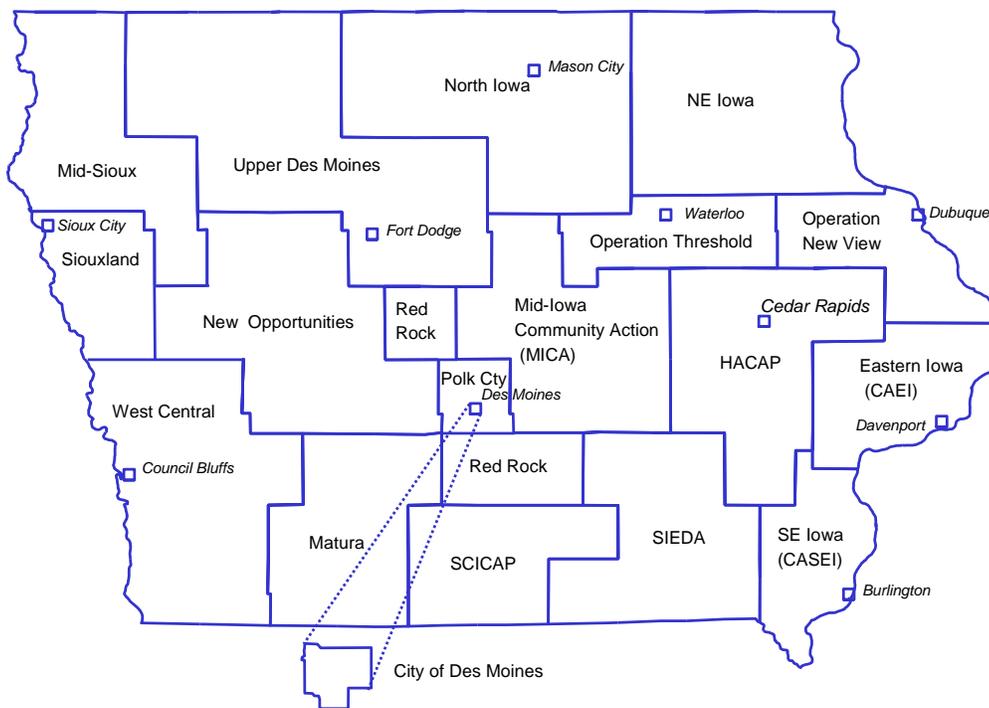


REPORT ON THE IMPACTS AND COSTS OF THE IOWA LOW-INCOME WEATHERIZATION PROGRAM -- Calendar Year 2007

October 15, 2008

Iowa Community Action Agencies



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PROGRAM**

Calendar Year 2007

October 15, 2008

**Prepared for the
Iowa Statewide Low-Income Collaborative**

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1. EXECUTIVE SUMMARY

This report summarizes state and utility low-income weatherization program activity for dwellings weatherized to completion during calendar year 2007. The report includes state, utility, and agency summaries of calendar year 2007 spending and impacts by measure, end-use, and fuel. The base data consisted of statewide program tracking databases of spending and measure installations maintained by the Iowa Division of Community Action Agencies. Fuel consumption histories were provided by the three co-funding utilities, including by Black Hills Energy (formerly Aquila Networks – PNG), Interstate Power and Light Company, and MidAmerican Energy.

We estimated energy and coincident demand impacts for the program participants by adjustment factors to engineering estimates from algorithms developed as part of this study, using data from the Calendar Year 2005 program. The algorithms were developed from the ground up for this analysis – previous assessments were based upon algorithms developed for the 1992 program¹ and updated for the 2002 program². The methodology used to develop the algorithms is detailed in Appendix B of this Report.

Program Costs and Impacts

The WAP program installed measures in 1,959 dwellings during calendar year (CY) 2007. Program expenditures for labor, materials, and support decreased by 8.2% from the previous year, totaling \$13,806,959. The average expenditure was \$7,048 per dwelling compared with \$7,002 the previous year.

The major measures installed by the program in 2007 are essentially unchanged from the 2006, however over the past several years the program has seen attrition to the point of virtually zero installations of several minor measures, including water heater blankets, capsylite bulbs (now fully replaced by installations of compact fluorescent lighting), and waterbed mattress pads.

First-year savings included 408,433 therms; 2,360,620 kWh electricity; 66,001 gallons of propane; 2,285 gallons of fuel oil. First-year peak demand savings totaled 4,296 therms, 705 kW summer demand, and 365 kW winter demand.

On average, the program saved 1,209 kWh of electricity for 1,878 dwellings with electricity impacts. The program saved an average of 243 therms of natural gas for 1,682 dwellings with gas impacts. In addition, the program delivered first-year savings of 284 gallons of propane in 228 dwellings with propane impacts, and 208 gallons of fuel oil in 11 dwellings with fuel oil impacts.

First-year client energy cost savings totaled \$772,760, averaging \$394 for dwellings receiving energy savings measures for the CY 2007 program.

Utility Expenditures and Impacts

Utility funding totaled \$4,542,326, and averaged \$3,055 for the 1,487 dwellings that received utility-funded measures (76% of all dwellings treated by the program).

¹ see the following Wisconsin Energy Conservation Corporation reports for a full description of the estimation routines and derivation of the adjustment factors:

- Estimated Low-Income Program Impacts in Iowa, June 14, 1993;
- An Evaluation of Iowa's Low-Income Weatherization Efforts, August 8, 1994; and
- An Evaluation of the 1995 Iowa Low-Income Collaborative Weatherization Program, November 5, 1996.

² Report on Impacts and Costs of the Iowa Low-Income Weatherization Program – Calendar Year 2002. October 31, 2003. Dalhoff and Associates.

These measures were responsible for 58% of all energy savings for electricity and 62% of gas savings achieved by the program. Utility-funded measures saved an average of 1,063 kWh of electricity for the 1,304 dwellings with utility-funded electricity measures, and 208 therms of natural gas for the 1,212 dwellings with utility-funded natural gas measures. Utility-funded measures installed in 2007 reduced peak electricity demand by 409 kW in the summer and 212 kW in the winter, and provided 2,669 peak-day therms of gas savings.

Utility-funded measures yielded first-year client bill savings of \$392,045, averaging \$264 per dwelling that received utility-funded measures, including \$87 per dwelling for utility-funded electricity measures, and \$230 for dwellings receiving gas measures.

Summary of Program Impacts and Costs

Overall Program Impacts

	Electricity (kWh and kW)			Natural Gas (therms)			Propane (gals)	Fuel Oil (gals)
	Overall	DCAA	Utility	Overall	DCAA	Utility	DCAA	DCAA
Energy	2,360,620	988,804	1,371,816	408,433	156,730	251,703	66,601	2,285
Summer Demand	705.4	297.4	408.0	NA	NA	NA	NA	NA
Winter Demand	365.5	154.1	211.4	4,296	1,631	2,665	NA	NA

Average Impacts¹ per Dwelling (for those receiving measures with a given fuel type)

	Electricity (kWh)			Natural Gas (therms)			Propane (gals)	Fuel Oil (gals)
	Overall	DCAA	Utility	Overall	DCAA	Utility	DCAA	DCAA
Energy	1,209	527	1,052	243	93	208	284	208
Summer Demand	0.361	0.159	0.313	NA	NA	NA	NA	NA
Winter Demand	0.197	0.140	0.162	2.554	0.97	2.199	NA	NA

Expenditures and Client Fuel Bill Savings

Totals	Overall	DCAA	Utility	Averages	Overall	DCAA ²	Utility
Expenditures	\$13,806,959	\$9,264,633	\$4,542,326	Expenditures	\$7,048	\$4,732	\$3,055
Client Fuel Savings	\$772,760	\$380,715	\$392,045	Client Fuel Savings	\$394	\$194	\$264

¹ Average impacts are not additive, i.e. Utility and DCAA averages do not equal the Overall average

² DCAA funds measures that provide no direct client fuel savings, including health & safety and repairs

Summary of Changes to the Engineering Algorithms

The algorithms used to assess dwelling-specific savings were completely redesigned as part of this study. We had several objectives for this analysis. First was to utilize the more extensive data now available through program tracking. Second, we designed the algorithms to minimize the reliance on the most uncertain sources of data (this is primarily pre-weatherization usage for dwellings with no billing data).

In addition, we assessed distinct impacts for measures that were previously bundled or less-well known, including:

- Ceiling/Attic insulation, which is now broken out into several categories, including:
 - open-blown ceiling insulation (or just ceiling insulation)
 - sloped attic surfaces
 - cavity-fill attic insulation (floored attic insulation, some roof rafter installations)
- Kneewall insulation (previously it was bundled with wall insulation)
- Exhaust Ventilation (whole house ventilation, along with energy impacts), where costs averaged greater than \$250 per installed unit
- Space heater replacements, now reflected as high or standard efficiency heating system replacements
- Water heater replacement savings, now assessed using billing analysis rather than engineering estimates.

The development of the algorithms entailed billing analysis to assess measure-specific impacts of water heater measures and refrigeration measures, and whole house impacts of cooling measures. Insulation, infiltration reduction, and heating system savings were developed using calibrated engineering models of savings, with separate calibration factors for assumptions of existing heating system efficiency and existing surface and insulation R-values. The details of the methodology used to develop these algorithms are provided in Appendix B of this report.

Fuel Consumption Analysis Results

The natural gas savings reported herein were first estimated using the revised algorithms, and then were adjusted based upon a billing analysis of the calendar year 2007 weatherization clients. The factors were applied to the estimated natural gas, propane, and fuel oil heating measures, and to natural gas and propane water heater measures. Along with providing better assessments of agency-level impacts, this procedure also provides a check on the accuracy of the algorithms used to estimate savings. The fuel consumption showed 236 therms \pm 14 at 90% confidence, and 23.2% savings \pm 1.2% at 90% confidence for natural gas measures installed in CY 2007.

The discussion in Section 3 (Fuel Consumption Analysis and Assessment of Agency-Level Savings Adjustment Factors) highlights a continuing trend of reduced baseline (pre-weatherization) consumption in the treatment and comparison group dwellings. Savings now average 1,016 therms prior to weatherization, which is a 28% decrease from baseline consumption of the 1998 treatment group. Lower baseline consumption essentially indicates less potential for savings, and indeed the program has seen a reduction in average natural gas savings in recent years.

Changes in Program Delivery and Reporting

We have made numerous changes to reporting and methodologies in this report to reflect changes in the algorithms, changes in program delivery, and program reporting. These include:

- The clients formerly served by the City of Des Moines are now served by Polk County.
- As noted previously, the algorithms were completely overhauled, resulting in additional breakout for some measures.
- Ventilation measures are reported in greater detail, including exhaust ventilation (whole house ventilation, along with energy impacts), furnace, bathroom, water heating, and other.

- Measures no longer installed or which are no longer broken out in DCAA data were removed from the summary tables, including capsylite bulbs, asbestos abatement, preservation, roof repairs, and warehouse.
- The energy impacts of water heater mattress pad savings are no longer assessed (these are essentially phased out of the program, with only one dwelling receiving the measure during CY 2007).
- We have observed some inconsistencies in data received from the utilities for fuel prices over the past several years. This prompted us to use statewide average fuel costs as reported by the Energy Information Agency (EIA) for assessing client fuel bill savings.
- The weather data used for defining long-term normals in the normalization procedures were updated to more recent years (1998-2007).

Recommendations

As noted previously, we have seen a decline in the baseline consumption of both treatment and comparison group homes over the past decade. Weather data suggests that some of the decline may be due to cyclic or long-term warming. In addition, we suspect that clients may be reacting to higher fuel prices through behavior changes or as older, less-efficient heating and waterheating systems are replaced. We've also observed a slight reduction in the installation rate of wall insulation, which might indicate that some clients are self-weatherizing. Alternately, we may be observing the symptoms of clients 'freezing in the dark', reducing consumption to an extent that may result in health and safety concerns. Given that baseline consumption is the single most significant indicator of savings, the factors underpinning the decline in baseline usage should be examined in depth.

Organization of the Report

Section 2, Summary of Program Impacts and Expenditures, provides the overall findings of the study, and relates these to prior year results. In addition, it provides broad summaries of impacts and costs for the agencies.

Section 3, Fuel Consumption Analysis and Assessment of Agency-Level Savings Adjustment Factors, details the methodology and results of the fuel consumption analysis. A standard comparison-adjusted pre/post weather-normalization methodology was used to assess impacts.

Section 4, Detailed Spending and Impact Profiles by Funding Entity provides detailed result tables for the overall program, state funding, and for each of the three funding utilities. These tables include counts of installations and totals and average energy savings, demand impacts, and program expenditures by measure.

Section 5, Detailed Spending and Impact Profiles by Agency provides tables similar to those in Section 4 for each weatherization agency, for all measures installed.

Section 6, Detailed Spending and Impact Profiles by Agency for Utility Expenditures provides similar detail by agency, but is limited to measures funded by the utilities.

Appendix A provides a characterization of households and dwellings weatherized during 2007.

Appendix B provides a detailed description of the development of the revised algorithms used to estimate house-specific impacts.

2. SUMMARY OF PROGRAM IMPACTS AND EXPENDITURES

Aggregate Program Expenditures and Impacts

Program spending totaled \$13,808,959 for materials, labor, and support in houses weatherized to completion during calendar year (CY) 2007, declining by 8.2% from \$15,034,395 in 2006 (see Figure 2.1a, totals exclude administration expenditures). The number of households weatherized in 2007 decreased by 8.7%, from 2,145 in 2006 to 1,959 in 2007.

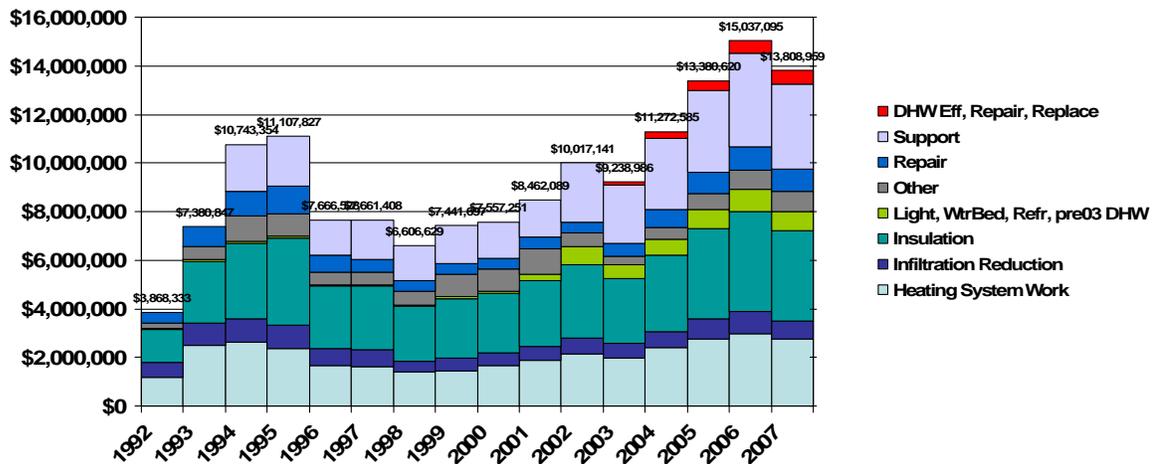


Figure 2.1a. Overall Program Expenditures

Utility funding totaled \$4,542,326, which represents a 1.4% decrease over \$4,606,920 spent during 2006 (Figure 2.1b). Utility expenditures accounted for 32.9% of the total low-income program expenditures, which is an increase from 30.7% of total expenditures in the CY 2006 program.

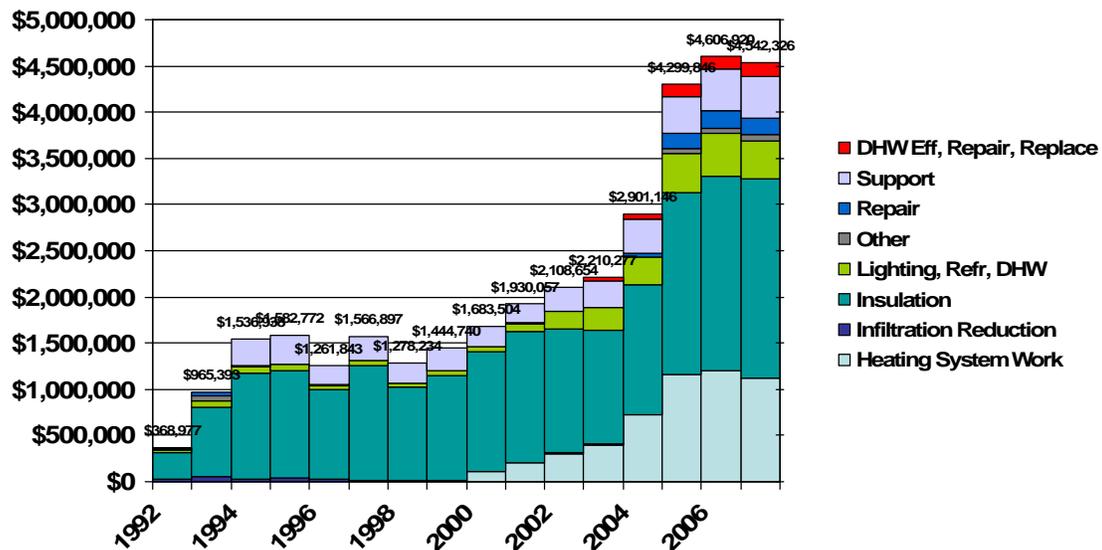


Figure 2.1b. Utility Expenditures

Aggregate program savings declined by 12.4%, from 63,351 MBtu in 2006 to 55,475 MBtu in 2006 (Figure 2.2a.) outpacing the 8.1% decline in number of households weatherized. We will discuss the reasons behind the decline in greater detail in Section 3 (the billing analysis results), but we note at this time that the decline in impacts is primarily due to the steady decline in baseline consumption for weatherized dwellings.

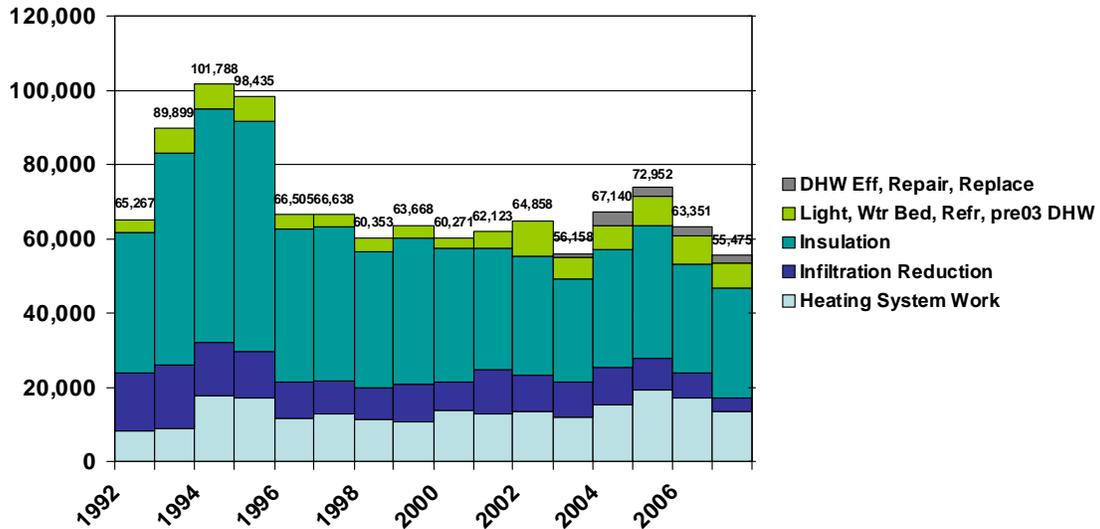


Figure 2.2a. Program First Year Savings (MBTU)

Savings from utility-funded measures increased by 0.7% to 29,945 MBtu in 2007 from 29,729 in 2006 (Figure 2.2b.)

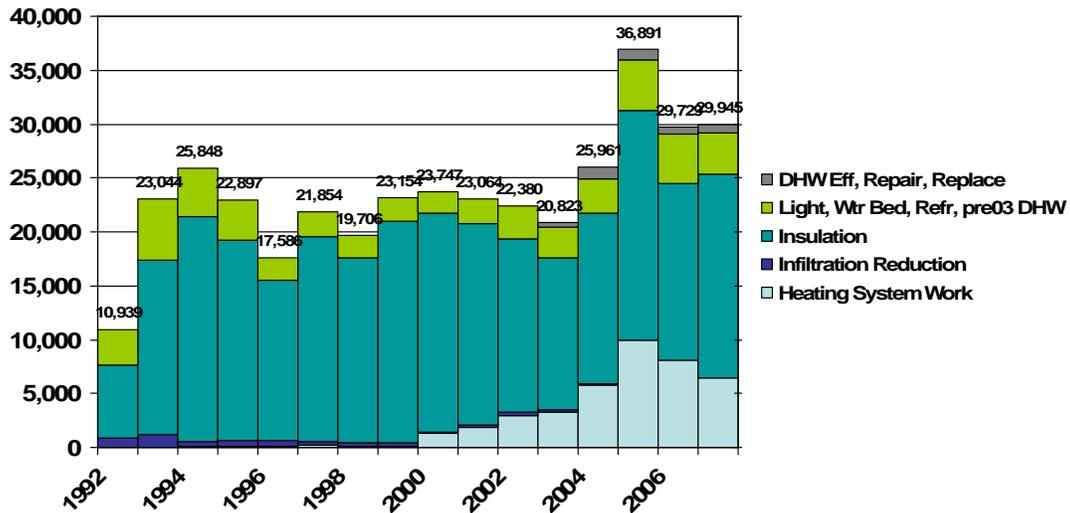


Figure 2.2b. Utility First Year Savings (MBTU)

Taken together, heating system and shell measures savings accounted for 80.3% of the programs savings, on an MBtu basis. Domestic hot water accounted for 7%, refrigeration measures 4.8%, lighting 4.1%, and cooling savings 3.7% of program savings on an MBtu basis.

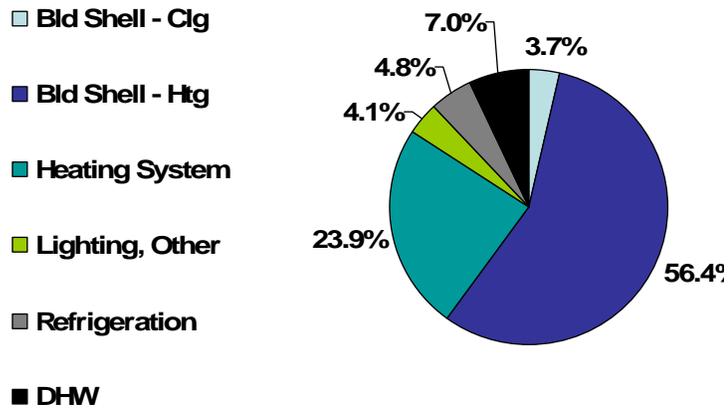


Figure 2.3a. Program MBtu Savings by End-Use

Natural gas savings accounted for 73.6% of savings on an MBtu basis, electricity savings accounted for 14.7% of savings, and propane savings accounted for 11.0% in the CY 2007 program. In fuel units, first-year savings totaled 408,433 therms of natural gas, 2,360,620 kWh of electricity, 66,601 gallons of propane, 2,285 gallons of fuel oil, and 23 MBtu of coal and wood. First-year peak demand savings totaled 4,296 therms, 705 kW summer demand, and 365 kW winter demand.

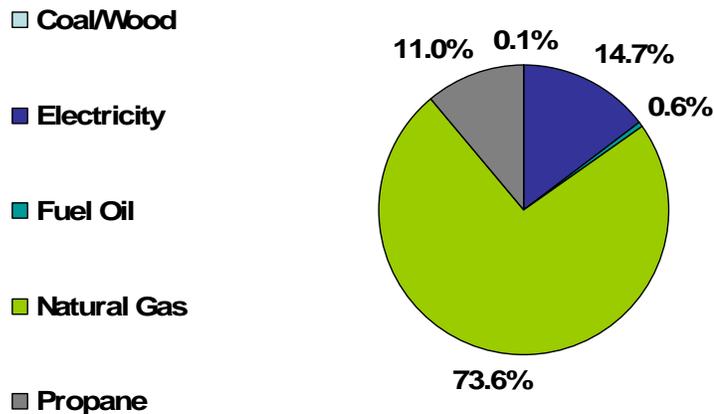


Figure 2.3b. Program MBtu Savings by Fuel Type

Client Bill Savings

In past years, we calculated the client energy bill savings using monthly fuel costs provided by the utilities. Over time we've observed discrepancies in these data, varying both within years and across billing requests, suggesting that the methods used by the utilities to generate these data have changed periodically. In order to provide a more consistent reporting of client fuel bill savings, we have used annual state average prices provided by the Department of Energy's Energy Information Agency (EIA). The results shown in Figures 2.4a and b are client bill savings based upon EIA's state average fuel costs for all years: these vary to within a few percent when compared with the previously-reported values.

The total nominal first year client energy bill savings decreased to \$772,760 in 2007 (Figure 2.4a.)

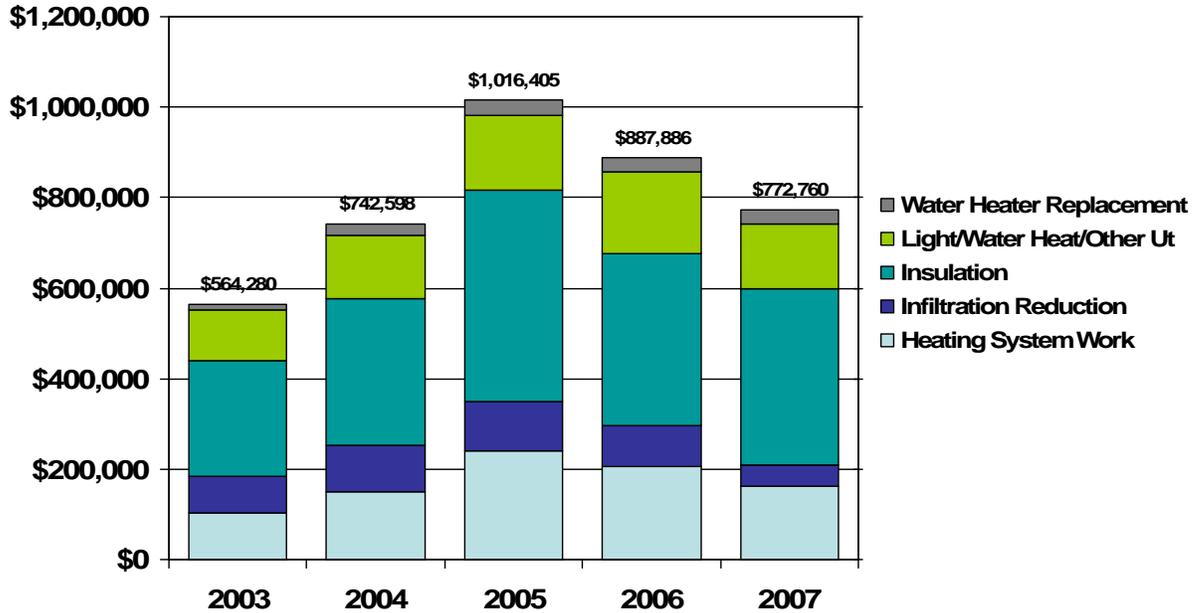


Figure 2.4a. First Year Client Fuel Cost Savings (Nominal Dollars)

Fuel prices decreased by 3.6% for electricity and increased by 2.5% for natural gas (Figure 2.4b) – taken together, these fuels account for 84% of client bill savings (Figure 2.5a). Fuel costs increased sharply for delivered fuels: 14.9% for fuel oil, and 11.1% for propane.

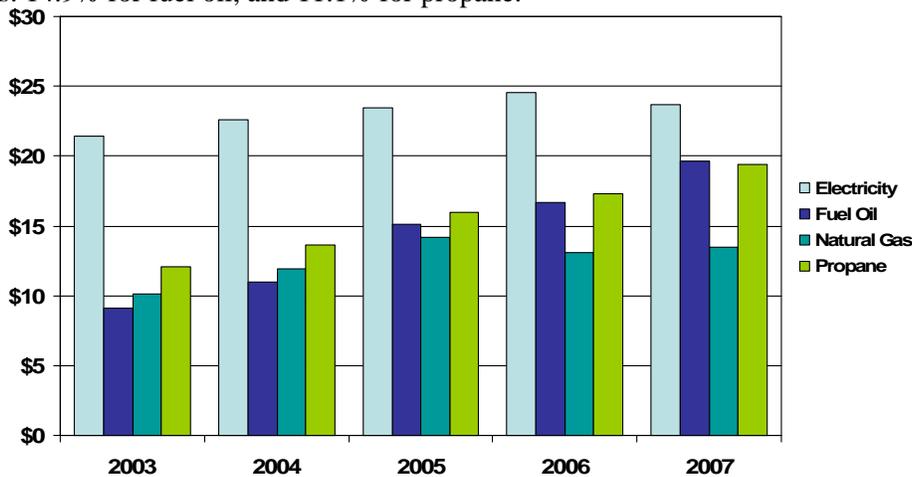


Figure 2.4b. Average Fuel Cost (Nominal Dollars per MBtu)

Natural gas savings account for 59% of client bill savings, followed by electricity at 25% (Figure 2.5a).

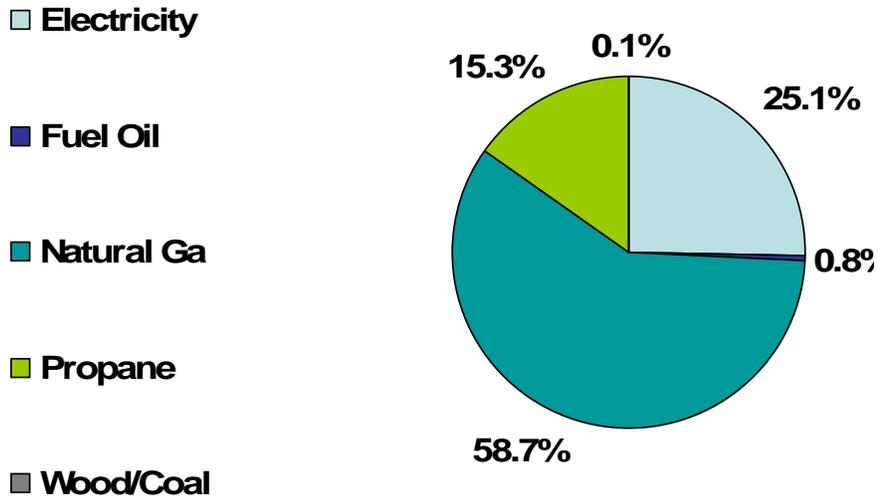


Figure 2.5a. Client Bill Savings by Fuel Type

Nearly 50% of client bill savings are attributable to the heating impacts of shell measures (insulation and infiltration reduction), and 21% due to heating system work (Figure 2.5b). Taken together, heating impacts from shell improvements and heating system measures account for nearly 71% of total client bill savings.

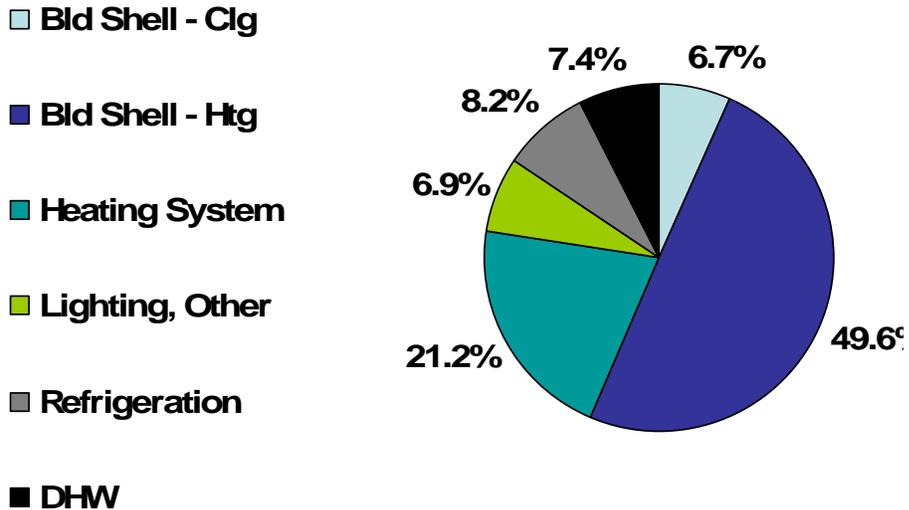


Figure 2.5b. Client Bill Savings by End-Use

Utility Funding Impacts

Utility funding reached 1,487 households, or 76% of all dwellings treated by the program, up from 75% in 2006. The average utility expenditure for materials and labor was \$2,754 for households receiving these measures: when adding in support expenditures, the total average expenditure was \$3,055.

Utility-funded measures accounted for 58% of all energy savings for electricity and 62% of gas savings. Utility-funded measures saved an average of 1,063 kWh of electricity for the 1,304 dwellings with utility-funded electricity measures, compared with an average of 892 kWh in 2006. These measures saved 208 therms of natural gas for the 1,212 dwellings with utility-funded natural gas measures compared to an average of 203 therms in 2006. Utility-funded measures installed in 2006 reduced peak electricity demand by 409 kW in the summer and 212 kW in the winter, and provided 2,669 peak-day therms of gas savings.

Utility-funded measures yielded first-year client bill savings of \$392,045, averaging \$264 per dwelling that received utility-funded measures. Savings averaged \$87 per household for utility-funded electricity measures, and \$230 for gas measures.

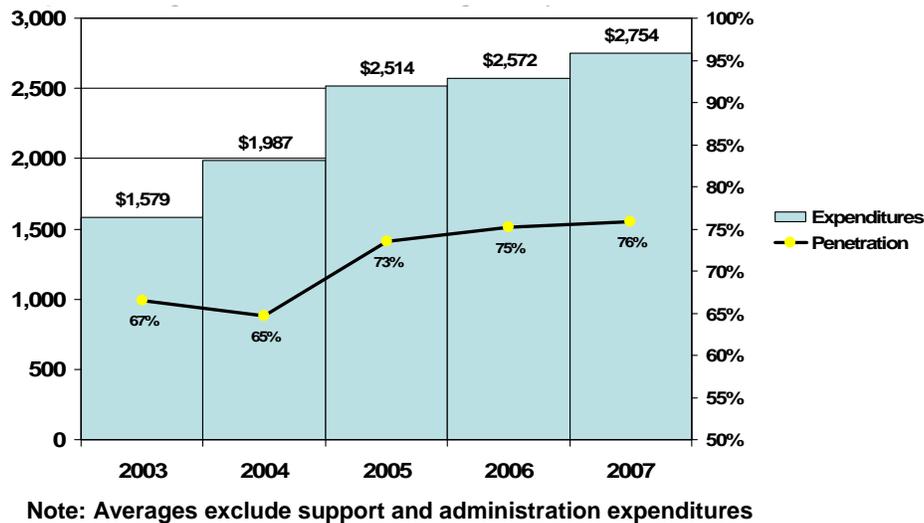


Figure 2.6. Average Utility Spending on Materials and Labor, and the Percentage of Homes Receiving Utility-Funded Measures

Table 2.1 provides the percentages of total expenditures for the types of measures that were funded by the utilities (note that this table only lists the types of measures that were funded in part by the utilities, and excludes measures funded solely by DCAA for specific repairs and health and safety) .

Table 2.1. Percentage of Expenditures Funded by Utilities

Measure	Expenditures		Utility Percentage
	Total	Utility	
Wall Insulation	\$1,353,955	\$866,418	64.0%
Attic Insulation	\$1,519,806	\$932,708	61.4%
Floor/Crawlspace Insulation	\$475,582	\$283,550	59.6%
Bandjoist Insulation	\$107,262	\$68,457	63.8%
High Efficiency Htg Sys Repl.	\$2,202,971	\$1,120,268	50.9%
Pipe Wrap	\$5,627	\$3,349	59.5%
Faucet Aerator	\$3,522	\$2,173	61.7%
Shower Head	\$4,578	\$2,896	63.3%
Water Heater Replacement - Hi Eff	\$362,771	\$156,738	43.2%
Compact Fluorescent Lighting	\$94,763	\$62,497	66.0%
Exchange Refrigerator	\$523,611	\$267,115	51.0%
Exchange Freezer	\$148,598	\$69,201	46.6%
Repairs	\$919,454	\$181,204	19.7%
Programmable Thermostat	\$673	\$673	100.0%
Htg Sys Ventilation	\$55,765	\$54,400	97.6%
Water Heater Ventilation	\$39,272	\$16,865	42.9%
Misc	\$1,255,272	\$5,935	0.5%
Overall Excluding Support	\$9,073,482	\$4,094,447	45.1%
Support	\$3,501,826	\$447,880	12.8%

Average Household Expenditures and Impacts

Average household expenditures increased slightly to \$7,048 from \$7,009 in 2006 (Figure 2.7.) Insulation accounted for the largest proportion of total expenditures, followed by support and heating system work.

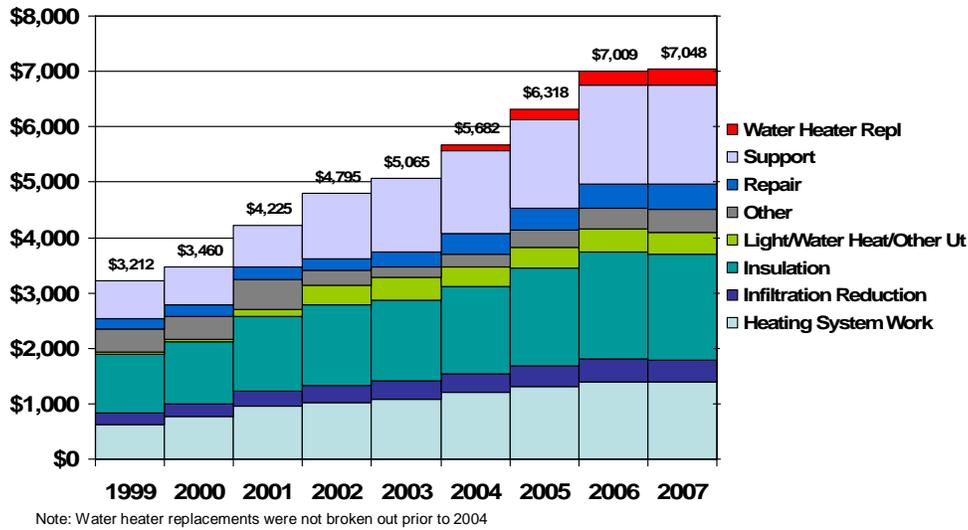


Figure 2.7. Average Program Expenditures

The average dwelling savings was 28.3 MBtu for clients weatherized during 2007 (Figure 2.8).

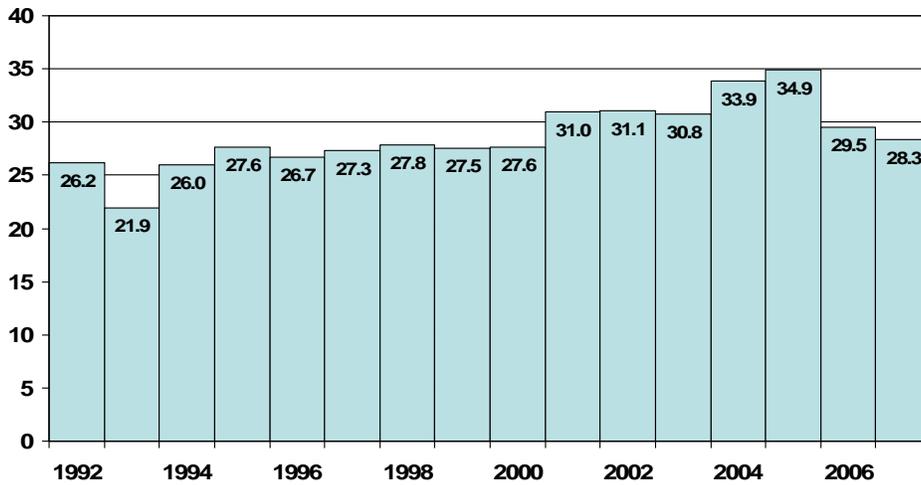


Figure 2.8. Average Annual Energy Savings per Dwelling (MBtu)

First-year client fuel bill savings averaged \$394 for the CY 2007 program, compared with \$435 per dwelling in 2006 (Figure 2.9). As noted earlier, this decline is driven by the apparent decreases in net savings (Figure 2.8) discussed further in Section 3.

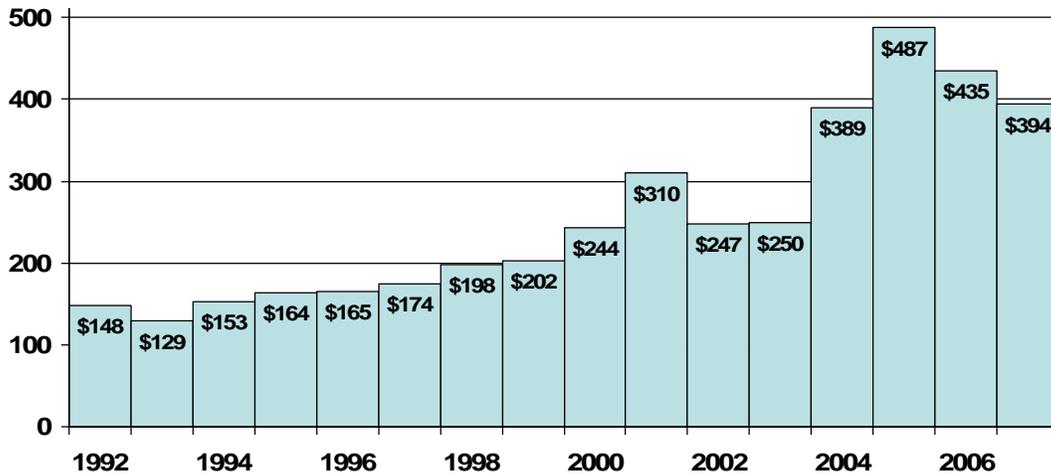


Figure 2.9. Average Annual Client Fuel Bill Savings (Nominal Dollars)

Figure 2.10 shows the average annual energy cost savings by agency. The series are arranged from left to right in the chart according to left to right and top to bottom and in the legend, e.g., Bldg Shell Cooling, then Bldg Shell Heating, then Heating system, etc.

