Final Report

An Evaluation of the Low-Income Weatherization Program

Results of an Impact Evaluation

Prepared for
Empire District Electric Co.

602 S. Joplin Avenue
P.O. Box 127
Joplin, MO 64802

March 16, 2009

Prepared by Johna Roth

TecMarket Works
165 West Netherwood Road
Oregon, WI 53575
Voice: (608) 835-8855
Fax: (608) 835-9490
JRoth@TecMarket.net

Table of Contents

Executive Summary

About This Report

This report presents the results of an impact evaluation of Empire Electric's Low-Income Weatherization Program. This program's primary goal is to provide home weatherization services to the low-income community within Empire Electric's territory. The services provided are expected to lower participant's utility bills and improve their payment performance. This evaluation focuses on 100 participants that received weatherization services between October 2006 and September 2008 and had billing data that fit the reliability criteria for the study (please see methodology for details).

Summary of Findings

1. The net savings from the weatherization services is an average of 2,052 annual kWhs, or a 13.4% decrease in consumption. The electric savings for the participant group is estimated at a 1,819 kWhs annually, equal to an 11.8% reduction in electricity consumed. The comparison group increased their annual consumption by 233 kWhs.

2. Seventy-four out of the 100 participants (74%) studied decreased their consumption of electricity by an average of 3,141 kWhs (adjusted for comparison group) after their homes were weatherized. This is an approximate monthly savings of 262 kWhs. The other 26% increased their energy consumption by an average of 3,128 kWhs.

3. The evaluation found no significant correlation between blower door test results and program-level whole house energy savings, the costs of weatherization, or the number of weatherization measures installed. This indicates that while blower door test may help identify measures to be installed, the installation of those measures in themselves do not provide enough total savings to greatly influence the total amount of savings achieved. Likewise, installing higher number of measures does not necessarily results in lower infiltration. This is most likely due to the overall condition of the homes before weatherization and the ways in which the home is used by the occupants (number of occupants, high-use medical equipment, etc.).

4. The highest energy savings are realized by those homes receiving lighting upgrades (CFLs). However, there were a small number of homes getting CFLs, so this finding is not significant due to a low sample size.

Recommendations

TecMarket Works has the following recommendations for the low-income weatherization program:

1. The weatherization program in the Empire territory should include CFLs into the mix when possible, as lighting improvements will likely result in greater energy savings for the customer and Empire, and lower utility bills for their low-income customers.

Introduction

This report presents the results of an impact evaluation of the Low-Income Weatherization Program. The evaluation examined 100 participants that received weatherization services between October 2006 and September 2008 and had billing data that fit the reliability criteria for the study (please see methodology for details).

Program Description

Qualifying low income customers receive help in managing their energy use and bills through Empire's Low Income Weatherization and High Efficiency Program. The program works directly with local CAP agencies that already provide weatherization services to low income customers through the DOE and other state agencies. Empire provides supplemental funds to the CAP agencies to cover the cost of weatherization measures. This program is administered by the CAP agencies and follows the protocol under current federal and state guidelines. CAP agencies expect to spend an average of $1,200 (escalated by $50 per year) of Empire funds to supplement their DOE funds. Empire funds focus on measures that reduce electricity usage such as electric heat, air conditioning, refrigeration, lighting, etc. CAP agencies have discretion to use the funds as they wish for weatherization and heating equipment. In addition, they may also spend up to $200 towards the purchase of an ENERGY STAR® rated refrigerator and $100 towards the purchase of ENERGY STAR® rated CFLs and lighting fixtures.

There were three CAP agencies represented in this study, they are: Economic Security Corporation (ESC), West Central Missouri Community Action Agency (WCMCAA), and The Ozarks Area Community Action Corporation (OACAC).

Anticipated annual participation is 125 customers. Empire is currently in its third contract year of participation in this program. The 2005-2006 contract-year had 103 participants, with 148 participants in the following contract year. The current contract year has benefited 80 customers through May 2008.

This program is based on the Department of Energy weatherization program. As such, it will require an impact evaluation only.

Evaluation Methodology

The study methodology consisted of three parts. These are:

1. A weather normalized energy usage analysis in which TecMarket Works examined participant's electricity consumption before and after weatherization to determine if the program had an effect on energy consumption.
2. Comparison of billing analysis results to Blower Door Test results.
3. Comparison of billing analysis results between measure groups.

