programs allows the agency to double or triple that amount.

The joint delivery through coordination of program funds allows for comprehensive service delivery. This is beneficial for program clients and reduces the fixed costs of returning to the home to deliver additional services under a separate program.

*Recommendation: Maintain joint program implementation if possible.*

2. The program is delivered the same way as the Missouri WAP model, and therefore does not emphasize electric measures.

The Ameren funds for the LIWP are from an electric rate case settlement, and most of the agencies serve clients who have a gas utility other than Ameren. However, when asked specifically about measures that would address electric usage – refrigerator replacement, air conditioning repair and replacement, and CFL replacements for incandescent light bulbs, most agency weatherization managers reported that these measures were not part of the program.

When DNR was given responsibility for program administration, they were told that the funds should be utilized under the same guidelines as the DOE WAP and that they should only be expended on Ameren’s electric customers. However, there are no requirements that Ameren funds be used for measures that address electric usage and the WAP program, as implemented in Missouri, has a focus on fossil fuel usage reduction.

DNR’s operational manual includes air conditioner tune-up and replacement and refrigerator replacement as measures that are “Not Considered” and lighting retrofits as “Optional”. Additionally, there is a DOE requirement that agencies cannot use program funds to replace electric heating systems, and this rule is enforced with the Ameren funds.

When these issues were discussed with DNR, managers noted that DNR considers Missouri a heating system state and concentrates on heating system work. Air conditioning work is approved on a case by case basis if it is related to client health issues. They noted that DNR and the weatherization network may consider adding air conditioner work in the future. They also noted that DNR may consider allowing refrigerator replacement. DNR only began allowing CFLs as an option for agencies in mid 2008.

*Recommendation: Revise the rules for expenditure of Ameren program funds so that electric usage reduction measures are allowed and emphasized.*

3. Many clients are not aware that the services they receive are at least partially funded by Ameren.

When asked whether clients were aware that services were funded by Ameren, six of the agency weatherization managers said that clients were informed, four said that the clients did not know this, and two stated that they were not sure whether or not clients were aware that the program was funded by Ameren.

*Recommendation: Provide a program information sheet for agencies to distribute during the energy audit with Ameren’s logo.*



4. Agencies do not have adequate data systems in place to allow for tracking program services and managing the program.

Eight of the twelve agencies reported that all client and program data are maintained in paper client files. Four of the agencies reported that some data are electronic and some are in client files. Due to the way that the data are maintained, it was a time-consuming process for the agencies to provide data on clients, homes, and service delivery that were needed for the LIWP evaluation. Additionally, there were duplicates in reporting of clients served that were difficult to resolve because of missing and/or incorrect job numbers.

*Recommendation: DNR should develop a database for agencies to collect and manage the program data. These data will be useful for both program management and future program evaluation efforts.*

5. There is a potential group of households who could be made eligible for service delivery in areas where agencies have a difficult time finding clients to serve.

Households are only eligible for LIWP if the home has not been previously serviced through WAP since September 30, 1993. However, most of these households would not have received electric efficiency measures that are not provided through WAP. Some agencies reported that they have difficulty finding Ameren electric customers to serve by the program. The program could offer electric efficiency measures to previously treated WAP customers.

*Recommendation: allow for customers who previously received WAP to receive LIWP targeted at electric reduction measures.*

6. Ameren customer service representatives should be trained to refer payment-troubled customers to agencies to receive LIWP.

Ameren customer service representatives refer payment troubled clients to agencies for energy assistance. They should also tell the clients to contact the agencies and request services through the LIWP.

*Recommendation: Ameren customer service representatives should be trained to refer low-income, high usage customers to the program.*

## **B. Agency Weatherization Staff Training**

Findings and recommendations related to agency weatherization staff training are summarized below.

1. The program infrastructure provides good training for program staff.

DNR requires the weatherization technicians to be trained in building science principals, advanced building diagnostics, combustion heating systems, and whole house best practices approach to cost-effective energy efficiency measures.