The natural gas savings attained by each agency were adjusted according to results of the natural gas fuel consumption analyses (see Section 3, Fuel Consumption Analysis and Assessment of Agency-Specific Adjustment Factors). The estimated impacts for propane and fuel oil were adjusted using the same factors as those used for natural gas. An electricity fuel consumption analysis was not run for the 2007 program, however estimates developed in the billing analyses of CY 2005 and CY 2006 programs for the algorithm revisions are incorporated in these results.

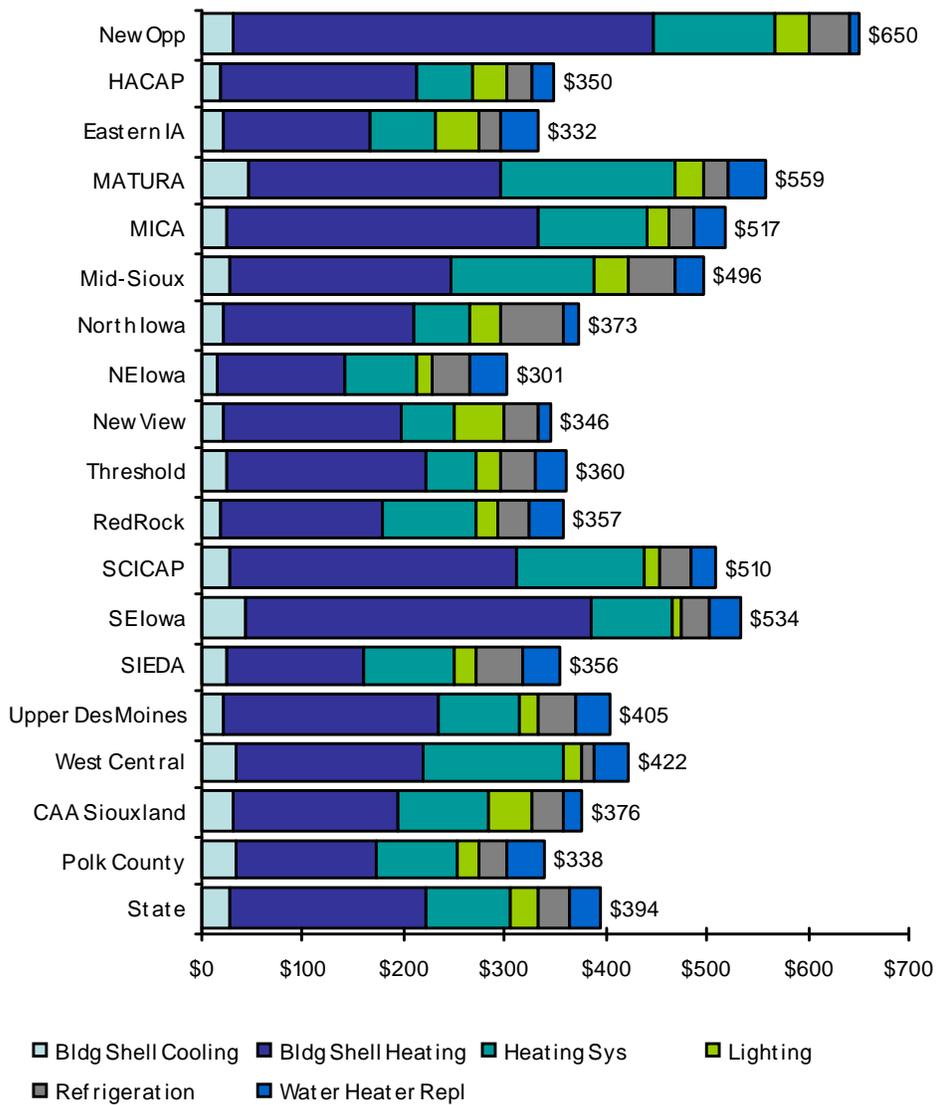


Figure 2.10. Average Annual Energy Cost Savings per Dwelling

Bear in mind that various factors affect the values shown in this chart, factors beyond quality or intensity of weatherization treatment (an example is climate variations within the state). Consequently, these results should not be used as a basis for comparing the quality, attention to detail, dedication, or other factors of agency performance.

As shown in Figure 2.10, the average first-year client bill savings widely varied across agencies, from lows of \$301 per dwelling for North East Iowa to highs of \$650 for New Opportunities and South East IA, at \$534. The statewide average savings were \$394 per dwelling.

Figure 2.11 shows the average expenditures for all households in 2007. New Opportunities reported the highest average expenditures, at \$8,999 per dwelling, and SEIDA reported the lowest average expenditure, at \$5,814. The statewide average expenditure was \$7,048 per dwelling.

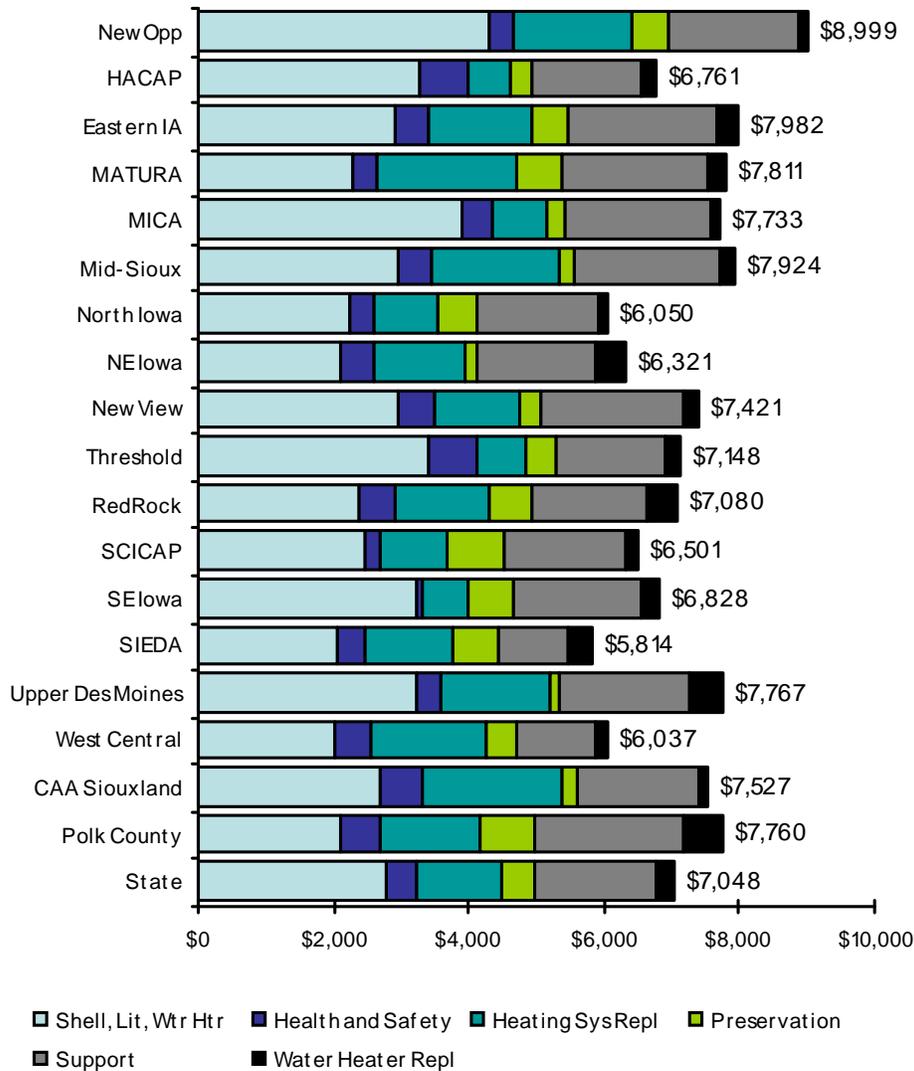


Figure 2.11 Average Spending Per Dwelling

The average installation rates, costs, and savings for energy efficiency measures for calendar year programs 2005-2007 are shown in Figures 2.12a and 2.12b. Several measures have effectively been phased out in the past years, including water heater wrap, capsylite bulbs, and waterbed mattress pads.

The percentage of dwellings receiving wall insulation has declined to 61% in CY 2007, from 66% in CY 2006 and 67% in CY 2007. Heating system replacements were installed in 51% of dwellings weatherized in CY 2007, down from 56% in the previous year. High-efficiency heating system installation rates accounted for 91% of all heating systems replacements. Refrigeration appliance exchanges declined to 37% in CY 2007 from 44% and 157% of dwellings received freezer exchanges. Water heater replacement rates increased slightly to 36% from 34% in CY 2006. Compact fluorescent bulbs were installed in 89% of dwellings in CY 2007.

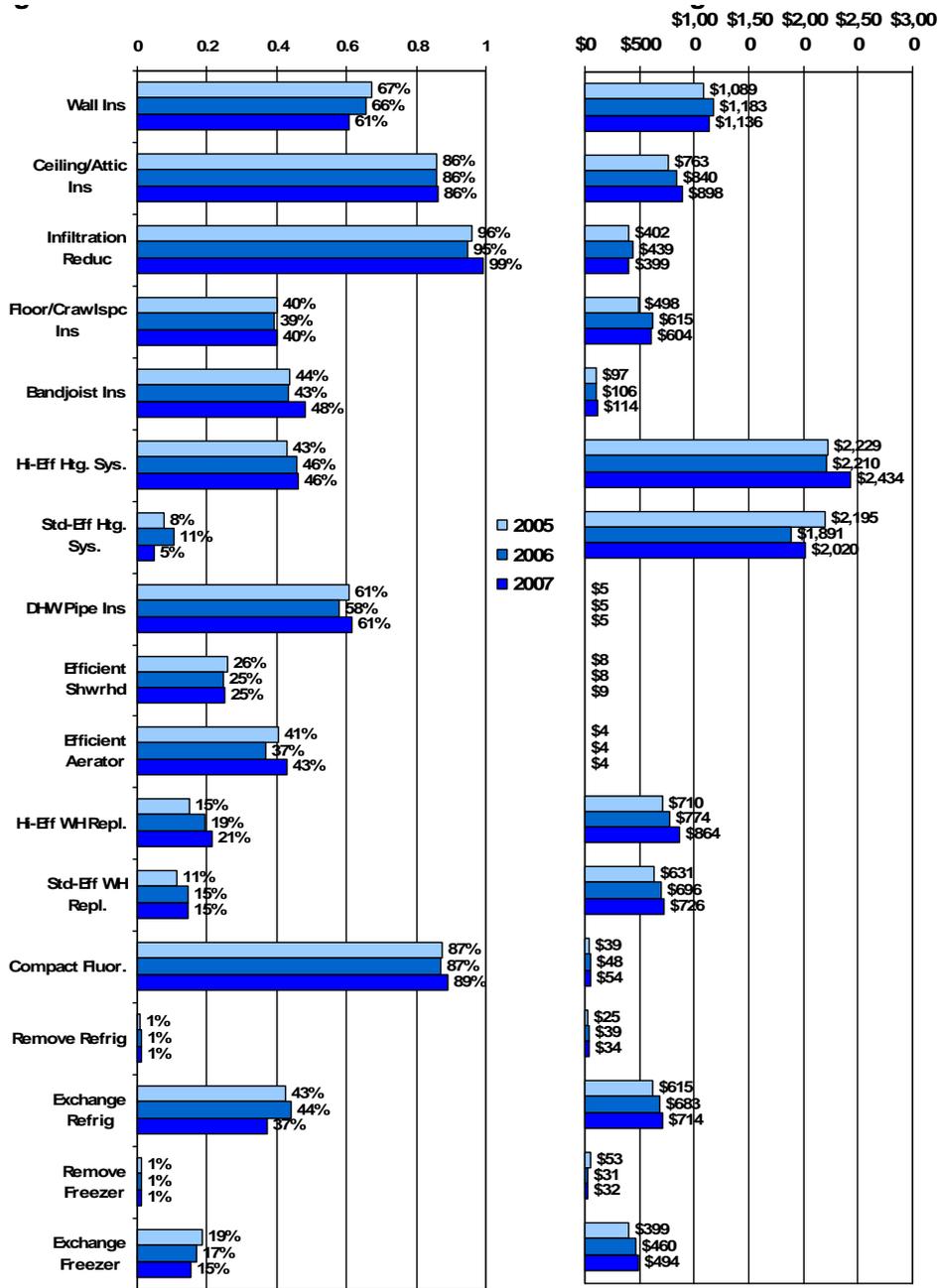


Figure 2.12a. Average Installation Rates and Measure Costs

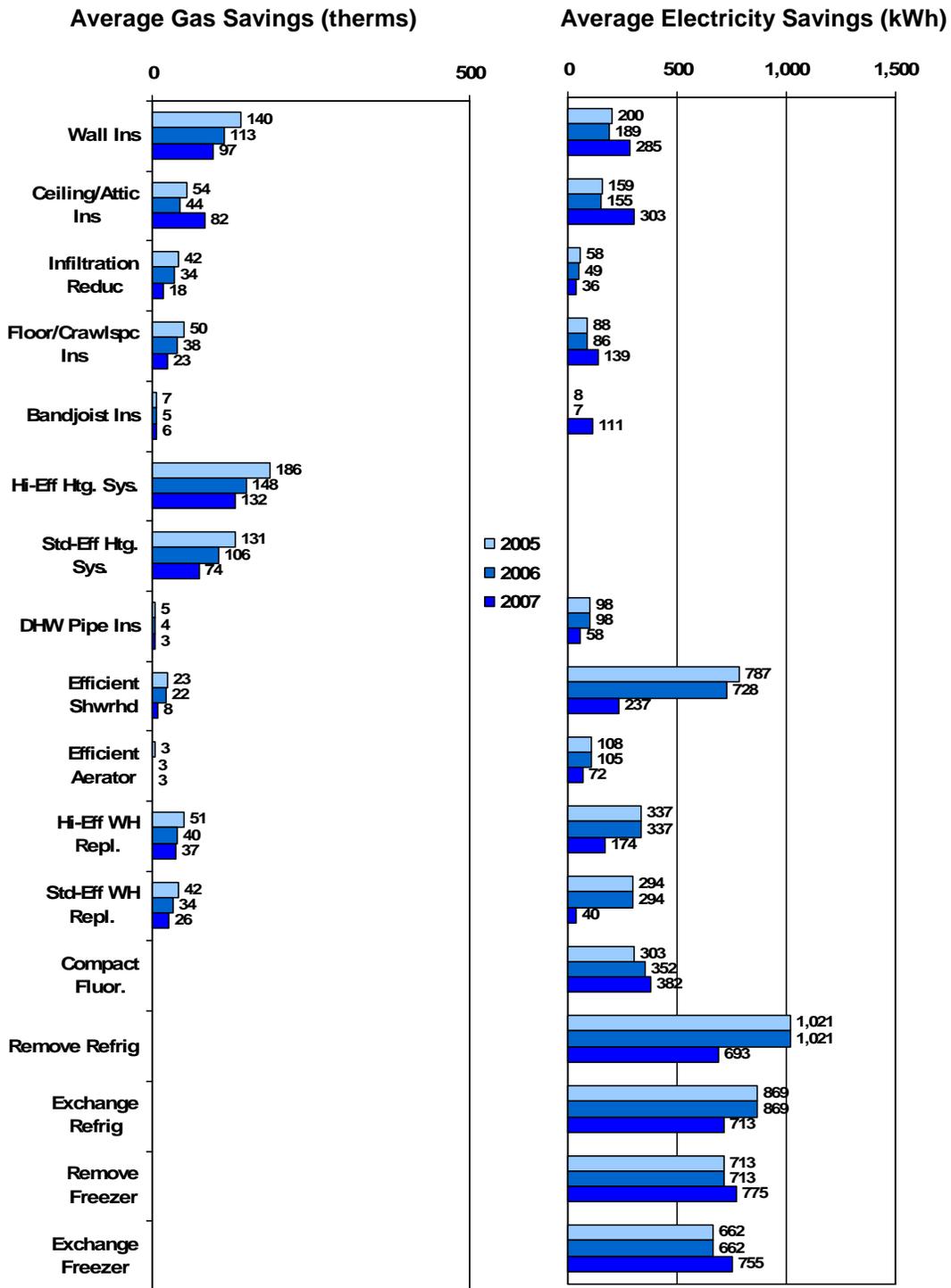


Figure 2.12b. Average Gas and Electricity Savings

Average first-year energy savings for each major measure is shown in Figures 12a and 12b. The majority of the differences in savings between CY 2007 and previous years reflect changes in the algorithms used to estimate measure-specific impacts (see Appendix B of this report).

In the revised algorithms, heating savings for ceiling/attic insulation were found to save more than previously estimated, while savings for wall and heating system replacements were lower.

In addition, electric savings from insulation increased, due largely to increases in electric cooling savings. *Note that the relatively large high average value for electric bandjoist insulation shown in Figure 2.12b reflects a total of only 3,223 kWh in 29 electrically-heated homes. Since no cooling savings were estimated for bandjoist, the average savings appears to be much greater than the actual program impact.*

The analyses conducted during the development of the revised algorithms for water heater measures indicate that savings are less than previously estimated for both natural gas and electricity. These analyses also found that freezer measure savings increased while refrigerator measures savings declined when compared to previous estimates.

Table 2.2 provides a detailed listing of the average installation rates of measures over the past 10 years.

Table 2.2. Percentage of houses receiving measures

Measure	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
<i>Insulation and Infiltration Reduction Measures</i>										
Wall Insulation	56	51	53	63	68	66	63	67	66	61
Ceiling/Attic Insulation	72	69	74	82	83	85	85	86	86	86
Floor/Crawlspace Insulation	32	29	30	33	35	36	39	40	39	40
Bandjoist Insulation	39	32	35	43	40	44	41	44	43	48
Infiltration Reduction	89	84	82	97	96	97	97	96	95	100
<i>Heating System Measures</i>										
Htg. Sys. Replacement	31	29	39	44	44	44	49	50	56	51
High Eff Htg Sys Repl	7	5	8	18	20	25	38	43	46	46
Std/Unspec Eff Htg Sys Repl	24	24	31	26	24	19	11	8	11	5
Htg. Sys. Tune and Clean	59	53	52	63	62	62	57	56	54	57
Heating System Safety Check	55	55	60	25	35	28	29	27	28	27
Heating System Ventilation										22
<i>Water Heater Measures</i>										
Water Heater Turndown	----- Not Tracked Consistently -----									45
Water Heater Wrap	15	12	10	13	10	9	6	1	0	0
Pipe Wrap	44	38	40	46	47	49	55	61	58	61
Shower Head	19	18	14	23	20	18	21	26	25	28
Faucet Aerator	31	27	27	32	33	33	33	41	37	43
Water Heater Replacement					15	19	21	26	34	36
Hi-Eff Wtr Htr Repl.					1	6	10	15	19	21
Std-Eff Wtr Htr Repl.					14	12	11	11	15	15
Water Heater Ventilation										13
Water Heater Repair	11	14	20	18	7	13	15	14	12	8
<i>Lighting Measures</i>										
Compact Fluorescent Bulbs	31	39	47	55	66	80	83	87	89	89
<i>Water Bed Mattress Pads</i>										
	1	2	2	2	1	1	1	0	0	0
<i>Refrigeration Measures</i>										
Refrigerator Removal	Na	Na	Na	1	1	2	1	1	1	1
Refrigerator Exchange	Na	Na	Na	9	31	37	40	43	44	37
Freezer Removal	Na	Na	Na	0	1	1	1	1	1	1
Freezer Exchange	Na	Na	Na	3	10	14	17	19	17	15
<i>Health and Safety (other than heating & water heating measures listed above)</i>										
CO Detector	22	24	29	33	30	34	37	38	42	50
Smoke Detector	4	5	7	0	6	9	11	11	15	17
Exhaust Ventilation	36	35	38	57	47	48	51	61	64	60
Fuses	1	0	0	0	0	0	0	0	0	0
<i>Repairs</i>	73	68	70	80	80	85	86	88	90	86
<i>Support</i>	98	98	98	100	99	94	94	92	96	96

Trends in the Installation Rates of Lighting, Refrigeration, and Heating System Replacements

We reviewed the increases in the installation rates of several measures over the past 11 years, including lighting measures, heating system replacements, and refrigeration measures. These are shown in Figures 2.13a through 2.13d.

Figure 2.13a shows the percentage of dwellings receiving at least one lighting measure for each year, beginning in 1997. Lighting was installed in 41% of dwellings in 1997; currently 89% of dwellings receive lighting from the program. Capsylite bulbs, which were initially installed in more than one-third of dwellings receiving lighting measures, were steadily phased-out as more CFL bulbs were installed: by 2002, they were essentially phased-out completely.

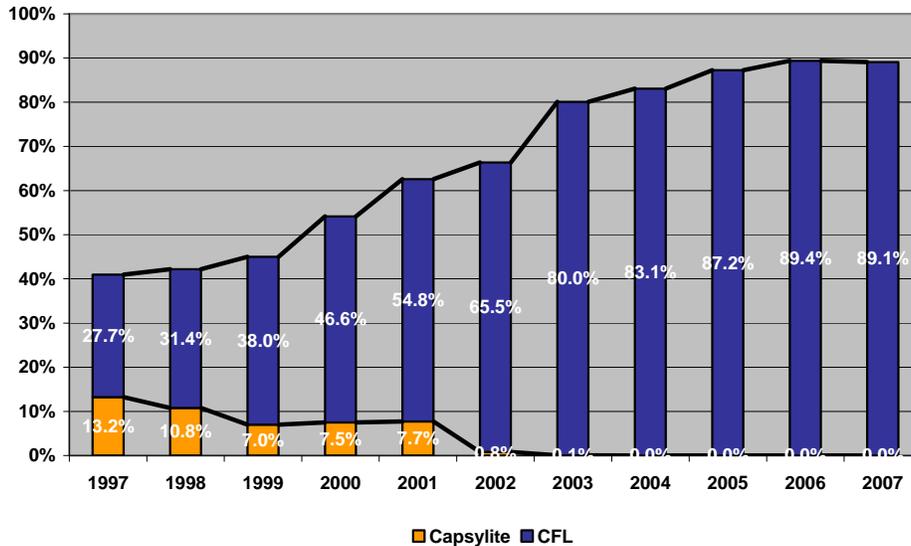


Figure 2.13a. Percentage of Dwellings Receiving at Least One Lighting Measure

The average number of bulbs installed in dwellings that received at least one lighting measure increased by 18% year-over-year, and from 3.8 bulbs in 1997 to 8.7 in 2007, a 129% increase (Figure 2.13b).

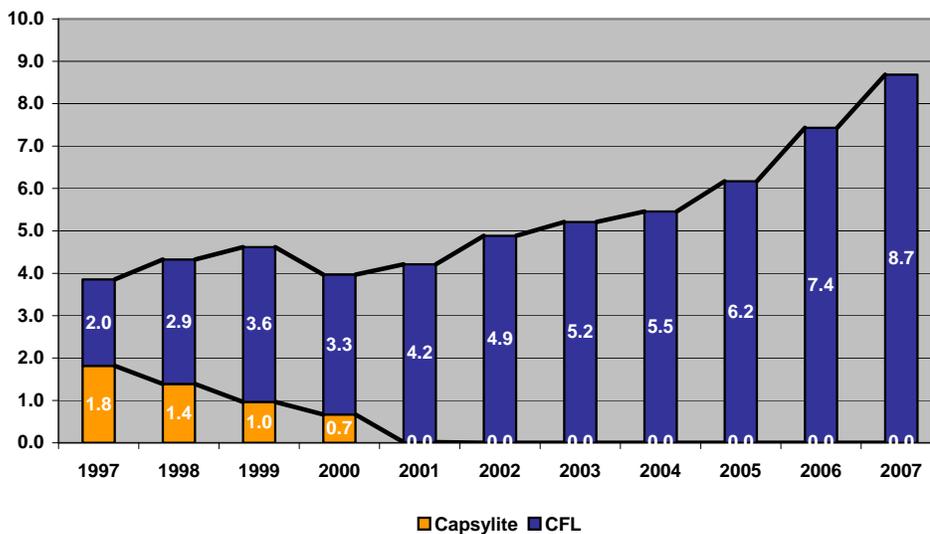


Figure 2.13b. Average Number of Bulbs Installed in Dwellings That Received at Least One Lighting Measure

Figure 13c shows the ramping up of refrigeration measure installation rates. Installation rates for all refrigeration measures declined during CY 2007, however 45% of dwellings received at least one refrigeration measure.

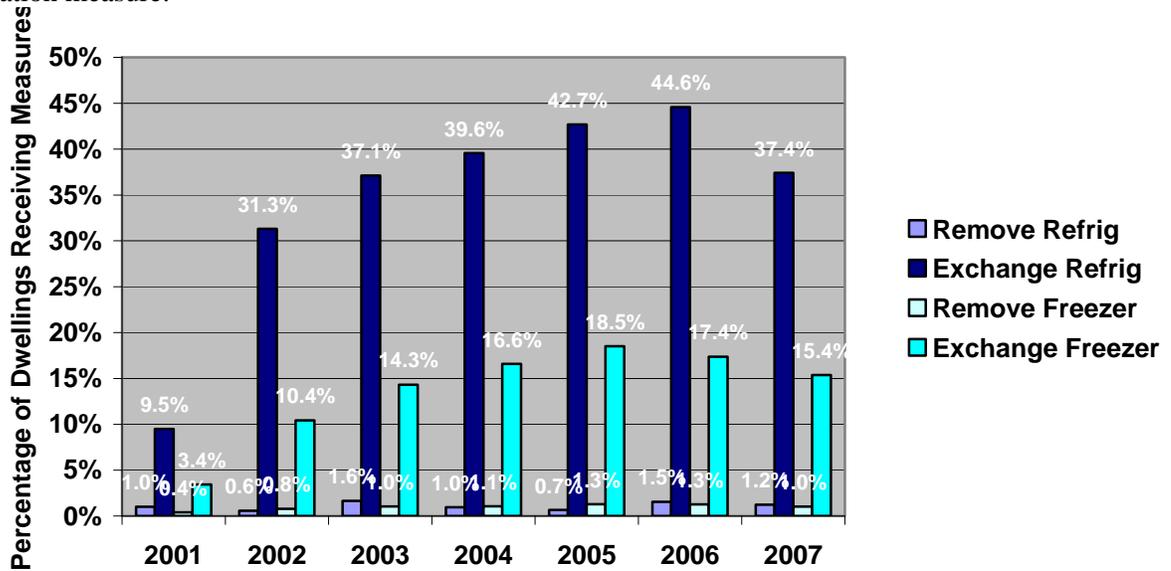


Figure 13c. Installation Rates of Refrigeration Measures

Figure 13d shows the transition away from standard (80%) efficiency furnaces to high (90+) efficiency furnaces. Overall, 51% of dwellings with natural gas heating received a heating system replacement during 2007. The installation rates of high efficiency furnaces increased slightly from 45.6% in 2006 to 46.2% in 2007, while replacement rates for standard efficiency units declined from 10.6% to 4.8%.

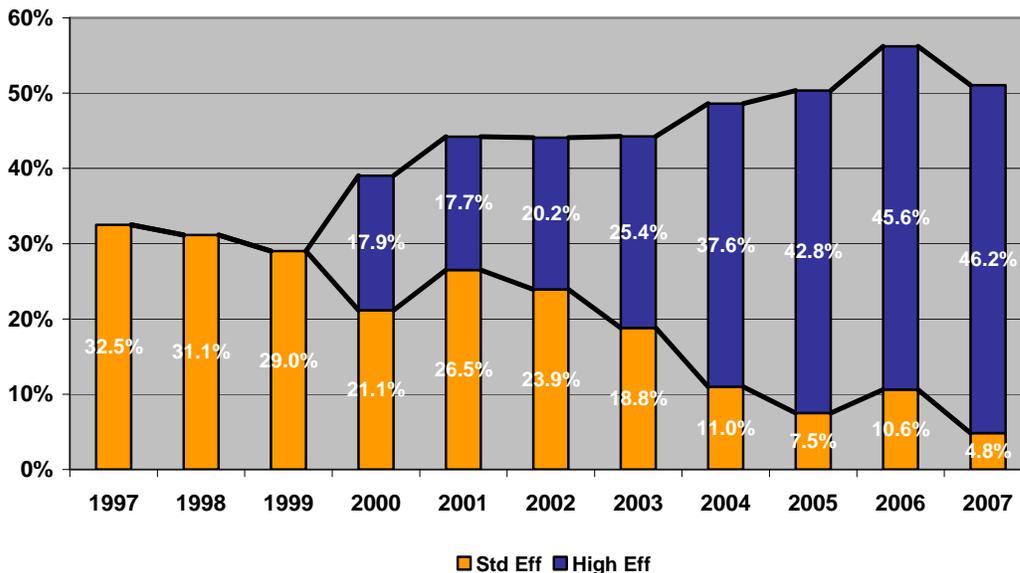


Figure 13d. Installation Rates of Natural Gas Heating System Replacements

Savings of Water Heater, Lighting, and Refrigeration Measures

Table 2.3 shows the installation rates for energy efficiency measures other than space heating or cooling. These measures include water heater (except water heater replacements which are primarily health and safety measures), lighting, and refrigeration measures.

Statewide, client bill savings averaged \$73 for these measures in 2007.

The highest average bill savings were attained by North Iowa at \$101 per dwelling and Mid-Sioux at \$97. SE Iowa had the lowest average savings for these measures, averaging \$40 per dwelling.

Table 2.3 Installation rates of non-space-conditioning measures

Agency	Water Heating			Lighting	Refrigeration				Average First Year Bill Savings
	Pipe Wrap	Eff Shower-head	Eff Faucet Aerator	Compact Fluor	Ex-change Refrig	Ex-change Freezer	Remove Refrig	Remove Freezer	
1 New Opp	81%	0%	0%	97%	44%	16%	6%	3%	\$78.16
2 HACAP	1%	16%	11%	94%	33%	9%	2%	0%	\$67.50
3 Eastern IA	45%	47%	61%	90%	32%	9%	0%	0%	\$84.76
4 Matura	61%	34%	58%	97%	42%	5%	3%	0%	\$65.06
5 MICA	88%	47%	88%	94%	22%	21%	0%	0%	\$65.17
6 Mid-Sioux	72%	14%	36%	98%	39%	27%	2%	3%	\$97.38
8 North Iowa	81%	46%	77%	94%	51%	34%	6%	9%	\$100.76
9 NE Iowa	78%	0%	0%	83%	43%	20%	3%	1%	\$68.81
10 New View	1%	26%	39%	97%	51%	11%	1%	0%	\$87.31
11 Threshold	92%	65%	87%	89%	34%	21%	3%	0%	\$73.53
Redrock	14%	10%	8%	94%	49%	6%	0%	2%	\$56.93
13 SCICAP	13%	45%	77%	77%	23%	23%	0%	0%	\$68.42
14 SE Iowa	80%	0%	0%	74%	35%	10%	0%	0%	\$40.33
15 SIEDA	79%	40%	31%	68%	53%	25%	0%	0%	\$91.52
16 Upper Des Moines	86%	0%	43%	91%	41%	22%	0%	0%	\$70.45
17 West Central	76%	40%	79%	90%	16%	4%	1%	1%	\$57.14
18 CAA Siouxland	65%	14%	1%	97%	35%	15%	0%	0%	\$82.21
20 Polk County	75%	19%	42%	91%	40%	5%	0%	0%	\$53.49
State	61%	28%	43%	89%	37%	15%	1%	1%	\$72.74

(1) First-year household bill savings are averages of total water heater, and lighting households that received the measures.

Table 2.4 shows details of the average installed costs for each measure over the past 10 years of the joint program (average costs are computed for households that received the specific measures, not across all households treated by the program.) The most notable change in cost is for heating system and water heater replacements: high-efficiency furnace replacement costs increased by 10%, standard efficiency replacements increased by 7%, and high-efficiency water heater replacements increased by 12%. On balance, insulation and infiltration reduction measure costs were unchanged when taken together, some increasing while others decreased approximately the same magnitude. The average costs of refrigerator and freezer exchanges increased by 4% and 7%, respectively.

Table 2.4 Average measure costs

Measure	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Recent Year Change (%)
<i>Insulation and Infiltration Reduction Measures</i>											
Wall Insulation	826	846	831	871	875	919	1017	1089	1183	1136	-3.9%
Ceiling/Attic Insulation	558	573	592	631	684	664	698	763	840	898	6.9%
Infiltration Reduction	248	264	281	294	340	342	353	402	439	410	-6.7%
Floor/Crawlspace Insulation	350	408	407	421	423	391	474	498	615	600	-2.4%
Bandjoist Insulation	75	79	77	82	81	79	85	97	106	113	7.3%
<i>Heating System Measures</i>											
Hg. Sys. Replacement											
High Eff Htg Sys Repl	1,830	2,059	1,959	2,063	2,129	2,103	2,160	2,229	2,212	2,434	10.1%
Std/Unspec Eff Htg Sys Repl	1,712	1,751	1,781	1,727	1,696	1,872	1,965	2,195	1,891	2,020	6.8%
Htg. Sys. Tune and Clean	77	80	75	77	82	80	81	85	90	89	-0.9%
Heating System Safety Check	53	119	144	266	69	75	97	77	82	89	9.0%
Heating System Ventilation	Not Separately Tracked									132	-NA-
<i>Water Heater Measures</i>											
Water Heater Wrap	19	19	18	18	17	16	18	39	0	0	-NA-
Pipe Wrap	6	7	6	7	7	7	6	5	5	5	3.0%
Shower Head	8	8	7	29	8	7	8	8	8	8	0.9%
Faucet Aerator	5	5	5	5	5	5	5	4	4	4	-1.8%
Water Heater Replacement											
Hi-Eff Wtr Htr Repl.					816	521	615	710	774	864	11.7%
Std-Eff Wtr Htr Repl.					422	444	554	631	696	726	4.3%
Water Heater Ventilation	Not Separately Tracked									151	-NA-
Water Heater Repair	252	265	240	328	85	137	143	140	145	130	-10.4%
<i>Lighting Measures</i>											
CFL Bulbs (avg spent per home)	70	66	58	62	74	48	48	39	48	54	12.1%
<i>Refrigeration Measures</i>											
Refrigerator Removal	Na	Na	Na	43	31	28	23	25	39	33	-16.0%
Refrigerator Exchange	Na	Na	Na	589	588	591	596	615	683	713	4.4%
Freezer Removal	Na	Na	Na	40	31	30	23	53	31	32	4.2%
Freezer Exchange	Na	Na	Na	410	397	386	396	399	460	494	7.2%
<i>Health and Safety (other than heating & water heating measures listed above)</i>											
CO Detector	56	55	51	50	53	53	53	53	53	50	-5.3%
Smoke Detector	31	33	25	0	25	29	31	30	31	29	-6.3%
Exhaust Ventilation	74	73	79	187	89	116	128	191	229	250	9.0%
Fuses	35	35	28	0	23	33	20	68	55	34	-38.5%
Repairs	298	292	279	296	275	318	420	461	503	546	8.5%
Support	709	690	699	754	1,178	1,405	1,584	1,734	1,855	#N/A	#N/A

Note: Kneewall insulation was reported with wall insulation prior to 2007, it is now bundled with Ceiling/Attic Insulation

Average Costs of Major Measures by Agency

Figures 2.14-2.17 show the agency-specific average costs for ceiling, wall, and floor/crawlspace insulation and furnace replacements for the overall program and for utility-funded measures only. These costs represent the total expenditures for these measures averaged over the number of households that received the measure (as opposed to an average across all households that were treated by the agency).

Ceiling Insulation Expenditures

Figures 2.14a and 2.14b show the average installed costs for open-blown ceiling insulation. The statewide average cost for ceiling insulation was \$898 in 2007 as compared to \$837 in 2006.

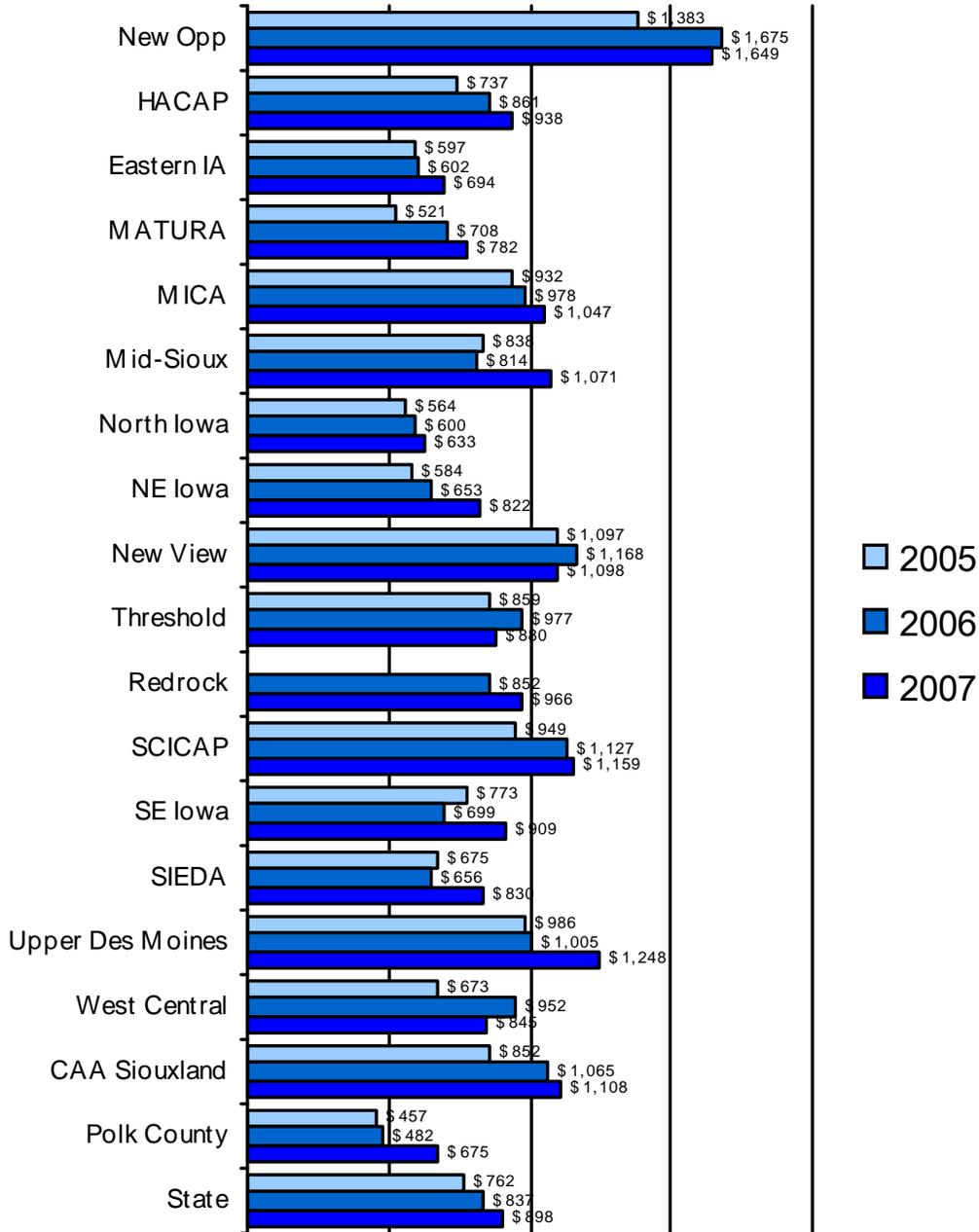


Figure 2.14a Average Cost of Ceiling Insulation (Nominal Dollars Per Dwelling)

New Opportunities had the highest average expenditure at \$1,649 per dwelling far greater than the next highest (Upper Des Moines at \$1,248). Three agencies, North Iowa, Polk County, and Eastern IA spent the least, averaging \$633, \$675, and \$694 per dwelling, respectively.

Figure 2.14b shows the statewide average expenditure of *utility funds* on ceiling insulation was \$760 in 2007. New Opportunities had the highest average average expenditures at \$1,803; the next highest average expenditure was for Upper Des Moines at \$1,008. North Iowa had the smallest average expenditure of utility funds on ceiling insulation (\$598).