Energy Savings Analysis

Energy savings for Program participants were determined by looking at the change in energy usage of the participants from before weatherization to after weatherization compared to a simulated comparison group established by using the monthly pre-program consumption of participants over the analysis period. Empire selected this approach because selecting a comparison group of non-participating low-income customers would have been too time-consuming and costly for this evaluation. Instead, the comparison group was developed from the participant group by using only pre-weatherization meter data and randomly assigning a date to break all pre-weatherization data into pre and post data. In effect, the participants become their own comparison group. This procedure is a standard approach within the evaluation field when the study cannot include a comparison group of non-participants.

The data that was used for this analysis was provided from Empire's monthly-metered account database. The data was provided in kWh per month per customer for up to twenty-seven months before the program and twenty-seven months after the program.

After the data was cleaned, average participant usage per year was calculated. Energy savings were calculated using PRISM.

PRISM™ Analysis

Program impacts were examined using PRISM™ Advanced Version 1.0 software for Windows developed at Princeton University's Center for Energy and Environmental Studies.

PRISM™ is a commercially available analysis software package designed to estimate energy savings for heating and/or cooling loads in residential and small commercial buildings. The current Advanced Version permits users to enter and edit data from a variety of sources, to carry out sophisticated reliability checks, to eliminate cases that do not meet standards, and to display results in graphical and textual forms.

PRISM™ allows the user to estimate the change in energy consumption per heating or cooling degree-day for the periods before and after measures are installed in homes by combining energy consumption and weather data. By subtracting the estimate of energy use per degree-day after the measures are installed from the value before the measures are installed and multiplying by an appropriate annual degree-day value, total annual normalized energy savings can be estimated.

Degree-days vary from year to year, which potentially presents a problem for deciding on a value for annual degree-days. This is especially problematic if one is trying to determine paybacks. For example, one could normalize the savings to the period preceding the installation of measures or the period after. If one selects a warm period, then savings may be too low and paybacks too long. If one selects a cool period for normalization, then the estimate of paybacks may be too high.

PRISM™ mitigates this problem by effectively averaging temperatures over a twelve-year period and providing an estimate of degree-days that is typical for the region of the study, although not one that necessarily matches the specific weather conditions in any given year. The advantage of normalizing to the PRISM™ recommended period is that the results will be consistent from study to study over a period of time. The same end can be achieved by consistently using the same user selected time frame. For this study we chose the period from January 1, 1992 through December 31, 2002, recommended by PRISM™ support.

A major feature of PRISM™ is the ability to evaluate cases against reliability criteria. The first criterion is the R^2 value (explained variance), a measure of the fit of the degree-day and energy consumption data, or in statistical lingo, the amount of variance in energy consumption explained by changes in degree-days. Energy consumption is assumed to be a linear function of degree-day. R^2 varies from 0 to 1. If R^2 is close to zero, it means that factors other than outdoor temperature are driving energy consumption. If the R^2 is close to 1 it means that outdoor temperature is almost entirely responsible for energy consumption. Outdoor temperature is usually the overriding factor in both heating and air conditioning fuel use and the goal of the weatherization program is to improve the thermal characteristics of the building shell and the fuel use rate of the heating and air conditioning systems to reduce fuel use related to outdoor temperature. The PRISM™ default for R^2 is at .7. This means that at least seventy percent of energy use is temperature dependant. If less than 70 percent of the energy used in a building is temperature related, then it becomes difficult to understand the effects of the weatherization measures and the case is dropped from the analysis. We used .7 in this study although most of the R^2 values in this study were .85 or higher. In other words, 85 percent or more of heating and cooling electricity use in this study is temperature driven. PRISM™ has a second measure of reliability which is the coefficient of variation for the normalized annual consumption (CV(NAC)). Normalized annual consumption is the amount of fuel consumed by a unit for a typical weather year. When estimating normalized annual consumption some estimates may have a very tight error band while others may have a band that is quite wide. In estimating the average consumption we want estimates of unit consumption that are very close to the actual and we want to eliminate values that may not be very close because they may cause the estimates of the average consumption for all units to vary significantly from the actual. Because the variation in the estimates of normalized annual consumption generally will be higher in homes with higher consumption, the estimate of the variation in normalized annual consumption is divided by the estimate of normalized consumption to obtain CV(NAC). This provides a standardized measure of the variability of the normalized consumption that is comparable across homes. The PRISM™ default for CV(NAC) is 7 percent and that is the value used in this study.