DNR also encourages subgrantees to use the Training and Technical Assistance (T&TA) sub category in the DOE budget to attend the Affordable Comfort and the U.S. DOE conferences. The weatherization agencies also attend quarterly Energy Professional Housing Alliance (EHPA) meetings and the annual Missouri Association for Community Action (MACA) training conference.

Beginning in Fiscal Year 2006 each agency was required to have at least one BPI certified auditor on staff. BPI certified auditors are required to have a certain number of continuing education hours each year and must be recertified every three years. Any subgrantee that does not meet this requirement is required to submit a corrective action plan before DNR will award a grant for the next program year.

Lead-Safe Work Practices training is required for both direct hire and contractor crew workers. New crew members are required to be trained within a six-month period. Re-training needs to be completed within a three-year period.

*Recommendation: DNR should continue to provide training and technical support and require certifications.*

2. One area of weakness in program training is with respect to client education.

There are few DNR requirements regarding client education that is provided during the audit and measure installation. Program documentation shows that the auditor does an initial interview with the client and DNR reported that they encourage client education when the auditor is assessing the home.

Discussions with the agency weatherization managers revealed that there were different amounts of emphasis placed on the energy education provided to the customer. Several of the managers focused on pamphlets and other materials that are handed to the clients at the time of the audit.

While many of the program participants who were surveyed said that they did take actions to reduce their energy usage as a result of the program, the survey found that the program compared negatively to others with respect to client energy education and that there is room for improvement on customer education.

*Recommendation: Additional training should be required on customer energy education and education about customer actions should be required during the audit visit.*

## C. Program Impact

Findings and recommendations related to program impact are summarized below.

### 1. Health and Safety

Most of the agency weatherization managers reported that they install CO detectors and many reported that they install smoke detectors, conduct CO testing, and take care of water heater issues. These measures should result in significant health and safety benefits for program participants.

*Recommendation: Health and safety measures should continue to be provided through the program.*

### 2. Customer Reported Program Benefits

The survey found that program participants felt the program benefited them by reducing their bills, improving the safety and comfort of their home, lowering their energy use, and providing energy education. Ameren's program compared favorably to the other programs in terms of lower energy bills and improved safety and comfort. Ninety-one percent of the Ameren respondents agreed that the program resulted in lower energy bills and 95 percent of the Ameren respondents agreed that the program resulted in a safer or more comfortable home.

### 3. Energy Consumption

As expected, the electric usage impacts of the program were low, due to the focus on measures that reduce fossil fuel consumption. Net electric savings averaged 6.8 percent, lower than many other low-income energy efficiency programs that we have evaluated that place a greater emphasis on electric efficiency measures.

*Recommendation: The program should increase its focus on electric reduction measures. This will have a greater impact on usage for Ameren customers.*

### 4. Bill Affordability and Coverage

Energy costs declined by approximately \$60 or 4.3 percent compared to the comparison group. While cash payments increased, assistance payments declined, resulting in a net decline in payments made.

*Recommendation: The program should increase its focus on electric reduction measures. This will have a greater impact on affordability and payment for Ameren customers.*

## **D. Program Satisfaction**

Comparisons to other programs found that Ameren LIWP participants were more likely to say that the program improved the winter and summer comfort than some of these other program participants. Ameren respondents were also more likely to agree that lower energy bills and a safer or more comfortable home were benefits of the program compared to some of the other low-income weatherization programs that have been studied.

However, comparisons on measure installation and energy education, as well as overall program satisfaction, show room for improvement. Satisfaction with air sealing and insulation was not as high as in some other programs and many customers did not say they were “very satisfied” with the condition in which the contractor left their home. The survey found that Ameren’s customers were somewhat more likely to say that they did not get everything that they expected than some of the other programs.

*Recommendation: Ameren should require the agencies to provide customers with information about how they can reduce their energy usage.*

*Recommendation: Ameren could provide a program information sheet for agencies to distribute during the energy audit with energy efficiency tips and Ameren’s logo.*

*Recommendation: Ameren should require additional training and inspections with respect to air sealing and insulation work.*

*Recommendation: Agency weatherization staff should be given more training on how to discuss what to expect from the program with the customers.*