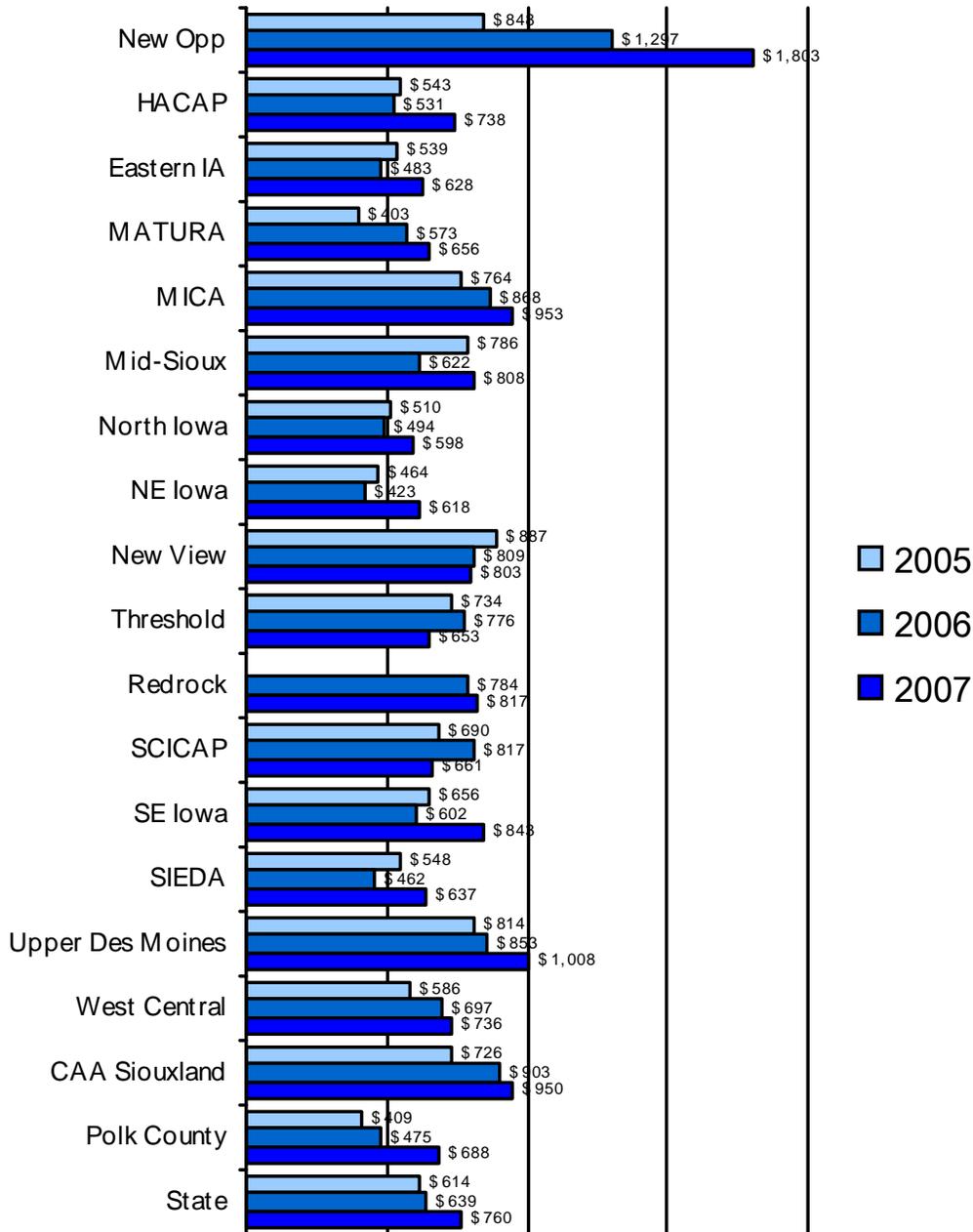


Figure 2.14b Average Cost of Ceiling Insulation, Utility Expenditures (Nominal Dollars Per Dwelling)

Wall Insulation Expenditures

Figures 2.15a and 2.15b show the average installed costs for wall insulation. The overall average expenditure for wall insulation decreased from \$1,182 in CY 2006 to \$1,136 in 2007. New Opportunities had the highest average expenditures at \$1,830, with HACAP and Threshold spending \$1,588 and \$1,521, respectively. SIEDA spent the least, averaging \$555, followed by West Central at \$602.

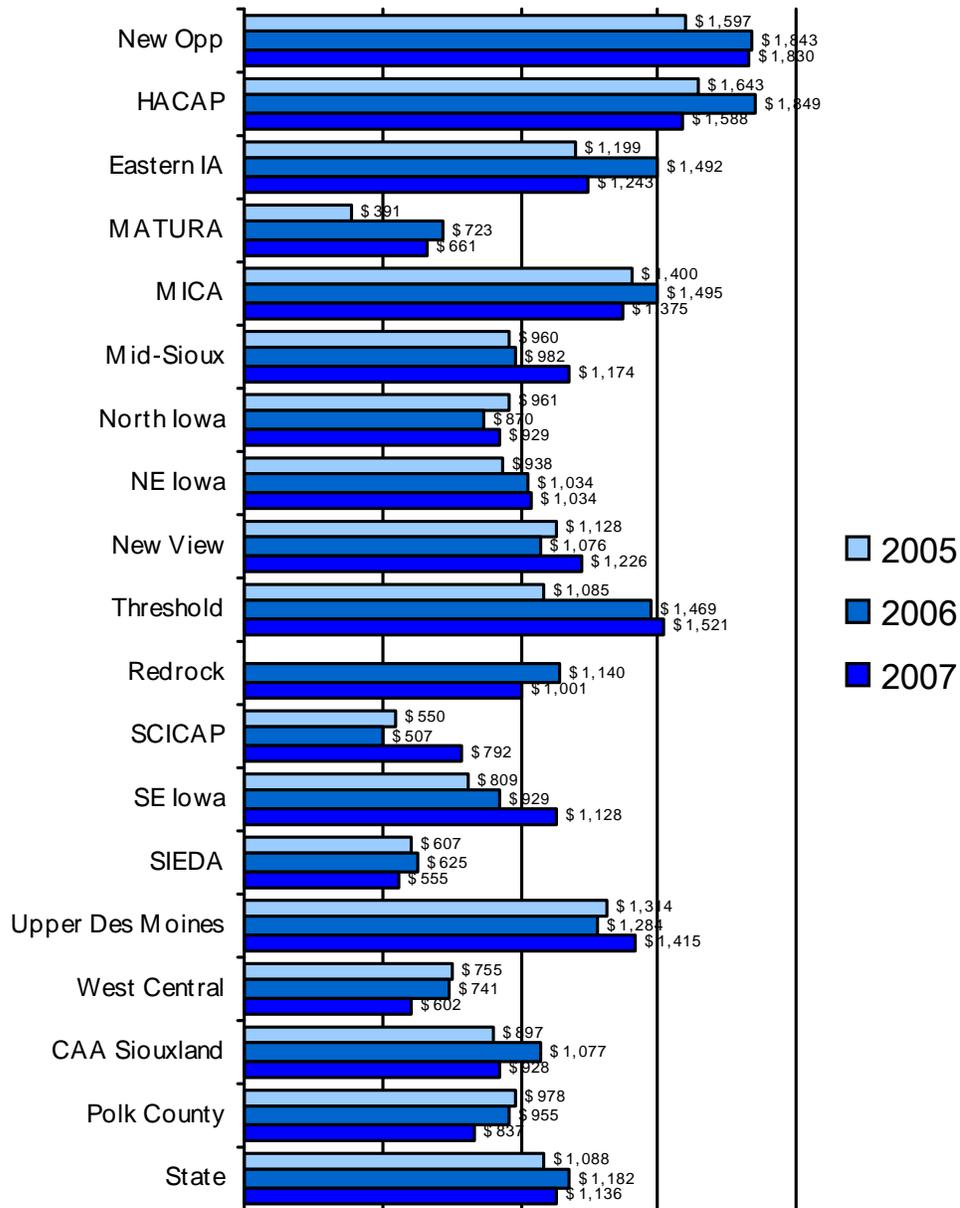


Figure 2.15a Average Cost of Wall Insulation (Nominal Dollars Per Dwelling)

Statewide, the average expenditures for *utility-funded* wall insulation increased year-over-year, from \$965 to \$1,003. New Opportunities' average expenditure was highest at \$1,518 per dwelling followed by Threshold and MICA, at \$1,338 and \$1,325 respectively. SIEDA, SCICAP, and West Central each averaged less than an average of \$500 for utility-funded wall insulation expenditures in 2007, at \$417, \$450, and \$466, respectively.

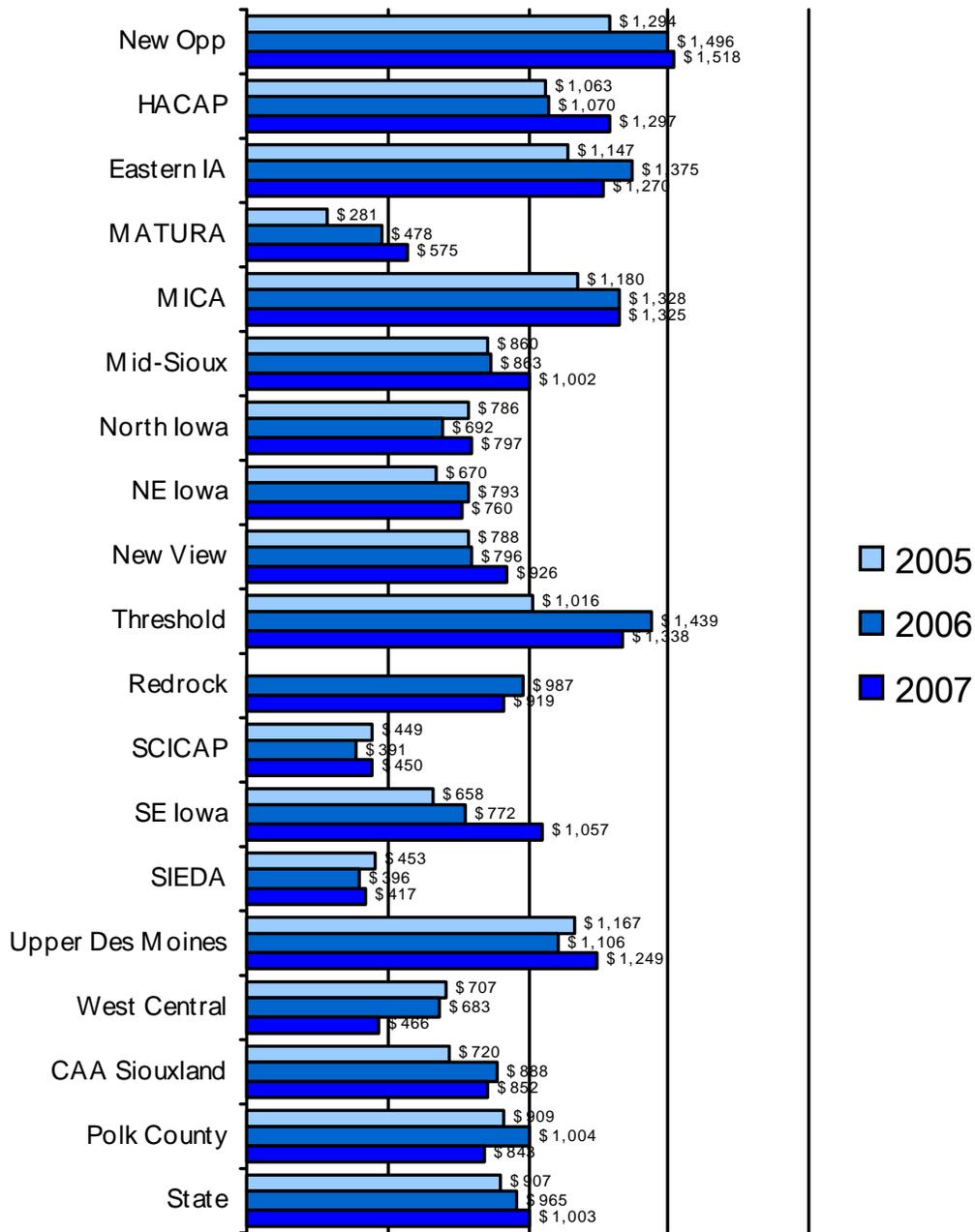


Figure 2.15b Average Cost of Wall Insulation, Utility Expenditures (Nominal Dollars Per Dwelling)

Floor/Crawlspace Insulation

Figures 2.16a and 2.16b show the average expenditures for floor/crawlspace insulation for CY 2005-7. Statewide, the cost for floor/crawlspace insulation averaged \$600, a slight decrease from \$615 in 2006. HACAP had the highest average expenditures, at \$1,200. At \$169 per dwelling, North Iowa spent the least.

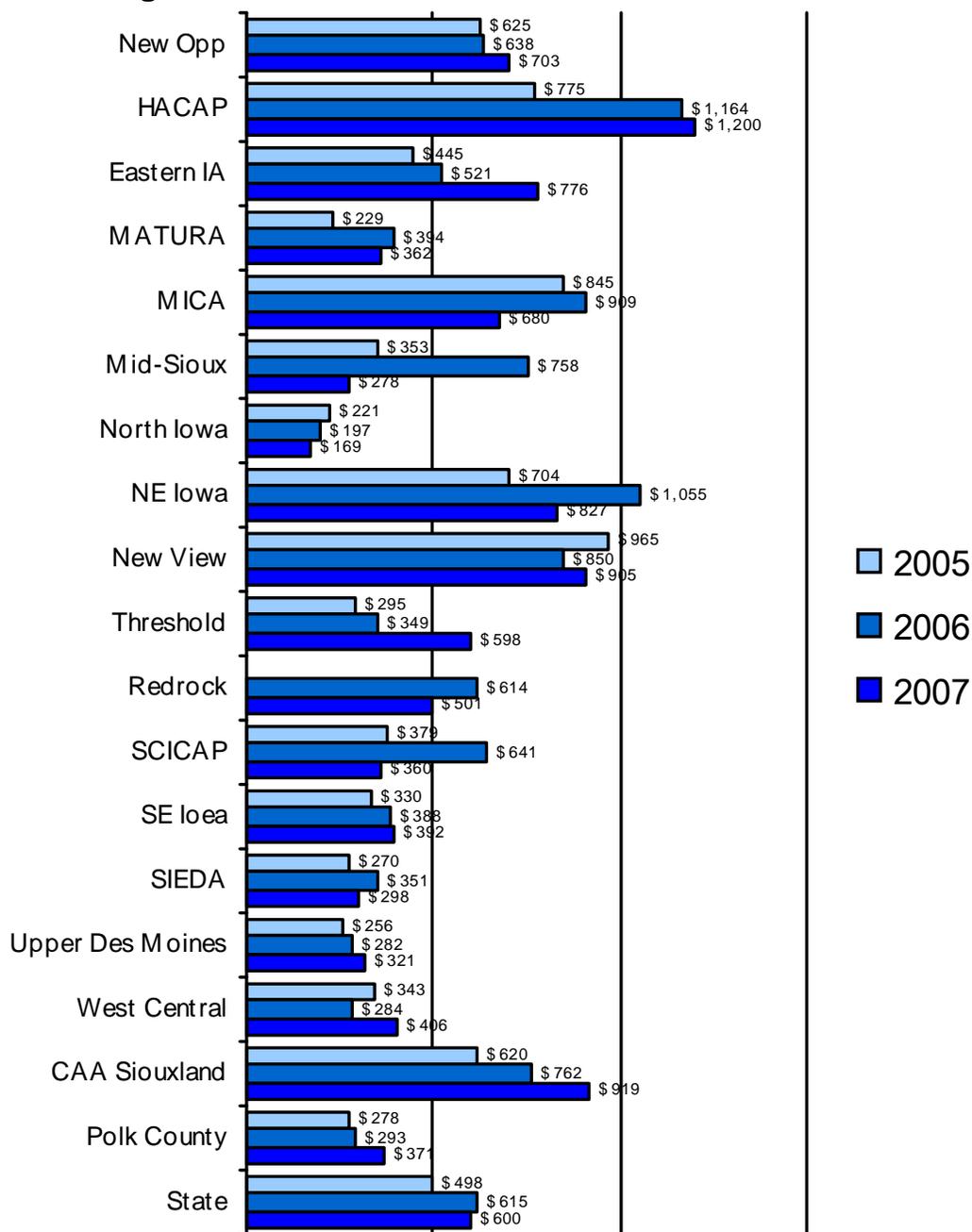


Figure 2.16a Average Cost of Floor/Crawlspace Insulation (Nominal Dollars Per Dwelling)

Statewide, the average expenditure of utility funds for floor/crawlspace insulation was \$497. HACAP averaged the highest at \$964 per dwelling, followed by MICA at \$863. North Iowa and SCICAP each averaged less than \$200 per dwelling, at \$162 and \$182, respectively.

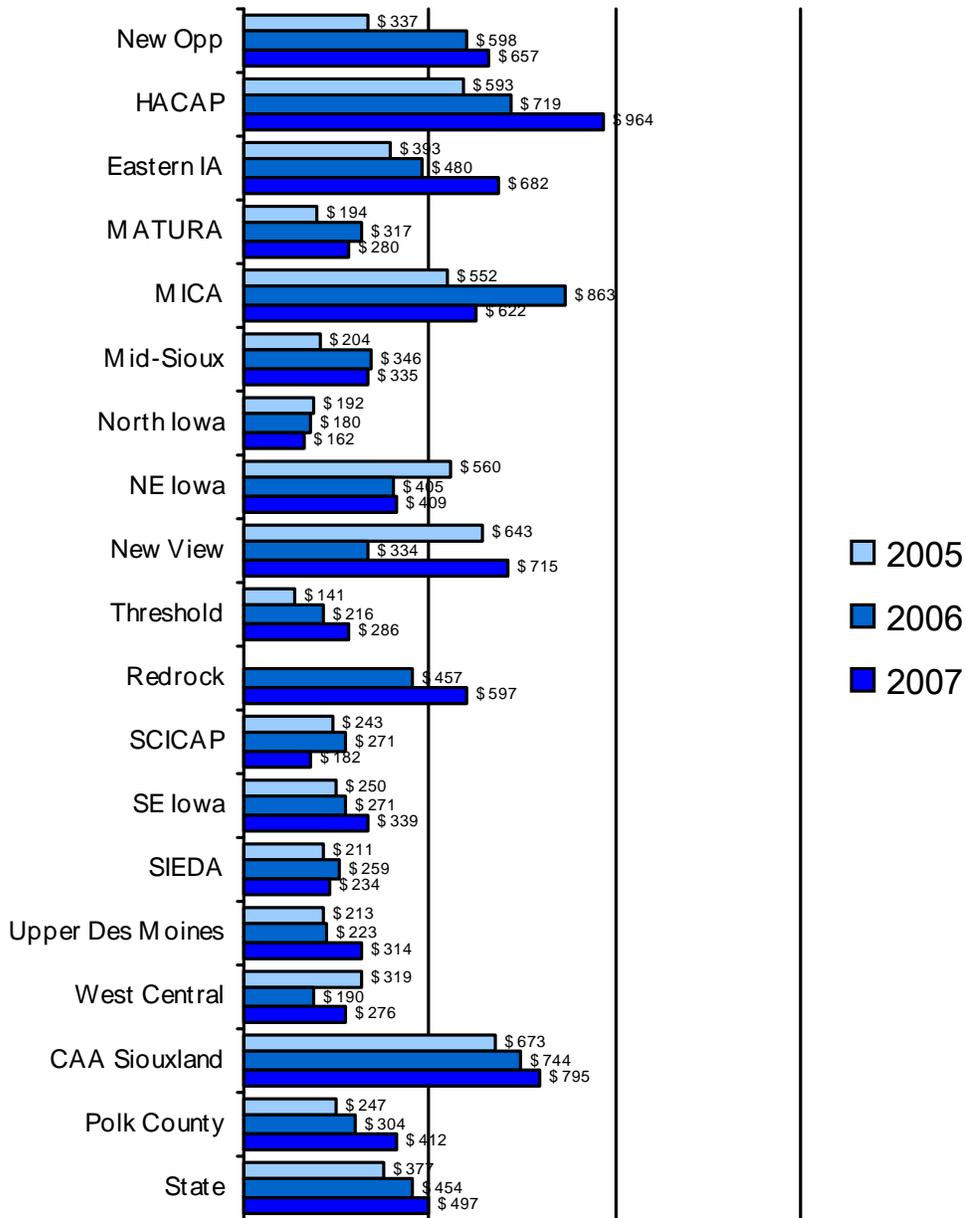


Figure 2.16b Average Cost of Floor/Crawlspace Insulation, Utility Expenditures (Nominal Dollars Per Dwelling)

Furnace Replacement Expenditures

Figures 2.17a and 2.17b show average expenditures for furnace replacements. Statewide average furnace replacement costs increased to \$2,405 in 2007 from \$2,303 the previous year (Figure 2.17a). On average, CAA Siouxland, New Opportunities, and Eastern Iowa spent in excess of \$2,900 per dwelling. HACAP, MICA, North Iowa, and SE Iowa each spent less than \$2,000 on average.

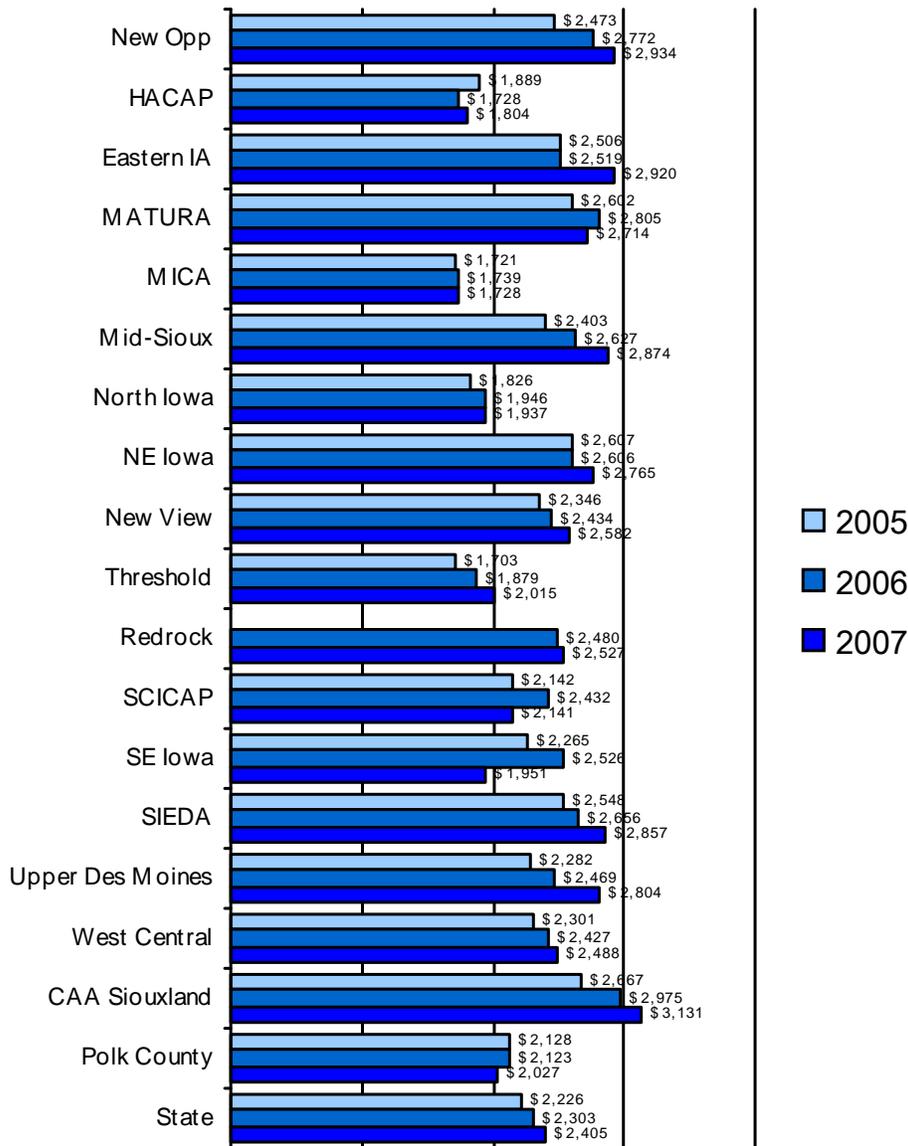


Figure 2.17a Average Cost of Heating System Replacements (Nominal Dollars Per Dwelling)

All agencies reported *utility-funded* furnace replacements for households with weatherization completed during that year. Figure 2.17b shows the average utility funding for replacement heating systems, which averaged \$2,087 statewide. New Opportunities, Eastern IA, Upper Des Moines, and CAA Siouxland each averaged more than \$2,400 on utility expenditures for heating system replacements. On the lower end, HACAP and North Iowa averaged less than \$1,700 for utility-funded heating system replacements.

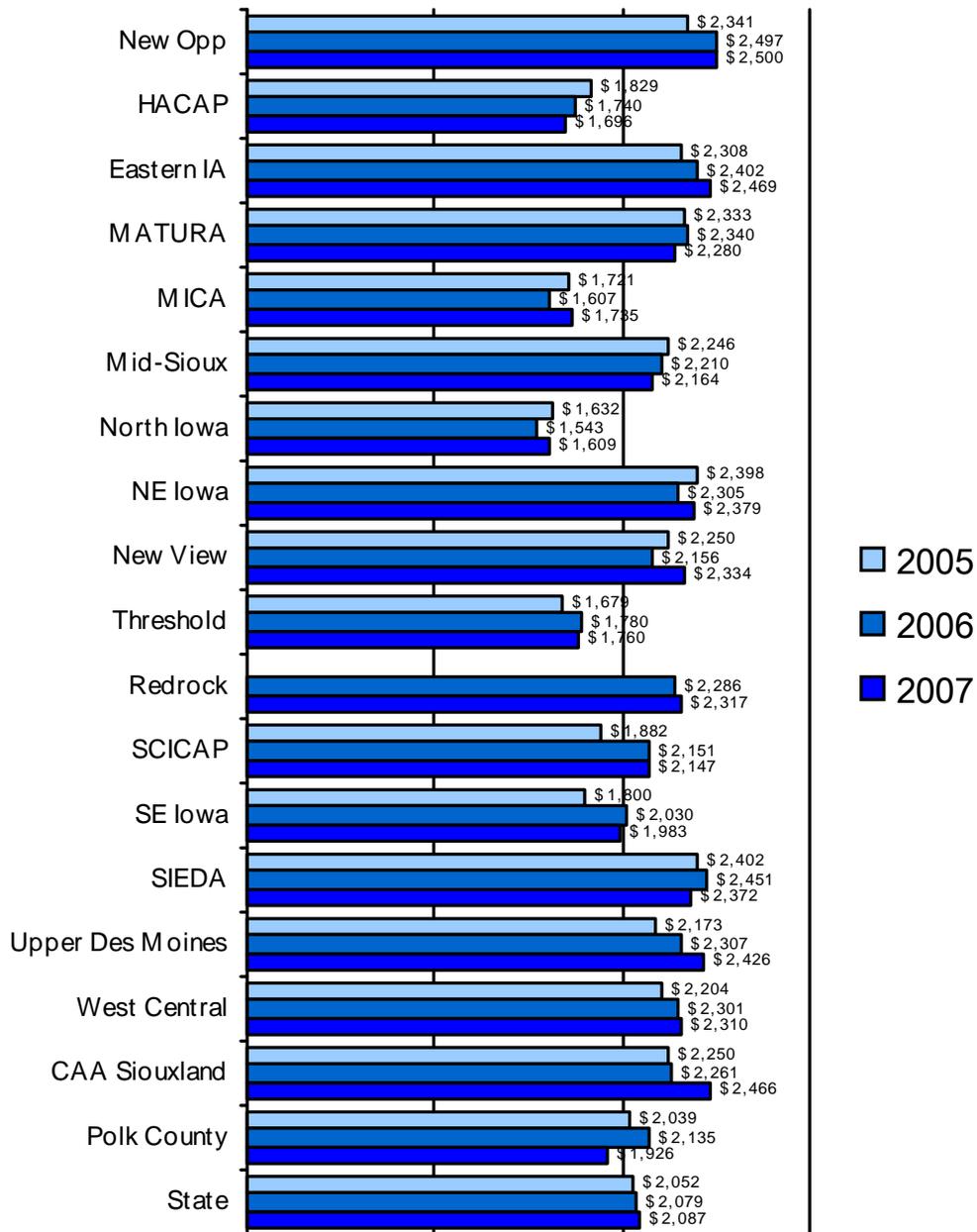


Figure 2.17b Average Cost of Heating System Replacements, Utility Expenditures (Nominal Dollars Per Dwelling)

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3. FUEL CONSUMPTION ANALYSIS AND ASSESSMENT OF AGENCY-LEVEL SAVINGS ADJUSTMENT FACTORS

The 1997 WAP report prompted a change in the methodology for estimating program savings. That study discussed the potential error from summarizing agency-level results from the SLICE-algorithm estimates, which were designed for state-level and utility-level reporting. The revised methodology incorporates agency-level adjustment factors for estimated natural gas savings. The adjustment factors are developed annually using weather-normalization analysis of client fuel consumption histories.

Fuel Consumption Analysis of Natural Gas Impacts

For this study, we developed adjustment factors for each agency using observed savings from a weather-normalization analysis of natural gas clients with dates of completion from January 1, 2007 to December 31, 2007. These adjustment factors were applied to estimated natural gas, propane, and fuel oil heating and insulation measures, and to natural gas and propane water heater measures.

We used a comparison group to adjust for non-program factors that could affect energy consumption. We assessed savings for a group of clients with similar characteristics to our treatment group, and netted the change in consumption from this comparison group from the WAP client group savings. In order to assess a change in consumption for the comparison group, we established a pseudo-treatment period for each comparison group household by assigning the same period as that of a randomly selected household from the treatment group.

Our comparison group consisted of all LIHEAP clients who were natural gas customers of the SLICE utilities and who applied for energy assistance from October, 2007 through March, 2008. The purpose of the comparison group is to account for all non-weatherization program factors that affect fuel usage: examples are fuel price shocks, naturally-occurring conservation, and participation in other energy programs. The comparison group should be drawn from a sample of homes that are representative of the treatment group. Many energy evaluations use a comparison group that is composed of future weatherization participants – this essentially delays an assessment of impacts by a full year. The Iowa utilities require a more timely assessment of impacts, and consequently we use the population of LIHEAP (low income clients) that will be used to select the following year program. The energy consumption tends to be lower for this group – consequently we weighted each comparison group dwelling in five usage bins so that our consumption of the weighted comparison group was similar to our treatment group.

Methodology

We assessed impacts for changes in natural gas consumption using the methodology reported in detail in previous studies. Pre- and post-weatherization gas consumption was weather-normalized using weather data from the same ten weather zones used in previous studies (Figure 3.1). Our long-term normal datasets for this year's analysis was updated to the 10-year period ending in Dec, 2007.

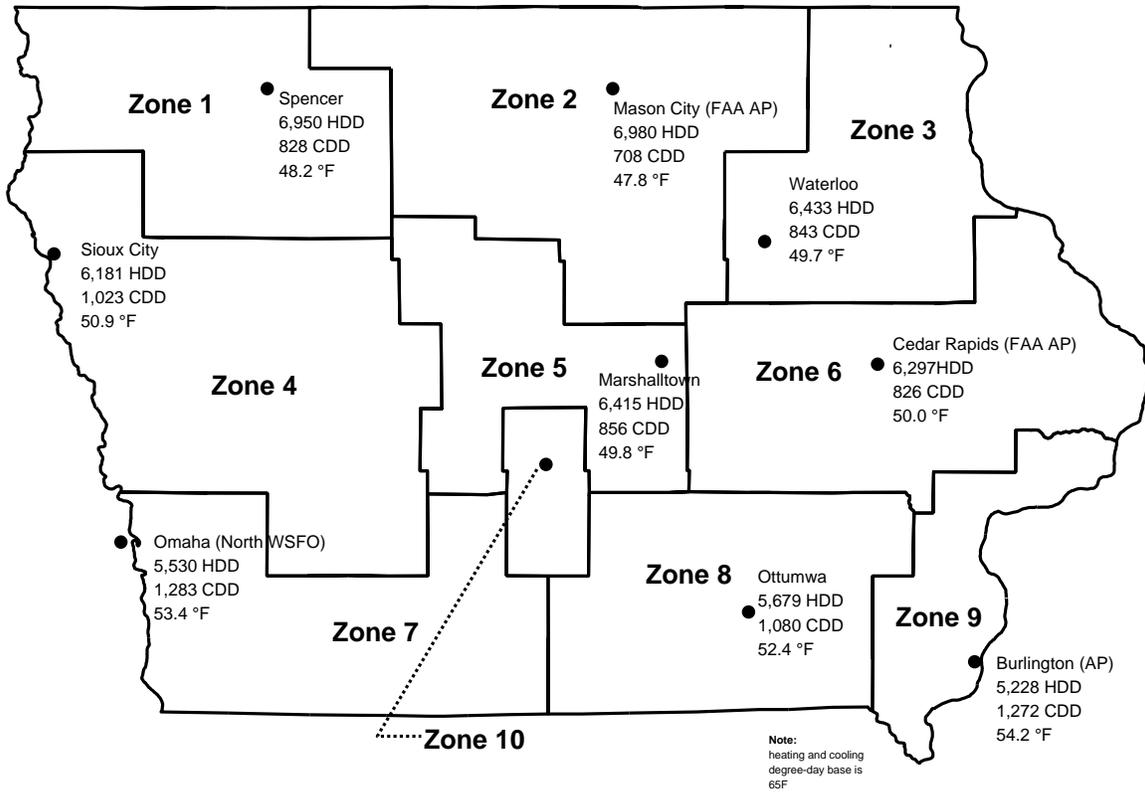


Figure 3.1. Weather zones used in the weather-normalization

Study Sample

Of 1,652 weatherization client households with gas heating, we had pre- and post-billing data for 1,200. In addition, we had pre- and post-billing data for 26,403 comparison group dwellings. The normalization models were screened to include only those dwellings overall model was significant at 97.5% (F-test)³ and a 't value' of at least 2.0 for heating slopes on both the pre- and post-normalization models. Additionally, we required the heating period in the model to include no less than 40% of the heating season degree days, and removed dwellings with normalized annual consumption in the upper and lower 1% for each of the treatment and comparison groups. Our analysis set after screening included 737 WAP client dwellings and 24,623 comparison group dwellings (LIHEAP clients).

Results

Our results are summarized in Table 3.1. The agency-specific results are summarized on each line, with the overall program impacts summarized on the bottom line. The column labeled 'Population' provides the count of all dwellings with natural gas heating that were treated by the weatherization program during the calendar year. The treatment group columns indicate the number of dwellings in our screened analysis dataset ('n'), the weather-normalized annual consumption prior to weatherization ('Baseline' consumption), the 90% confidence interval on the baseline consumption (interpreted as the variation from baseline for which we are 90% certain that the true mean value of the baseline consumption falls within), the unadjusted savings ('Savings') and the 90% confidence interval on the savings.

³ A t-value of 2.0 indicates 90% confidence on the regression coefficient. The F-test is the ratio of the variance of the model explained by the regression model to the variance of the residuals (the portion not explained by the model). When used for prediction purposes, the significance of the F-test should be approximately 4 times greater than what would be accepted for a valid model. In our case, 90% confidence would be considered acceptable for a valid model (uncertainty of 10%), 97.5% confidence (uncertainty of 2.5%) is considered acceptable for predictions based upon the model.

We show a similar range of values for the comparison group, however there are some differences. The ‘Unweighted Baseline’ provides a value that does not weight each dwelling according to annual consumption. The ‘Weighted Baseline’ applies the weighting factors, resulting in a value that is approximately the same as the Baseline Consumption for the Treatment Group.

The next section of Table 3.1 shows the comparison-group adjusted savings and percentage savings, each with 90% confidence intervals. The rightmost section summarizes our estimated savings for the Treatment Group, and the realization rate. The realization rate is defined as the ratio of observed savings to estimated savings. By adjusting our estimated savings for natural gas with these realization rates, we help assure that savings reported for each agency are approximately correct.

The overall adjusted savings averaged 236 therms per dwelling. The 90% confidence interval was 14 therms, meaning that we are 90% certain that the true population mean savings falls in the range of 244 therms and 228 therms. The overall percentage savings was 23.2%, with a 1.2% confidence interval. The baseline consumption of weatherized dwellings was 1,016 therms per year. The unweighted baseline consumption of the comparison group was 784 therms, however the weighted baseline consumption was 992 therms – this compares very well with the baseline of the treatment group (1,016 therms) and essentially validates that our weighting procedures effectively adjusted for major differences in the treatment and comparison groups.

Table 3.1 Fuel Consumption Analysis Results

	Population n (with gas heating source)	Treatment Group				Comparison Group														
		Baseline Cons. n	90% CI	Savings (therms)	90% CI	Un- weighted Baseline Cons. n	Weighted Baseline Cons. (therms)	Weighted 90% CI	Weighted Savings (therms)	90% CI	Adjusted Savings (therms)	90% CI	Percent Savings (%)	90% CI on Pct Savings (%)	Unadjusted Savings (therms)	90% CI	Realization Rate (%)	90% CI on RR (%)		
Agency																				
New Opportunities	23	8	1,190	169	377	154	940	782	1,016	17	10	7	377	145	31.4	12.0	396	36	95.9%	40.0%
HACAP	204	33	876	67	242	58	2,256	747	858	10	19	5	221	58	25.1	6.2	228	44	97.1%	20.2%
Eastern IA	165	83	952	65	256	41	2,759	772	950	11	32	4	218	39	23.2	3.3	287	32	76.0%	10.5%
MATURA	34	10	1,102	218	404	137	349	808	1,041	34	32	14	388	123	33.9	7.1	324	76	119.5%	20.6%
MICA	112	48	1,107	86	341	56	1,298	760	1,076	15	30	7	309	52	28.3	4.0	294	40	105.2%	13.4%
Mid-Sioux	40	10	1,090	125	364	99	529	771	1,002	23	33	10	308	106	27.7	9.7	392	98	78.2%	15.4%
North Iowa	140	91	1,052	50	226	36	1,301	811	1,007	12	18	6	207	36	19.7	3.1	316	24	65.6%	9.1%
NE Iowa	69	26	955	100	200	75	1,049	800	949	14	13	7	175	71	18.5	6.5	215	42	82.1%	34.2%
New View	67	30	1,135	104	251	72	1,277	790	1,140	15	26	8	213	64	18.9	4.8	305	37	70.1%	21.2%
Threshold	87	34	1,048	104	232	62	1,477	811	1,039	15	16	6	220	62	20.9	5.1	298	43	74.0%	17.9%
Redrock	41	20	1,122	107	214	94	590	755	1,077	21	32	10	185	93	16.6	8.1	229	46	80.4%	36.2%
SCICAP	6	3	1,022	394	285	55	380	743	988	33	28	11	225	18	23.7	7.5	294	82	77.8%	15.2%
SE Iowa	104	40	1,298	89	456	74	641	778	1,223	19	28	10	419	69	32.7	4.8	374	51	112.2%	13.8%
SIEDA	117	74	749	53	142	32	1,353	759	751	13	0	5	144	33	19.2	3.9	152	20	94.5%	16.8%
Upper Des Moines	76	35	1,138	103	281	70	1,979	828	1,090	12	15	6	262	66	22.9	5.4	407	49	64.5%	15.4%
West Central	110	75	1,016	63	260	45	1,851	766	985	13	16	6	243	42	23.8	3.9	246	26	99.0%	13.8%
CAA Siouxland	68	35	976	77	224	49	1,499	798	957	13	15	6	208	47	21.5	4.8	244	34	85.2%	13.5%
Polk County	189	82	1,015	57	227	38	880	741	972	17	22	8	206	37	20.4	3.5	289	25	71.3%	11.0%
Overall	1,652	737	1,016	21	254	14	24,623	784	992	3	19	1	236	14	23.2	1.2	280	10	84.0%	4.1%

Importance of Targeting High Users

In previous studies we have emphasized the importance between savings and pre-weatherization energy consumption: in general, higher pre-weatherization consumption yields greater savings. The WAP prioritizes on energy consumption so that higher consumption dwellings are given precedence over lower consumption dwellings. In practice, the prioritization list is a guideline, and various issues arise that may cause the agency to pick a dwelling lower on the priority list.

For agencies that follow the prioritization list closely, we would expect that the average treatment group consumption to the comparison group consumption in the pre-weatherization period, and the greater the differences between the treatment and comparison group, the more effective the targeting of the highest energy users.

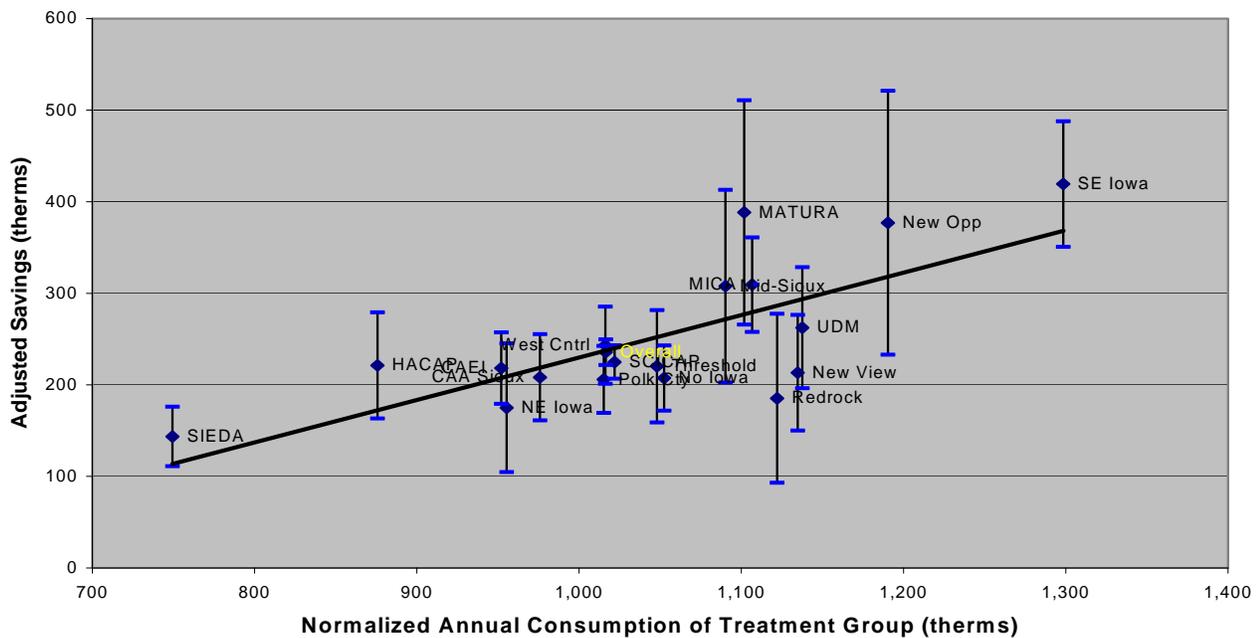


Figure 3.2 Savings in relation to the normalized annual consumption.

We plotted the relationship between savings and the difference in average energy consumption between the treatment and comparison groups in Figure 3.2. In addition we regressed a line through the groups indicated in Table 1. The 90% confidence interval on the adjusted savings is shown as the range between the upper and lower triangles for each point and signifies the range for which we are 90% certain that the true agency average savings falls within.

The chart demonstrates the potential savings that can be attained by targeting clients with the highest energy consumption. These findings affirm our previous analysis that concluded targeting the highest usage households substantially increases the average household savings.

Figure 3.3 provides another view of the benefits of targeting higher users by illustrating the relationship between baseline consumption, savings, and percentage savings. The plot shows a point for the adjusted savings for dwellings weatherized in CY 2007, and a robust regression line

through the 'cloud' of points, and an assessment of the percentage savings as determined by this regression line.