Comparison to Blower Door Test Results

The blower door tests that were performed on participating homes were done by the weatherizing agency, and the results of these tests were provided to TecMarket Works for each of the participants.

The results of the blower door tests were provided as CFM (cubic feet per minute) reduction values and in percent change in CFM for each home. These values are then regressed with the PRISM results for each home.

Comparison Between Measure Groups

The services provided to the participants were varied and in many cases went beyond weatherization services. Table 1 below presents the measures recorded by the agencies and how they were categorized by TMW and Empire for analysis. Some measures, such as "health and safety repairs" were eliminated from the list of measures as they have no significant effect on energy consumption. All others were categorized into the following groups:

- Insulation
- Infiltration
- Hot Water Heater
- Doors and Windows
- HVAC
- Lighting

Table 1. Measures Installed During Weatherization

Measure as Listed in Data from Agencies	Frequency	Percent	Group for Analysis
2 doors	1	0.05	Doors and Windows
A/C coil cleaned & recharged	1	0.05	HVAC
AC foam	23	1.23	Infiltration
Attic & floor insulation	8	0.43	Insulation
Attic insulation	152	8.11	Insulation
Backer Rod	8	0.43	Infiltration
batten strip on interior walls on paneling seam	1	0.05	Infiltration
C&T	3	0.16	HVAC
Caulking	148	7.90	Infiltration
Ceiling and Floor Insulation	1	0.05	Insulation
Ceiling Insulation	3	0.16	Insulation
Cement Patch	90	4.80	
CFLs	22	1.17	Lighting
Change Furnace Filters	1	0.05	HVAC
Chimney liner	1	0.05	Infiltration
Claze	7	0.37	Doors and Windows
Clean & tune furnace	52	2.77	HVAC
Cover Plate	12	0.64	Infiltration
Door	25	1.33	Doors and Windows
Door Replacement	5	0.27	Doors and Windows
Door Sweep	80	4.27	Infiltration
Door: Misc. Material	3	0.16	Doors and Windows
Door: Misc. Repair	20	1.07	Doors and Windows
Door: Storm Door Replacement	1	0.05	Doors and Windows
DR	1	0.05	Doors and Windows
Drw & Wdws	1	0.05	Doors and Windows

Dryer Vent	2	0.11	Infiltration
Duct Insulation	6	0.32	Infiltration
Duct Repairs & Insulation	2	0.11	Infiltration
Expanding Foam	2	0.11	Infiltration
Exterior Door	56	2.99	Doors and Windows
Faced bat on knee wall	1	0.05	Insulation
Fan limit	1	0.05	HVAC
Flashing	40	2.13	Infiltration
Floor Insulation	23	1.23	Insulation
Floor Repair	3	0.16	
Floor Vents	1	0.05	Infiltration
Foam Sealant	100	5.34	Infiltration
Foundation Vent	3	0.16	Infiltration
Glass	57	3.04	Doors and Windows
Glass Replacement	3	0.16	Doors and Windows
Glaze	51	2.72	Doors and Windows
Grill & Pipe	1	0.05	Hot Water Heater
Hatch Replaced	1	0.05	Infiltration
Health & Safety Repair	90	4.80	
Health & Safety Repair/Replacement	30	1.60	
Heating System Repair	4	0.21	HVAC
Heating System Replacement	3	0.16	HVAC
Hole in Ceiling Repaired	1	0.05	Infiltration
Hot Water Heater Jacket	68	3.63	Hot Water Heater
Infiltration	85	4.54	Infiltration
Install return duct and attach to r/a duct	1	0.05	Infiltration
Insulation	5	0.27	Insulation
Insulation: Rim Joist	2	0.11	Insulation
Joints Sealed	1	0.05	Infiltration
Mill Plastic	1	0.05	
Mortar Patch	2	0.11	
Outlet Gaskets	120	6.40	Infiltration
Outlet Insulators	23	1.23	Infiltration
Patch Holes in Floor	1	0.05	
Pipe Wrap	53	2.83	Hot Water Heater
Plastic	1	0.05	Infiltration
Primary Windows	26	1.39	Doors and Windows
Pully Covers	20	1.07	Infiltration
Reconn seal	1	0.05	Infiltration
Repair Ceiling and Wall Holes	3	0.16	Infiltration
Repair Gas Leak	1	0.05	

Replace furnace vent	1	0.05	
Replace Hatch	3	0.16	Infiltration
Replace water heater vent	1	0.05	Hot Water Heater
Replaced outlet and switch covers where missing	1	0.05	Infiltration
Roof Vent	2	0.11	Infiltration
Sash Locks	29	1.55	
Screen	1	0.05	
Scuttle Door	6	0.32	Infiltration
Seal around wall furnace	1	0.05	
Seal Lines	4	0.21	
Seal Lines Under Sinks	1	0.05	
Sheet Rock	1	0.05	Infiltration
Sidewall Plugs	30	1.60	Infiltration
Skirting	2	0.11	Infiltration
Space Heater	1	0.05	
Storm Door	1	0.05	Doors and Windows
Storm Windows	11	0.59	Doors and Windows
Stroms Interior	1	0.05	Doors and Windows
Thermostat	1	0.05	HVAC
Threshold	1	0.05	Infiltration
Vapor Barrier	6	0.32	
Vent Skirting	1	0.05	Infiltration
Vented Water Heater	1	0.05	Hot Water Heater
Vents	8	0.43	Infiltration
W-Stat	1	0.05	HVAC
Wall	1	0.05	Insulation
Wall & Attic Insulation	4	0.21	Insulation
Wall Insulation	56	2.99	Insulation
Water Heater	2	0.11	Hot Water Heater
Water Heater Replacement	1	0.05	Hot Water Heater
Weatherstrip	106	5.66	Infiltration
WHdr	1	0.05	Hot Water Heater
Window Repair	1	0.05	Doors and Windows
Window Replacement	2	0.11	Doors and Windows
Windows	16	0.85	Doors and Windows
Windows and Doors	3	0.16	Doors and Windows

Placing the measures into the six measure groups allows us to assign that group to each home, as applicable. Some homes have one group assignment, others have all six. These groups and the impact results, dollars spent, and blower door test results are examined in the report.

Evaluation Findings

Sample Size

The results presented in this section are based on 100 participants that were customers long enough to have an account history and who have stayed with Empire long enough to look at trends in usage after the program. The comparison group of pre-program participants consists of 107 customers.[1]

Because of this participant sample size, the sample's precision level and the confidence interval are rigorous enough to draw program impact conclusions. The sample available for this analysis represents a 90% level of precision with a plus or minus 10% confidence interval. This means that if this study were repeated 100 times we would expect that 90% of the studies would have findings that would be the same as the findings in this study plus or minus 10 percent. This confidence interval is considered strong enough for developing conclusions and provides evidence of program effects. The primary findings from these activities are reported below.

Energy Savings Analysis: Changes in Electricity Consumption of Participants

Seventy-Four of the 100 participants studied used significantly less energy after weatherization than they did before they were weatherized. The data from the 100 participants was analyzed using PRISM as described in the methodology.

It's interesting to note the annual kWh consumption of the participants before they were weatherized. Table 2 below summarizes their consumption:

Table 2. Annual Usage of Customers Before Being Weatherized

	Increased Consumption After Weatherization	Decreased Consumption After Weatherization
Annual Usage Before Weatherization	11,622	16,688

As can be seen in Table 2, those that decreased their consumption after weatherization started out with a higher level of consumption before they were weatherized than those that increased their consumption. This could be because of multiple reasons:

1. The homes with the higher energy consumption were in greater need of being weatherized.
2. These homes were provided with methods of reducing energy consumption that resulted in changed behavior. For example, the weatherization agency may have noticed that all the bulbs were incandescent and suggested they be replaced with CFLs to reduce energy consumption further.

[1] The comparison group is larger than the participant group because the random split of the pre-weatherization data resulted in an additional 7 customers having results that passed the reliability criteria.

3. Those that increased their consumption had homes that were not in as great a need for the weatherization services, so the measures provided less savings.

On average, those that decreased their consumption did so by 2,908 kWhs annually. However, the consumption stream for non-participants over the same period increased, widening the gap between participants and the comparison group. After adjusting for the comparison group, savings increased, on average, to 3,141 kWhs annually. However, a number of participants (26%) increased their consumption after weatherization. This is normal in any given population; however, it is significant that one in four of the participants increased their consumption after they were weatherized. Those that increased their consumption did so by an average of 3,128 kWhs annually after adjusting for the comparison group. Overall, of the 100 participants analyzed, the mean savings per weatherized home is 2,052 kWhs annually.