Not only do absolute savings increase as higher-consumption dwellings are targeted, but the percentage savings also increase. Percentage savings approaches 33% when baseline consumption exceeds 2,000 therms.

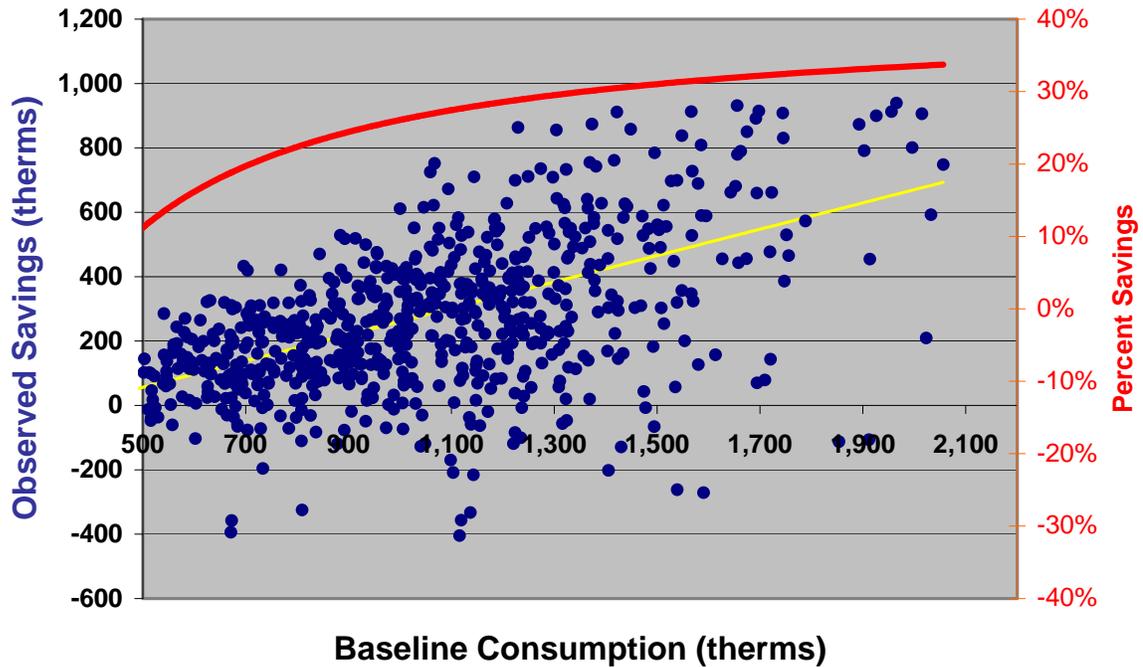


Figure 3.3. Relationship between baseline consumption, savings, and percentage savings

Decline in Average Savings

Figure 3.4 provides a yearly summary of baseline consumption, savings, and percentage savings for billing analyses conducted since the calendar year 1998 program. Baseline consumption of the treatment group has declined by 21% since 1998, and the comparison group baseline has declined by 23%. We've seen slight declines in net savings and percentage savings in recent years.

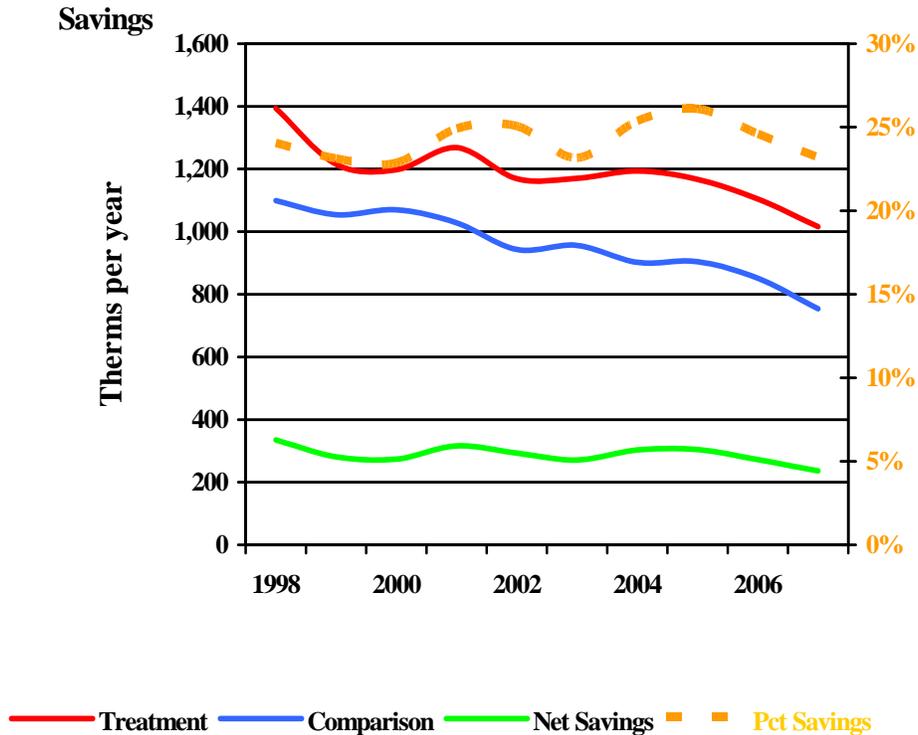


Figure 3.4 Annual Baseline, Savings, and Percentage Savings

Whereas the normalized annual consumption approached 1,400 therms per house in the CY 1998 program, it has declined to slightly over 1,000 therms in the CY 2007 program -- a 29% decline in baseline consumption.

One possible explanation contributing to the decline in consumption is a change in climate. We compared the average annual degree days for normalization periods used in the billing analyses (Table 3.2). The ten year period from 1983 through 1992 was used for the initial billing analyses through 2002, and included data entry of paper records for each station of the ten weather regions. Our assessments began incorporating electronically available data from the National Climatic Data Center (NCDC) from 1993 to present, primarily utilizing the Global Summary of Day information, supplemented with First-Order Summary of Day data where necessary. Our long-term normal datasets were updated in for the 2003-2006 billing analyses using data for the ten year period 1993-2002, and again updated again for the CY 2007 analysis (data from 1998-2007).

Table 3.2 shows a comparison of the annual heating and cooling degree days between the original SLICE long term normals and the most recent ten-year period.

Table 3.2 Comparison of Degree Days in Normalization Periods

Region	City	Heating Degree Days (base 65)			Cooling Degree Days (base 65)		
		Long-term normalization period 1983-1992	1998-2007	Pct Chg	Long-term normalization period 1983-1992	1998-2007	Pct Chg
1	Spencer	7,743	6,950	-10.2%	649	828	27.7%
2	Mason City	7,837	6,980	-10.9%	623	709	13.7%
3	Waterloo	7,406	6,433	-13.1%	702	843	20.0%
4	Sioux City	6,893	6,181	-10.3%	907	1,023	12.8%
5	Marshalltown	7,170	6,416	-10.5%	695	846	21.7%
6	Cedar Rapids	6,924	6,297	-9.1%	788	826	4.8%
7	Omaha	6,413	5,530	-13.8%	1,037	1,283	23.7%
8	Ottumwa	6,269	5,679	-9.4%	1,043	1,080	3.5%
9	Burlington	6,158	5,228	-15.1%	992	1,272	28.3%
10	Des Moines	6,497	5,689	-12.4%	1,025	1,137	10.9%

The results showed a marked decrease in the average annual heating degree days, ranging from 9.1% to 15.1% from the 1983-1992 period to the 1998-2007 period. In addition, we observed an even greater increase in the average annual cooling degree days, between 3.5% and 28.3% for the same periods.

Upon observing the large difference between the two datasets, we compared the degree day from NCDC's Global Summary of Day datasets to weather data to data reported by wunderground.com for the most extreme location, Burlington. The wunderground data was missing for data for a period during 2000, but the other nine years averaged 4% more heating degree days and 10.6% fewer cooling degree days in the wunderground data than in the GSOD data. While this suggests the GSOD data reports slightly warmer temperatures than those reported by wunderground, it accounts for only about one-third of the difference we observed between the long-term normal weather data used for earliest SLICE evaluations and the most recent – in other words, both the GSOD and wunderground data showed significant decreases in heating degree days and increases in cooling degree days.

An assessment of the reasons for the changes is beyond the scope of this study, however we will note that in addition to possible greenhouse warming or cyclical climate patterns, there may be some bias in temperature readings due to the implementation of automated weather observation stations during the late 1990's and early 2000's. Furthermore, it is important to recognize that if bias has been introduced due to changes in data collection procedures, then the long term normalization weather data should conform as closely to the recent period data collection as possible in order to reduce the impact of this bias on the normalized annual consumption. Consequently, it is more appropriate to use the more recent ten year period in our normalization analysis (which is what we have done here).

In addition to the apparent increase in temperatures, it is likely that clients are reacting to increases in the cost of heating fuels by reducing consumption, both through changes in behavior and through replacement of aging equipment with more efficient equipment – again, research addressing this factor is beyond the scope of the study.

Finally, though not a factor in the long-term trend in declining baseline consumption, we observed a decline in the installation rates of some of the most significant heating measures between the CY 2006 and CY 2007 programs. Heating system replacement rates declined from

56% of homes in 2006 to 51% in 2007. Wall insulation declined from 66% of homes to 61%, which is the lowest percentage since CY 2000. Taken together, these reduced number of installations of these major measures accounts for nearly one-half of the reduction in gas savings observed between the CY 2006 and CY 2007 programs.

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4. DETAILED SPENDING AND IMPACT PROFILES BY FUNDING ENTITY

This section provides tables of spending and impacts for the utilities, the state, and the overall program. The tables are designed to provide information to meet the filing requirements for cost recovery.

The summaries of impacts for state and utility funding are similar in format to those provided in the earlier SLICE reports.

We show a second table for each of the utilities in this report. These tables show the combined impacts of electricity and natural gas measures from all funding sources. These tables should prove useful for the energy and demand planning departments at the utilities to account for the aggregate impacts of the low-income program, and not just the impacts funded by a specific utility.

Interstate Power and Light Co.
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings										
	Total	Electric	Gas	by Season				Summer kWh	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Average per Treated Household								
				Cooling	Heating	Summer kWh			Winter kWh	Annual kWh					Summer kWh	Electricity kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms			
OVERALL	958	831	556	831	785		1,980,543	260.4	146.6		910,708	1,423	133,072	2067.37	0.313	0.187	1,096	2,559	239				
Shell & Htg. Sys.	853	687	547	682	32		1,633,095	198.1	238.875	61.2	92,413	331,288	1,396	126,979	1914.53	0.290	350	1,913	2,888	482	2,553	232	
Wall Insul.	547	454	358	453	10		448,826	78.87	95,118	17.68	26,317	121,434	450	40,642	820.52	0.174	210	1,768	2,632	267	1,256	114	
Open Blown Ceiling Insul.	741	624	469	622	28		368,066	84.37	101,755	27.04	40,818	142,573	313	28,698	496.71	0.136	164	0.966	1,458	228	0.668	61	
Cavity Fill Insul.	133	94	91	94	2		48,704	6.73	8,120	2.30	3,632	11,752	56	5,236	366.20	0.072	86	1.152	1,816	125	0.616	58	
Sloped Attic Insul.	232	174	170	173	5		47,786	12.96	15,630	7.16	11,045	26,674	103	9,348	205.97	0.075	90	1.432	2,209	153	0.606	55	
Kneewall Insul.	142	115	96	115	4		19,806	4.28	5,160	1.62	2,517	7,677	22	2,021	139.48	0.037	45	0.406	629	67	0.231	21	
Infil. Reduction	1	1	0	1	0		29	0.02	26	0.00	0	26	0	0	29.18	0.022	26	-	-	26	-	-	
Found./Crawl. Insul.	299	137	231	133	15		137,786	10.83	13,067	4.05	6,057	19,124	54	4,843	460.82	0.081	98	0.270	404	140	0.233	21	
Bandjoist Insul.	314	18	296	-	18		38,482	0.00	0	1.26	1,881	1,881	26	2,344	122.55	-	-	0.070	105	105	0.088	8	
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Hi-Eff Htg Sys Repl	257	0	257	-	0		521,111	0.00	0	0.00	0	0	372	33,847	2027.67	-	-	-	-	-	-	1,449	132
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	-
Electric Htg Sys Repl	1	1	0	-	1		2,500	0.00	0	0.09	146	146	0	0	2500.00	-	-	0.094	146	146	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	-

Measure	Number of Households with Impacts			Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms
	Total	Electric	Gas	Total	Electric	Gas												
Water Heating	479	123	359	1,245	320	926	67,702	0.0	0.4	32,058	26.6	6,093	141.34	0.000	0.003	261	0.074	17
Temp. Reduct.	214	79	135	214	79	135	0	0.00	0.02	12,324	3.4	1,180	0.00	0.000	0.000	156	0.025	9
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	342	88	254	342	88	254	1,411	0.00	0.01	5,104	2.5	856	4.13	0.000	0.000	58	0.010	3
LF Showerhead	142	31	111	144	32	112	1,204	0.00	0.17	7,347	2.8	862	8.48	0.000	0.005	237	0.025	8
Faucet Aerator	282	65	217	464	106	358	946	0.00	0.11	4,717	1.9	572	3.36	0.000	0.002	73	0.009	3
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Hi-Eff Wtr Htr Repl.	109	15	94	81	15	67	64,142	0.00	0.06	2,566	16.1	2,623	589.46	0.000	0.004	171	0.171	28
Lighting	720	720		6,770	6,770		38,826	29.3	54.1	278,903	-	-	53.92	0.041	0.075	387	-	-
CFL (6W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (11W)	45	45		304	304		966	0.71	1.31	6,757	-	-	21.47	0.016	0.029	150	-	-
CFL (14W)	3	3		23	23		87	0.09	0.16	811	-	-	29.15	0.028	0.052	270	-	-
CFL (15W)	374	374		3,094	3,094		15,309	11.21	20.70	106,720	-	-	40.93	0.030	0.055	285	-	-
CFL (18W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (20W)	223	223		1,962	1,962		13,243	8.68	16.05	82,713	-	-	59.38	0.039	0.072	371	-	-
CFL (23W)	110	110		988	988		6,746	6.12	11.31	58,312	-	-	61.33	0.056	0.103	530	-	-
CFL (25W)	68	68		395	395		2,444	2.45	4.52	23,313	-	-	35.94	0.036	0.067	343	-	-
CFL (30W)	4	4		4	4		30	0.03	0.05	276	-	-	7.59	0.007	0.013	69	-	-
CFL_unknown	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator/Freezer	398	398		380	380		240,920	33.02	30.87	268,460	-	-	605.33	0.083	0.078	675	-	-
Refrigerator Removal	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator Exchange	320	320		259	259		185,570	22.05	20.62	179,285	-	-	579.91	0.069	0.064	560	-	-
Freezer Removal	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Freezer Exchange	145	145		121	121		55,350	10.97	10.26	89,175	-	-	381.72	0.076	0.071	615	-	-

Costs for Measures Without Energy Impacts Installed in 963 Total Households with Spending and/or Energy Impacts:

Measure	Count	Spending on Materials & Labor (\$)
Total		380,375
Unspecified Insul.	2	159
Duct Sealing	0	0
Duct Insulation	2	67
Damming Material	0	0
Htg. Sys. Tune & Clean	0	0
Htg. Sys./WH Other	1	90
Air Conditioning Work	0	0
Water Heater Repair	0	0
Refrigerator Coil Clean	0	0
Waterbed Mattress Pad	0	0
Programmable Tstat	7	350
Unspecified Utility Meas.	0	0
CO Detector	0	0
Smoke Detector	0	0
Fuses	0	0
Htg Sys Safety Check	0	0
Htg Sys Ventilation	170	22,049
Water Heater Ventilation	81	7,854
Bathroom Ventilation	0	0
Other Exhaust Ventilation	0	0
Health/Safety Repairs	0	0
Health/Safety Other	0	0
Consumables	0	0
General Repairs	526	121,431
Meter Refrig (no action)	0	0
Meter Freezer (no action)	0	0
Support	940	228,376
Landlord Contr Misc	0	0
Landlord Contr Furnace	0	0
Landlord Contr DHW	0	0
Client Contr (Any)	0	0
Unspecified	0	0

Total Reported Materials, Labor, and Support Costs: 2,360,918
Utility Expenditures for Administration: 118,957
Grand Total of Expenditures: 2,479,875

Interstate Power and Light Co.
Calendar Year 2007
Fuel and Demand Impacts For All Customer Households and All Funding Sources

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by End-Use		Estimated First-Year Savings Electricity					Average per Treated Household									
	Total	Electric	Gas	Cooling	Heating	Summer kW	Winter kWh	Annual kWh	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms		
OVERALL	1,012	883	579	883	835	308.4	179.9	1,126,271				1,724	162,214	0.349	0.215	1,276	2.977	280		
Shell & Htg. Sys.	972	809	579	805	37	227.7	274,577	75.3	113,676	388,253	1,676	152,288	0.283	341	2,035	3,072	480	2,894	263	
Wall Insul.	579	482	372	481	10	85.22	102,774	18.15	27,056	129,830	472	42,714	0.177	214	1,815	2,706	269	1,269	115	
Open Blown Ceiling Insul.	787	661	495	658	29	89.74	108,228	31.05	46,787	155,015	329	30,157	0.136	164	1,071	1,613	235	0.665	61	
Cavity Fill Insul.	142	99	98	99	2	7.18	8,655	2.30	3,632	12,287	63	5,839	0.072	87	1,152	1,816	124	0.638	60	
Sloped Attic Insul.	250	188	183	187	5	13.83	16,685	7.16	11,045	27,730	110	10,022	0.074	89	1,432	2,209	147	0.603	55	
Kneewall Insul.	157	126	106	126	4	4.58	5,526	1.62	2,517	8,044	25	2,238	0.036	44	0.406	629	64	0.231	21	
Infil. Reduction	963	802	571	798	37	15.20	18,333	8.98	13,547	31,880	135	12,128	0.019	23	0.243	366	40	0.237	21	
Found./Crawl. Insul.	323	149	247	145	16	11.92	14,376	5.38	8,142	22,518	60	5,399	0.082	99	0.336	509	151	0.242	22	
Bandjoist Insul.	324	18	306	-	18	0.00	0	1.27	1,887	1,887	27	2,404	-	-	0.070	105	105	0.088	8	
Exhaust Ventilation	59	6	53	-	6	0.00	0	-0.82	(1,248)	(1,248)	(4)	(342)	-	-	-0.137	(208)	(208)	-0.070	-6	
Hi-Eff Htg Sys Repl	277	0	277	-	0	0.00	0	0.00	0	0	442	40,156	-	-	-	-	-	1.596	145	
Std-Eff Htg Sys Repl	18	0	18	-	0	0.00	0	0.00	0	0	17	1,573	-	-	-	-	-	0.950	87	
Electric Htg Sys Repl	2	2	0	-	2	0.00	0	0.20	311	311	0	0	-	-	0.100	156	156	-	-	
Heat Pump Repl	0	0	0	-	0	0.00	0	0.00	0	0	0	0	-	-	-	-	-	-	-	
Other Htg Sys Repl	0	0	0	-	0	0.00	0	0.00	0	0	0	0	-	-	-	-	-	-	-	
				Number of Measures by Fuel Type																
	Total	Electric	Gas	Total	Electric	Gas	Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms				
Water Heating	579	153	429	830	188	642	0.0	0.4	37,935	48.3	9,926	0.000	0.003	248	0.113	23				
Temp. Reduct.	246	94	152				0.00	0.03	14,664	3.8	1,332	0.000	0.000	156	0.025	9				
WH Wrap	2	0	2				0.00	0.00	0	0.0	14	-	-	-	0.021	7				
Pipe Insul.	436	103	333				0.00	0.01	5,974	3.4	1,198	0.000	0.000	58	0.010	4				
LF Showerhead	152	37	115	154	38	116	0.00	0.20	8,769	2.9	896	0.000	0.005	237	0.025	8				
Faucet Aerator	296	71	225	484	115	369	0.00	0.12	5,118	1.9	590	0.000	0.002	72	0.009	3				
Std-Eff Wtr Htr Repl.	64	20	44	64	20	44	0.00	0.02	800	7.8	1,267	0.000	0.001	40	0.176	29				
Hi-Eff Wtr Htr Repl.	128	15	113	128	15	113	0.00	0.06	2,610	28.4	4,630	0.000	0.004	174	0.251	41				
Lighting	766	766		7,214	7,214		31.5	58.1	299,610	-	-	0.041	0.076	391	-	-				
CFL (5W)	0	0		0	0		0.00	0.00	0	-	-	-	-	-	-	-				
CFL (7W)	0	0		0	0		0.00	0.00	0	-	-	-	-	-	-	-				
CFL (9W)	0	0		0	0		0.00	0.00	0	-	-	-	-	-	-	-				
CFL (11W)	45	45		304	304		0.71	1.31	6,757	-	-	0.016	0.029	150	-	-				
CFL (14W)	3	3		23	23		0.09	0.16	811	-	-	0.028	0.052	270	-	-				
CFL (15W)	385	385		3,171	3,171		11.48	21.22	109,376	-	-	0.030	0.055	284	-	-				
CFL (18W)	0	0		0	0		0.00	0.00	0	-	-	-	-	-	-	-				
CFL (20W)	245	245		2,176	2,176		9.63	17.80	91,735	-	-	0.039	0.073	374	-	-				
CFL (23W)	126	126		1,127	1,127		6.98	12.90	66,516	-	-	0.055	0.102	528	-	-				
CFL (25W)	70	70		409	409		2.53	4.68	24,139	-	-	0.036	0.067	345	-	-				
CFL (30W)	4	4		4	4		0.03	0.05	276	-	-	0.007	0.013	69	-	-				
CFL, unknown	0	0		0	0		0.00	0.00	0	-	-	-	-	-	-	-				
Refrigerator/Freezer	446	446		566	566		49.26	46.05	400,473	-	-	0.110	0.103	898	-	-				
Refrigerator Removal	17	17		17	17		1.45	1.35	11,781	-	-	0.085	0.080	693	-	-				
Refrigerator Exchange	354	354		366	366		31.20	29.17	253,638	-	-	0.088	0.082	716	-	-				
Freezer Removal	13	13		13	13		1.18	1.10	9,594	-	-	0.091	0.085	738	-	-				
Freezer Exchange	167	167		170	170		15.43	14.43	125,460	-	-	0.092	0.086	751	-	-				

Black Hills Energy
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household									
	Total	Electric	Gas	Cooling	Heating			Electricity			Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Electricity			Pk-Day therms	Gas Annual therms			
								Summer kWh	Winter kWh	kWh					Summer kWh	Winter kWh	Annual kWh					
OVERALL	165	0	165	0	0		368,048	0.0		0.0	0	0	285	27,338	2230.59	-	-	-	-	1,730	166	
Shell & Htg. Sys.	156	0	156	0	0		349,288	0.0	0	0.0	0	0	277	25,355	2239.02	-	-	-	-	1,776	163	
Wall Insul.	87	0	87	0	0		77,523	0.00	0	0.00	0	0	71	6,567	891.07	-	-	-	-	0.821	75	
Open Blown Ceiling Insul.	119	0	119	0	0		62,769	0.00	0	0.00	0	0	65	5,941	527.47	-	-	-	-	0.547	50	
Cavity Fill Insul.	43	0	43	0	0		23,158	0.00	0	0.00	0	0	28	2,587	538.57	-	-	-	-	0.659	60	
Sloped Attic Insul.	47	0	47	0	0		11,615	0.00	0	0.00	0	0	18	1,668	247.13	-	-	-	-	0.384	35	
Kneewall Insul.	20	0	20	0	0		2,532	0.00	0	0.00	0	0	3	293	126.60	-	-	-	-	0.159	15	
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
Found./Crawl. Insul.	63	0	63	0	0		28,396	0.00	0	0.00	0	0	15	1,407	450.73	-	-	-	-	0.244	22	
Bandjoist Insul.	52	0	52	-	0		3,714	0.00	0	0.00	0	0	3	308	71.41	-	-	-	-	0.064	6	
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
Hi-Eff Htg Sys Repl	63	0	63	-	0		139,581	0.00	0	0.00	0	0	72	6,584	2215.57	-	-	-	-	1.148	105	
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
	Total	Electric	Gas	Total	Electric	Gas		Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Annual therms		Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Annual therms		Annual therms		
Water Heating	114	0	114	279	0	279	18,760	0.0	0.0	0	8.4	1,983	164.56	-	-	-	-	-	-	0.074	17	
Temp. Reduct.	61	0	61	61	0	61	0	0.00	0.00	0	1.6	541	0.00	-	-	-	-	-	-	0.026	9	
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-	-	-	-	
Pipe Insul.	71	0	71	71	0	71	303	0.00	0.00	0	0.7	244	4.27	-	-	-	-	-	-	0.010	3	
LF Showerhead	35	0	35	35	0	35	308	0.00	0.00	0	0.9	273	8.80	-	-	-	-	-	-	0.025	8	
Faucet Aerator	65	0	65	91	0	91	232	0.00	0.00	0	0.5	146	3.57	-	-	-	-	-	-	0.007	2	
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-	-	-	-	
Hi-Eff Wtr Htr Repl.	30	0	30	21	0	21	17,916	0.00	0.00	0	4.8	779	597.21	-	-	-	-	-	-	0.159	26	
Lighting	0	0	0	0	0	0	0	0.0	0.0	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (5W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (11W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (15W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (20W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (23W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (25W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
Refrigerator/Freezer	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
Refrigerator Exchange	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
Freezer Exchange	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	-	-	-	
Costs for Measures Without Energy Impacts Installed in 165 Total Households with Spending and/or Energy Impacts:																						
Total							65,104															
Unspecified Insul.	0						0						0.00									
Duct Sealing	0						0						0.00									
Duct Insulation	0						0						0.00									
Damming Material	0						0						0.00									
Htg. Sys. Tune & Clean	0						0						0.00									
Htg. Sys./WH Other	0						0						0.00									
Air Conditioning Work	0						0						0.00									
Water Heater Repair	0						0						0.00									
Refrigerator Coil Clean	0						0						0.00									
Waterbed Mattress Pad	0						0						0.00									
Programmable Tstat	0						0						0.00									
Unspecified Utility Meas.	0						0						0.00									
CO Detector	0						0						0.00									
Smoke Detector	0						0						0.00									
Fuses	0						0						0.00									
Htg Sys Safety Check	0						0						0.00									
Htg Sys Ventilation	58						7,896						136.13									
Water Heater Ventilation	29						3,310						114.14									
Bathroom Ventilation	0						0						0.00									
Other Exhaust Ventilation	0						0						0.00									
Health/Safety Repairs	0						0						0.00									
Health/Safety Other	0						0						0.00									
Consumables	0						0						0.00									
General Repairs	50						9,915						198.30									
Meter Refrig (no action)	0						0						0.00									
Meter Freezer (no action)	0						0						0.00									
Support	160						43,983						274.90									
Landlord Contr Misc	0						0						0.00									
Landlord Contr Furnace	0						0						0.00									
Landlord Contr DHW	0						0						0.00									
Client Contr (Any)	0						0						0.00									
Unspecified	0						0						0.00									
Total Reported Materials, Labor, and Support Costs:							433,152															
Utility Expenditures for Administration:							23,671															
Grand Total of Expenditures:							456,823															

Black Hills Energy
Calendar Year 2007
Fuel and Demand Impacts For All Customer Households and All Funding Sources

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by End-Use		Estimated First-Year Savings Electricity					Average per Treated Household									
	Total	Electric	Gas	Cooling	Heating	Summer kW	Summer kWh	Winter kW	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms	Summer kW	Summer kWh	Winter kW	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms	
OVERALL	238	0	238	0	0	0.0		0.0		0	532	50,907	-	-	-	-	-	2.236	214	
Shell & Htg. Sys.	238	0	238	0	0	0.0	0	0.0	0	0	514	46,925	-	-	-	-	-	2.159	197	
Wall Insul.	133	0	133	0	0	0.00	0	0.00	0	0	116	10,640	-	-	-	-	-	0.873	80	
Open Blown Ceiling Insul.	193	0	193	0	0	0.00	0	0.00	0	0	107	9,764	-	-	-	-	-	0.553	51	
Cavity Fill Insul.	72	0	72	0	0	0.00	0	0.00	0	0	44	4,037	-	-	-	-	-	0.614	56	
Sloped Attic Insul.	67	0	67	0	0	0.00	0	0.00	0	0	25	2,337	-	-	-	-	-	0.379	35	
Kneewall Insul.	37	0	37	0	0	0.00	0	0.00	0	0	5	468	-	-	-	-	-	0.140	13	
Infil. Reduction	237	0	237	0	0	0.00	0	0.00	0	0	39	3,523	-	-	-	-	-	0.163	15	
Found./Crawl. Insul.	87	0	87	0	0	0.00	0	0.00	0	0	21	1,904	-	-	-	-	-	0.239	22	
Bandjoist Insul.	83	0	83	-	0	0.00	0	0.00	0	0	5	468	-	-	-	-	-	0.061	6	
Exhaust Ventilation	24	0	24	-	0	0.00	0	0.00	0	0	(2)	(144)	-	-	-	-	-	-0.065	-6	
Hi-Eff Htg Sys Repl	109	0	109	-	0	0.00	0	0.00	0	0	143	12,980	-	-	-	-	-	1.309	119	
Std-Eff Htg Sys Repl	14	0	14	-	0	0.00	0	0.00	0	0	10	947	-	-	-	-	-	0.749	68	
Electric Htg Sys Repl	0	0	0	-	0	0.00	0	0.00	0	0	0	0	-	-	-	-	-	-	-	
Heat Pump Repl	0	0	0	-	0	0.00	0	0.00	0	0	0	0	-	-	-	-	-	-	-	
Other Htg Sys Repl	0	0	0	-	0	0.00	0	0.00	0	0	0	0	-	-	-	-	-	-	-	
				Number of Measures by Fuel Type			Summer kW		Winter kW		Annual kWh	Pk-Day therms	Annual therms	Summer kW		Winter kW		Annual kWh	Pk-Day therms	Annual therms
Water Heating	177	0	177	253	0	253	0.0		0.0		0	18.5	3,981	-	-	-	-	0.104	22	
Temp. Reduct.	100	0	100				0.00		0.00		0	2.6	890	-	-	-	-	0.026	9	
WH Wrap	1	0	1				0.00		0.00		0	0.0	7	-	-	-	-	0.021	7	
Pipe Insul.	113	0	113				0.00		0.00		0	1.1	396	-	-	-	-	0.010	4	
LF Showerhead	47	0	47	47	0	47	0.00		0.00		0	1.2	378	-	-	-	-	0.026	8	
Faucet Aerator	93	0	93	138	0	138	0.00		0.00		0	0.7	230	-	-	-	-	0.008	2	
Std-Eff Wtr Htr Repl.	28	0	28	28	0	28	0.00		0.00		0	3.8	619	-	-	-	-	0.135	22	
Hi-Eff Wtr Htr Repl.	40	0	40	40	0	40	0.00		0.00		0	9.0	1,462	-	-	-	-	0.224	37	
Lighting	0	0	0	0	0	0	0.0		0.0		0	-	-	-	-	-	-	-	-	
CFL (5W)	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
CFL (7W)	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
CFL (9W)	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
CFL (11W)	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
CFL (14W)	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
CFL (15W)	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
CFL (18W)	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
CFL (20W)	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
CFL (23W)	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
CFL (25W)	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
CFL (30W)	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
CFL, unknown	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
Refrigerator/Freezer	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
Refrigerator Removal	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
Refrigerator Exchange	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
Freezer Removal	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	
Freezer Exchange	0	0	0	0	0	0	0.00		0.00		0	-	-	-	-	-	-	-	-	

MidAmerican Energy
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household									
	Total	Electric	Gas	Cooling		Heating		Summer		Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer		Electricity		Annual kWh	Pk-Day therms	Gas Annual therms
				kWh	kWh			kWh	kWh	kWh	kWh					kWh	kWh	kWh	kWh			
OVERALL	609	475	492	475	458		1,489,308	147.7		64.8		461,107	956	91,294	2445.50	0.311		0.142		971	1.944	186
Shell & Htg. Sys.	570	390	482	387	11		1,291,547	116.0	139,941	19.2	29,967	169,908	925	84,155	2265.87	0.300	362	1.747	2,724	436	1.918	175
Wall Insul.	356	261	294	259	8		340,069	47.58	57,388	10.85	16,928	74,315	279	25,399	955.25	0.184	222	1.356	2,116	285	0.948	86
Open Blown Ceiling Insul.	472	355	393	354	8		258,606	49.39	59,570	4.29	6,544	66,114	215	19,638	547.89	0.140	168	0.537	818	186	0.547	50
Cavity Fill Insul.	79	60	62	59	2		44,604	4.66	5,618	1.27	2,013	7,631	44	4,044	564.61	0.079	95	0.635	1,006	127	0.712	65
Sloped Attic Insul.	120	101	89	100	3		30,733	8.03	9,681	2.64	4,231	13,912	43	3,980	256.11	0.080	97	0.881	1,410	138	0.488	45
Kneewall Insul.	86	67	65	67	0		14,330	2.00	2,407	0.00	0	2,407	11	991	166.63	0.030	36	-	-	36	0.168	15
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Found./Crawl. Insul.	200	54	190	54	0		117,369	4.38	0	0.00	0	5,278	47	4,295	586.84	0.081	98	-	-	98	0.248	23
Bandjoist Insul.	227	2	225	-	2		26,261	0.00	0	0.16	251	251	15	1,325	115.69	-	0.081	126	126	0.065	6	
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Hi-Eff Htg Sys Repl	217	0	217	-	0		459,576	0.00	0	0.00	0	0	271	24,484	2117.86	-	-	-	-	-	1.248	113
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-

Measure	Number of Households with Impacts			Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household					
	Total	Electric	Gas	Total	Electric	Gas		Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms
Water Heating	422	43	381	1,106	101	1,006	78,694	0.0	0.1	9,687	31.7	7,139	186.48	0.000	0.002	225	0.083	19
Temp. Reduct.	496	24	172	196	24	172	0	0.00	0.01	3,744	4.2	1,447	0.00	0.000	0.000	156	0.024	8
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	305	32	273	305	32	273	1,635	0.00	0.00	1,856	2.5	861	5.36	0.000	0.000	58	0.009	3
LF Showerhead	143	7	136	146	7	139	1,384	0.00	0.04	1,659	3.5	1,076	9.68	0.000	0.005	237	0.026	8
Faucet Aerator	206	20	186	365	32	333	994	0.00	0.03	1,424	1.6	493	4.83	0.000	0.002	71	0.009	3
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Hi-Eff Wtr Htr Repl.	125	6	119	94	6	89	74,680	0.00	0.02	1,004	20.0	3,262	597.44	0.000	0.004	167	0.168	27
Lighting	437	437	0	3,512	3,512	0	23,671	17.4	32.2	166,112	-	-	54.17	0.040	0.074	380	-	-
CFL (6W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (11W)	20	20	0	99	99	0	693	0.23	0.43	2,201	-	-	34.65	0.012	0.021	110	-	-
CFL (14W)	33	33	0	193	193	0	1,400	0.71	1.32	6,805	-	-	42.42	0.022	0.040	206	-	-
CFL (15W)	98	98	0	593	593	0	3,747	2.15	3.97	20,454	-	-	38.24	0.022	0.040	209	-	-
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (20W)	176	176	0	1,092	1,092	0	7,608	4.83	8.93	43,233	-	-	43.23	0.027	0.051	262	-	-
CFL (23W)	179	179	0	1,243	1,243	0	8,261	7.70	14.23	73,362	-	-	46.15	0.043	0.080	410	-	-
CFL (25W)	43	43	0	290	290	0	1,942	1.80	3.32	17,116	-	-	45.17	0.042	0.077	398	-	-
CFL (30W)	2	2	0	2	2	0	20	0.01	0.03	138	-	-	10.00	0.007	0.013	69	-	-
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator/Freezer	168	168	0	164	164	0	95,396	14.19	13.27	115,400	-	-	567.83	0.084	0.079	687	-	-
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator Exchange	148	148	0	131	131	0	81,545	11.18	10.45	90,890	-	-	550.98	0.076	0.071	614	-	-
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Freezer Exchange	38	38	0	33	33	0	13,850	3.01	2.62	24,510	-	-	364.49	0.079	0.074	645	-	-

Costs for Measures Without Energy Impacts Installed in 610 Total Households with Spending and/or Energy Impacts:

Measure	Count	Spending on Materials & Labor (\$)	Average per Treated Household
Total	258,949	0.00	0.00
Unspecified Insul.	2	335	167.45
Duct Sealing	0	0	0.00
Duct Insulation	1	17	17.00
Damming Material	0	0	0.00
Htg. Sys. Tune & Clean	0	0	0.00
Htg. Sys./WH Other	2	2,739	1,369.27
Air Conditioning Work	0	0	0.00
Water Heater Repair	0	0	0.00
Refrigerator Coil Clean	0	0	0.00
Waterbed Mattress Pad	0	0	0.00
Programmable Tstat	7	323	46.10
Unspecified Utility Meas.	0	0	0.00
CO Detector	0	0	0.00
Smoke Detector	0	0	0.00
Fuses	0	0	0.00
Htg Sys Safety Check	0	0	0.00
Htg Sys Ventilation	185	24,456	132.19
Water Heater Ventilation	58	5,701	98.29
Bathroom Ventilation	0	0	0.00
Other Exhaust Ventilation	0	0	0.00
Health/Safety Repairs	0	0	0.00
Health/Safety Other	0	0	0.00
Consumables	0	0	0.00
General Repairs	222	49,858	224.59
Meter Refrig (no action)	0	0	0.00
Meter Freezer (no action)	0	0	0.00
Support	574	175,520	305.78
Landlord Contr Misc	0	0	0.00
Landlord Contr Furnace	0	0	0.00
Landlord Contr DHW	0	0	0.00
Client Contr (Any)	0	0	0.00
Unspecified	0	0	0.00

Total Reported Materials, Labor, and Support Costs: 1,748,257
Utility Expenditures for Administration: 77,122
Grand Total of Expenditures: 1,825,379

MidAmerican Energy
Calendar Year 2007
Fuel and Demand Impacts For All Customer Households and All Funding Sources

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by End-Use		Estimated First-Year Savings Electricity					Average per Treated Household								
	Total	Electric	Gas	Cooling	Heating	Summer kW	Winter kWh	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms	Summer kW	Winter kWh	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms		
OVERALL	932	740	772	740	704	269.4		115.8	832,709		1,844	176,584	0.364	0.164	1,125	2.388	229		
Shell & Htg. Sys.	916	677	771	674	16	212.3	256,083	37.7	58,304	314,387	1,761	159,892	0.315	380	2,358	3,644	464	2,284	207
Wall Insul.	567	424	481	421	11	81.16	97,887	15.51	24,051	121,938	460	41,875	0.193	233	1,410	2,186	288	0.957	87
Open Blown Ceiling Insul.	748	574	631	571	13	82.22	99,164	11.04	16,863	116,027	338	30,758	0.144	174	0.850	1,297	202	0.535	49
Cavity Fill Insul.	145	108	112	107	3	8.96	10,808	2.60	4,050	14,858	83	7,577	0.084	101	0.867	1,350	138	0.739	68
Sloped Attic Insul.	218	181	167	179	6	13.95	16,826	5.25	8,217	25,044	75	6,854	0.078	94	0.875	1,370	138	0.450	41
Kneewall Insul.	159	127	125	127	1	4.25	5,126	0.09	131	5,257	24	2,135	0.033	40	0.086	131	41	0.188	17
Infil. Reduction	914	676	769	673	16	14.73	17,762	1.99	3,097	20,859	143	12,956	0.022	26	0.125	194	31	0.186	17
Found./Crawl. Insul.	310	86	290	84	3	7.06	8,510	0.88	1,340	9,850	78	7,093	0.084	101	0.292	447	115	0.268	24
Bandjoist Insul.	374	4	370	-	4	0.00	0	0.30	459	459	22	2,031	-	-	0.074	115	115	0.061	5
Exhaust Ventilation	104	4	100	-	4	0.00	0	-0.53	(832)	(832)	(7)	(627)	-	-	-0.133	(208)	(208)	-0.068	-6
Hi-Eff Htg Sys Repl	393	0	393	-	0	0.00	0	0.00	0	0	531	47,959	-	-	-	-	-	1.351	122
Std-Eff Htg Sys Repl	19	0	19	-	0	0.00	0	0.00	0	0	14	1,280	-	-	-	-	-	0.742	67
Electric Htg Sys Repl	1	1	0	-	1	0.00	0	0.14	218	218	0	0	-	-	0.143	218	218	-	-
Heat Pump Repl	3	3	0	-	3	0.00	0	0.46	708	708	0	0	-	-	0.154	236	236	-	-
Other Htg Sys Repl	0	0	0	-	0	0.00	0	0.00	0	0	0	0	-	-	-	-	-	-	-
				Number of Measures by Fuel Type		Summer kW		Winter kW	Annual kWh	Pk-Day therms	Annual therms	Summer kW		Winter kW	Annual kWh	Pk-Day therms	Annual therms		
	Total	Electric	Gas	Total	Electric	Gas													
Water Heating	727	76	652	1,098	79	1,018	0.0	0.2	17,042	83.2	16,692	0.000	0.002	224	0.128	26			
Temp. Reduct.	344	44	299				0.00	0.01	6,864	7.3	2,526	0.000	0.000	156	0.024	8			
WH Wrap	1	0	1				0.00	0.00	0	0.0	7	-	-	-	0.021	7			
Pipe Insul.	467	52	415				0.00	0.01	3,016	3.7	1,302	0.000	0.000	58	0.009	3			
LF Showerhead	214	15	199	219	15	204	0.00	0.08	3,555	5.1	1,575	0.000	0.005	237	0.026	8			
Faucet Aerator	316	33	283	547	54	493	0.00	0.05	2,403	2.4	728	0.000	0.002	73	0.008	3			
Std-Eff Wtr Htr Repl.	116	4	112	116	4	112	0.00	0.00	160	17.8	2,908	0.000	0.001	40	0.159	26			
Hi-Eff Wtr Htr Repl.	216	6	209	216	6	209	0.00	0.03	1,044	46.9	7,646	0.000	0.004	174	0.224	37			
Lighting	675	675	5,440	5,440	26.8	49.6	255,598	-	-	0.040	0.073	379	-	-	-	-			
CFL (5W)	1	1	5	5	0.01	0.01	57	-	-	0.006	0.011	57	-	-	-	-			
CFL (7W)	0	0	0	0	0.00	0.00	0	-	-	-	-	-	-	-	-	-			
CFL (9W)	0	0	0	0	0.00	0.00	0	-	-	-	-	-	-	-	-	-			
CFL (11W)	58	58	281	281	0.66	1.21	6,246	-	-	0.011	0.021	108	-	-	-	-			
CFL (14W)	36	36	203	203	0.75	1.39	7,158	-	-	0.021	0.039	199	-	-	-	-			
CFL (15W)	147	147	796	796	2.88	5.33	27,456	-	-	0.020	0.036	187	-	-	-	-			
CFL (18W)	0	0	0	0	0.00	0.00	0	-	-	-	-	-	-	-	-	-			
CFL (20W)	293	293	1,814	1,814	8.03	14.84	76,474	-	-	0.027	0.051	261	-	-	-	-			
CFL (23W)	261	261	1,861	1,861	11.53	21.31	109,837	-	-	0.044	0.082	421	-	-	-	-			
CFL (25W)	64	64	476	476	2.95	5.45	28,094	-	-	0.046	0.085	439	-	-	-	-			
CFL (30W)	4	4	4	4	0.03	0.05	276	-	-	0.007	0.013	69	-	-	-	-			
CFL, unknown	0	0	0	0	0.00	0.00	0	-	-	-	-	-	-	-	-	-			
Refrigerator/Freezer	290	290	349	349	30.22	28.25	245,682	-	-	0.104	0.097	847	-	-	-	-			
Refrigerator Removal	7	7	7	7	0.60	0.56	4,851	-	-	0.085	0.080	693	-	-	-	-			
Refrigerator Exchange	251	251	257	257	21.91	20.48	178,101	-	-	0.087	0.082	710	-	-	-	-			
Freezer Removal	6	6	7	7	0.64	0.59	5,166	-	-	0.106	0.099	861	-	-	-	-			
Freezer Exchange	77	77	78	78	7.08	6.62	57,564	-	-	0.092	0.086	748	-	-	-	-			

5. DETAILED SPENDING AND IMPACT PROFILES BY AGENCY

This section provides tables of spending and impacts by agency for all expenditures.

Energy impacts were estimated according to the statewide algorithms, which include agency-specific adjustments beginning this year.

MATURA Action Corporation
Calendar Year 2007
Costs, Fuel, and Demand Impacts for All Measures

Measure	Number of Households with Impacts						Count of Households with Electricity Impacts by Season						Estimated First-Year Savings Electricity						Average Estimated First Year Measure Cost and Savings Average per Treated Household																				
	Total	Electric	Gas	Propane	Fuel Oil	Other	Cooling		Heating				Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other	Spending on Materials & Labor (\$)	Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other										
							By Season	Heating	Summer	Winter	Annual	Summer																		Winter	Annual	Summer	Winter	Annual	Summer	Winter	Annual	Summer	Winter
OVERALL	38	38	34	4	0	0	38	37													167,744	22.0	5.4	48,611	138	12,280	2,053	0	0	4414.32	0.580	0.146	1,279	4.046	361	513	-	-	
Shell & Htg. Sys.	38	38	34	4	0	0	38	1												142,440	19.2	20,197	1.6	2,278	22,475	134	11,515	1,898	0	0	3748.42	0.506	0.532	1,578	2,278	591	3,930	339	633
Wall Insul.	22	22	19	3	0	0	22	0												14,544	6.20	6,574	0.00	0	6,574	19	1,639	558	0	0	661.11	0.282	299	-	-	299	1,001	86	186
Open Blown Ceiling Insul.	37	37	33	3	0	0	37	1												24,783	8.59	8,683	1.22	1,757	10,440	33	2,812	359	0	0	669.82	0.227	235	1,217	1,757	282	0,989	85	120
Cavity Fill Insul	6	6	5	1	0	0	6	0												1,533	0.45	522	0.00	0	522	3	246	21	0	0	255.45	0.075	87	-	-	87	0,570	49	21
Sloped Attic Insul.	10	10	9	1	0	0	10	0												1,928	1.32	1,305	0.00	0	1,305	7	606	34	0	0	192.83	0.132	131	-	-	131	0,781	67	34
Kneewall Insul.	7	7	5	2	0	0	7	0												697	0.28	326	0.00	0	326	1	53	65	0	0	99.50	0.040	47	-	-	47	0,122	11	32
Infltr. Reduction	38	38	34	3	0	0	38	1												11,009	1.23	1,238	0.20	283	1,521	8	680	97	0	0	289.71	0.032	33	0.196	283	40	0,232	20	32
Found./Crawl. Insul.	20	12	16	3	0	0	12	1												7,234	1.35	1,548	0.16	238	1,786	5	439	105	0	0	361.68	0.112	129	0.165	238	149	0,318	27	35
Bandage Insul.	17	0	16	1	0	0	-	0												1,042	0.00	0	0.00	0	0	0	1	88	0	0	61.32	-	-	-	-	-	0,064	5	8
Exhaust Ventilation	3	0	3	0	0	0	-	0												965	0.00	0	0.00	0	0	(0)	(25)	0	0	0	321.76	-	-	-	-	-	-0,058	-8	-
Hi-Eff Htg Sys Repl	29	0	26	3	0	0	-	-												78,704	0.00	0	0.00	0	0	58	4,978	651	0	0	2713.94	-	-	-	-	-	2,222	191	217
Std-Eff Htg Sys Repl	0	0	0	0	0	0	-	-												0	0.00	0	0.00	0	0	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-
Electric Htg Sys Rep	0	0	0	0	0	0	-	0												0	0.00	0	0.00	0	0	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-
Heat Pump Repl	0	0	0	0	0	0	-	0												0	0.00	0	0.00	0	0	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-
Other Htg Sys Repl	0	0	0	0	0	0	-	0												0	0.00	0	0.00	0	0	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-
	Total	Electric	Gas	Propane	Fuel Oil	Other	Total	Electric	Gas	Propane	Fuel Oil	Other	Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other	Spending on Materials & Labor (\$)	Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other										
Water Heating	30	4	23	3	0	0	88	15	63	10	0	0	10,908	0.0	0.0	1,429	4.0	765	154	0	0	363.61	0.000	0.007	357	0.172	33	51	-	-									
Temp. Reduct.	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0	0	0	0.00	-	-	-	-	-	-	-	-									
WH Wrap	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0	0	0	0.00	-	-	-	-	-	-	-	-									
Pipe Insul.	23	4	17	2	0	0	23	4	17	2	0	0	136	0.00	0.00	232	0.2	81	10	0	0	65.00	0.000	0.000	58	0.014	5	5	-	-									
LF Showerhead	13	3	9	1	0	0	13	3	9	1	0	0	130	0.00	0.02	711	0.3	104	13	0	0	10.00	0.000	0.005	237	0.038	12	13	-	-									
Faucet Aerator	22	4	16	2	0	0	38	7	27	4	0	0	114	0.00	0.01	312	0.2	61	10	0	0	5.18	0.000	0.002	78	0.012	4	5	-	-									
Std-Eff Wtr Htr Repl.	5	0	3	2	0	0	5	0	3	2	0	0	3,248	0.00	0.00	0	0.6	105	57	0	0	649.63	-	-	-	-	-	0.215	35	28									
Hi-Eff Wtr Htr Repl.	9	1	7	1	0	0	9	1	7	1	0	0	7,278	0.00	0.00	174	2.5	413	64	0	0	808.70	0.000	0.004	174	0.362	59	64	-	-									
Lighting	37	37					321	321					2,247	1.3	2.4	12,144	-	-	-	-	-	60.73	0.034	0.064	328	-	-	-	-	-									
CFL (5W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-									
CFL (7W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-									
CFL (9W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-									
CFL (11W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-									
CFL (14W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-									
CFL (15W)	35	35					245	245					1,715	0.89	1.64	8,451	-	-	-	-	-	49.00	0.025	0.047	241	-	-	-	-	-									
CFL (18W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-									
CFL (20W)	22	22					47	47					329	0.21	0.38	1,981	-	-	-	-	-	14.95	0.009	0.017	90	-	-	-	-	-									
CFL (23W)	12	12					29	29					203	0.18	0.33	1,712	-	-	-	-	-	16.92	0.015	0.028	143	-	-	-	-	-									
CFL (25W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-									
CFL (30W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-									
CFL_unknown	0	0					0	0					0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-									
Refrigerator/Freezer	18	18					18	18					12,149	1.55	1.44	12,564	-	-	-	-	-	674.94	0.086	0.080	698	-	-	-	-	-									
Refrigerator Remova	0	0					0	0					0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-									
Refrigerator Exchange	16	16					16	16					11,246	1.36	1.28	11,088	-	-	-	-	-	702.88	0.085	0.080	693	-	-	-	-	-									
Freezer Removal	0	0					0	0					0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-									
Freezer Exchange	2	2					2	2					888	0.18	0.17	1,476	-	-	-	-	-	444.00	0.091	0.085	738	-	-	-	-	-									
Costs for Measures Without Energy Impacts Installed in 38 Total Households with Spending and/or Energy Impacts:																																							
Total	129,067																																						
Unspecified Insul.	37	8,616																																					
Duct Sealing	0	0																																					
Duct Insulation	0	0																																					
Damming Material	28	400																																					
Htg. Sys. Tune & Clean	38	2,545																																					
Htg. Sys./WH Other	24	3,606																																					
Air Conditioning Work	5	125																																					
Water Heater Repair	1	28																																					
Refrigerator Coil Clear	0	0																																					
Waterbed Mattress Pad	0	0																																					
Programmable Tstat	0	0																																					
Unspecified Utility Meas	0	0																																					
CO Detector	15	350																																					
Smoke Detector	3	64																																					
Fuses	0	0																																					
Htg Sys Safety Check	0	0																																					
Htg Sys Ventilation	20	2,095																																					
Water Heater Ventilation	15	875																																					
Bathroom Ventilation	3	305																																					
Other Exhaust Ventilator	16	2,448																																					
Health/Safety Repairs	0	0																																					
Health/Safety Other	2	287																																					
Consumables	0	0																																					
General Repairs	37	24,694																																					
Meter Rating (no action)	0	0																																					
Meter Freezer (no action)	0	0																																					
Support	38	82,630																																					
Landlord Contr Misc	0	0																																					
Landlord Contr Furnace	0	0																																					
Landlord Contr DHW	0	0																																					
Client Contr (Any)	0	0																																					
Unspecified	0	0																																					
Total Reported Materials, Labor, and Support Costs:	296,812																																						
Grand Total of Expenditures:	296,812																																						

**Mid-Iowa Community Action
Calendar Year 2007
Costs, Fuel, and Demand Impacts for All Measures**

Measure	Number of Households with Impacts						Count of Households with Electricity Impacts by Season						Estimated First-Year Savings Electricity										Average Estimated First Year Measure Cost and Savings Average per Treated Household																				
	Total	Electric	Gas	Propane	Fuel Oil	Other	Cooling		Heating				Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu	Spending on Materials & Labor (\$)	Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu														
							Spring	Summer	Fall	Winter	Spending on Materials & Labor (\$)	Summer kW																		Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu							
OVERALL	139	139	119	22	0	0	139	134													632,272	45.0	29.5		156,898	409	39,547	8,699	0	0	4548.72	0.323	0.220	1,129	3.437	332	395	-	-				
Shell & Htg. Sys.	139	124	112	22	0	0	123	134													575,616	35.6	39,269	17.1	26,767	66,036	400	37,249	8,522	0	0	4141.12	0.289	319	3,428	5,353	533	3,569	333	387	-	-	
Wall Insul.	104	84	85	16	0	0	83	3													142,985	14.75	16,191	6.36	9,930	26,121	113	10,573	1,822	0	0	1374.85	0.178	195	2,120	3,310	311	1,335	124	114	-	-	
Open Blown Ceiling Insul.	113	92	90	18	0	0	91	5													78,151	9.92	11,007	2.72	4,250	15,257	70	6,561	1,613	0	0	691.60	0.109	121	0.544	850	166	0.782	73	90	-	-	
Cavity Fill Insul	49	34	39	9	0	0	34	1													25,299	3.49	3,787	1.94	3,027	6,814	39	3,666	983	0	0	516.32	0.103	111	1.938	3,027	200	1,009	94	109	-	-	
Sloped Attic Insul.	55	38	44	9	0	0	38	2													15,832	2.16	2,428	2.85	4,445	6,873	24	2,245	537	0	0	287.85	0.057	64	1.423	2,223	181	0.547	51	60	-	-	
Kneewall Insul.	25	20	22	2	0	0	20	1													5,345	0.33	368	0.40	618	986	3	313	38	0	0	213.78	0.016	18	0.396	618	49	0.153	14	19	-	-	
Infl. Reduction	139	124	112	22	0	0	123	5													126,835	2.51	2,684	2.23	3,479	6,163	25	2,297	369	0	0	912.48	0.020	22	0.445	696	50	0.220	24	17	-	-	
Found./Crawl. Insul.	81	35	67	11	0	0	33	3													55,107	2.45	2,805	0.41	645	3,450	17	1,615	252	0	0	680.34	0.074	85	0.138	215	99	0.259	24	23	-	-	
Bandicist Insul.	94	4	75	15	0	0	-	4													11,591	0.00	0	0.24	373	8	710	172	0	0	123.31	-	-	0.060	93	93	0.102	9	11	-	-		
Exhaust Ventilation	10	0	6	4	0	0	-	0													3,859	0.00	0	0.00	0	0	0	(0)	(45)	(33)	0	0	385.94	-	-	-	93	-	-0.080	-7	-8	-	-
Hi-Eff Htg Sys Repl	56	0	47	9	0	0	-	-													98,511	0.00	0	0.00	0	0	92	8,595	2,666	0	0	1759.12	-	-	-	-	-	1.962	183	296	-	-	
Std-Eff Htg Sys Repl	8	0	7	1	0	0	-	-													12,101	0.00	0	0.00	0	0	8	719	103	0	0	1512.61	-	-	-	-	-	1.102	103	103	-	-	
Electric Htg Sys Rep	0	0	0	0	0	0	-	0													0	0.00	0	0.00	0	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	-		
Heat Pump Repl	0	0	0	0	0	0	-	0													0	0.00	0	0.00	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	-			
Other Htg Sys Repl	0	0	0	0	0	0	-	0													0	0.00	0	0.00	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	-			
	Total	Electric	Gas	Propane	Fuel Oil	Other	Total	Electric	Gas	Propane	Fuel Oil	Other	Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu	Spending on Materials & Labor (\$)	Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu	Spending on Materials & Labor (\$)	Summer kW	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu					
Water Heating	135	41	90	4	0	0	438	121	302	15	0	0	21,556	0.0	0.1	9,353	9.3	2,297	177	0	0	159.67	0.000	0.002	228	0.103	26	44	-	-	44	-	-										
Temp. Reduct.	72	24	45	3	0	0	72	24	45	3	0	0	0	0.00	0.01	3,744	1.4	474	34	0	0	0.00	0.000	0.000	156	0.030	11	11	-	-	11	-	-										
WH Wrap	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Pipe Insul.	123	39	80	4	0	0	123	39	80	4	0	0	653	0.00	0.00	2,262	1.0	337	18	0	0	53.31	0.000	0.000	58	0.012	4	5	-	-	5	-	-										
LF Showerhead	18	4	14	0	0	0	18	4	14	0	0	0	376	0.00	0.02	948	0.5	143	0	0	0	20.87	0.000	0.005	237	0.033	10	10	-	-	10	-	-										
Faucet Aerator	122	36	83	3	0	0	197	53	139	5	0	0	572	0.00	0.05	2,359	0.9	278	11	0	0	4.69	0.000	0.001	66	0.011	3	4	-	-	4	-	-										
Std-Eff Wtr Htr Repl.	14	1	12	1	0	0	14	1	12	1	0	0	8,653	0.00	0.00	40	1.6	381	25	0	0	618.07	0.000	0.001	40	0.135	32	25	-	-	25	-	-										
Hi-Eff Wtr Htr Repl.	14	0	12	2	0	0	14	0	12	2	0	0	11,303	0.00	0.00	0	4.0	685	88	0	0	807.34	-	-	-	-	-	88	44	-	-	44	-	-									
Lighting	131	131					1,077	1,077					3,111	3.9	7.2	37,148	-	-	-	-	23.75	0.030	0.055	284	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
CFL (5W)	0	0					0	0				0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
CFL (7W)	0	0					0	0				0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
CFL (9W)	0	0					0	0				0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
CFL (11W)	0	0					0	0				0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
CFL (14W)	0	0					0	0				0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
CFL (15W)	131	131					1,077	1,077				3,111	3.90	7.21	37,148	-	-	-	-	-	23.75	0.030	0.055	284	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
CFL (18W)	0	0					0	0				0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
CFL (20W)	0	0					0	0				0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
CFL (23W)	0	0					0	0				0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
CFL (25W)	0	0					0	0				0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
CFL (30W)	0	0					0	0				0	0.00	0.00	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
CFL, unknown	0	0					0	0				0	0.00	0.00																													

**Operation: New View Community Action Agency
Calendar Year 2007
Costs, Fuel, and Demand Impacts for All Measures**

Measure	Number of Households with Impacts						Count of Households with Electricity Impacts by Season		Spending on Materials & Labor (\$)	Estimated First-Year Savings Electricity					Average Estimated First Year Measure Cost and Savings Average per Treated Household																
	Total	Electric	Gas	Propane	Fuel Oil	Other	Cooling	Heating		Summer		Annual kWh	Pk-Day therms	Gas Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu	Spending on Materials & Labor (\$)		Electricity		Gas									
										kWh	kWh							kWh	kWh	kWh	kWh	kWh	kWh	kWh	kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu
OVERALL	76	75	67	4	3	0	75	75	317,440	26.0	18.7	108,909	145	13,661	586	497	0	4176.84	0.346	0.249	1,452	2,169	204	146	166	-					
Shell & Htg. Sys.	76	67	67	4	3	0	67	75	257,214	17.0	19,698	6.0	9,188	28,886	142	13,069	566	497	0	3384.39	0.254	294	2,983	4,594	431	2,122	195	141	166	-	
Wall Insul.	45	42	42	0	1	0	42	2	55,185	6.88	8,070	1.67	2,574	10,644	39	3,593	0	52	0	1226.34	0.164	192	0.836	1,287	253	0.931	86	-	52	-	
Open Blown Ceiling Insul.	58	51	50	3	3	0	51	2	42,782	6.00	6,881	4.05	6,232	13,113	28	2,559	186	113	0	737.63	0.118	135	2,023	3,116	257	0.557	51	62	38	-	
Cavity Fill Insul	30	19	29	0	1	0	19	0	25,054	1.36	1,561	0.00	0	1,561	18	1,624	0	34	0	835.13	0.071	82	-	-	82	0.609	56	-	34	-	
Sloped Attic Insul.	30	22	29	0	1	0	22	0	7,311	0.79	948	0.00	0	948	8	775	0	5	0	243.68	0.036	43	-	-	43	0.291	27	-	5	-	
Kneewall Insul.	12	10	11	0	1	0	10	0	1,733	0.18	203	0.00	0	203	1	94	0	12	0	144.43	0.018	20	-	-	20	0.093	9	-	12	-	
Infltr. Reduction	75	67	66	4	3	0	67	2	9,791	1.27	1,454	0.12	192	1,646	7	624	60	39	0	130.54	0.019	22	0.062	96	25	0.103	9	15	13	-	
Found./Crawl. Insul.	23	7	18	4	1	0	7	0	20,816	0.56	581	0.00	0	581	8	723	167	31	0	905.06	0.080	83	-	-	83	0.437	40	42	31	-	
Bandajist Insul.	18	1	15	0	2	0	-	1	1,152	0.00	0	0.02	26	26	1	53	0	10	0	64.02	-	-	0.017	26	26	0.039	4	-	5	-	
Exhaust Ventilation	1	0	1	0	0	0	-	0	423	0.00	0	0.00	0	0	0	(5)	0	0	0	423.00	-	-	-	26	-	-0.054	-5	-	-	-	
Hi-Eff Htg Sys Repl	26	0	24	1	1	0	-	-	72,612	0.00	0	0.00	0	0	29	2,639	153	101	0	2792.76	-	-	-	-	-	1,196	110	153	101	-	
Std-Eff Htg Sys Repl	9	0	7	0	2	0	-	-	19,945	0.00	0	0.00	0	0	4	389	0	99	0	2216.11	-	-	-	-	-	0.604	56	-	49	-	
Electric Htg Sys Rep	1	1	0	0	0	0	-	1	409	0.00	0	0.11	164	164	0	0	0	0	0	408.92	-	-	0.107	164	164	-	-	-	-	-	
Heat Pump Repl	0	0	0	0	0	0	-	0	0	0.00	0	0.00	0	0	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	-	
Other Htg Sys Repl	0	0	0	0	0	0	-	0	0	0.00	0	0.00	0	0	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	-	
	Total	Electric	Gas	Propane	Fuel Oil	Other	Total	Electric	Gas	Propane	Fuel Oil	Other	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu			
Water Heating	44	7	36	1	0	0	75	9	65	1	0	0	19,711	0.0	0.0	714	3.1	592	20	0	0	447.98	0.000	0.002	102	0.087	16	20	-	-	
Temp. Reduct.	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	
WH Wrap	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	
Pipe Insul.	1	0	1	0	0	0	1	0	1	0	0	0	0	0.00	0.00	0	0.0	3	0	0	9.00	-	-	-	0.008	3	-	-	-	-	
LF Showerhead	20	1	19	0	0	0	20	1	19	0	0	0	167	0.00	0.01	237	0.4	129	0	0	8.35	0.000	0.005	237	0.022	7	-	-	-	-	
Faucet Aerator	30	5	25	0	0	0	33	5	28	0	0	0	92	0.00	0.01	223	0.1	37	0	0	3.05	0.000	0.001	45	0.005	1	-	-	-	-	
Std-Eff Wtr Htr Repl.	16	2	13	1	0	0	16	2	13	1	0	0	16,455	0.00	0.00	80	1.6	269	20	0	1028.41	0.000	0.001	40	0.127	21	20	-	-	-	
Hi-Eff Wtr Htr Repl.	5	1	4	0	0	0	5	1	4	0	0	0	2,989	0.00	0.00	174	0.9	154	0	0	597.85	0.000	0.004	174	0.236	38	-	-	-	-	
Lighting	74	74					904	904					6,328	4.7	8.7	44,992	-	-	-	-	85.51	0.064	0.118	608	-	-	-	-	-	-	
CFL (5W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-
CFL (7W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-
CFL (9W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-
CFL (11W)	1	1					6	6					42	0.01	0.03	133	-	-	-	-	42.00	0.014	0.026	133	-	-	-	-	-	-	
CFL (14W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	
CFL (15W)	28	28					279	279					1,953	1.01	1.87	9,623	-	-	-	-	69.75	0.036	0.067	344	-	-	-	-	-	-	
CFL (18W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	
CFL (20W)	7	7					77	77					539	0.34	0.63	3,246	-	-	-	-	77.00	-	-	-	-	-	-	-	-	-	
CFL (23W)	40	40					515	515					3,605	3.19	5.90	30,396	-	-	-	-	90.13	0.080	0.147	760	-	-	-	-	-	-	
CFL (25W)	6	6					27	27					189	0.17	0.31	1,594	-	-	-	-	31.50	0.028	0.052	266	-	-	-	-	-	-	
CFL (30W)	0	0					0	0					0	0.00	0.00	0	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	
CFL, unknown	0	0					0	0					0	0.00	0.00	0	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	
Refrigerator/Freezer	42	42					49	49					34,187	4.22	3.95	34,317	-	-	-	-	813.98	0.100	0.094	817	-	-	-	-	-	-	
Refrigerator Remova	1	1					1	1					25	0.09	0.08	653	-	-	-	-	25.00	0.085	0.080	693	-	-	-	-	-	-	
Refrigerator Exchange	39	39					40	40					31,250	3.41	3.19	27,720	-	-	-	-	801.28	0.087	0.082	711	-	-	-	-	-	-	
Freezer Removal	0	0					0	0					0	0.00	0.00	0	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	
Freezer Exchange	8	8					8	8					2,912	0.73	0.68	5,904	-	-	-	-	364.00	0.091	0.085	738	-	-	-	-	-	-	
Costs for Measures Without Energy Impacts Installed in 76 Total Households with Spending and/or Energy Impacts:																															
Total									246,534																						
Unspecified Insul.	70												17,425								248.93										
Duct Sealing	13												554								42.62										
Duct Insulation	10												2,344																		
Damming Material	31												716								23.11										
Htg. Sys. Tune & Clean	41												2,482								60.53										
Htg. Sys./WH Other	26												8,527								327.96										

**South Central Iowa Community Action Program
Calendar Year 2007
Costs, Fuel, and Demand Impacts for All Measures**

Measure	Number of Households with Impacts						Count of Households with Electricity Impacts by Season		Spending on Materials & Labor (\$)	Estimated First-Year Savings Electricity					Average Estimated First Year Measure Cost and Savings Average per Treated Household					Average per Treated Household											
	Total	Electric	Gas	Propane	Fuel Oil	Other	Cooling	Heating		Summer kW	kWh	Winter kW	kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu	Spending on Materials & Labor (\$)	Summer kW	kWh	Winter kW	kWh	Annual kWh	Pk-Day therms	Annual therms	Propane gallons	Fuel Oil gallons	Other Mbtu	
																															Summer kW
OVERALL	31	29	6	18	0	0	29	27	106,793	11.5	9,858	11.9	13,684	48,138	15	1,327	5,783	0	0	3444.94	0.396	0.441	1.660	2.457	221	321	-	-	-		
Shell & Htg. Sys.	31	25	6	18	0	0	25	6	90,578	9.5	9,858	9.3	13,684	23,542	15	1,286	5,667	0	0	2921.87	0.379	0.394	1.547	2,281	942	2,436	214	315	-	-	
Wall Insul.	14	10	2	10	0	0	10	1	11,090	2.58	2,456	0.58	862	3,318	1	112	800	0	0	792.12	0.238	0.246	0.584	862	332	0.636	56	80	-	-	
Open Blown Ceiling Insul.	29	24	5	17	0	0	24	6	23,320	4.05	4,254	5.61	8,276	12,530	5	429	1,385	0	0	804.13	0.189	0.177	0.935	1,379	522	0.976	86	81	-	-	
Cavity Fill Insul.	12	9	4	7	0	0	9	0	9,010	1.01	1,115	0.00	0	1,115	3	265	671	0	0	750.86	0.112	0.124	-	-	124	0.754	66	96	-	-	
Sloped Attic Insul.	6	6	0	4	0	0	6	1	1,744	0.46	457	1.78	2,620	3,077	0	0	208	0	0	290.70	0.077	0.076	1.776	2,620	513	-	-	52	-	-	
Kneewall Insul.	6	6	1	4	0	0	6	0	704	0.05	54	0.00	0	54	0	1	48	0	0	117.35	0.008	9	-	-	9	0.007	1	12	-	-	
Infltr. Reduction	31	25	6	18	0	0	25	6	7,867	0.61	658	0.74	1,098	1,756	1	64	306	0	0	253.77	0.024	0.026	0.124	183	70	0.121	11	17	-	-	
Found./Crawl. Insul.	17	9	2	12	0	0	8	2	6,128	0.92	864	0.46	685	1,549	0	34	224	0	0	360.48	0.116	0.108	0.232	342	172	0.193	17	19	-	-	
Bandage Insul.	15	3	2	9	0	0	-	3	795	0.00	0	0.00	0	145	0	6	51	0	0	48.97	-	-	0.033	48	48	0.033	3	6	-	-	
Exhaust Ventilation	0	0	0	0	0	0	-	0	0	0.00	0	0.00	0	0	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	-	-
Hi-Eff Htg Sys Repl	13	0	3	10	0	0	-	-	26,802	0.00	0	0.00	0	0	4	375	1,851	0	0	2061.73	-	-	-	-	-	-	1,422	125	185	-	-
Std-Eff Htg Sys Repl	1	0	0	1	0	0	-	-	3,178	0.00	0	0.00	0	0	0	0	123	0	0	3178.00	-	-	-	-	-	-	-	123	-	-	-
Electric Htg Sys Rep	0	0	0	0	0	0	-	0	0	0.00	0	0.00	0	0	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	-	-
Heat Pump Repl	0	0	0	0	0	0	-	0	0	0.00	0	0.00	0	0	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	-	-
Other Htg Sys Repl	0	0	0	0	0	0	-	0	0	0.00	0	0.00	0	0	0	0	0	0	0	0.00	-	-	-	-	-	-	-	-	-	-	-

6. DETAILED SPENDING AND IMPACT PROFILES BY AGENCY FOR UTILITY EXPENDITURES

This section provides tables of spending and impacts by agency for utility expenditures.

**New Opportunities
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings				Average Estimated First Year Measure Cost and Savings										
	Total	Electric	Gas	Cooling		Heating		Summer kW	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Average per Treated Household								
				kWh	kWh				kWh	kWh				Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms				
OVERALL (Energy Mea)	19	16	18	16	15		94,256	7.1		2.4		22,261	78	7,168	4960.85	0.443	0.163	1,391	4,338	398		
Shell & Htg. Sys.	19	16	18	15	19		88,704	5.7	6,885	1.9	2,933	9,818	78	7,100	4668.64	0.381	459	0.101	154	614	4,323	394
Wall Insul.	17	15	16	14	1		25,799	2.72	3,285	1.92	2,933	6,218	20	1,793	1517.61	0.195	235	1.919	2,933	415	1,228	112
Open Blown Ceiling Insul.	17	15	17	15	0		16,256	1.64	1,980	0.00	0	1,980	20	1,818	956.21	0.109	132	-	-	132	1,172	107
Cavity Fill Insul.	4	4	4	4	0		5,614	0.36	438	0.00	0	438	5	444	1403.54	0.091	110	-	-	110	1,218	111
Sloped Attic Insul.	11	9	11	9	0		8,734	0.79	955	0.00	0	955	14	1,293	794.03	0.088	106	-	-	106	1,289	118
Kneewall Insul.	4	4	4	4	0		1,851	0.10	124	0.00	0	124	1	112	462.69	0.026	31	-	-	31	0,306	28
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Found./Crawl. Insul.	7	1	7	1	0		4,602	0.09	103	0.00	0	103	2	160	657.43	0.085	103	-	-	103	0,250	23
Bandjoist Insul.	6	0	6	-	0		848	0.00	0	0.00	0	0	0	43	141.31	-	-	-	-	43	0,079	7
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Hi-Eff Htg Sys Repl	10	0	10	-	0		25,000	0.00	0	0.00	0	0	16	1,437	2500.00	-	-	-	-	-	1,575	144
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-

Measure	Number of Measures by Fuel Type			Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms	
	Total	Electric	Gas												
Water Heating	14	2	12	681	0.0	0.0	116	0.3	68	48.64	0.000	0.000	58	0.022	6
Temp. Reduct.	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
WH Wrap	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	14	2	12	81	0.00	0.00	116	0.1	46	5.79	0.000	0.000	58	0.011	4
LF Showerhead	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Faucet Aerator	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Std-Eff Wtr Htr Repl.	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Hi-Eff Wtr Htr Repl.	1	0	1	600	0.00	0.00	0	0.1	22	600.00	-	-	-	0.137	22
Lighting	15	15	132	924	0.8	0.0	7,791	-	-	61.60	0.055	0.000	519	-	-
CFL (5W)	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (7W)	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (9W)	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (11W)	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (14W)	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (15W)	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (18W)	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (20W)	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (23W)	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (25W)	15	15	132	924	0.82	0.00	7,791	-	-	61.60	0.055	0.000	519	-	-
CFL (30W)	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL_unknown	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator/Freezer	6	6	6	3,947	0.56	0.52	4,535	-	-	657.83	0.093	0.087	756	-	-
Refrigerator Removal	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator Exchange	6	6	5	3,547	0.47	0.44	3,797	-	-	591.17	0.078	0.073	633	-	-
Freezer Removal	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Freezer Exchange	1	1	1	400	0.09	0.08	738	-	-	400.00	0.091	0.085	738	-	-

Costs for Measures Without Energy Impacts Installed in 19 Total Households with Spending and/or Energy Impacts:

Measure	Total	Spending on Materials & Labor (\$)
Total	12,157	0.00
Unspecified Insul.	0	0.00
Duct Sealing	0	0.00
Duct Insulation	0	0.00
Damming Material	0	0.00
Htg. Sys. Tune & Clean	0	0.00
Htg. Sys./WH Other	0	0.00
Air Conditioning Work	0	0.00
Water Heater Repair	0	0.00
Refrigerator Coil Clean	0	0.00
Waterbed Mattress Pad	0	0.00
Programmable Tstat	0	0.00
Unspecified Utility Meas.	0	0.00
CO Detector	0	0.00
Smoke Detector	0	0.00
Fuses	0	0.00
Htg Sys Safety Check	0	0.00
Htg Sys Ventilation	9	1,350
Water Heater Ventilation	0	0.00
Bathroom Ventilation	0	0.00
Other Exhaust Ventilation	0	0.00
Health/Safety Repairs	0	0.00
Health/Safety Other	0	0.00
Consumables	0	0.00
General Repairs	0	0.00
Meter Refrig (no action)	0	0.00
Meter Freezer (no action)	0	0.00
Support	13	10,807
Landlord Contr Misc	0	0.00
Landlord Contr Furnace	0	0.00
Landlord Contr DHW	0	0.00
Client Contr (Any)	0	0.00
Unspecified	0	0.00

Total Reported Materials, Labor, and Support Costs: 106,413

Grand Total of Expenditures: 106,413

**Hawkeye Area Community Action Program
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings				Average Estimated First Year Measure Cost and Savings Average per Treated Household									
	Total	Electric	Gas	Cooling		Heating		Summer kWh	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer		Electricity		Annual kWh	Pk-Day therms	Gas Annual therms
				kWh	kWh				kWh	kWh					kWh	kWh	kWh	kWh			
OVERALL (Energy Mea)	194	174	140	174	166		464,490	46.7		4.9		161,262	294	27,589	2394.28	0.268	0.030	927	2.098	197	
Shell & Htg. Sys.	176	130	139	130	139		398,412	33.5	40,448	0.0	0	40,448	288	26,499	2263.70	0.258	0.000	0	311	2,074	191
Wall Insul.	105	90	83	90	0		136,176	14.19	17,119	0.00	0	17,119	95	8,743	1296.91	0.158	-	-	190	1.146	105
Open Blown Ceiling Insul.	136	116	102	116	0		87,677	16.61	20,033	0.00	0	20,033	82	7,557	644.69	0.143	-	-	173	0.806	74
Cavity Fill Insul.	10	5	9	5	0		8,730	0.30	356	0.00	0	356	9	853	872.97	0.059	-	-	71	1.031	95
Sloped Attic Insul.	19	16	15	16	0		4,580	0.87	1,049	0.00	0	1,049	7	626	241.05	0.054	-	-	66	0.454	42
Kneewall Insul.	15	13	13	13	0		3,875	0.47	563	0.00	0	563	3	277	258.36	0.036	-	-	43	0.232	21
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-
Found./Crawl. Insul.	71	16	66	16	0		81,002	1.10	1,328	0.00	0	1,328	29	2,654	1140.87	0.069	-	-	83	0.437	40
Bandjoist Insul.	54	0	54	-	0		8,543	0.00	0	0.00	0	0	3	273	158.20	-	-	-	-	0.055	5
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-
Hi-Eff Htg Sys Repl	40	0	40	-	0		67,829	0.00	0	0.00	0	60	5,516	1695.73	-	-	-	-	-	1,500	138
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-

Measure	Total	Electric	Gas	Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms
				Total	Electric	Gas												
Water Heating	60	11	49	98	23	75	13,962	0.0	0.0	3,015	5.5	1,090	232.70	0.000	0.004	274	0.112	22
Temp. Reduct.	28	7	21	28	7	21	0	0.00	0.00	1,092	0.6	204	0.00	0.000	0.000	156	0.028	10
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	3	2	1	3	2	1	15	0.00	0.00	116	0.0	4	4.83	0.000	0.000	58	0.011	4
LF Showerhead	19	3	16	21	3	18	159	0.00	0.02	711	0.5	151	8.37	0.000	0.005	237	0.031	9
Faucet Aerator	16	4	12	26	6	20	69	0.00	0.01	267	0.1	37	4.28	0.000	0.002	67	0.010	3
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Hi-Eff Wtr Htr Repl.	24	5	19	20	5	15	13,720	0.00	0.02	829	4.3	694	571.87	0.000	0.004	166	0.224	37
Lighting	164	164		1,793	1,793		12,521	7.9	0.0	75,588	-	-	76.35	0.048	0.000	461	-	-
CFL (5W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (11W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (15W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (20W)	164	164		1,793	1,793		12,521	7.94	0.00	75,588	-	-	76.35	0.048	0.000	461	-	-
CFL (23W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (25W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator/Freezer	68	68		60	60		39,595	5.19	4.85	42,210	-	-	582.29	0.076	0.071	621	-	-
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator Exchange	56	56		45	45		33,296	3.87	3.62	31,471	-	-	594.56	0.069	0.065	562	-	-
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Freezer Exchange	17	17		15	15		6,300	1.32	1.24	10,739	-	-	370.58	0.078	0.073	632	-	-

Costs for Measures Without Energy Impacts Installed in 194 Total Households with Spending and/or Energy Impacts:

Measure	Total	Spending on Materials & Labor (\$)
Total		55,570
Unspecified Insul.	0	0
Duct Sealing	0	0
Duct Insulation	0	0
Damming Material	0	0
Htg. Sys. Tune & Clean	0	0
Htg. Sys./WH Other	0	0
Air Conditioning Work	0	0
Water Heater Repair	0	0
Refrigerator Coil Clean	0	0
Waterbed Mattress Pad	0	0
Programmable Tstat	0	0
Unspecified Utility Meas.	0	0
CO Detector	0	0
Smoke Detector	0	0
Fuses	0	0
Htg Sys Safety Check	0	0
Htg Sys Ventilation	2	300
Water Heater Ventilation	2	164
Bathroom Ventilation	0	0
Other Exhaust Ventilation	0	0
Health/Safety Repairs	0	0
Health/Safety Other	0	0
Consumables	0	0
General Repairs	1	300
Meter Refrig (no action)	0	0
Meter Freezer (no action)	0	0
Support	194	54,806
Landlord Contr Misc	0	0
Landlord Contr Furnace	0	0
Landlord Contr DHW	0	0
Client Contr (Any)	0	0
Unspecified	0	0

Total Reported Materials, Labor, and Support Costs: 520,060

Grand Total of Expenditures: 520,060

**Community Action of Eastern Iowa
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings									
	Total	Electric	Gas	Cooling		Heating		Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Average per Treated Household									
				Summer kW	Winter kW			Summer kWh	Winter kWh				Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms					
OVERALL (Energy Mea)	102	79	98	79	77		301,905	23.7		2.7		86,781	171	16,855	2959.86	0.300	0.035	1,098	1,750	172		
Shell & Htg. Sys.	102	65	98	65	99		271,495	16.5	19,858	0.3	413	20,271	165	15,162	2661.71	0.253	306	0.003	4	312	1,683	155
Wall Insul.	55	42	54	42	0		69,828	6.41	7,727	0.00	0	7,727	52	4,795	1269.61	0.153	184	-	-	184	0.966	89
Open Blown Ceiling Insul.	77	60	73	60	1		32,521	6.64	8,014	0.27	413	8,426	28	2,558	422.35	0.111	134	0.268	413	140	0.381	35
Cavity Fill Insul.	18	10	17	10	0		8,424	0.51	614	0.00	0	614	9	873	468.01	0.051	61	-	-	61	0.558	51
Sloped Attic Insul.	26	20	25	20	0		5,861	1.60	1,929	0.00	0	1,929	11	970	225.42	0.080	96	-	-	96	0.422	39
Kneewall Insul.	15	12	14	12	0		4,071	0.36	433	0.00	0	433	2	202	271.41	0.030	36	-	-	36	0.157	14
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Found./Crawl. Insul.	48	14	46	14	0		33,436	0.95	1,142	0.00	0	1,142	13	1,149	696.59	0.068	82	-	-	82	0.272	25
Bandjoist Insul.	59	0	59	-	-		11,164	0.00	0	0.00	0	0	4	412	189.23	-	-	-	-	-	0.076	7
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Hi-Eff Htg Sys Repl	43	0	43	-	0		106,188	0.00	0	0.00	0	0	46	4,203	2469.49	-	-	-	-	-	1.063	98
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-

Measure	Number of Households with Impacts			Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings						
	Total	Electric	Gas	Total	Electric	Gas		Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms		
Water Heating	86	3	83	300	11	289	10,126	0.0	0.0	1,223	6.5	1,693	117.74	0.000	0.006	408	0.079	20	
Temp. Reduct.	82	3	79	82	3	79	0	0.00	0.00	0	468	1.7	600	0.00	0.000	0.000	156	0.022	8
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	39	1	38	39	1	38	222	0.00	0.00	0	58	0.3	115	5.69	0.000	0.000	58	0.009	3
LF Showerhead	52	2	50	52	2	50	520	0.00	0.01	474	1.2	368	10.00	0.000	0.005	237	0.024	7	
Faucet Aerator	66	3	63	117	5	112	351	0.00	0.01	223	0.5	162	5.32	0.000	0.002	74	0.008	3	
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-	
Hi-Eff Wtr Htr Repl.	15	0	15	10	0	10	9,033	0.00	0.00	0	2.7	448	602.18	-	-	-	-	0.183	30
Lighting	75	75	75	756	756	0	5,229	4.7	0.0	44,619	-	-	69.72	0.062	0.000	595	-	-	
CFL (5W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
CFL (11W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
CFL (15W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
CFL (20W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
CFL (23W)	67	67	67	682	682	0	4,774	4.23	0.00	40,252	-	-	71.25	0.063	0.000	601	-	-	
CFL (25W)	8	8	8	74	74	0	455	0.46	0.00	4,368	-	-	56.88	0.057	0.000	546	-	-	
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
Refrigerator/Freezer	28	28	28	29	29	0	15,056	2.54	2.38	20,668	-	-	537.71	0.091	0.085	738	-	-	
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
Refrigerator Exchange	22	22	22	20	20	0	11,549	1.74	1.63	14,172	-	-	524.95	0.079	0.074	644	-	-	
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-	
Freezer Exchange	10	10	10	9	9	0	3,507	0.80	0.75	6,496	-	-	350.70	0.080	0.075	650	-	-	