Table 3. Annual Energy Savings

	Increased Consumption	Decreased Consumption	All Participants
Number of Participants	26 (26%)	74 (74%)	100
Number of Comparison Homes	56 (52%)	51 (48%)	107
Mean Change in Annual kWh Consumption of Participants	+3,361	-2,908	-1,819
Mean Percent Change in Annual kWh Consumption of Participants	+28.9%	-17.4%	-11.8%
Mean Change in Annual kWh Consumption of Comparison Group	+2,118	-1,802	+233
Mean Percent Change in Annual kWh Consumption of Comparison Group	+14.7%	-11.8%	+1.6%
Mean Change in Annual kWh Consumption of Participants Adjusted for Comparison Group	+3,128	-3,141	-2,052
Mean Percent Change in Annual kWh Consumption of Participants Adjusted for Comparison Group	+26.9%	-18.8%	-13.4%

As noted above, increases in consumption are normal and appear in every study of this type. After weatherization, some participants feel that they can adjust the temperature in their homes to a more comfortable level without an increase in their utility bill. Others may have had changes occur in their homes that are not related to heating or cooling, such as additional occupants in the home, or the addition of medical equipment or appliances such as televisions or computers.

Comparison to Blower Door Test Results

Results for the blower door tests conducted before and after weatherization were provided to TecMarket Works for 235 participants. In this section of the report we examine the blower door test results, and compare that data to the energy impact evaluation results.

Table 4 below presents the summary of findings of the blower door tests and the PRISM results among the participants. For those 100 participants that had reliable results from the PRISM analysis, the CFM results dropped an average of 30.8% after weatherization, and their energy consumption dropped an average of 13.4%. If we look at only those PRISM participants that had energy savings, the energy savings is an average of 18.8%, and the change in CFM increases slightly – and insignificantly – from 30.8% to 31.4%.

Table 4. Blower Door Test Results

Group	n	% change in CFM	% change in annual kWh consumption
All Participants	235	-33.3%	-
PRISM participants	100	-30.8%	-13.4%
PRISM participants with energy savings	74	-31.4%	-18.8%

Correlations

Surprisingly, there is no significant correlation to be found between blower door test results and energy savings in either of the PRISM groups listed in Table 4. For the PRISM participants, the correlation factor of energy savings and CFM the percent change in CFM is 0.19. For PRISM participants with energy savings, the correlation factor of energy savings and CFM the percent change in CFM is 0.20. Correlation factors for CFM reduction to costs of weatherization or number of measures installed are even lower at 0.02 for both. This analysis, from this limited population, indicates that there are only limited benefits in conducting blower door tests in order to achieve weatherization induced energy savings.

Correlation with Participants That Only Received Infiltration and/or Door Measures

There were two participants that received only infiltration measures and that also had reliable PRISM results. This sample was too low for a regression analysis, however an examination of these two participants indicate that as infiltration is reduced, savings increase. Table 5 presents the results of the infiltration reduction for the two participants.

Table 5. Savings of Participants Receiving Only Infiltration Measures

	Reduction in CFM	Normalized Annual Savings
Participant A	10.4%	426 kWh = 1.9%
Participant B	5.2%	262 kWh = 1.42%

When we expand the analysis to include participants receiving both infiltration and door measures (11 participants) the correlation between the blower door test results and the electric energy savings increases to .30, indicating a somewhat positive relationship. This low correlation is because 3 of these participants increased their consumption after weatherization while 8 decreased their consumption. Looking at only the 8 participants who decreased their consumption provides a correlation between blower test results and kWh savings of .83, a strong positive relationship. Thus, for energy savers the relationship between the change in blower door test scores and savings is strong and positive, but not all participants who reduce CFM also save energy.

Comparisons Between Measure Groups

As described in methodology, the measures installed were placed into groups for analysis. These groups are listed are: Insulation, Infiltration, Hot Water Heater, Doors and Windows, HVAC, and Lighting and encompass all the measures listed in Table 1. Table 6 below presents the counts of measures installed in the 286 homes for which there was data. Counts are shown in total and by weatherization agency. Percents for each agency and measure group are also presented.