Costs for Measures Without Energy Impacts Installed in 102 Total Households with Spending and/or Energy Impacts:

Measure	Spending on Materials & Labor (\$)
Total	62,976
Unspecified Insul.	0
Duct Sealing	0
Duct Insulation	0
Damming Material	0
Htg. Sys. Tune & Clean	0
Htg. Sys./WH Other	0
Air Conditioning Work	0
Water Heater Repair	0
Refrigerator Coil Clean	0
Waterbed Mattress Pad	0
Programmable Tstat	13
Unspecified Utility Meas.	0
CO Detector	0
Smoke Detector	0
Fuses	0
Htg Sys Safety Check	0
Htg Sys Ventilation	42
Water Heater Ventilation	15
Bathroom Ventilation	0
Other Exhaust Ventilation	0
Health/Safety Repairs	0
Health/Safety Other	0
Consumables	0
General Repairs	95
Meter Refrig (no action)	0
Meter Freezer (no action)	0
Support	99
Landlord Contr Misc	0
Landlord Contr Furnace	0
Landlord Contr DHW	0
Client Contr (Any)	0
Unspecified	0

Total Reported Materials, Labor, and Support Costs: 364,882

Grand Total of Expenditures: 364,882

MATURA Action Corporation
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings							
	Total	Electric	Gas	Cooling		Heating		Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Average per Treated Household						
				Summer kWh	Winter kWh			Summer kWh	Winter kWh					Annual kWh	Pk-Day therms	Gas Annual therms				
OVERALL (Energy Mea)	29	22	25	22	20		88,281	11.2		2.1		27,891	87	7,848	3044.18	0.510	0.106	1,268	3.496	314
Shell & Htg. Sys.	29	22	25	22	26		76,289	9.8	11,783	1.4	1,995	13,778	85	7,298	2630.65	0.444	0.053	77	626	292
Wall Insul.	17	15	14	15	0		9,774	3.67	4,429	0.00	0	4,429	14	1,211	574.92	0.245	295	-	295	1,004
Open Blown Ceiling Insul.	28	22	24	22	1		15,510	4.24	5,115	1.22	1,757	6,872	24	2,037	553.93	0.193	233	1,217	1,757	312
Cavity Fill Insul.	5	4	4	4	0		1,153	0.31	378	0.00	0	378	2	181	230.57	0.078	95	-	95	524
Sloped Attic Insul.	7	4	6	4	0		1,286	0.44	525	0.00	0	525	5	438	183.68	0.109	131	-	131	847
Kneewall Insul.	7	5	5	5	0		415	0.25	304	0.00	0	304	1	52	59.29	0.050	61	-	61	122
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Found./Crawl. Insul.	14	8	11	8	1		4,198	0.85	1,031	0.16	238	1,269	3	292	299.86	0.107	129	0.165	238	159
Bandjoist Insul.	11	0	11	-	0		640	0.00	0	0.00	0	0	1	63	58.17	-	-	-	-	27
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Hi-Eff Htg Sys Repl	19	0	19	-	0		43,314	0.00	0	0.00	0	0	35	3,023	2279.68	-	-	-	-	1,847
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
	Total	Electric	Gas	Number of Measures by Fuel Type				Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Annual therms		Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Annual therms		
Water Heating	22	3	19	65	12	53	5,012	0.0	0.0	1,282	2.7	550	227.83	0.000	0.009	427	0.142	29		
Temp. Reduct.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-		
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-		
Pipe Insul.	18	3	15	18	3	15	108	0.00	0.00	174	0.2	72	6.00	0.000	0.000	58	0.014	5		
LF Showerhead	11	3	8	11	3	8	110	0.00	0.02	711	0.3	93	10.00	0.000	0.005	237	0.038	12		
Faucet Aerator	18	3	15	30	5	25	90	0.00	0.01	223	0.2	57	5.00	0.000	0.002	74	0.012	4		
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-		
Hi-Eff Wtr Htr Repl.	8	1	7	6	1	5	4,704	0.00	0.00	174	2.0	328	589.03	0.000	0.004	174	0.288	47		
Lighting	20	20		173	173		1,211	0.7	0.0	6,590	-	-	60.55	0.035	0.000	329	-	-		
CFL (6W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (7W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (9W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (11W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (14W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (15W)	19	19		138	138		966	0.50	0.00	4,760	-	-	50.84	0.026	0.000	251	-	-		
CFL (18W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (20W)	8	8		14	14		98	0.06	0.00	590	-	-	12.25	0.008	0.000	74	-	-		
CFL (23W)	8	8		21	21		147	0.13	0.00	1,239	-	-	18.38	0.016	0.000	155	-	-		
CFL (25W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (30W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL_unknown	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
Refrigerator/Freezer	10	10		9	9		5,769	0.77	0.72	6,242	-	-	576.90	0.077	0.072	624	-	-		
Refrigerator Removal	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
Refrigerator Exchange	9	9		8	8		5,369	0.69	0.65	5,626	-	-	596.56	0.077	0.072	625	-	-		
Freezer Removal	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
Freezer Exchange	1	1		1	1		400	0.08	0.07	616	-	-	400.00	0.076	0.071	616	-	-		
Costs for Measures Without Energy Impacts Installed in 29 Total Households with Spending and/or Energy Impacts:							18,198													
Total							18,198													
Unspecified Insul.							0	0.00												
Duct Sealing							0	0.00												
Duct Insulation							0	0.00												
Damming Material							0	0.00												
Htg. Sys. Tune & Clean							0	0.00												
Htg. Sys./WH Other							0	0.00												
Air Conditioning Work							0	0.00												
Water Heater Repair							0	0.00												
Refrigerator Coil Clean							0	0.00												
Waterbed Mattress Pad							0	0.00												
Programmable Tstat							0	0.00												
Unspecified Utility Meas.							0	0.00												
CO Detector							0	0.00												
Smoke Detector							0	0.00												
Fuses							0	0.00												
Htg Sys Safety Check							0	0.00												
Htg Sys Ventilation							2,095	104.77												
Water Heater Ventilation							10	55.02												
Bathroom Ventilation							0	0.00												
Other Exhaust Ventilation							0	0.00												
Health/Safety Repairs							0	0.00												
Health/Safety Other							0	0.00												
Consumables							0	0.00												
General Repairs							25	251.87												
Meter Refrig (no action)							0	0.00												
Meter Freezer (no action)							0	0.00												
Support							19	487.13												
Landlord Contr Misc							0	0.00												
Landlord Contr Furnace							0	0.00												
Landlord Contr DHW							0	0.00												
Client Contr (Any)							0	0.00												
Unspecified							0	0.00												

Total Reported Materials, Labor, and Support Costs: 106,479

Grand Total of Expenditures: 106,479

**Mid-Iowa Community Action
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household								
	Total	Electric	Gas	Cooling		Heating		Summer kWh	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer		Electricity		Annual kWh	Pk-Day therms	Gas Annual therms
				kWh	kWh				kWh	kWh					kWh	kWh	kWh	kWh			
OVERALL (Energy Mea)	111	99	94	99	97		328,564	28.5		17.3		105,098	312	29,784	2960.04	0.288	0.179	1,062	3.321	317	
Shell & Htg. Sys.	104	78	92	77	97		310,719	23.1	27,820	14.9	23,288	51,108	309	28,797	2987.68	0.300	0.154	240	655	3,359	
Wall Insul.	79	63	71	62	3		104,683	9.90	11,936	6.36	9,930	21,866	98	9,165	1325.10	0.160	0.193	2,120	3,310	347	
Open Blown Ceiling Insul.	87	70	75	69	5		55,409	6.89	8,310	2.72	4,250	12,560	57	5,353	636.88	0.100	0.120	0.544	850	179	
Cavity Fill Insul.	35	25	32	25	1		15,605	2.31	2,786	1.94	3,027	5,813	31	2,894	445.86	0.092	0.111	1,938	3,027	233	
Sloped Attic Insul.	43	30	39	30	2		12,096	1.69	2,037	2.85	4,445	6,482	22	2,096	281.31	0.056	0.068	1,423	2,223	216	
Kneewall Insul.	22	17	20	17	1		4,597	0.24	286	0.40	618	904	3	273	208.97	0.014	0.017	0.396	618	53	
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0.00	-	-	-	-	-	-	
Found./Crawl. Insul.	63	31	56	29	3		40,436	2.04	2,465	0.41	645	3,110	14	1,338	641.85	0.070	0.085	0.138	215	100	
Bandjoist Insul.	69	4	65	-	4		8,498	0.00	0	0.24	373	373	7	614	123.15	-	0.060	0.060	93	93	
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0.00	-	-	-	-	-	-	
Hi-Eff Htg Sys Repl	40	0	40	-	0		69,395	0.00	0	0.00	0	0	76	7,064	1734.88	-	-	-	-	-	
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0.00	-	-	-	-	-	-	
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0.00	-	-	-	-	-	-	
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0.00	-	-	-	-	-	-	
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0.00	-	-	-	-	-	-	

Measure	Total	Electric	Gas	Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms
				Total	Electric	Gas												
Water Heating	94	26	68	290	76	214	1,952	0.0	0.1	5,652	3.2	987	20.77	0.000	0.002	217	0.047	15
Temp. Reduct.	45	14	31	45	14	31	0	0.00	0.00	2,184	0.9	326	0.00	0.000	0.000	156	0.030	11
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	87	24	63	87	24	63	458	0.00	0.00	1,392	0.8	265	5.26	0.000	0.000	58	0.012	4
LF Showerhead	12	2	10	12	2	10	257	0.00	0.01	474	0.3	102	21.43	0.000	0.005	237	0.033	10
Faucet Aerator	88	25	63	145	36	109	417	0.00	0.04	1,602	0.7	218	4.74	0.000	0.001	64	0.011	3
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Hi-Eff Wtr Htr Repl.	1	0	1	1	0	1	820	0.00	0.00	0	0.5	75	820.48	-	-	-	-	0.460
Lighting	95	95		807	807		2,319	2.9	0.0	27,835	-	-	24.41	0.031	0.000	293	-	-
CFL (5W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (11W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (15W)	95	95		807	807		2,319	2.92	0.00	27,835	-	-	24.41	0.031	0.000	293	-	-
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (20W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (23W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (25W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator/Freezer	28	28		29	29		13,574	2.52	2.36	20,502	-	-	484.77	0.090	0.084	732	-	-
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator Exchange	20	20		20	20		10,629	1.70	1.59	13,860	-	-	531.46	0.085	0.080	693	-	-
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Freezer Exchange	9	9		9	9		2,944	0.82	0.76	6,642	-	-	327.16	0.091	0.085	738	-	-

Costs for Measures Without Energy Impacts Installed in 111 Total Households with Spending and/or Energy Impacts:

Measure	Total	Electric	Gas	Spending on Materials & Labor (\$)
Total				56,402
Unspecified Insul.	1			130
Duct Sealing	0			0
Duct Insulation	1			45
Damming Material	0			0
Htg. Sys. Tune & Clean	0			0
Htg. Sys./WH Other	0			0
Air Conditioning Work	0			0
Water Heater Repair	0			0
Refrigerator Coil Clean	0			0
Waterbed Mattress Pad	0			0
Programmable Tstat	0			0
Unspecified Utility Meas.	0			0
CO Detector	0			0
Smoke Detector	0			0
Fuses	0			0
Htg Sys Safety Check	0			0
Htg Sys Ventilation	37			4,477
Water Heater Ventilation	22			1,276
Bathroom Ventilation	0			0
Other Exhaust Ventilation	0			0
Health/Safety Repairs	0			0
Health/Safety Other	0			0
Consumables	0			0
General Repairs	80			15,665
Meter Refrig (no action)	0			0
Meter Freezer (no action)	0			0
Support	111			34,809
Landlord Contr Misc	0			0
Landlord Contr Furnace	0			0
Landlord Contr DHW	0			0
Client Contr (Any)	0			0
Unspecified	0			0

Total Reported Materials, Labor, and Support Costs: 384,966

Grand Total of Expenditures: 384,966

**North Iowa Community Action Organization
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household								
	Total	Electric	Gas	Cooling		Heating		Summer kWh	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer		Electricity		Annual kWh	Pk-Day therms	Gas Annual therms
				kWh	kWh				kWh	kWh					kWh	kWh	kWh	kWh			
OVERALL (Energy Mea)	148	140	138	140	139		356,868	41.4		16.8		170,158	258	26,292	2411.27	0.296	0.121	1,215	1.869	191	
Shell & Htg. Sys.	146	131	138	130	142		272,136	27.4	33,049	9.0	14,809	47,857	252	24,804	1863.95	0.211	0.063	104	365	1,823	
Wall Insul.	87	76	84	76	1		69,347	9.91	11,947	1.73	2,865	14,812	73	7,204	797.09	0.130	1.734	2,865	195	0.870	
Open Blown Ceiling Insul.	140	126	133	126	3		57,334	12.35	14,899	3.92	6,472	21,371	74	7,256	409.53	0.098	1.18	1,306	2,157	170	
Cavity Fill Insul.	30	24	28	24	1		8,175	1.24	1,494	0.37	605	2,099	12	1,159	272.51	0.052	0.366	605	87	0.420	
Sloped Attic Insul.	52	45	50	44	2		14,245	2.64	3,181	2.35	3,887	7,068	22	2,208	273.94	0.060	1.176	1,943	157	0.448	
Kneewall Insul.	25	19	25	19	0		5,782	0.69	832	0.00	0	832	7	733	231.30	0.036	0.44	-	44	0.297	
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	
Found./Crawl. Insul.	44	11	42	10	2		7,289	0.58	696	0.59	980	1,676	4	359	165.67	0.058	0.297	490	152	0.087	
Bandjoist Insul.	46	0	46	-	0		3,790	0.00	0	0.00	0	0	3	280	82.40	-	-	-	-	0.062	
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	
Hi-Eff Htg Sys Repl	66	0	66	-	0		106,173	0.00	0	0.00	0	0	57	5,604	1608.68	-	-	-	-	0.861	
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	

Measure	Number of Households with Impacts			Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household					
	Total	Electric	Gas	Total	Electric	Gas		Summer kWh	Winter kWh		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms
Water Heating	136	3	133	366	5	361	14,980	0.0	0.0	379	6.4	1,489	110.15	0.000	0.002	126	0.048	11
Temp. Reduct.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	115	2	113	115	2	113	221	0.00	0.00	116	0.9	296	1.93	0.000	0.000	58	0.008	3
LF Showerhead	61	0	61	61	0	61	268	0.00	0.00	0	1.3	388	4.39	-	-	-	0.021	6
Faucet Aerator	108	2	106	170	2	168	81	0.00	0.00	89	0.7	209	0.75	0.000	0.001	45	0.006	2
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Hi-Eff Wtr Htr Repl.	25	1	24	20	1	19	14,410	0.00	0.00	174	3.6	595	575.41	0.000	0.004	174	0.152	25
Lighting	131	131		1,559	1,559		8,963	5.6	0.0	53,774	-	-	68.42	0.043	0.000	410	-	-
CFL (5W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (11W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (15W)	131	131		1,559	1,559		8,963	5.65	0.00	53,774	-	-	68.42	0.043	0.000	410	-	-
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (20W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (23W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (25W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator/Freezer	96	96		96	96		60,789	8.38	7.84	68,147	-	-	633.21	0.087	0.082	710	-	-
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator Exchange	71	71		55	55		41,822	4.71	4.41	38,313	-	-	589.04	0.066	0.062	540	-	-
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Freezer Exchange	49	49		40	40		18,967	3.67	3.43	29,835	-	-	387.08	0.075	0.070	609	-	-

Costs for Measures Without Energy Impacts Installed in 148 Total Households with Spending and/or Energy Impacts:

Measure	Total	Spending on Materials & Labor (\$)
Total	78,824	78,824
Unspecified Insul.	0	0.00
Duct Sealing	0	0.00
Duct Insulation	0	0.00
Damming Material	0	0.00
Htg. Sys. Tune & Clean	0	0.00
Htg. Sys./WH Other	0	0.00
Air Conditioning Work	0	0.00
Water Heater Repair	0	0.00
Refrigerator Coil Clean	0	0.00
Waterbed Mattress Pad	0	0.00
Programmable Tstat	0	0.00
Unspecified Utility Meas.	0	0.00
CO Detector	0	0.00
Smoke Detector	0	0.00
Fuses	0	0.00
Htg Sys Safety Check	0	0.00
Htg Sys Ventilation	7	862
Water Heater Ventilation	16	1,812
Bathroom Ventilation	0	0.00
Other Exhaust Ventilation	0	0.00
Health/Safety Repairs	0	0.00
Health/Safety Other	0	0.00
Consumables	0	0.00
General Repairs	129	30,293
Meter Refrig (no action)	0	0.00
Meter Freezer (no action)	0	0.00
Support	148	45,858
Landlord Contr Misc	0	0.00
Landlord Contr Furnace	0	0.00
Landlord Contr DHW	0	0.00
Client Contr (Any)	0	0.00
Unspecified	0	0.00

Total Reported Materials, Labor, and Support Costs: 435,692

Grand Total of Expenditures: 435,692

Northeast Iowa Community Action Corporation
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household								
	Total	Electric	Gas	Cooling		Heating		Summer kW	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer		Electricity		Annual kWh	Pk-Day therms	Gas Annual therms
				kWh	kWh				kWh	kWh					kWh	kWh	kWh	kWh			
OVERALL (Energy Mea)	76	65	54	65	60		150,239	13.0		5.3		59,369	70	6,936	1976.83	0.199	0.089	913	1.292	128	
Shell & Htg. Sys.	61	40	49	38	52		111,391	8.1	9,733	2.1	3,272	13,005	66	6,178	1826.08	0.212	0.256	63	325	1,354	
Wall Insul.	25	17	21	17	0		19,010	2.44	2,940	0.00	0	2,940	17	1,549	760.40	0.143	173	-	173	0.792	
Open Blown Ceiling Insul.	45	34	36	34	1		25,743	4.76	5,745	0.75	1,165	6,910	19	1,738	572.06	0.140	169	0.747	1,165	0.518	
Cavity Fill Insul.	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	
Sloped Attic Insul.	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	
Kneewall Insul.	5	4	4	4	1		2,703	0.40	486	1.03	1,616	2,101	2	209	540.59	0.101	121	1,035	1,616	0.561	
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	
Found./Crawl. Insul.	18	7	16	7	0		8,171	0.47	562	0.00	0	562	2	218	453.92	0.067	80	-	-	80	
Bandjoist Insul.	23	2	21	-	2		3,430	0.00	0	0.22	345	345	2	195	149.13	-	0.110	172	172	0.099	
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	
Hi-Eff Htg Sys Repl	21	0	21	-	0		49,835	0.00	0	0.00	0	0	24	2,271	2373.08	-	-	-	-	1,161	
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	
Electric Htg Sys Repl	1	1	0	-	1		2,500	0.00	0	0.09	146	146	0	0	2500.00	-	0.094	146	146	-	
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	

Measure	Number of Households with Impacts			Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms
	Total	Electric	Gas	Total	Electric	Gas												
Water Heating	58	20	39	118	41	77	15,505	0.0	0.0	4,606	3.4	758	267.33	0.000	0.001	230	0.088	19
Temp. Reduct.	51	18	33	51	18	33	0	0.00	0.01	2,808	0.8	271	0.00	0.000	0.000	156	0.024	8
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	50	19	31	50	19	31	99	0.00	0.00	1,102	0.3	102	1.98	0.000	0.000	58	0.009	3
LF Showerhead	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Faucet Aerator	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Hi-Eff Wtr Htr Repl.	26	4	22	17	4	13	15,406	0.00	0.02	696	2.4	385	592.54	0.000	0.004	174	0.107	18
Lighting	53	53		317	317		1,288	1.4	0.0	13,694	-	-	23.92	0.027	0.000	258	-	-
CFL (6W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (11W)	1	1		2	2		8	0.00	0.00	44	-	-	8.00	0.005	0.000	44	-	-
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (15W)	22	22		108	108		432	0.39	0.00	3,725	-	-	19.64	0.018	0.000	169	-	-
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (20W)	37	37		136	136		544	0.60	0.00	5,733	-	-	14.70	0.016	0.000	155	-	-
CFL (23W)	6	6		22	22		88	0.14	0.00	1,298	-	-	14.67	0.023	0.000	216	-	-
CFL (25W)	16	16		49	49		196	0.30	0.00	2,892	-	-	12.25	0.019	0.000	181	-	-
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator/Freezer	36	36		40	40		22,075	3.45	3.23	28,064	-	-	613.19	0.096	0.090	780	-	-
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator Exchange	29	29		26	26		16,341	2.19	2.05	17,830	-	-	563.48	0.076	0.071	615	-	-
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Freezer Exchange	15	15		14	14		5,734	1.26	1.18	10,235	-	-	382.27	0.084	0.078	682	-	-

Costs for Measures Without Energy Impacts Installed in 77 Total Households with Spending and/or Energy Impacts:

Measure	Cost
Total	27,338
Unspecified Insul.	0
Duct Sealing	0
Duct Insulation	0
Damming Material	0
Htg. Sys. Tune & Clean	0
Htg. Sys./WH Other	0
Air Conditioning Work	0
Water Heater Repair	0
Refrigerator Coil Clean	0
Waterbed Mattress Pad	0
Programmable Tstat	0
Unspecified Utility Meas.	0
CO Detector	0
Smoke Detector	0
Fuses	0
Htg Sys Safety Check	0
Htg Sys Ventilation	25
Water Heater Ventilation	23
Bathroom Ventilation	0
Other Exhaust Ventilation	0
Health/Safety Repairs	0
Health/Safety Other	0
Consumables	0
General Repairs	28
Meter Refrig (no action)	0
Meter Freezer (no action)	0
Support	77
Landlord Contr Misc	0
Landlord Contr Furnace	0
Landlord Contr DHW	0
Client Contr (Any)	0
Unspecified	0

Total Reported Materials, Labor, and Support Costs: 177,577

Grand Total of Expenditures: 177,577

**Operation: New View Community Action Agency
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings							
	Total	Electric	Gas	Cooling		Heating		Electricity				Spending on Materials & Labor (\$)	Average per Treated Household							
				Summer kW	Winter kW			Annual kWh	Pk-Day therms	Gas Annual therms	Summer kW		Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms				
OVERALL (Energy Mea)	72	68	53	68	67		163,797	20.9		7.3		87,613	84	7,906	2274.95	0.307	0.109	1,288	1,589	149
Shell & Htg. Sys.	68	58	49	58	51		131,287	13.7	16,574	4.5	6,971	23,545	83	7,610	1930.69	0.237	0.089	137	406	1,690
Wall Insul.	43	40	28	40	2		40,737	6.19	7,464	1.28	1,964	9,428	27	2,441	947.37	0.155	0.638	982	236	0.948
Open Blown Ceiling Insul.	54	47	37	47	2		28,970	5.10	6,152	3.24	4,985	11,137	19	1,792	536.48	0.109	1.618	2,493	237	0.527
Cavity Fill Insul.	26	18	19	18	0		18,208	1.17	1,407	0.00	0	1,407	12	1,098	700.29	0.065	-	-	-	0.628
Sloped Attic Insul.	29	21	21	21	0		5,691	0.78	940	0.00	0	940	6	595	196.26	0.037	-	-	-	0.308
Kneewall Insul.	10	8	7	8	0		935	0.14	171	0.00	0	171	1	55	93.50	0.018	-	-	-	0.086
Infil. Reduction	1	1	0	1	0		29	0.02	26	0.00	0	26	0	0	29.18	0.022	-	-	-	0.086
Found./Crawl. Insul.	18	5	16	5	0		15,008	0.34	415	0.00	0	415	8	703	833.80	0.069	-	-	-	0.478
Bandjoist Insul.	11	1	10	-	1		701	0.00	0	0.01	21	21	0	37	63.74	-	0.013	21	21	0.041
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Hi-Eff Htg Sys Repl	9	0	9	-	0		21,007	0.00	0	0.00	0	0	10	890	2334.13	-	-	-	-	1.075
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-

Measure	Number of Households with Impacts			Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings					
	Total	Electric	Gas	Total	Electric	Gas		Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms	Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms	
Water Heating	32	4	28	49	4	45	3,204	0.0	0.0	308	1.4	296	100.12	0.000	0.002	77	0.050	11
Temp. Reduct.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
LF Showerhead	16	0	16	16	0	16	136	0.00	0.00	0	0.4	109	8.50	-	-	-	-	0.022
Faucet Aerator	26	3	23	28	3	25	79	0.00	0.00	0	0.1	33	3.02	0.000	0.001	-	-	0.005
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Hi-Eff Wtr Htr Repl.	5	1	4	5	1	4	2,989	0.00	0.00	174	0.9	154	597.85	0.000	0.004	-	-	0.236
Lighting	65	65	800	800	0	0	5,600	4.2	0.0	39,841	-	-	86.15	0.064	0.000	613	-	-
CFL (6W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (11W)	1	1	6	6	6	6	42	0.01	0.00	133	-	-	42.00	0.014	0.000	133	-	-
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (15W)	25	25	247	247	0	0	1,729	0.89	0.00	8,520	-	-	69.16	0.036	0.000	341	-	-
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (20W)	6	6	65	65	65	65	455	0.29	0.00	2,740	-	-	75.83	0.048	0.000	457	-	-
CFL (23W)	35	35	455	455	455	455	3,185	2.82	0.00	26,854	-	-	91.00	0.081	0.000	767	-	-
CFL (25W)	6	6	27	27	27	27	189	0.17	0.00	1,594	-	-	31.50	0.028	0.000	266	-	-
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator/Freezer	38	38	34	34	0	0	23,706	2.94	2.75	23,919	-	-	623.84	0.077	0.072	629	-	-
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator Exchange	36	36	28	28	28	28	21,600	2.42	2.26	19,657	-	-	600.00	0.067	0.063	546	-	-
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Freezer Exchange	6	6	6	6	6	6	2,106	0.52	0.49	4,263	-	-	351.00	0.087	0.082	710	-	-

Costs for Measures Without Energy Impacts Installed in 72 Total Households with Spending and/or Energy Impacts:

Measure	Spending on Materials & Labor (\$)
Total	20,608
Unspecified Insul.	0
Duct Sealing	0
Duct Insulation	0
Damming Material	0
Htg. Sys. Tune & Clean	0
Htg. Sys./WH Other	0
Air Conditioning Work	0
Water Heater Repair	0
Refrigerator Coil Clean	0
Waterbed Mattress Pad	0
Programmable Tstat	0
Unspecified Utility Meas.	0
CO Detector	0
Smoke Detector	0
Fuses	0
Htg Sys Safety Check	0
Htg Sys Ventilation	381
Water Heater Ventilation	146
Bathroom Ventilation	0
Other Exhaust Ventilation	0
Health/Safety Repairs	0
Health/Safety Other	0
Consumables	0
General Repairs	249
Meter Refrig (no action)	0
Meter Freezer (no action)	0
Support	19,831
Landlord Contr Misc	0
Landlord Contr Furnace	0
Landlord Contr DHW	0
Client Contr (Any)	0
Unspecified	0

Total Reported Materials, Labor, and Support Costs: 184,404

Grand Total of Expenditures: 184,404

**Operation Threshold
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings									
	Total	Electric	Gas	Cooling		Heating		Electricity				Annual kWh	Pk-Day therms	Gas Annual therms	Average per Treated Household							
				Summer kW	Winter kW			Summer kWh	Winter kWh	Summer kW	Winter kW				Annual kWh	Pk-Day therms	Gas Annual therms					
OVERALL (Energy Mea)	69	63	62	63	61		186,009	17.7		5.3		64,855	111	11,016	2695.78	0.281	0.086	1,029	1.796	178		
Shell & Htg. Sys.	67	51	62	51	64		154,042	12.9	15,535	2.7	4,255	19,790	106	9,837	2299.14	0.253	305	0.043	66	388	1,703	159
Wall Insul.	57	44	52	44	2		76,257	6.70	8,083	2.24	3,497	11,580	42	3,896	1337.84	0.152	184	1.120	1,749	263	0.804	75
Open Blown Ceiling Insul.	52	43	48	43	2		24,135	4.60	5,546	0.49	758	6,303	25	2,365	464.14	0.107	129	0.243	379	147	0.529	49
Cavity Fill Insul.	15	9	14	9	0		9,062	0.69	837	0.00	0	837	9	832	604.13	0.077	93	-	-	93	0.638	59
Sloped Attic Insul.	11	9	10	9	0		4,711	0.67	805	0.00	0	805	5	436	428.28	0.074	89	-	-	89	0.468	44
Kneewall Insul.	6	5	5	5	0		1,263	0.08	101	0.00	0	101	1	63	210.50	0.017	20	-	-	20	0.136	13
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Found./Crawl. Insul.	15	3	15	3	0		4,287	0.13	162	0.00	0	162	2	158	285.81	0.045	54	-	-	54	0.113	11
Bandjoist Insul.	23	0	23	-	0		2,652	0.00	0	0.00	0	0	1	133	115.32	-	-	-	-	-	0.062	6
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Hi-Eff Htg Sys Repl	18	0	18	-	0		31,675	0.00	0	0.00	0	0	21	1,953	1759.69	-	-	-	-	-	1.165	109
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-

Measure	Number of Households with Impacts			Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings					
	Total	Electric	Gas	Total	Electric	Gas		Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms	Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms	
Water Heating	65	9	56	213	33	180	13,323	0.0	0.1	3,067	5.7	1,179	204.97	0.000	0.007	341	0.102	21
Temp. Reduct.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	61	9	52	61	9	52	363	0.00	0.00	522	0.4	154	5.95	0.000	0.000	58	0.009	3
LF Showerhead	40	7	33	40	7	33	400	0.00	0.04	1,659	0.8	237	10.00	0.000	0.005	237	0.023	7
Faucet Aerator	52	9	43	94	16	78	282	0.00	0.02	712	0.4	110	5.42	0.000	0.002	79	0.008	3
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Hi-Eff Wtr Htr Repl.	21	1	20	18	1	17	12,278	0.00	0.00	174	4.2	679	584.65	0.000	0.004	174	0.208	34
Lighting	56	56	0	370	370	0	2,604	2.2	0.0	20,513	-	-	46.50	0.038	0.000	366	-	-
CFL (6W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (11W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (15W)	12	12	0	54	54	0	392	0.20	0.00	1,863	-	-	32.67	0.016	0.000	155	-	-
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (20W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (23W)	55	55	0	316	316	0	2,212	1.96	0.00	18,650	-	-	40.22	0.036	0.000	339	-	-
CFL (25W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator/Freezer	27	27	0	30	30	0	16,040	2.64	2.47	21,485	-	-	594.07	0.098	0.092	796	-	-
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator Exchange	20	20	0	18	18	0	11,415	1.57	1.47	12,744	-	-	570.75	0.078	0.073	637	-	-
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Freezer Exchange	13	13	0	12	12	0	4,625	1.08	1.01	8,741	-	-	355.77	0.083	0.077	672	-	-

Costs for Measures Without Energy Impacts Installed in 69 Total Households with Spending and/or Energy Impacts:

Measure	Count	Spending on Materials & Labor (\$)	Average per Treated Household
Total		35,795	
Unspecified Insul.	0	0	0.00
Duct Sealing	0	0	0.00
Duct Insulation	0	0	0.00
Damming Material	0	0	0.00
Htg. Sys. Tune & Clean	0	0	0.00
Htg. Sys./WH Other	1	239	238.54
Air Conditioning Work	0	0	0.00
Water Heater Repair	0	0	0.00
Refrigerator Coil Clean	0	0	0.00
Waterbed Mattress Pad	0	0	0.00
Programmable Tstat	0	0	0.00
Unspecified Utility Meas.	0	0	0.00
CO Detector	0	0	0.00
Smoke Detector	0	0	0.00
Fuses	0	0	0.00
Htg Sys Safety Check	0	0	0.00
Htg Sys Ventilation	3	390	130.00
Water Heater Ventilation	12	1,556	129.70
Bathroom Ventilation	0	0	0.00
Other Exhaust Ventilation	0	0	0.00
Health/Safety Repairs	0	0	0.00
Health/Safety Other	0	0	0.00
Consumables	0	0	0.00
General Repairs	61	14,274	234.00
Meter Refrig (no action)	0	0	0.00
Meter Freezer (no action)	0	0	0.00
Support	66	19,336	292.97
Landlord Contr Misc	0	0	0.00
Landlord Contr Furnace	0	0	0.00
Landlord Contr DHW	0	0	0.00
Client Contr (Any)	0	0	0.00
Unspecified	0	0	0.00

Total Reported Materials, Labor, and Support Costs: 221,804

Grand Total of Expenditures: 221,804

**Red Rock Area Community Action
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household							
	Total	Electric	Gas	by Season				Summer kW	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	
				Cooling	Electric	Heating			Summer kWh	Winter kWh					Summer kWh	Winter kWh				Summer kWh
OVERALL (Energy Mea)	45	36	37	36	35		120,301	9.3		3.9		32,462	71	6,766	2673.35	0.259	0.113	902	1.913	183
Shell & Htg. Sys.	43	33	37	32	39		101,614	7.2	8,704	2.9	4,593	13,297	69	6,400	2363.10	0.226	0.075	118	403	1,856
Wall Insul.	19	16	16	16	1		17,456	2.64	3,188	0.63	985	4,173	17	1,541	918.74	0.165	0.630	985	261	1,034
Open Blown Ceiling Insul.	36	28	33	28	0		28,040	3.89	4,697	0.00	0	4,697	20	1,851	778.89	0.139	168	-	168	0.602
Cavity Fill Insul.	2	2	1	1	1		910	0.10	125	0.82	1,288	1,413	1	57	455.00	0.104	125	0.825	1,288	0.610
Sloped Attic Insul.	6	5	4	4	1		1,650	0.39	467	1.35	2,108	2,575	3	274	275.00	0.097	117	1,350	2,108	0.735
Kneewall Insul.	7	7	5	7	0		2,093	0.19	227	0.00	0	227	1	51	298.99	0.027	32	-	32	0.109
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Found./Crawl. Insul.	8	0	8	0	0		4,772	0.00	0	0.00	0	0	1	101	596.50	-	-	-	-	0.135
Bandjoist Insul.	17	1	16	-	1		2,670	0.00	0	0.14	213	213	2	151	157.06	-	0.136	213	213	0.101
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Hi-Eff Htg Sys Repl	19	0	19	-	0		44,022	0.00	0	0.00	0	0	25	2,375	2316.97	-	-	-	-	1.341
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-

Measure	Total	Electric	Gas	Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms
				Total	Electric	Gas												
Water Heating	23	4	20	30	9	21	9,644	0.0	0.0	745	2.1	366	419.30	0.000	0.003	186	0.105	18
Temp. Reduct.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	7	3	4	7	3	4	36	0.00	0.00	174	0.0	13	5.14	0.000	0.000	58	0.009	3
LF Showerhead	5	1	4	5	1	4	44	0.00	0.01	237	0.1	31	8.80	0.000	0.005	237	0.025	8
Faucet Aerator	4	2	2	8	4	4	24	0.00	0.00	178	0.0	6	6.00	0.000	0.002	89	0.010	3
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Hi-Eff Wtr Htr Repl.	16	1	15	10	1	9	9,540	0.00	0.00	156	1.9	316	596.25	0.000	0.004	156	0.129	21
Lighting	34	34		254	254		1,799	1.0	0.0	9,781	-	-	52.91	0.030	0.000	288	-	-
CFL (6W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (11W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (15W)	31	31		121	121		868	0.44	0.00	4,174	-	-	28.00	0.014	0.000	135	-	-
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (20W)	33	33		133	133		931	0.59	0.00	5,607	-	-	28.21	0.018	0.000	170	-	-
CFL (23W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (25W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator/Freezer	13	13		12	12		7,244	1.06	0.99	8,639	-	-	557.25	0.082	0.076	665	-	-
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator Exchange	11	11		10	10		6,076	0.84	0.79	6,838	-	-	552.34	0.076	0.071	622	-	-
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Freezer Exchange	3	3		2	2		1,169	0.22	0.21	1,801	-	-	389.50	0.074	0.069	600	-	-

Costs for Measures Without Energy Impacts Installed in 46 Total Households with Spending and/or Energy Impacts:

Measure	Total	Electric	Gas	Spending on Materials & Labor (\$)
Total	0	0	0	22,653
Unspecified Insul.	0	0	0	0.00
Duct Sealing	0	0	0	0.00
Duct Insulation	0	0	0	0.00
Damming Material	0	0	0	0.00
Htg. Sys. Tune & Clean	0	0	0	0.00
Htg. Sys./WH Other	0	0	0	0.00
Air Conditioning Work	0	0	0	0.00
Water Heater Repair	0	0	0	0.00
Refrigerator Coil Clean	0	0	0	0.00
Waterbed Mattress Pad	0	0	0	0.00
Programmable Tstat	1	0	0	22.71
Unspecified Utility Meas.	0	0	0	0.00
CO Detector	0	0	0	0.00
Smoke Detector	0	0	0	0.00
Fuses	0	0	0	0.00
Htg Sys Safety Check	0	0	0	0.00
Htg Sys Ventilation	19	0	0	2,822
Water Heater Ventilation	7	0	0	921
Bathroom Ventilation	0	0	0	0.00
Other Exhaust Ventilation	0	0	0	0.00
Health/Safety Repairs	0	0	0	0.00
Health/Safety Other	0	0	0	0.00
Consumables	0	0	0	0.00
General Repairs	36	0	0	8,981
Meter Refrig (no action)	0	0	0	0.00
Meter Freezer (no action)	0	0	0	0.00
Support	35	0	0	9,907
Landlord Contr Misc	0	0	0	0.00
Landlord Contr Furnace	0	0	0	0.00
Landlord Contr DHW	0	0	0	0.00
Client Contr (Any)	0	0	0	0.00
Unspecified	0	0	0	0.00

Total Reported Materials, Labor, and Support Costs: 142,954

Grand Total of Expenditures: 142,954

**South Central Iowa Community Action Program
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings									
	Total	Electric	Gas	Cooling		Heating		Electricity				Annual kWh	Pk-Day therms	Gas Annual therms	Average per Treated Household							
				Summer kW	Winter kW			Summer kWh	Winter kWh	Summer kW	Winter kW				Annual kWh	Pk-Day therms	Gas Annual therms					
OVERALL (Energy Mea)	23	22	5	22	20		30,595	6.6		9.1		33,505	12	1,088	1330.24	0.299	0.455	1,523	2,405	218		
Shell & Htg Sys.	21	18	5	18	11		24,467	5.5	6,632	8.5	12,561	19,193	12	1,047	1165.08	0.306	0.368	0.774	1,142	1,066	2,379	
Wall Insul.	9	7	2	7	1		4,047	1.45	1,748	0.58	862	2,610	1	112	449.61	0.207	0.250	0.584	862	373	0.636	
Open Blown Ceiling Insul.	20	18	4	18	6		9,590	2.64	3,179	5.61	8,276	11,454	4	394	479.52	0.146	0.177	0.935	1,379	636	1.118	
Cavity Fill Insul.	10	8	4	8	0		3,330	0.78	947	0.00	0	947	3	265	333.00	0.098	0.118	-	-	118	0.754	
Sloped Attic Insul.	4	4	0	4	1		828	0.24	284	1.78	2,620	2,904	0	0	206.98	0.059	0.071	1.776	2,620	726	-	
Kneewall Insul.	4	4	1	4	0		140	0.04	49	0.00	0	49	0	1	35.00	0.010	0.012	-	-	12	0.007	
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
Found./Crawl. Insul.	7	5	2	4	2		2,004	0.35	426	0.45	659	1,085	0	34	286.34	0.088	0.107	0.224	330	217	0.193	
Bandjoist Insul.	5	3	2	-	3		234	0.00	0	0.10	145	145	0	6	46.73	-	-	0.033	48	48	0.033	
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
Hi-Eff Htg Sys Repl	2	0	2	-	0		4,294	0.00	0	0.00	0	0	3	236	2147.00	-	-	-	-	-	-	1.340
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	
	Total	Electric	Gas	Total	Electric	Gas		Summer kW	Winter kW		Annual kWh	Pk-Day therms	Annual therms		Summer kW	Winter kW	Annual kWh	Pk-Day therms	Annual therms			
Water Heating	16	14	2	57	47	10	1,247	0.0	0.1		4,854	0.1	41	77.95	0.000	0.005	347	0.063	21			
Temp. Reduct.	12	10	2	12	10	2	0	0.00	0.00		1,560	0.0	16	0.00	0.000	0.000	156	0.022	8			
WH Wrap	0	0	0	0	0	0	0	0.00	0.00		0	0.0	0	0.00	-	-	-	-	-			
Pipe Insul.	4	3	1	4	3	1	17	0.00	0.00		174	0.0	3	4.25	0.000	0.000	58	0.009	3			
LF Showerhead	9	7	2	9	7	2	49	0.00	0.04		1,659	0.0	15	5.49	0.000	0.005	237	0.025	8			
Faucet Aerator	15	13	2	30	25	5	57	0.00	0.03		1,113	0.0	7	3.79	0.000	0.002	86	0.012	4			
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00		0	0.0	0	0.00	-	-	-	-	-			
Hi-Eff Wtr Htr Repl.	2	2	0	2	2	0	1,124	0.00	0.01		348	0.0	0	561.93	0.000	0.004	174	-	-			
Lighting	19	19		215	215		682	0.5	0.0		5,076	-	-	35.87	0.028	0.000	267	-	-			
CFL (5W)	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-			
CFL (7W)	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-			
CFL (9W)	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-			
CFL (11W)	16	16		192	192		608	0.45	0.00		4,268	-	-	37.97	0.028	0.000	267	-	-			
CFL (14W)	2	2		19	19		59	0.07	0.00		670	-	-	29.73	0.035	0.000	335	-	-			
CFL (15W)	1	1		4	4		15	0.01	0.00		138	-	-	14.58	0.014	0.000	138	-	-			
CFL (18W)	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-			
CFL (20W)	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-			
CFL (23W)	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-			
CFL (25W)	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-			
CFL (30W)	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-			
CFL_unknown	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-			
Refrigerator/Freezer	6	6		6	6		4,200	0.54	0.50		4,383	-	-	700.00	0.090	0.084	730	-	-			
Refrigerator Removal	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-			
Refrigerator Exchange	5	5		4	4		3,000	0.34	0.32		2,789	-	-	600.00	0.069	0.064	558	-	-			
Freezer Removal	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-			
Freezer Exchange	3	3		2	2		1,200	0.20	0.18		1,594	-	-	400.00	0.065	0.061	531	-	-			
Costs for Measures Without Energy Impacts Installed in 23 Total Households with Spending and/or Energy Impacts:							5,057															
Total							5,057															
Unspecified Insul.							0															
Duct Sealing							0															
Duct Insulation							0															
Damming Material							0															
Htg. Sys. Tune & Clean							0															
Htg. Sys./WH Other							1	90														
Air Conditioning Work							0															
Water Heater Repair							0															
Refrigerator Coil Clean							0															
Waterbed Mattress Pad							0															
Programmable Tstat							0															
Unspecified Utility Meas.							0															
CO Detector							0															
Smoke Detector							0															
Fuses							0															
Htg Sys Safety Check							0															
Htg Sys Ventilation							0															
Water Heater Ventilation							1	150.00														
Bathroom Ventilation							0															
Other Exhaust Ventilation							0															
Health/Safety Repairs							0															
Health/Safety Other							0															
Consumables							0															
General Repairs							1	300.00														
Meter Refrig (no action)							0															
Meter Freezer (no action)							0															
Support							22	4,517														
Landlord Contr Misc							0															
Landlord Contr Furnace							0															
Landlord Contr DHW							0															
Client Contr (Any)							0															
Unspecified							0															

Total Reported Materials, Labor, and Support Costs: 35,652

Grand Total of Expenditures: 35,652

**Community Action of South Eastern Iowa
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household										
	Total	Electric	Gas	Cooling		Heating		Summer kWh	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms				
				kw	kWh				kw	kWh					Summer kWh	Winter kWh				Summer kWh	Winter kWh		
OVERALL (Energy Mea)	105	90	92	90	73		285,537	43.7		15.7		99,097	363	30,995	2719.40	0.485	0.216	1,101	3,950	337			
Shell & Htg. Sys.	104	88	92	88	95		250,071	39.9	48,111	13.2	18,650	66,762	358	30,165	2404.53	0.453	0.139	196	759	3,894	328		
Wall Insul.	78	70	70	70	3		82,431	16.60	20,018	8.50	11,993	32,011	171	14,412	1056.81	0.237	0.286	2,833	3,998	457	2,445	206	
Open Blown Ceiling Insul.	101	87	89	87	3		82,689	14.36	17,317	2.66	3,754	21,070	56	4,700	818.70	0.165	0.199	0.887	1,251	242	0.627	53	
Cavity Fill Insul.	1	0	1	0	0		306	0.00	0	0.00	0	0	0	9	305.80	-	-	-	-	-	0.109	9	
Sloped Attic Insul.	40	35	36	35	1		1,705	4.81	5,797	0.88	1,244	7,041	31	2,650	42.63	0.137	0.166	0.882	1,244	201	0.874	74	
Knee-wall Insul.	30	29	26	29	0		1,334	1.37	1,651	0.00	0	1,651	9	734	44.47	0.047	0.057	-	-	57	0.335	28	
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Found./Crawl. Insul.	51	26	45	26	3		17,941	2.76	3,328	0.83	1,170	4,498	15	1,221	351.79	0.106	0.128	0.276	390	173	0.322	27	
Bandjoist Insul.	68	3	65	-	3		6,148	0.00	0	0.35	490	490	10	878	90.42	-	-	-	-	163	0.161	14	
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Hi-Eff Htg Sys Repl	29	0	29	-	0		57,517	0.00	0	0.00	0	0	66	5,561	1983.33	-	-	-	-	-	-	2,277	192
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
	Total	Electric	Gas	Number of Measures by Fuel Type				Summer kWh	Winter kWh		Annual kWh	Pk-Day therms	Annual therms		Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Annual therms				
Water Heating	31	3	31	24	0	24	18,600	0.0	0.0	0	5.1	830	600.00	0.000	0.000	0	0.164	27					
Temp. Reduct.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-					
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-					
Pipe Insul.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-					
LF Showerhead	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-					
Faucet Aerator	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-					
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-					
Hi-Eff Wtr Htr Repl.	31	0	31	24	0	24	18,600	0.00	0.00	0	5.1	830	600.00	-	-	-	-	0.164	27				
Lighting	65	65		318	318		701	1.1	0.0	10,369	-	-	10.79	0.017	0.000	160	-	-					
CFL (6W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-					
CFL (7W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-					
CFL (9W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-					
CFL (11W)	25	25		90	90		211	0.21	0.00	2,001	-	-	8.43	0.008	0.000	80	-	-					
CFL (14W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-					
CFL (15W)	50	50		196	196		375	0.71	0.00	6,761	-	-	7.50	0.014	0.000	135	-	-					
CFL (18W)	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-					
CFL (20W)	9	9		19	19		62	0.08	0.00	801	-	-	6.86	0.009	0.000	89	-	-					
CFL (23W)	4	4		4	4		10	0.02	0.00	236	-	-	2.62	0.006	0.000	59	-	-					
CFL (25W)	2	2		5	5		13	0.03	0.00	295	-	-	6.45	0.015	0.000	148	-	-					
CFL (30W)	4	4		4	4		30	0.03	0.00	276	-	-	7.59	0.007	0.000	69	-	-					
CFL_unknown	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-					
Refrigerator/Freezer	28	28		31	31		16,164	2.70	2.53	21,966	-	-	577.30	0.096	0.090	785	-	-					
Refrigerator Removal	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-					
Refrigerator Exchange	25	25		25	25		13,258	2.13	1.99	17,325	-	-	530.32	0.085	0.080	693	-	-					
Freezer Removal	0	0		0	0		0	0.00	0.00	0	-	-	0.00	-	-	-	-	-					
Freezer Exchange	7	7		6	6		2,907	0.57	0.53	4,641	-	-	415.21	0.082	0.076	663	-	-					
Costs for Measures Without Energy Impacts Installed in 106 Total Households with Spending and/or Energy Impacts:																							
Total							56,403																
Unspecified Insul.							0							0.00									
Duct Sealing							0							0.00									
Duct Insulation							2		39					19.53									
Damming Material							0		0					0.00									
Htg. Sys. Tune & Clean							0		0					0.00									
Htg. Sys./WH Other							0		0					0.00									
Air Conditioning Work							0		0					0.00									
Water Heater Repair							0		0					0.00									
Refrigerator Coil Clean							0		0					0.00									
Waterbed Mattress Pad							0		0					0.00									
Programmable Tstat							0		0					0.00									
Unspecified Utility Meas.							0		0					0.00									
CO Detector							0		0					0.00									
Smoke Detector							0		0					0.00									
Fuses							0		0					0.00									
Htg Sys Safety Check							0		0					0.00									
Htg Sys Ventilation							0		0					0.00									
Water Heater Ventilation							0		0					0.00									
Bathroom Ventilation							0		0					0.00									
Other Exhaust Ventilation							0		0					0.00									
Health/Safety Repairs							0		0					0.00									
Health/Safety Other							0		0					0.00									
Consumables							0		0					0.00									
General Repairs							98		25,327					258.44									
Meter Refrig (no action)							0		0					0.00									
Meter Freezer (no action)							0		0					0.00									
Support							105		31,037					295.59									
Landlord Contr Misc							0		0					0.00									
Landlord Contr Furnace							0		0					0.00									
Landlord Contr DHW							0		0					0.00									
Client Contr (Any)							0		0					0.00									
Unspecified							0		0					0.00									

Total Reported Materials, Labor, and Support Costs: 341,939

Grand Total of Expenditures: 341,939

**Southern Iowa Economic Development Authority
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household							
	Total	Electric	Gas	Cooling		Heating		Summer kW	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	
				kWh	kWh				kWh	kWh					kWh	kWh				kWh
OVERALL (Energy Mea)	153	143	102	143	134		264,810	43.3		15.5		154,138	127	12,142	1730.78	0.303	0.116	1,078	1,245	119
Shell & Htg. Sys.	131	110	95	109	102		197,682	32.7	39,444	9.2	13,583	53,026	123	10,814	1509.02	0.300	0.090	133	482	1,293
Wall Insul.	61	57	42	57	0		25,446	11.69	14,100	0.00	0	14,100	27	2,373	417.15	0.205	247	-	247	0.642
Open Blown Ceiling Insul.	102	94	71	93	7		63,567	18.20	21,945	7.12	10,505	32,450	40	3,542	623.21	0.196	236	1,018	1,501	0.567
Cavity Fill Insul.	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Sloped Attic Insul.	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Kneewall Insul.	15	12	10	12	2		1,381	0.71	852	0.19	284	1,136	1	95	92.05	0.059	71	0.096	142	0.108
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Found./Crawl. Insul.	45	24	34	24	3		11,226	2.11	2,547	1.56	2,293	4,840	6	536	249.47	0.088	106	0.518	764	0.179
Bandjoist Insul.	72	4	68	-	4		8,308	0.00	0	0.34	500	500	4	395	115.39	-	0.085	125	125	0.066
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Hi-Eff Htg Sys Repl	37	0	37	-	0		87,754	0.00	0	0.00	0	0	44	3,872	2371.72	-	-	-	-	1.189
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-

Measure	Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms
	Total	Electric	Gas												
Water Heating	108	31	77	299	83	216	1,601	0.0	0.1	9,236	4.1	1,328	14.82	0.000	0.003
Temp. Reduct.	92	26	66	92	26	66	0	0.00	0.01	4,056	1.8	624	0.00	0.000	0.000
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-
Pipe Insul.	99	28	71	99	28	71	453	0.00	0.00	1,624	0.8	268	4.57	0.000	0.000
LF Showerhead	48	12	36	50	13	37	437	0.00	0.06	2,844	1.1	330	9.11	0.000	0.005
Faucet Aerator	34	10	24	57	16	41	111	0.00	0.02	712	0.2	74	3.26	0.000	0.002
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-
Hi-Eff Wtr Htr Repl.	1	0	1	1	0	1	600	0.00	0.00	0	0.2	32	600.00	-	-
Lighting	97	97	723	723	4,614	3.9	0.0	37,595	-	-	47.56	0.041	0.000	388	-
CFL (5W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-
CFL (11W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-
CFL (15W)	39	39	207	207	1,292	0.75	0.00	7,140	-	-	33.14	0.019	0.000	183	-
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-
CFL (20W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-
CFL (23W)	34	34	274	274	1,789	1.70	0.00	16,172	-	-	52.63	0.050	0.000	476	-
CFL (25W)	39	39	242	242	1,532	1.50	0.00	14,283	-	-	39.28	0.038	0.000	366	-
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-
Refrigerator/Freezer	93	93	77	77	60,913	6.68	6.24	54,281	-	-	654.98	0.072	0.067	584	-
Refrigerator Removal	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-
Refrigerator Exchange	78	78	51	51	46,800	4.36	4.08	35,456	-	-	600.00	0.056	0.052	455	-
Freezer Removal	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-
Freezer Exchange	36	36	26	26	14,113	2.32	2.16	18,825	-	-	392.04	0.064	0.060	523	-

Costs for Measures Without Energy Impacts Installed in 154 Total Households with Spending and/or Energy Impacts:

Measure	Spending on Materials & Labor (\$)
Total	76,059
Unspecified Insul.	0
Duct Sealing	0
Duct Insulation	0
Damming Material	0
Htg. Sys. Tune & Clean	0
Htg. Sys./WH Other	0
Air Conditioning Work	0
Water Heater Repair	0
Refrigerator Coil Clean	0
Waterbed Mattress Pad	0
Programmable Tstat	0
Unspecified Utility Meas.	0
CO Detector	0
Smoke Detector	0
Fuses	0
Htg Sys Safety Check	0
Htg Sys Ventilation	62
Water Heater Ventilation	0
Bathroom Ventilation	0
Other Exhaust Ventilation	0
Health/Safety Repairs	0
Health/Safety Other	0
Consumables	0
General Repairs	142
Meter Refrig (no action)	0
Meter Freezer (no action)	0
Support	154
Landlord Contr Misc	0
Landlord Contr Furnace	0
Landlord Contr DHW	0
Client Contr (Any)	0
Unspecified	0

Total Reported Materials, Labor, and Support Costs: 340,868

Grand Total of Expenditures: 340,868

**Upper Des Moines Opportunity
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household										
	Total	Electric	Gas	Cooling		Heating		Summer kWh	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer		Electricity		Annual kWh	Pk-Day therms	Gas Annual therms		
				kWh	kWh				kWh	kWh					kWh	kWh	kWh	kWh					
OVERALL (Energy Mea)	70	46	60	46	44		252,661	13.5		5.3		47,515	125	12,721	3609.44	0.294	0.120	1,033	2.082	212			
Shell & Htg. Sys.	69	38	60	38	62		221,871	10.5	12,691	3.6	5,910	18,602	120	11,690	3215.52	0.277	0.334	0.058	95	490	2,001	195	
Wall Insul.	56	33	47	33	2		69,948	5.03	6,061	2.36	3,843	9,904	37	3,578	1249.06	0.152	0.184	1.178	1,922	300	0.782	76	
Open Blown Ceiling Insul.	58	33	51	33	1		31,412	2.98	3,593	0.18	290	3,883	26	2,486	541.59	0.090	0.109	0.178	290	118	0.501	49	
Cavity Fill Insul.	35	19	31	19	1		22,659	0.99	1,189	0.44	725	1,915	12	1,184	647.40	0.052	0.063	0.445	725	101	0.392	38	
Sloped Attic Insul.	33	18	29	18	1		11,330	1.05	1,269	0.60	973	2,242	12	1,149	343.34	0.058	0.071	0.596	973	125	0.407	40	
Kneewall Insul.	8	4	8	4	0		1,126	0.03	35	0.00	0	35	1	81	140.72	0.007	9	-	-	9	0.104	10	
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Found./Crawl. Insul.	27	7	26	7	1		8,780	0.45	543	0.04	71	614	2	216	325.20	0.064	0.078	0.043	71	88	0.085	8	
Bandjoist Insul.	21	1	20	-	1		1,397	0.00	0	0.01	9	9	1	74	66.50	-	-	0.005	9	9	0.038	4	
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Hi-Eff Htg Sys Repl	31	0	31	-	0		75,219	0.00	0	0.00	0	0	30	2,921	2426.43	-	-	-	-	-	-	0.968	94
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	

Measure	Number of Households with Impacts			Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings Average per Treated Household								
	Total	Electric	Gas	Total	Electric	Gas		Summer kWh	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms		
Water Heating	58	10	48	181	27	154	17,856	0.0		0.0		2,580	4.8	1,031	307.86	0.000	0.002		258	0.101	21
Temp. Reduct.	54	9	45	54	9	45	0	0.00	0.00	0.00	1,404	0.8	290	0.00	0.000	0.000		156	0.019	6	
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-	-	
Pipe Insul.	54	10	44	54	10	44	321	0.00	0.00	0.00	580	0.3	114	5.94	0.000	0.000		58	0.007	3	
LF Showerhead	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-		
Faucet Aerator	30	3	27	54	6	48	135	0.00	0.01	0.00	267	0.2	59	4.50	0.000	0.002		89	0.007	2	
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-		
Hi-Eff Wtr Htr Repl.	29	2	27	19	2	17	17,400	0.00	0.01	0.00	329	3.5	568	600.00	0.000	0.004		165	0.129	21	
Lighting	42	42		241	241		1,687	1.3		0.0		12,139			40.17	0.030	0.000		289		
CFL (6W)	0	0	0	0	0	0	0	0.00	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (11W)	1	1		10	10		70	0.02	0.00	0.00	222	-	-	70.00	0.023	0.000		222	-		
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (15W)	14	14		70	70		490	0.25	0.00	0.00	2,414	-	-	35.00	0.018	0.000		172	-		
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (20W)	0	0	0	0	0	0	0	0.00	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL (23W)	3	3		17	17		119	0.11	0.00	0.00	1,003	-	-	39.67	0.035	0.000		334	-		
CFL (25W)	24	24		144	144		1,008	0.89	0.00	0.00	8,499	-	-	42.00	0.037	0.000		354	-		
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
Refrigerator/Freezer	19	19		20	20		11,247	1.75		1.63		14,194			591.93	0.092	0.086		747		
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
Refrigerator Exchange	16	16		14	14		8,777	1.21	1.13	0.00	9,822	-	-	548.54	0.076	0.071		614	-		
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0.00	0	-	-	0.00	-	-	-	-	-		
Freezer Exchange	7	7		6	6		2,470	0.54	0.50	0.00	4,372	-	-	352.85	0.077	0.072		625	-		

Costs for Measures Without Energy Impacts Installed in 70 Total Households with Spending and/or Energy Impacts:

Measure	Spending on Materials & Labor (\$)
Total	33,671
Unspecified Insul.	0
Duct Sealing	0
Duct Insulation	0
Damming Material	0
Htg. Sys. Tune & Clean	0
Htg. Sys./WH Other	0
Air Conditioning Work	0
Water Heater Repair	0
Refrigerator Coil Clean	0
Waterbed Mattress Pad	0
Programmable Tstat	0
Unspecified Utility Meas.	0
CO Detector	0
Smoke Detector	0
Fuses	0
Htg Sys Safety Check	0
Htg Sys Ventilation	4,763
Water Heater Ventilation	2,064
Bathroom Ventilation	0
Other Exhaust Ventilation	0
Health/Safety Repairs	0
Health/Safety Other	0
Consumables	0
General Repairs	0
Meter Refrig (no action)	0
Meter Freezer (no action)	0
Support	26,843
Landlord Contr Misc	0
Landlord Contr Furnace	0
Landlord Contr DHW	0
Client Contr (Any)	0
Unspecified	0

Total Reported Materials, Labor, and Support Costs: 286,331

Grand Total of Expenditures: 286,331

West Central Development Corporation
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings				Average Estimated First Year Measure Cost and Savings											
	Total	Electric	Gas	Cooling		Heating		Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Average per Treated Household										
				Summer kW	Winter kW			Summer kWh	Winter kWh				Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms						
OVERALL (Energy Mea)	91	77	72	77	73		214,546	27.6		3.5		61,132	174	15,796	237.65	0.358	0.049	794	2,417	219			
Shell & Htg. Sys.	85	63	70	62	71		201,490	24.7	29,756	2.5	3,644	33,401	171	14,718	2370.47	0.398	480	0.036	51	530	2,440	210	
Wall Insul.	49	41	37	40	1		22,846	9.29	11,200	1.21	1,752	12,952	22	1,919	466.25	0.232	280	1.214	1,752	316	0.602	52	
Open Blown Ceiling Insul.	74	60	59	59	1		37,984	8.65	10,434	1.31	1,892	12,326	32	2,779	513.29	0.147	177	1.310	1,892	205	0.547	47	
Cavity Fill Insul.	27	21	24	21	0		9,775	2.26	2,724	0.00	0	2,724	19	1,611	362.02	0.108	130	-	-	130	0.779	67	
Sloped Attic Insul.	37	28	28	28	0		9,375	2.63	3,178	0.00	0	3,178	13	1,141	253.39	0.094	113	-	-	113	0.473	41	
Kneewall Insul.	29	23	17	23	0		1,743	0.64	768	0.00	0	768	2	173	60.10	0.028	33	-	-	33	0.118	10	
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Found./Crawl. Insul.	38	12	34	12	0		11,312	1.20	1,453	0.00	0	1,453	5	424	297.69	0.100	121	-	-	121	0.145	12	
Bandjoist Insul.	32	0	32	-	0		2,179	0.00	0	0.00	0	0	2	135	68.08	-	-	-	-	121	0.049	4	
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Hi-Eff Htg Sys Repl	46	0	46	-	0		106,276	0.00	0	0.00	0	0	76	6,536	2310.35	-	-	-	-	-	-	1,649	142
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-	
	Total	Electric	Gas	Total	Electric	Gas		Summer kWh	Winter kWh		Annual kWh	Pk-Day therms	Annual therms		Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Annual therms		Annual kWh	Annual therms	
Water Heating	68	8	60	219	20	199	806	0.0	0.0		1,806	3.2	1,079	11.85	0.000	0.002	0.000	0.002	226	0.054	18		
Temp. Reduct.	57	6	51	57	6	51	0	0.00	0.00		936	1.5	505	0.00	0.000	0.000	0.000	0.000	156	0.029	10		
WH Wrap	0	0	0	0	0	0	0	0.00	0.00		0	0.0	0	0.00	-	-	-	-	-	-	-	-	
Pipe Insul.	53	4	49	53	4	49	297	0.00	0.00		232	0.6	194	5.60	0.000	0.000	0.000	0.000	58	0.011	4		
LF Showerhead	26	1	25	26	1	25	260	0.00	0.01		237	0.8	240	10.00	0.000	0.005	0.000	0.005	237	0.031	10		
Faucet Aerator	54	5	49	83	9	74	249	0.00	0.01		401	0.5	139	4.61	0.000	0.002	0.000	0.002	80	0.009	3		
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00		0	0.0	0	0.00	-	-	-	-	-	-	-	-	
Hi-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00		0	0.0	0	0.00	-	-	-	-	-	-	-	-	
Lighting	68	68		462	462		3,272	1.8	0.0		17,226	-	-	48.12	0.027	0.000	0.000	0.000	253	-	-	-	
CFL (5W)	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (11W)	8	8		34	34		238	0.08	0.00		756	-	-	29.75	0.010	0.000	0.000	0.000	94	-	-	-	
CFL (14W)	34	34		197	197		1,428	0.73	0.00		6,946	-	-	42.00	0.021	0.000	0.000	0.000	204	-	-	-	
CFL (15W)	23	23		134	134		921	0.49	0.00		4,622	-	-	40.04	0.021	0.000	0.000	0.000	201	-	-	-	
CFL (18W)	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (20W)	19	19		50	50		350	0.22	0.00		2,108	-	-	18.42	0.012	0.000	0.000	0.000	111	-	-	-	
CFL (23W)	18	18		45	45		315	0.28	0.00		2,656	-	-	17.50	0.015	0.000	0.000	0.000	148	-	-	-	
CFL (25W)	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-	-	-	-	
CFL (30W)	2	2		2	2		20	0.01	0.00		138	-	-	10.00	0.007	0.000	0.000	0.000	69	-	-	-	
CFL_unknown	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-	-	-	-	
Refrigerator/Freezer	16	16		12	12		8,979	1.07	1.00		8,700	-	-	561.19	0.067	0.063	0.000	0.000	544	-	-	-	
Refrigerator Removal	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-	-	-	-	
Refrigerator Exchange	13	13		10	10		7,800	0.83	0.78		6,767	-	-	600.00	0.064	0.060	0.000	0.000	521	-	-	-	
Freezer Removal	0	0		0	0		0	0.00	0.00		0	-	-	0.00	-	-	-	-	-	-	-	-	
Freezer Exchange	3	3		3	3		1,179	0.24	0.22		1,933	-	-	393.00	0.079	0.074	0.000	0.000	644	-	-	-	
Costs for Measures Without Energy Impacts Installed in 91 Total Households with Spending and/or Energy Impacts:																							
Total							53,459																
Unspecified Insul.	0						0							0.00									
Duct Sealing	0						0							0.00									
Duct Insulation	0						0							0.00									
Damming Material	0						0							0.00									
Htg. Sys. Tune & Clean	0						0							0.00									
Htg. Sys./WH Other	0						0							0.00									
Air Conditioning Work	0						0							0.00									
Water Heater Repair	0						0							0.00									
Refrigerator Coil Clean	0						0							0.00									
Waterbed Mattress Pad	0						0							0.00									
Programmable Tstat	0						0							0.00									
Unspecified Utility Meas.	0						0							0.00									
CO Detector	0						0							0.00									
Smoke Detector	0						0							0.00									
Fuses	0						0							0.00									
Htg Sys Safety Check	0						0							0.00									
Htg Sys Ventilation	45						6,543							145.40									
Water Heater Ventilation	10						1,427							142.70									
Bathroom Ventilation	0						0							0.00									
Other Exhaust Ventilation	0						0							0.00									
Health/Safety Repairs	0						0							0.00									
Health/Safety Other	0						0							0.00									
Consumables	0						0							0.00									
General Repairs	81						17,28																

**Community Action Agency of Siouxland
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings								
	Total	Electric	Gas	Cooling		Heating		Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Average per Treated Household								
				Summer kW	Winter kW			Summer kWh	Winter kWh				Summer kW	Winter kW	Annual kWh	Pk-Day therms	Gas Annual therms				
OVERALL (Energy Mea)	56	51	49	51	49		152,518	14.8		2.2		48,381	89	8,489	2723.53	0.290	0.044	949	1.817	173	
Shell & Htg. Sys.	48	41	44	41	46		140,512	11.4	13,719	1.3	2,047	15,766	86	7,883	2927.34	0.277	0.335	0.029	44	385	1,964
Wall Insul.	27	24	27	24	0		22,992	4.69	5,662	0.00	0	5,662	20	1,826	851.56	0.196	0.236	-	-	236	0.741
Open Blown Ceiling Insul.	39	38	35	38	2		34,008	5.90	7,122	1.31	2,009	9,130	24	2,154	872.00	0.155	0.187	0.657	1,004	240	0.675
Cavity Fill Insul.	2	2	2	2	0		1,342	0.23	278	0.00	0	278	2	145	670.84	0.115	0.139	-	-	139	0.793
Sloped Attic Insul.	4	4	4	4	0		880	0.27	324	0.00	0	324	2	161	219.92	0.067	0.11	-	-	81	0.440
Kneewall Insul.	2	2	2	2	0		817	0.10	126	0.00	0	126	1	59	408.33	0.052	0.081	-	-	63	0.322
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-
Found./Crawl. Insul.	12	2	12	2	0		9,535	0.17	206	0.00	0	206	3	243	794.58	0.085	0.103	-	-	103	0.222
Bandjoist Insul.	16	1	15	-	1		1,879	0.00	0	0.02	38	38	1	59	117.44	-	-	0.025	38	38	0.043
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-
Hi-Eff Htg Sys Repl	28	0	28	-	0		69,060	0.00	0	0.00	0	0	35	3,237	2466.44	-	-	-	-	-	1,267
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-
	Total	Electric	Gas	Total	Electric	Gas		Summer kW	Winter kW		Annual kWh	Pk-Day therms	Annual therms		Summer kW	Winter kW	Annual kWh	Pk-Day therms	Annual therms		
Water Heating	42	7	35	0	0	0	3,700	0.0	0.0		1,168	2.7	606	88.10	0.000	0.000	167	0.076	17		
Temp. Reduct.	33	6	27	0	0	0	0	0.00	0.00		936	0.7	230	0.00	0.000	0.000	156	0.025	9		
WH Wrap	0	0	0	0	0	0	0	0.00	0.00		0	0.0	0	0.00	-	-	-	-	-		
Pipe Insul.	30	4	26	0	0	0	161	0.00	0.00		232	0.3	89	5.37	0.000	0.000	58	0.010	3		
LF Showerhead	1	0	1	0	0	0	68	0.00	0.00		0	0.0	8	67.60	-	-	-	-	0.027		
Faucet Aerator	1	0	1	0	0	0	3	0.00	0.00		0	0.0	2	2.90	-	-	-	-	0.005		
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00		0	0.0	0	0.00	-	-	-	-	-		
Hi-Eff Wtr Htr Repl.	6	0	6	0	0	0	3,469	0.00	0.00		0	1.7	277	578.12	-	-	-	-	0.283		
Lighting	47	47	0	0	0	0	2,530	2.5	0.0		24,173	-	-	53.83	0.054	0.000	514	-	-		
CFL (5W)	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-		
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-		
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-		
CFL (11W)	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-		
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-		
CFL (15W)	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-		
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-		
CFL (20W)	19	19	0	0	0	0	556	0.42	0.00		4,047	-	-	29.25	0.022	0.000	213	-	-		
CFL (23W)	43	43	0	0	0	0	1,905	2.04	0.00		19,418	-	-	44.30	0.047	0.000	452	-	-		
CFL (25W)	1	1	0	0	0	0	69	0.07	0.00		708	-	-	69.48	0.074	0.000	708	-	-		
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-		
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-		
Refrigerator/Freezer	11	11	0	0	0	0	5,775	0.89	0.84		7,274	-	-	525.00	0.081	0.076	661	-	-		
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-		
Refrigerator Exchange	8	8	0	0	0	0	4,595	0.62	0.58		5,060	-	-	574.38	0.078	0.073	633	-	-		
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00		0	-	-	0.00	-	-	-	-	-		
Freezer Exchange	3	3	0	0	0	0	1,180	0.27	0.25		2,214	-	-	393.33	0.091	0.085	738	-	-		
Costs for Measures Without Energy Impacts Installed in 56 Total Households with Spending and/or Energy Impacts:							15,665														
Total							15,665														
Unspecified Insul.							0														
Duct Sealing							0														
Duct Insulation							0														
Damming Material							0														
Htg. Sys. Tune & Clean							0														
Htg. Sys./WH Other							0														
Air Conditioning Work							0														
Water Heater Repair							0														
Refrigerator Coil Clean							0														
Waterbed Mattress Pad							0														
Programmable Tstat							0														
Unspecified Utility Meas.							0														
CO Detector							0														
Smoke Detector							0														
Fuses							0														
Htg Sys Safety Check							0														
Htg Sys Ventilation							26	3,883													
Water Heater Ventilation							1	150													
Bathroom Ventilation							0	0													
Other Exhaust Ventilation							0	0													
Health/Safety Repairs							0	0													
Health/Safety Other							0	0													
Consumables							0	0													
General Repairs							1	66													
Meter Refrig (no action)							0	0													
Meter Freezer (no action)							0	0													
Support							42	11,566													
Landlord Contr Misc							0	0													
Landlord Contr Furnace							0	0													
Landlord Contr DHW							0	0													
Client Contr (Any)							0	0													
Unspecified							0	0													

Total Reported Materials, Labor, and Support Costs: 168,183

Grand Total of Expenditures: 168,183

**Polk County Planning and Development
Calendar Year 2007
Costs, Fuel, and Demand Impacts for Utility-Funded Measures**

Measure	Number of Households with Impacts			Count of Households with Electricity Impacts by Season			Spending on Materials & Labor (\$)	Estimated First-Year Savings					Average Estimated First Year Measure Cost and Savings									
	Total	Electric	Gas	Cooling Heating				Summer kWh	Electricity		Annual kWh	Pk-Day therms	Gas Annual therms	Average per Treated Household								
				Summer	Winter	Annual			Summer kWh	Winter kWh				Annual kWh	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms			
OVERALL (Energy Mea)	94	93	93	93	92		300,019	31.3		2.8		84,738	181	16,962	3191.69	0.336	0.030	911	1.946	182		
Shell & Htg. Sys.	92	76	92	76	92		249,376	25.2	30,379	0.0	0	30,379	173	15,464	2710.61	0.331	400	0.000	0	400	1.981	168
Wall Insul.	60	51	60	51	0		50,597	10.33	12,458	0.00	0	12,458	50	4,464	843.28	0.203	244	-	-	244	0.833	74
Open Blown Ceiling Insul.	78	70	78	70	0		49,113	12.13	14,623	0.00	0	14,623	37	3,347	629.65	0.173	209	-	-	209	0.480	43
Cavity Fill Insul.	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Sloped Attic Insul.	18	17	18	17	0		2,684	1.19	1,440	0.00	0	1,440	4	377	149.11	0.070	85	-	-	85	0.234	21
Kneewall Insul.	11	11	11	11	0		1,905	0.43	521	0.00	0	521	1	72	173.18	0.039	47	-	-	47	0.073	7
Infil. Reduction	0	0	0	0	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Found./Crawl. Insul.	41	13	41	13	0		16,872	1.11	1,337	0.00	0	1,337	7	633	411.51	0.085	103	-	-	103	0.171	15
Bandjoist Insul.	53	0	53	-	0		4,956	0.00	0	0.00	0	0	2	205	93.52	-	-	-	-	-	0.043	4
Exhaust Ventilation	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Hi-Eff Htg Sys Repl	64	0	64	-	0		123,249	0.00	0	0.00	0	0	71	6,366	1925.76	-	-	-	-	-	1.115	99
Std-Eff Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Electric Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Heat Pump Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-
Other Htg Sys Repl	0	0	0	-	0		0	0.00	0	0.00	0	0	0	0	0.00	-	-	-	-	-	-	-

Measure	Number of Households with Impacts			Number of Measures by Fuel Type			Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms	Spending on Materials & Labor (\$)	Summer kWh	Winter kWh	Annual kWh	Pk-Day therms	Gas Annual therms
	Total	Electric	Gas	Total	Electric	Gas												
Water Heating	83	4	79	0	0	0	29,224	0.0	0.0	720	7.9	1,498	352.10	0.000	0.004	180	0.100	19
Temp. Reduct.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
WH Wrap	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Pipe Insul.	0	2	66	0	0	0	405	0.00	0.00	116	0.5	188	0.00	0.000	0.000	58	0.008	3
LF Showerhead	0	0	19	0	0	0	178	0.00	0.00	178	0.4	131	0.00	-	-	-	0.022	7
Faucet Aerator	34	1	33	0	0	0	196	0.00	0.00	89	0.3	88	5.76	0.000	0.002	89	0.009	3
Std-Eff Wtr Htr Repl.	0	0	0	0	0	0	0	0.00	0.00	0	0.0	0	0.00	-	-	-	-	-
Hi-Eff Wtr Htr Repl.	0	3	44	0	0	0	28,445	0.00	0.01	515	6.7	1,090	0.000	0.004	172	0.152	25	
Lighting	92	92	697	697	0	0	4,977	3.1	0.0	29,384	-	-	54.10	0.034	0.000	319	-	-
CFL (6W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (7W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (9W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (11W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (14W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (15W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (18W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (20W)	92	92	697	697	0	0	4,977	3.09	0.00	29,384	-	-	54.10	0.034	0.000	319	-	-
CFL (23W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (25W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL (30W)	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
CFL_unknown	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator/Freezer	35	35	35	35	35	0	16,442	2.98	2.79	24,255	-	-	469.78	0.085	0.080	693	-	-
Refrigerator Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Refrigerator Exchange	35	35	35	35	35	0	16,442	2.98	2.79	24,255	-	-	469.78	0.085	0.080	693	-	-
Freezer Removal	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-
Freezer Exchange	0	0	0	0	0	0	0	0.00	0.00	0	-	-	0.00	-	-	-	-	-

Costs for Measures Without Energy Impacts Installed in 94 Total Households with Spending and/or Energy Impacts:

Measure	Spending on Materials & Labor (\$)
Total	55,209
Unspecified Insul.	0
Duct Sealing	0
Duct Insulation	0
Damming Material	0
Htg. Sys. Tune & Clean	0
Htg. Sys./WH Other	0
Air Conditioning Work	0
Water Heater Repair	0
Refrigerator Coil Clean	0
Waterbed Mattress Pad	0
Programmable Tstat	0
Unspecified Utility Meas.	0
CO Detector	0
Smoke Detector	0
Fuses	0
Htg Sys Safety Check	0
Htg Sys Ventilation	62
Water Heater Ventilation	24
Bathroom Ventilation	0
Other Exhaust Ventilation	0
Health/Safety Repairs	0
Health/Safety Other	0
Consumables	0
General Repairs	2
Meter Refrig (no action)	0
Meter Freezer (no action)	0
Support	93
Landlord Contr Misc	0
Landlord Contr Furnace	0
Landlord Contr DHW	0
Client Contr (Any)	0
Unspecified	0

Total Reported Materials, Labor, and Support Costs: 355,228

Grand Total of Expenditures: 355,228

Appendix A -- Client Characteristics

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Household characteristics										
Quarterly gross income	\$2,987	\$2,834	\$3,285	\$3,488	\$3,282	\$3,363	\$3,649	\$3,618	\$3,727	\$3,911
Average members	2.7	2.5	2.5	2.6	2.6	2.6	2.8	2.8	2.8	2.9
Percentage of households with:										
Elderly	37.9	40.7	42.0	42.4	42.5	38.9	36.3	35.2	32.3	32.6
Handicapped	36.8	41.6	44.0	49.6	47.6	47.3	42.0	42.7	42.5	43.1
Young children	20.1	17.8	18.0	18.0	NA	15.8	9.7	18.3	15.6	18.7
Housing type (%)										
Single family home	88.5	85.0	92.0	91.3	92.4	92.9	91.2	91.0	90.3	90.7
Mobile home	6.9	8.4	7.0	7.4	7.4	5.8	8.1	7.2	7.7	7.8
Duplex	1.2	2.6	0.0	1.3	0.0	0.4	0.7	0.9	2.1	0.6
Three+ unit apartment	0.9	1.3	0.0	0.0	0.1	0.9	0.2	0.8	0.0	0.4
Rent a room	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown/other	2.6	2.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Heating system type (%)										
Natural gas	80.7	81.1	81.0	85.2	84.5	85.5	84.0	84.4	84.0	84.3
Propane	13.6	11.9	14.0	11.2	11.8	11.4	12.2	10.7	11.7	11.4
Fuel oil	2.1	2.1	3.0	1.9	1.4	1.4	1.9	1.4	1.0	0.6
Electricity	0.0	0.0	0.0	1.5	2.2	85.5	1.9	3.4	3.3	3.5
Other	3.5	4.8	2.0	0.1	0.0	0.0	0.2	0.0	0.0	0.2
Air conditioning type (%)										
Central	32.9	31.6	39.0	40.0	41.6	44.1	48.4	47.8	49.8	56.3
Room	43.9	45.7	46.0	46.4	44.5	39.4	42.4	39.8	37.4	8.7
None or Missing Data	23.2	22.7	16.0	13.6	13.9	16.5	9.4	12.4	12.8	35.0
Blower door readings (average cfm50)										
Pre	3,403	3,356	3,191	3,531	3,555	3,642	3,733	3,723	3,856	3,639
Post	2,261	2,377	2,443	2,302	2,341	2,348	2,355	2,310	2,389	2,216

Appendix B

Assessment of Measure-Specific Impacts

Background

The initial evaluation of the collaborative utility/state low-income program conducted for the program years 1992 and 1993 required estimates of savings for each dwelling weatherized by the program. To conform to the specification, measure-specific algorithms were developed to assess the impacts of the measures installed in each dwelling. New algorithms were developed based upon engineering methods as the program evolved. Periodically, the estimated savings were trued-up to observed impacts using billing analysis, applying overall house-level correction factors. In recent years, billing analyses were conducted annually for natural gas to provide better assessments of agency-specific impacts. Although the measure-specific impacts were not re-assessed in these analyses, and were generated by scaling measure-specific estimates according to the house-level correction factors. A summary of the major changes to savings assessments is shown below.

Summary of Measure Savings Assessments

- Development of the initial engineering algorithms of the 1992 (1993 report)
- Initial billing analysis adjustment to the 1992 engineering algorithms, electricity and natural gas (CY 1992-1993 report)
 - added waterbed mattress pad impacts
- Kneewall insulation was broken out as a separate measure, wherein savings were estimated and bundled with wall insulation
- Billing analysis of electricity and natural gas (CY 1995 report)
 - added furnace fan impacts
 - added high-efficiency furnace impact algorithm
- Incorporated results of the evaluation of the 1998 pilot baseload energy efficiency program for estimates of refrigeration measure impacts (CY 2001 report)
- Added water heater replacement measures (updated for CY 2004 and 2006)
- Billing analysis of refrigeration measures, (CY 2003 report)
- Natural gas billing analyses to assess agency-specific adjustments to natural gas impacts (CY 1998- CY 2006)

The program has undergone several notable changes in recent years, including a doubling of the installation rates of furnace replacements, a higher percentage of dwellings with air conditioning, and the addition of water heater replacements. The legacy algorithms are heavily reliant upon the building characteristics and client usage patterns that existed in the earliest years of the joint utility/state low income program. In order to assess the implications of these changes, the algorithms used to assess dwelling-specific savings were completely redesigned as part of this study.

We had several objectives for this analysis. First was to utilize the more extensive data now available through program tracking. Second, we designed the algorithms to minimize the reliance

on the most uncertain sources of data (this is primarily pre-weatherization usage for dwellings with no billing data).

In addition, we assessed distinct impacts for measures that were previously bundled or less-well known, including:

- Ceiling/Attic insulation, which is now broken out into several categories, including:
 - open-blown ceiling insulation (or just ceiling insulation)
 - sloped attic surfaces
 - cavity-fill attic insulation (floored attic insulation, some roof rafter installations)
- Kneewall insulation (previously it was bundled with wall insulation)
- Exhaust Ventilation (whole house ventilation, along with energy impacts), where costs averaged greater than \$250 per installed unit
- Space heater replacements, now reflected as high or standard efficiency heating system replacements
- Water heater replacement savings, now assessed using billing analysis rather than engineering estimates.

The development of the algorithms entailed billing analysis to assess measure-specific impacts of water heater measures and refrigeration measures, and whole house impacts of cooling measures. Insulation, infiltration reduction, and heating system savings were developed using engineering models of savings calibrated to observed savings, with separate calibration factors for assumptions of existing heating system efficiency and existing surface and insulation R-values. The details of the methodology used to develop these algorithms are provided in this Technical Appendix.

The first section presents algorithm development for building envelope and heating system measures. Next, we present the methodology used to assess cooling measure savings. The methodologies used to develop algorithms for water heater measures, refrigeration measures, and lighting measures are presented in the final three sections.