Figure 1 displays the percent of homes weatherized that received measures from each of the measure groups by the weatherization agency. Infiltration measures such as sealing, caulking, and outlet gaskets were the most common measures installed, with 87% of weatherized homes receiving those measures. The Economic Security Corporation (ESC) installed these measures in 98% of the 150 homes they weatherized, and they were also the most likely to provide these infiltration measures or services.

Table 6. Measures Installed

		Infiltration	Insulation	Doors and Windows	HVAC	Hot Water Heater	Lighting	Total
	Number of Homes:	**Counts**						
ESC	150	147	118	108	54	77	0	504
WCMCAA	10	7	6	4	1	0	0	18
OACAC	126	95	77	48	10	16	22	268
Total	286	249	201	160	65	93	22	790
	Percent of Homes:	**Percents**						
ESC	52.4%	98.0%	78.7%	72.0%	36.0%	51.3%	0.0%	
WCMCAA	3.5%	70.0%	60.0%	40.0%	10.0%	0.0%	0.0%	
OACAC	44.1%	75.4%	61.1%	38.1%	7.9%	12.7%	17.5%	
Total	100.0%	87.1%	70.3%	55.9%	22.7%	32.5%	7.7%	

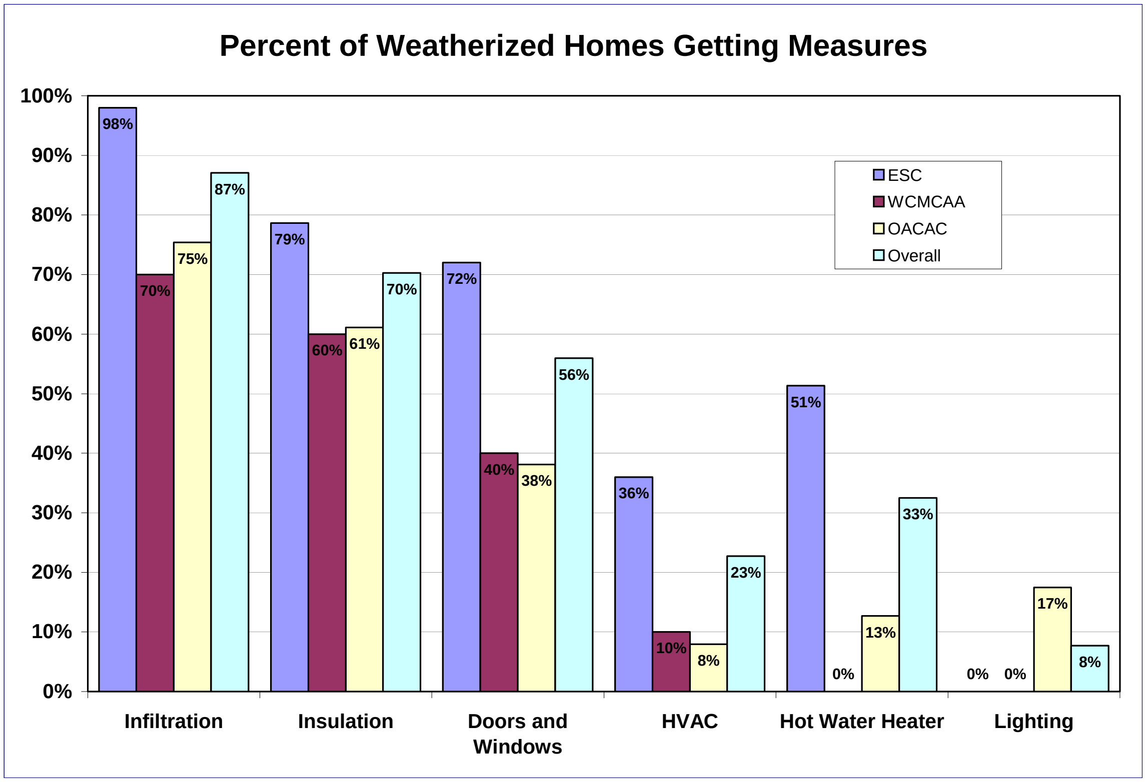

Figure 1. Percent of Weatherization Measures in Weatherized Homes

Costs of Weatherization

The amount of money spent on weatherizing a home ranged from a low of $48 to a high of $3,532. The average amount spent on weatherizing a home was $1,631. The three agencies were very similar in the mean amount spent on weatherizing a home. However, as homes were placed into one or more of the measure categories, differences in the mean cost of weatherization were revealed. As can be seen in Figure 2 below, those homes that received hot water heater services (which includes water heater replacement and hot water heater jackets), on average received a higher value for the total weatherization services received.

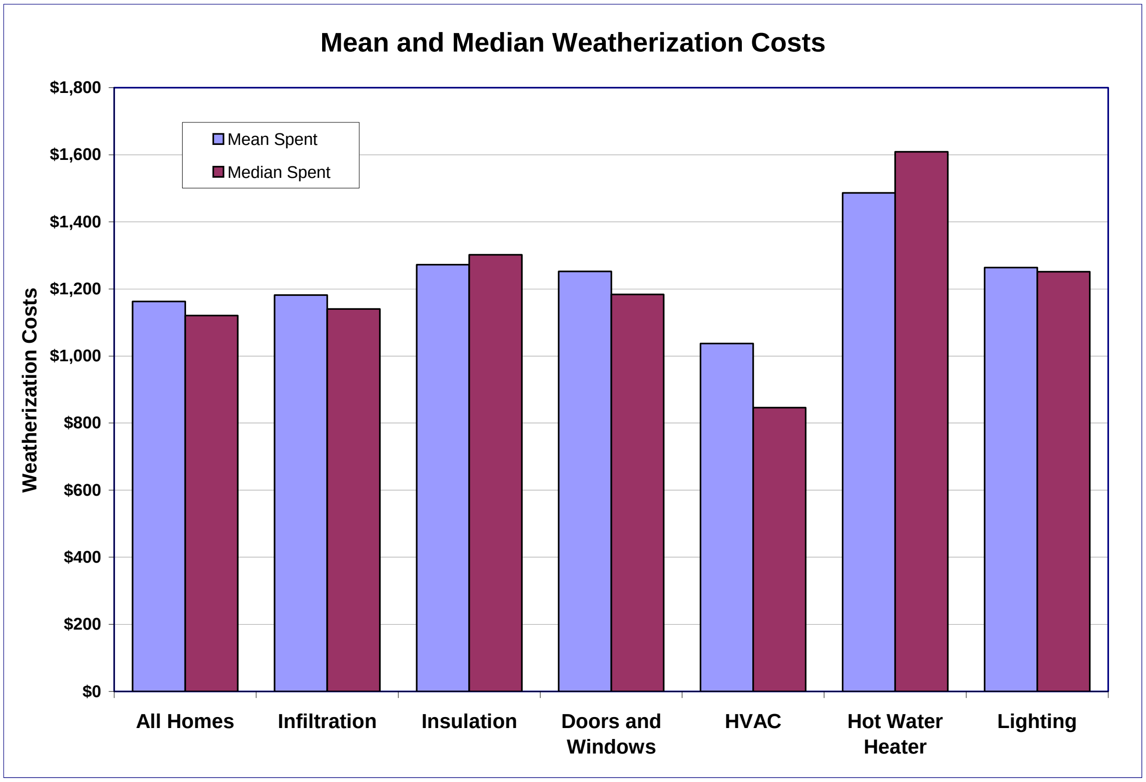

Figure 2. Costs of Weatherization

Energy Savings by Measure Group

Figure 3 below shows the mean annual energy savings by the homes that received the various measures. The 100 homes that had reliable data saved an average of 2,052 kWhs annually. As can be seen in Table 6 above, OACAC was the only weatherization agency to install lighting measures, and they only installed them in 17.5% of the homes they weatherized. The homes that received lighting upgrades had, on average, much higher energy savings. However, since there were a small number of homes receiving CFLs, this finding is not significant and should be viewed as an indicator of potential savings from CFLs.

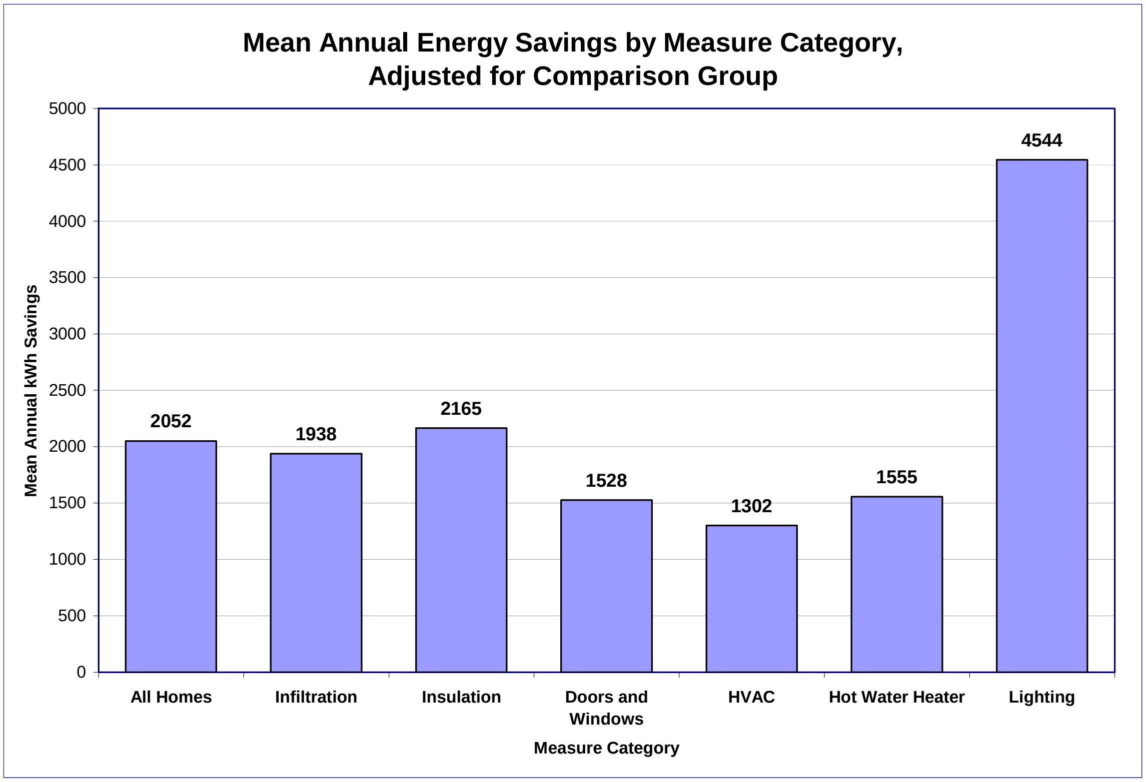

Figure 3. Mean Annual kWh Savings by Measure Group

Benefit Cost Tests

The total resource cost (TRC) test revealed a negative net present value (NPV) for the Low Income Weatherization Program. This indicates that, over a 15 year useful life, the avoided energy and demand savings were insufficient to recuperate the initial program cost of $226,360. Furthermore, a benefit cost ratio of less than one shows that this program is not economical from the combined perspective of the utility and the ratepayers.

The societal test, like the TRC test, produced a negative NPV for the Low Income Weatherization Program. Since the societal test aims to represent the program from the point of view of the society as a whole, it attempts to capture all benefits and costs, including externalities. What this means in this case is that on top of the avoided energy and demand savings incorporated into the TRC test, avoided environmental damage costs were factored in. However, all of these savings combined were not enough to offset the initial cost of $226,360 over the span of a 15 year useful life. Thus the benefit cost ratio remains less than one, and the program is deemed not cost effective from a societal perspective.

Because the Low Income Weatherization Program was a free program and the participant test does not take into account the impacts on the utility, the participant test showed a positive NPV. With the cost to the participant equaling zero, the benefit cost ratio is, by definition, undefined. This means that the benefits to the participant are infinitely greater than the costs. Therefore, this program is cost effective from the perspective of the participant.

Table 7. Benefit Cost Test Results for the Low Income Weatherization Program

Test	Net Present Value	B/C Ratio
Total Resource Cost Test	-$129,593	.43
Societal Test	-$115,957	.49
Participant Test	$211,455	-

Table 8. Parameter Values for Benefit Cost Tests

Parameter	Value
Number of Participants	100
Project Life	15
Project Analysis Year 1	2007
Avg. kWh/Part. Saved	2,052
Utility Project Cost	$226,360
Incentive Cost	$0
Participant Cost	$0
Utility Discount Rate	7.80%
Societal Discount Rate	4.72%
Participant Discount Rate	5.00%
Escalation Rate	2.50%