Development of Savings Algorithms for Space Heating Measures

Background

The space heating algorithms of the original, or legacy, algorithms were developed using the results of building simulation modeling. The percentage of the total heating savings contributed by each measure was used to develop simple algorithms that used house-specific installation data available through the program tracking system. The subsequent billing analyses provided scaling factors for the overall house savings, preserving the relationship between the percentages of savings allocated to each building component.

These algorithms relied heavily upon whole-house pre-weatherization natural gas energy consumption, the heated volume of the building, the change in infiltration rate (measured as cfm₅₀), and on the quantity of insulation (measured in pounds of insulation). Some of these parameters were not well known for all buildings, in particular the pre-weatherization consumption. In these cases, the pre-weatherization consumption was imputed based upon the fuel consumption during the peak winter months, and water heating usage was estimated at 20% of the annual consumption for dwellings with natural gas water heating. The change in infiltration rate, quantity of insulation and volume of the house was taken directly from data provided in the tracking system.

The legacy algorithms used other methods for floor/crawlspace/basement and bandjoist insulation. Floor/crawlspace/basement insulation savings were tied to the expenditures on the measures rather than the any physical measure of the insulation that was installed. A fixed value savings for bandjoist insulation savings was derived from a separate engineering estimate model, and applied to each dwelling receiving this measure.

The major limitations of the legacy algorithms included:

- Heavy reliance upon the relatively uncertain value of pre-weatherization conditions
- Limited recognition of certain engineering relationships, e.g., there was no relationship considered between the quantity of insulation against the square footage of the surfaces that were insulated – consequently the R-value of the installed insulation was not considered by the algorithms.

The revised algorithms provided the following benefits:

- More robust house-specific estimates by using tracking system information not available in earlier years
- Expanded capability for assessing the interactivity of measure savings and heating system replacements
- Assessment of impacts for some measures which were previously bundled with other measures
- Assessment of impacts for measures added to the program over the past fifteen years of the program
- Allocation of a portion of infiltration reduction impacts to all dense-pack insulation measures rather than just wall insulation

- Reduction in the dependence on estimates of pre-weatherization consumption -- these data are not available for dwellings with heating fuel provided by municipal and cooperative utilities, and by those using delivered fuels (propane and fuel oil).
- Expanded methods to allocate savings for measures with interactive impacts.

The details of the assessment of measure-specific savings for building envelope and heating system measures are discussed in the next section, followed by a comparison of the savings of the revised algorithms with savings from the legacy algorithms.

Development of Algorithms for Space Heating Measure Savings

This section provides a description of the process used to develop the revised algorithms of space heating measures. A goal of this study was to simplify the savings algorithms; however we found that ultimately we traded one form of complexity for another. Whereas the prior methods included a specific algorithm for each measure, the algorithms were relatively simple (albeit they bundled savings for some measures). The revised methods include only three classes of algorithms, for insulation, infiltration reduction, and furnace replacement savings. This is an improvement over the prior algorithms, but the algorithms themselves are far more complex than the previous ones. The added complexity stems from the need to explicitly address measure interactivity, expand reallocation of infiltration reduction to dense-pack insulation, and provide a breakout of measures that were previously bundled.

We used a two-stage approach to model the measure-specific savings; first by modeling savings for each measure using engineering methods, and then by calibrating those models to actual savings.

The data used in to estimate savings in the engineering models are collected as part of the weatherization process -- the specific engineering models for each component are discussed in the next section, entitled Development of Engineering Models.

The engineering models were designed to provide a reasonable allocation of savings for each installed measure; however engineering models typically overstate savings, often in a range of 50% to 100% greater than observed savings. In order to account for this, we calibrated the models in the second stage by fitting the total of the estimated measure savings for each house to PRISM-derived savings using a nonlinear optimization model. The optimization provided coefficients (or adjustment factors) on thirteen major parameters of the model, including:

- nine separate coefficients to adjust the estimated savings for shell and heating measure (water heater measure savings were specified using the relationships in the following section),
- the pre-weatherization heating system efficiency for dwelling receiving a furnace replacement,
- the pre-weatherization heating system efficiency for dwelling receiving a furnace tune-up,
- a factor to reallocate infiltration reduction savings to dense-pack insulation,
- a factor to account for whole house ventilation installed in some dwellings.

The specific adjustment factors which were determined in the modeling process are detailed in subsequent sections of this document.

In order to assure the resulting coefficients were within reasonable ranges, we specified the following constraints in our model:

- Insulation and infiltration coefficients could range from 0% to 100% of the values provided by the engineering models.
- The average efficiency of heating systems in houses that received replacements was lower than or equal to the average efficiency of heating systems that were not replaced – in other words, on average the program replaced units with relatively lower or similar efficiency to those in houses that did not receive a replacement.
- The average heating system efficiency of existing units were allowed to range between 55% and 80% for units that were replaced, and from 60% to 80% for units that were not replaced.
- Replacement heating system efficiencies were assumed to be 80% for standard, and 92% for high-efficiency units.

We calibrated our model using the PRISM results of the calendar year 2006 clients. Given that we were assessing impacts to calibrate models for typical weatherization completions, we limited our dataset to include only those with good PRISM models in the pre- and post-weatherization periods, and within a reasonable range of savings. We screened the PRISM models including only those with R^2 exceeding 80% and coefficient of variation on the normalized annual consumption (NAC) of 8.0. In addition, we limited our data to those with savings ranging between -20% and 70% of the pre-weatherization consumption. This provided us with a sample of 587 client households, or 32% of the total number of clients (1,826) that had natural gas savings in the 2006 program year.

Development of the Engineering Models

Our overall model of heating usage (and savings) provided coefficients to adjust our engineering estimates for measures: heating system replacement, including high efficiency, and standard efficiency systems; ceiling insulation including ceiling, floored attic); finished attic insulation including sloped ceiling and kneewall insulation; wall insulation; floor/crawlspace insulation (including basement wall and floor joist insulation); and bandjoist insulation.

Although our algorithms are based on engineering methods, they stop short of those used for comprehensive building simulation models in that simplified heat transfer formulations are used, and the methodology uses implicit assumptions of average internal and solar gains.

The basic model is defined as:

$$\text{Savings} = \text{Pre-Wx Fuel Consumption} - \text{Post-Wx Fuel Consumption}$$

where:

Fuel Consumption in each period is defined as:

$$\frac{(\text{Surface Heat Transfer} + \text{Infiltration Heat Transfer} + \text{Heat Transfer of Untreated Building Components})}{(\text{Heating System Efficiency})} + \text{Water Heater Usage}$$

The method used to assess water heater usage is discussed in the section entitled Development of Algorithms for Water Heater Measure Savings. The methods used to estimate each of the other parameters, and the final adjustment coefficients, are defined in the remainder of this section.

We developed savings algorithms using standard engineering relationships for three general classes of algorithms, including insulation, infiltration reduction, and heating system replacements.

Insulation

We calculated the heating system efficiency-adjusted savings for insulation measures as:

$$\text{BTU} = \text{HDD} * 24 * \text{Area/R-Value} / \text{Heating System Efficiency}$$

The HDD (heating-degree-day) values correspond to the ten weather regions in the state that are used to assess PRISM weather normalization (see Appendix B, Iowa Weather Zones).

Total Savings, which includes the interactive impacts of insulation, heating system replacements, and infiltration reduction effects of dense-pack insulation =

$$(cf_{pre} * \text{HDD} * 24 * \text{Area} / R_i) / n_{pre} - (cf_{rst} * \text{HDD} * 24 * \text{Area} / (R_i + R_{ins}) / n_{pst} + ir$$

where:

cf_{pre} and cf_{rst} are calibration factors determined in the second stage analysis

n_{pre} is the efficiency of the existing heating system from the calibration model
 an average value of 68% was calibrated where heating systems were replaced
 an average value of 61% was calibrated where heating systems were not replaced

n_{pst} is the efficiency of the heating system after weatherization
 80% and 92% are assumed for standard and high-efficiency units respectively,
 or $n_{pre} + 2.5\%$ if the heating system was not replaced (to account for tune-ups)

HDD is heating degree days

Area is the square footage of the insulated surface (from the tracking system)

R_i is an estimate of the initial (pre-weatherization) R-value of the surface

R_{ins} is the R-Value of the added insulation

ir denotes the allocation to infiltration reduction for dense-pack insulation, and is defined as the Net Savings Allocated to Insulation in the following section entitled Infiltration.

Table A1 provides the calibration factors (cf_{pre} and cf_{rst}) and R_i for each insulation measure.

Table B1. Insulation Calibration Factors and R Value Assumptions

Measure	Added Insulation	Calibration Factors (cf)		R Values	
		pre	post	pre	post
Open blow (attic) cellulose ¹	R 13	0.203	0.216	28.7	39.7
	R 19			21.6	40.6
	R 30			13.5	43.5
	R 38			8.4	46.4
Floored attic	R 13	0.418	0.445	5.1	13.8
	R 19			5.2	18.3
	R 30			5.3	25.2
	R 38			5.3	30.5
Sloped-ceiling attic insulation	R 13	0.297	0.316	3.9	12.5
	R 19			4.4	17.4
Dense-pack kneewall	R 13	0.359	0.381	5.2	14.6
	R 19			5.3	17.8
Batt kneewall	R 11	0.354	0.376	5.2	12.8
	R 19			5.3	17.8
Wall insulation	R13	0.209		4.8	12.6
Bandjoist Insulation	R 11	0.401		4.1	11.3
	R 19			4.1	14.0
Basement/Crawlspace Insul	R 11	0.441		3.1	9.7
	R 19			3.1	14.5
Floor joist insulation ²	R 11	0.209		3.1	9.7
	R 19			3.1	14.5
	R 30			3.1	27.5
	R 38			3.1	35.2

Notes

¹ Assumes pre-existing insulation is increased to a total of R-38

² Not included in calibration, as there are very few of these. Uses wall insulation calibration factor

R-Value Adjustments for Open-Blown Cellulose Insulation. We found it necessary to adjust inputs to account for the R-Value of pre-existing insulation in homes receiving open-blown cellulose insulation. For these measures, we estimated the level of pre-existing insulation so that the R-value of existing plus the added insulation totaled to R-38. The level of pre-existing insulation is not recorded in the tracking system.

Accounting for Interaction Between Insulation and Heating System Measures

The equation for Total Savings embeds the savings that accrue from replacing heating systems. The formulas to disaggregate the insulation and heating system impacts are as follows:

Savings Allocated to Insulation = Total Savings * Allocation Factor

where the Allocation Factor =

$$(1/(R_i * n_{pre}) - 1/((R_i + R_{ins}) * n_{pst})) / (2/(R_i * n_{pre}) - (1/(R_i * n_{pst})) - (1/((R_i + R_{ins}) * n_{pre})))$$

Impacts Allocated to Furnace Replacement =

Total Savings – Savings Allocated to Insulation

We provide an example calculation to illustrate our allocation method:

Example of Calculation for Insulation / Heating System Interaction

Allocation of Interactive Measure Savings

Surface Area	1,000		
Heating-degree days	5,000		
		Pre	Post
		Net	
<hr/>			
Scenario 1. Savings for insulation only			
R-Value	10.0	40.0	
Heating System Efficiency	0.6	0.6	
Consumption (Mbtu)	20.0	5.0	
Net savings (MBtu)			15.0
Scenario 2. Savings for heating system replacement only			
R-Value	10.0	10.0	
Heating System Efficiency	0.6	0.9	
Consumption (Mbtu)	20.0	13.3	
Net savings (MBtu)			6.7
Scenario 3. Savings for both insulation and heating system repl			
R-Value	10.0	40.0	
Heating System Efficiency	0.6	0.9	
Consumption (Mbtu)	20.0	3.3	
Net savings (MBtu)			16.7
<hr/>			
Allocation factor = 16.7 / (15+6.7) =			0.769
Allocated savings (Mbtu):			
Insulation			11.5
Heating System Replacement			5.1
Total Savings (same as Scenario 3 net savings)			16.7

Assume a wall with surface area of 1,000 sq ft, in a region with 5,000 heating-degree days. Three scenarios are presented:

- (1) Insulation-only, where an initial R-value of 10 is increased to 40. Savings are 15 MBtu per year.
- (2) A heating system of 60% efficiency is replaced with one of 90% efficiency. Savings are 6.7 MBtu per year.
- (3) Insulation is installed and the heating system is replaced. Savings are 16.7 MBtu per year.

Totalling the savings the insulation-only scenario (1) with the heating system replacement-only scenario (2), provides 21.7 MBtu. This is considerably higher than for the case in which both insulation and a heating system replacement are installed (15 MBtu).

The allocation factor is calculated as 16.7 / 21.7, or 0.769.

Insulation savings = 0.769 * 15 = 11.6 MBtu

Heating system replacement savings = 0.769 * 6.7 = 5.1 MBtu

Together these add to the total of 16.7 MBtu (11.6 + 6.5) shown in Scenario 3.

Infiltration Reduction

The basic approach used for assessing engineering estimates of infiltration savings is similar to that used in the original algorithms. The agencies conduct pre- and post-weatherization blower door tests on the structures, reporting results as CFM @ 50 Pa. The equation we used to estimate air infiltration under normal conditions is 1/20 of the infiltration reduction at 50 Pa. We used the heating degree days from the ten weather regions, and made the additional assumption that 60% of heating degree days are relevant to heating system usage.

The equation for estimating heat the heat transfer, adjusted for heating system efficiency, is calculated as:

$$\text{BTU} = (\text{cfm}_{50} / 20 * \text{HDD} * 0.6 * 25.92) / \text{Heating System Efficiency}$$

The constant value of 25.92 is derived from the heating capacity of air and unit conversion factors: 60 min/hour * 24 hours/day * 0.018 BTU/ft²-°F

Although the basic calculation for infiltration reduction is straightforward, the savings calculated in this way includes impacts that are attributable to furnace replacement, just as we had for insulation. In addition, the portion of the savings not allocated to furnace replacements can be broken down further to allocated savings to dense-pack insulation (denoted as 'ir' in the previous section). Consequently, a once-straightforward calculation becomes a complex mix of formulas to account for allocation of savings to dense-pack insulation and furnace replacements.

Total Infiltration Reduction Savings (TIRS, as Btu) =

$$c_{f_{ir}} * \text{HDD} * 0.6 * 25.92/20 ((\text{cfm}_{50\text{pre}}) / n_{\text{pre}} - (\text{cfm}_{50\text{pst}}) / n_{\text{pst}})$$

where:

$c_{f_{ir}}$ is calibration factor determined in the second stage analysis to be 0.421

$\text{cfm}_{50\text{pre}}$ and $\text{cfm}_{50\text{pst}}$ are the blower door readings recorded in the tracking system

HDD is heating degree days

Dense-pack cellulose insulation significantly reduces air flow through the insulated surface, and so contributes to infiltration reduction. A portion of the infiltration reduction savings was allocated to dense-pack insulation, including wall insulation, floored attic insulation, sloped ceiling insulation, and kneewall insulation (where cellulose insulation was installed). The fraction that was allocated to dense-pack was determined as a parameter in the 2nd stage model. These savings were allocated in proportion to the square-footage insulated for all dense-pack insulation measures. The following formulas provide the disaggregation methodology:

Allocation to Insulation =

$$\text{Min} (0.75 * \text{TIRS}, \text{ucTIRS} * (\text{aix} / (\text{aix} + \text{TIRS})))$$

where :

$$\text{ucTIRS} = (\text{TIRS}) / c_{f_{ir}}$$

$$\text{aix} = (\text{ucTIRS}) * (c_{f_a}) * (\text{tadp} / \text{vol})$$

c_{f_a} is a calibration factor determined in the second stage analysis to be 37.1

tadp = total surface area with dense-pack insulation (square feet)

vol = conditioned volume of dwelling (cubic feet)

Allocation to Non-Insulation Measures = TIRS - Allocation to Insulation

Each of these values (Allocation to Insulation and Allocation to Non-Insulation Measures) include savings that must be allocated to heating system replacements (just as we did for insulation measure savings). The allocation factor is:

Interaction Factor for Heating System Replacements (**xf**) =

$$(\text{cfm}_{50\text{pre}} / n_{\text{pre}} - \text{cfm}_{50\text{pst}} / n_{\text{pst}}) / (2 * (\text{cfm}_{50\text{pre}} / n_{\text{pre}}) - (\text{cfm}_{50\text{pst}} / n_{\text{pre}}) - (\text{cfm}_{50\text{pre}} / n_{\text{pst}}))$$

Net Savings Allocated to Insulation (ir) = xf * Allocation to Insulation

These savings are allocated to each dense-pack area in proportion to the total dense-pack area of any given dwelling.

Net Savings Allocated to Non-Insulation Measures =

$$\text{xf} * \text{Allocation to Non-Insulation Measures}$$

Allocation to Heating System Replacement =

(Allocation to Insulation + Allocation to Non-Insulation Measures) –

(Net Savings Allocated to Insulation + Net Savings Allocated to Non-Insulation Measures)

Whole House Mechanical Ventilation

Our 2nd stage model included a factor to directly account for the impacts of installing whole-house ventilation, which is used to help remove moisture in extremely tight homes. The tracking system makes no distinction between spot ventilation and ventilation for moisture removal: we defined the latter as cases where the minimum average cost was \$250. The final model estimated an increase of 7.1 therms for each ventilation system identified as a whole-house ventilation measure using this cost threshold.

Heating System Replacement

Increasing the heating system efficiency results in less heating fuel required regardless of whether or not the building received insulation or infiltration reduction measures. Our 2nd stage modeling defined savings for each measure that accounted for the pre- and post-weatherization heating system efficiency, and consequently, savings for weatherized components include the savings that result from the heating system replacement. In addition, there are savings attributable to heating system replacements for all building components that were not weatherized. In this section, we describe the methodology we used to address these situations.

Allocating savings to heating system replacements for weatherized measures. The savings for insulation and infiltration reduction measures are lower in cases where the heating system efficiency is replaced than the savings that would accrue if a heating system had not been replaced. Simply put, the heat that is ‘lost’ through the surface or by air leakage requires less energy to produce using a high-efficiency heating system than would be the case if an inefficient heating system had generated the heat, so actual savings at the meter are lower. Similarly, heating system savings are decreased when an insulation or infiltration reduction measures are installed as less heat is lost after the efficiency measures are installed. We accounted for these interactive effects by breaking out the interactive impacts in proportion to what the savings would have been if the other measure had not been installed.

Allocating savings to heating system replacements for unweatherized surfaces.

Heating system replacement savings also accrue from losses through non-weatherized components of the structure, such as windows, doors, or walls/ceilings/floors/basements that have pre-existing insulation. The heat that is ‘lost’ through the surface or by air leakage requires less energy to produce using a high-efficiency heating system than would be the case if an inefficient heating system had generated the heat, resulting in savings.

We assessed the savings for those components as:

Other Heating System Replacement Savings =

$$cf_{\text{other}} * (\text{Total Structure Heat Usage} - \text{WHUsage}_{\text{pre}} - \text{Quantified Heat Transfer}) * (1 - n_{\text{pre}} / n_{\text{pst}})$$

where:

cf_{other} is calibration factor determined in the second stage analysis to be 0.539

Total Structure Heat Transfer = Annual Fuel Consumption * Heating System Efficiency

Quantified Heat Transfer = Surface Heat Transfer + Infiltration Heat Transfer

WHUsage = pre-weatherization water heater consumption, as described in the section entitled Development of Algorithms for Water Heater Measure Savings

The Quantified Heat Transfer is assessed using the basic models of conductance in concert with the calibration factors from the 2nd stage modeling:

Heat Transfer (adjusted for heating system efficiency) is calculated as:

$$(cf_{\text{pre}} * \text{HDD} * 24 * \text{Area} / R_i) / n_{\text{pre}} \text{ for each surface receiving insulation,}$$

and for infiltration reduction as:

$$(cf_{ir} * HDD * 0.6 * 25.92/20 \text{ cfm}_{50pre}) / n_{pre}$$

Total Structure Heat Usage is taken from the normalized annual consumption (NAC) from PRISM modeling. The annual fuel consumption data is not available for all dwellings weatherized by the program, and in some cases the PRISM models are poorly defined. For these cases, we developed a regression model to estimate the pre-weatherization consumption.

Our regression model used the following parameters: heating degree days, house volume, total of area insulated (sq ft), indicator of receiving a heating system replacement, initial blower door reading (cfm₅₀), change in cfm₅₀, number of occupants in the house, and an indicator of having gas water heating (a constant was not significant in this model).

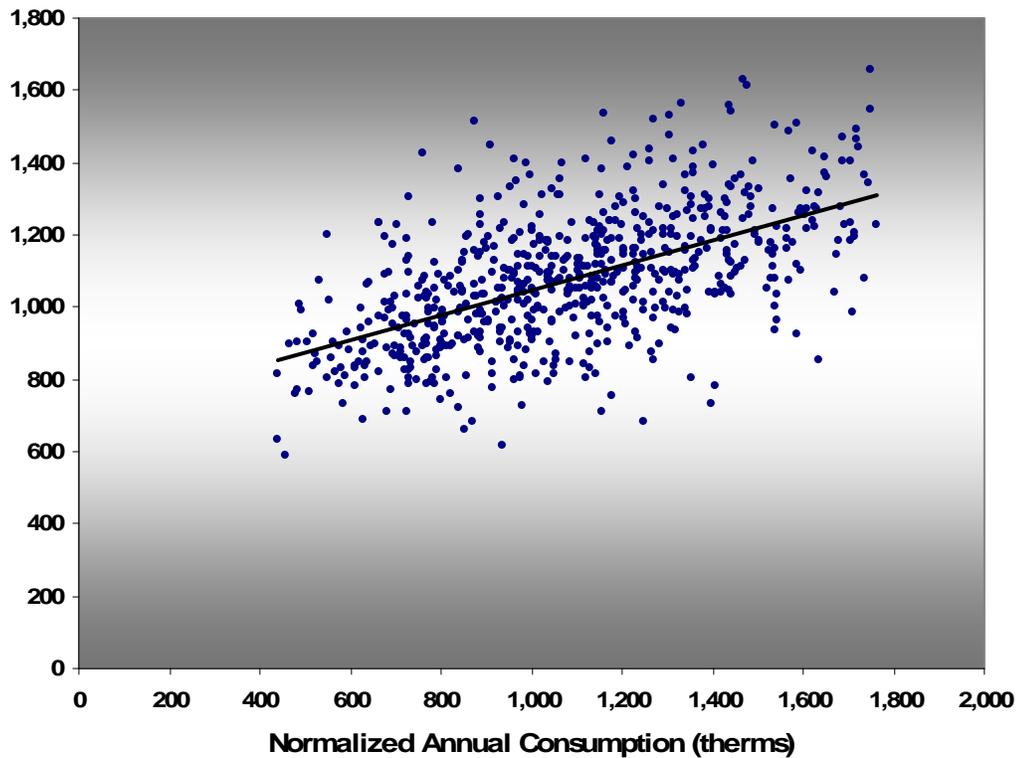
Source	SS	df	MS	Number of obs = 566		
Model	692406172	8	86550771.6	F(8, 558)	= 1532.68	
Residual	31510458.1	558	56470.3551	Prob > F	= 0.0000	
				R-squared	= 0.9565	
				Adj R-squared	= 0.9558	
Total	723916631	566	1279004.65	Root MSE	= 237.63	

nac	Coef.	Std. Err.	t	P> t	[90% Conf. Interval]	
Htg deg days	.0614594	.0071778	8.56	0.000	.0496333	.0732855
Volume	.0105677	.001977	5.35	0.000	.0073104	.0138249
Area Ins(sf)	.4379239	.1050825	4.17	0.000	.2647911	.6110566
Htg Sys Repl	63.85131	20.91957	3.05	0.002	29.38445	98.31817
PreBlower Dr	.0959256	.0116619	8.23	0.000	.0767116	.1151396
Chg Blower Dr	-.0535002	.0165657	-3.23	0.001	-.0807937	-.0262067
Occ in Hse	22.91148	5.703174	4.02	0.000	13.51499	32.30797
Has Gas Wh	97.50553	31.5983	3.09	0.002	45.44453	149.5665

Figure B1 shows a plot of estimated consumption from our regression model compared to observed annual fuel consumption from PRISM data. The line indicates the values for a perfect estimate, and the data points are the estimated values. In general, the estimated values provide a reasonable estimate of annual fuel consumption for cases in which we have no fuel consumption data, particularly for the central region of the plot which corresponds to the majority of the weatherization clients.

Bear in mind that errors in the estimates of annual fuel consumption affect the savings for a small subset of the weatherization program savings, i.e., the savings of heating system replacements for non-weatherized building components in dwellings where PRISM data is unavailable. In contrast, the legacy algorithms relied upon the estimates of this parameter to assess savings for all of the major heating system and shell measures installed by the program, and as such, were far more sensitive to errors in estimates of pre-weatherization fuel consumption.

Figure B1. Estimated Annual Fuel Consumption vs. Normalized Annual Fuel Consumption



Comparison of Average Savings for the Legacy and Revised Algorithms

This section provides a comparison of the average impacts of the revised estimated savings with those generated using the legacy algorithms.

Table B2. Comparison of Average Dwelling Unit Savings (Therms)

Year	n	Observed Savings		Estimated Savings	
		Raw (Unadjusted)	Comparison-Adjusted	Legacy Algorithms	Revised Algorithms
2005	584	369	289	298	300
2006	569	307	279	324	304

Table B2 shows a comparison between the observed savings (from PRISM analysis) and the estimated savings using both the legacy and revised algorithms. The revised algorithms provide estimates of aggregate impacts similar to those produced by the legacy methods for 2005, with both methods estimating approximately 300 therms per dwelling. The results for the revised algorithms are substantially better results for 2006, where the legacy algorithms overstated savings relative to the raw (unadjusted savings) by 5.5%, compared with understatement of 1% for the revised algorithms. Note that we calibrated our models in the data for calendar year 2006, so we would expect the results to closely match the raw savings for that year.

Table B3 provides a comparison of average measure-specific savings for building envelope heating and heating system measures. We compared the average measure savings from the original 1993 evaluation as well as the recent 2005 and 2006 evaluations, to the estimates for 2005 and 2006 clients developed using the revised algorithms.

The ‘legacy’ savings shown for 1993, 2005, and 2006 are billing-adjusted corrected at the house level and as such do not reflect measure-specific adjustments.

The revised algorithms include added detail for some measures which were bundled into a single measure in the previous analyses. These include ceiling, floored attic, and sloped ceiling insulation, which were previously bundled with an overall estimate of ceiling insulation savings. In addition, kneewall and wall insulation were previously aggregated into a single value for wall insulation. We show these aggregated values as line items, and further include a breakout for these formerly bundled measures (shown in italicized numbers) that were developed using our revised algorithms.

The revised algorithms allocate a greater proportion of savings to attic insulation – this is largely due to the additional breakout of floored attic and sloped ceiling insulation, both of which are dense-pack insulation measures and consequently receive an allocation of the infiltration-reduction impacts which were not accounted for in the legacy methods. In addition to ceiling insulation, heating system replacements (both high and standard-efficiency replacements), and high-efficiency water heater replacements are allocated a greater proportion of savings using the revised algorithms.

Table B3. Comparison of the Average Savings of Measures (Therms)

	Legacy Algorithms ¹			Revised Algorithms	
	1993	2005	2006	2005	2006
Shell and Heating System Measures					
Ceiling Insulation, including attic, floored attic, and sloped ceiling insulation	59	54	44	87	85
<i>Ceiling</i> ²	-	-	-	56	59
<i>Floored attic</i> ²	-	-	-	73	69
<i>Sloped attic ceiling</i> ²	-	-	-	59	57
Wall Insulation including sidewall and kneewall insulation	166	140	113	111	113
<i>Sidewall</i> ²	-	-	-	112	113
<i>Kneewall</i> ²	-	-	-	22	21
Floor/Foundation/Crawlspace Insulation	6	50	38	23	24
Bandjoist Insulation	18	7	5	7	7
Infiltration Reduction	48	42	34	22	23
High-efficiency Heating System Replacement	-	186	148	189	189
Standard-efficiency Heating System Replacement	108	131	106	117	114
Heating System Tune and Clean ²	-	-	-	18	18
Mechanical ventilation (whole house) ³	-	-	-	-7	-7

Notes:

¹ Savings include a whole-house billing analysis adjustment factor

² Measure was not disaggregated as a separate measure in the legacy algorithms

³ Impacts of mechanical ventilation, installed for moisture removal, was not previously quantified.

The savings for infiltration reduction appear to be lower using the revised methods; however this is not the case. The average total infiltration reduction estimated using the revised methods is actually 13% higher, at 79 therms per dwelling in 2005 and 2006, compared to approximately 70 therms for the legacy methods. The revised algorithms allocate a higher percentage of infiltration reduction impacts to dense-pack insulation, so the amount remaining for miscellaneous infiltration reduction measures (the value shown in the table) is lower. It's worth noting that one reason the proportion of savings which are allocated to dense-pack insulation is higher in the revised models is because all dense-pack insulation measures are now accounted for – the legacy methods only accounted for dense-pack insulation in walls.

Savings of floor/foundation/crawlspace insulation are 40% to 53% lower using the revised methods as compared to the 2005 and 2006 adjusted estimates, but are approximately 400% greater than the original values in the 1993 evaluation. The legacy estimates of floor/foundation/crawlspace insulation were tied to the expenditures made for these measures, and as prices have increased, so have the estimated savings, inflating the estimated savings for these measures substantially.

Finally, we have estimated that furnace tune-ups save 18 therms on average, and the addition of mechanical ventilation corresponds to a -7 therms.

Development of Algorithms for Assessing Space Cooling Impacts

Cooling savings assessments are inherently more complex to model than heating savings owing to discretionary usage and a more complex heat transfer relationships. Extensive engineering modeling of cooling savings is beyond the scope of this evaluation, however.

As an alternative approach, we conducted used a two-stage assessment. First, we conducted a billing analysis on recent program participants to assess the house-level impacts of building envelope measures on electricity usage. Next, we leveraged the results of detailed engineering modeling completed in the initial Iowa low income evaluation in 1992¹ to allocate impacts according to the proportion of savings for each measure, as found in that study. The billing analysis methodology and savings allocation process is described in the following sections.

Methodology

Our study population consisted of dwellings weatherized during the calendar years 2004, 2005, and 2006, with the treatment group consisting of those denoted in the client database as having air conditioning, and receiving some envelope measure (insulation and/or infiltration reduction).

The comparison group consisted of co-participants that were identified as having no air conditioning. Unfortunately, a large number of clients had no air conditioning type specified. We contacted DCAA to determine if it was appropriate to assume that missing values of the air conditioning could be counted as the absence of any air conditioning. They did not believe this would be the case, and consequently we were limited to a small number of comparison group homes.

In order to reduce the influence of savings from other measures installed by the program, we restricted both the treatment and comparison groups to dwellings that had non-electric heat, non-electric water heating, and received no refrigeration appliances. The only other measures installed by the program for which we had to account for were differences in lighting impacts: we accounted for these by estimating lighting measure impacts for each of the treatment and comparison group homes and subtracting the lighting impacts from the overall house impacts. The lighting impacts were estimated using the results of the assessment described in the last section of this appendix.

We weather-normalized consumption using ten weather regions in Iowa as described in Section 3 of this report. In all cases, we required at least ten billing periods and between 330 and 370 days in the pre- and post-periods. We accepted normalization models with 't' values of at least 2.0 for heating and cooling slopes. In addition, we required that the overall model was significant at 97.5% (F-test)². Our final treatment group consisted of 775 dwellings, 438 with central air conditioning and 337 with room. We had 46 comparison group homes.

¹ Wisconsin Energy Conservation Corporation. Estimated Low-Income Program Impacts in Iowa, June 14, 1993.

² A t-value of 2.0 indicates 90% confidence on the regression coefficient.

The F-test is the ratio of the variance of the model explained by the regression model to the variance of the residuals (the portion not explained by the model). When used for prediction purposes, the significance of the F-test should be approximately 4 times greater than what would be accepted for a valid model. In our case, 90% confidence would be considered acceptable for a valid model (uncertainty of 10%), 97.5% confidence (uncertainty of 2.5%) is considered acceptable for predictions based upon the model.

We conducted three assessments: a combined assessment with dwellings having either central or room air conditioning, and separate assessments for centrally-cooled dwellings and room-cooled dwellings. We used the same comparison group for each of the assessments.

Finally, we calculated the average savings per cooling degree day using the weighted average cooling degree days (base 65) for our treatment sample. This allowed us to estimate measure impacts for each of the ten weather zones in the state.

Results

The results of the billing analyses are shown in Table B.4.

The comparison group showed an average increase of $8 \text{ kWh} \pm 345 \text{ kWh}$ at 90% confidence per year. After accounting for savings from lighting measures installed in these dwellings, we estimated usage to have increased by 252 kWh.

The combined room/central air conditioning treatment group experienced an average savings of $506 \pm 96 \text{ kWh}$. The savings from lighting was estimated at 243 kWh, resulting in a cooling savings of 263 kWh. The average savings net of the comparison group impacts is 515 kWh. The average savings per cooling degree day (base 65) was 0.529 kWh.

The treatment group composed only of homes with central air conditioning had savings averaging $497 \pm 127 \text{ kWh}$. After subtracting the estimated lighting savings of 263 kWh, we found that savings averaged 234 kWh. The average savings net of comparison group impacts is 486 kWh, or 0.510 kWh per cooling degree day.

The treatment group comprised of only homes with room air conditioning had savings averaging $518 \pm 146 \text{ kWh}$. After subtracting the estimated lighting savings of 216 kWh, we found that savings averaged 301 kWh. The average savings net of comparison group impacts is 554 kWh, or 0.552 kWh per cooling degree day.

Table B.4 Summary of Cooling Measure Savings

Electricity (kWh)

Type		Treatment Group					Unweighted Comparison Group					Net Savings	
		n	NAC	90% CI	Savings	90% CI	n	NAC	90% CI	Savings	90% CI		90% CI
Central and Room	Overall	775	8,062	195	506	96	46	6,561	698	-8	345	513	358
	Estimated Lighting Savings				243					245			
	Savings Excluding Lighting				263					-252			
	Net AC Savings											515	
	Average Cooling Degree Days											975	
	Average Savings per CDD										0.529		
Central	Overall	438	8,383	258	497	127	46	6,561	697	-8	345	504	387
	Estimated Lighting Savings				263					245			
	Savings Excluding Lighting				234					-252			
	Net AC Savings											486	
	Average Cooling Degree Days											953	
	Average Savings per CDD										0.510		
Room	Overall	337	7,644	292	518	146	46	6,561	702	-8	346	525	366
	Estimated Lighting Savings				216					245			
	Savings Excluding Lighting				301					-252			
	Net AC Savings											554	
	Average Cooling Degree Days											1,004	
	Average Savings per CDD										0.552		

Allocating Impacts to Wall, Ceiling, and Floor Insulation and Infiltration Reduction

The earlier study modeled air conditioning impacts for 492 homes using building simulation modeling software. The savings for wall, ceiling, and floor insulation savings and infiltration reduction savings were calculated separately for central and room air conditioning. The percentage of savings allocated to each measure results are summarized in Table B5.

Table B5. Allocation of Cooling Measure Savings

	Insulation			Infiltration Reduction
	Ceiling	Wall	Floor & Crawlspace ¹	
Central	46.6%	47.2%	0.0%	6.2%
Room	39.1%	39.7%	18.2%	3.0%

¹ Floor and crawlspace insulation savings were slightly negative for central air conditioning in the previous findings. We have assumed no savings in this assessment.

Note that the earlier modeling assessed savings for floor and crawlspace insulation in homes with room air conditioning but none (or slightly negative) for those with central air conditioning. No explanation for this difference was presented in the prior study.

We backed out results for average savings for each weather-specific region with the findings of the earlier cooling model savings, we developed the following estimated impacts of cooling savings for each weather region and measure (Table B6).

Note that the results from the building simulation modeling do not provide the same level of detail as used for our estimates of heating savings, which included a further breakout of attic insulation savings into open-blown, cavity-filled attic spaces, and knee wall insulation. In order to preserve this level of detail, we allocated ceiling insulation cooling savings proportional to savings for these measures.

Band Joist Insulation Savings

Basements and crawlspaces are typically cooler than the rest of the house and may actually reduce annual cooling load, depending in part on the degree to which the basement is insulated, whether floor insulation is present, and the degree that HVAC blowers are used to distribute the cooler air throughout the house. Band joist insulation may tend to keep the basements cooler longer throughout the season, thus reducing cooler usage later in the season, but due to the large thermal mass of the basement or crawlspace in contact with the surrounding earth (at a relatively lower temperature), it is unlikely that it would have a significant impact on the actual temperature of the basement or crawlspace for most of the cooling season. Thus, cooling savings due to band joist insulation were assumed to be negligible.

Table B6. Measure Savings by Weather Region and AC Type

Savings by Weather Region (kWh)

Type	Weather Region	Insulation			Infiltration Reduction
		Ceiling	Wall	Floor & Crawlspace ¹	
Central	1	197	200	0	26
	2	169	171	0	22
	3	200	203	0	27
	4	243	246	0	32
	5	201	204	0	27
	6	196	199	0	26
	7	305	309	0	41
	8	257	260	0	34
	9	303	306	0	40
	10	270	274	0	36
Room	1	179	181	83	14
	2	153	155	71	12
	3	182	184	85	14
	4	221	224	103	17
	5	183	185	85	14
	6	178	181	83	14
	7	277	281	129	21
	8	233	236	108	18
	9	275	278	128	21
	10	246	249	114	19

Comparison to Previous Results

The average household cooling energy savings attributed to building envelope measures installed during CY 2007 is 341 kWh using the revised algorithms. Although this result is somewhat less than the observed savings of our study group, it is more than double the average dwelling savings for cooling measures reported for the program in recent years, which were 151 kWh and 148 kWh for the CY 2005 and 2006 programs, respectively.

Development of Algorithms for Water Heater Measure Savings

The revised algorithms for water heater measure savings are presented in this section. We note that assessing the savings for these measures is more problematic than for shell and heating system measures, owing in part to the relatively smaller impacts of these measures, interaction of the installed measures, and a host of additional variables that do not exist for those measures. These additional variables include:

- Less temperature-dependence, and the seasonality that does exist is due to lower incoming water temperatures (typically lagging ambient temperatures by approximately two months), and uncertainty in how seasonal temperature variation affects occupants' demand for hot water (e.g., do clients take more frequent showers in the summer months, or bask in the warmth of longer showers during cooler room temperatures in winter months?)
- Are other appliances which demand hot water present such as clothes washers or dishwashers (we have no accounting for these in the tracking system)
- Effects of lime-scale calcification on burner efficiency of the existing water heater
- High variability in showerhead flow rates, not only due to the efficiency of the installed showerheads but also due to extent of lime-scale calcification of existing showerheads (which reduces flow rates), and water service pressure differences (e.g., houses served by residential wells typically have much lower pressure than city-supplied water)
- Variations in the water heater temperature setting
- Number of individuals in the household – note that having higher numbers of occupants does not assure higher savings. For example, in a household of six members, the clients might limit their shower length to avoid running out of hot water. The installation of efficient showerheads could result in longer shower lengths, simply because hot water is available for longer periods before running out, and this could reduce or completely offset savings for those measures.
- Uncertainty of the efficiency of existing measures where no replacement is installed, which indirectly affects the degree of interaction for measures at the water heater (pipe wrap, insulation jackets, water heater turndown). Examples include cases where the clients reject efficient showerheads and aerators due to flow-rate concerns, or the agency might not provide them, or the existing measures might be so tightly calcified in place that replacement would risk damaging pipes. In these cases, the non-installation of a measure does not imply the existence of an efficient measure already in-place.
- Measure persistence, as these measures can be more easily removed or mitigated if they are found undesirable, such as clients replacing efficient showerheads or aerators with other less efficient ones, or increasing the temperature setting of the water heater.

With the exception of the number of individuals in the household, we have no accounting of these variables in the tracking system, making results of assessing the impacts of these measures much less certain. We discuss the approach to developing the savings algorithms in the next section, followed by a description of the final algorithms for each measure.

Approach to Assessing Water Heater Measure Savings

Our initial attempt to develop water heater measure savings algorithms involved direct assessment of each water heater measure using the 2nd stage modeling approach discussed in the section Development of Savings Algorithms for Space Heating, which would have provided the

average impacts as the coefficients for each installed measure. The models showed very high uncertainty on the coefficients for water heater measures.

As an alternative approach, we opted to use a standard pre/post analysis using a future participant comparison group. Our assessment was restricted to natural gas consumption for the summer months to avoid impacts of space heating on our data, and was not weather-normalized. We used the period from May 15 through September 15th of the pre- and post-weatherization years. We limited our analysis to only cases where we matched by day of year for at least sixty days of consumption in the pre- and post-weatherization periods.

Our initial dataset consisted of households in calendar years 2005 and 2006. We dropped 25 dwellings which received water heater jackets, as this measure is no longer installed by the program. Eighty six dwellings were removed where the percentage savings exceeded 100%, which were judged to be dwellings switched from electric to natural gas. Finally, we trimmed dwellings the upper and lower 10% of dwellings based upon percentage savings. Our remaining dataset consisted of 1,249 comparison and 1,033 treatment homes. The average annual consumption in the pre-weatherization period, extrapolated from the average daily consumption, was 254 therms for the treatment and 251 for the comparison group homes.

Regression Analysis

We conducted ordinary least-squares regression and robust regression analysis on numerous models to develop estimates of measure-level impacts. Our models variously included indicator variables for each installed measure, number in the household (including some models which used weighted the number lower as household size increased), indicator variables to represent interaction between all combinations of two and three measures, and estimated annual water heater consumption. In addition, we explored these models with and without a constant. Our models also included examinations of subsets of the data using upper and lower trims ranging from 5% to 25%.

We found that the models using the full dataset provided dubious results, including very low explanatory power and improperly-signed coefficients (i.e., a given measure would indicate increased usage rather than savings). The models were unstable, such that removing a few observations could have very large impacts upon savings of specific measures. These swings could be quite large, ranging from unrealistically high savings for a given measure to negative savings for the same measure, with the removal of only a few observations.

Inasmuch as our goal was to develop algorithms to assess impacts of typical installations of these measures, we opted to do a progressive trim on the data. After determining the best model form in the previous analyses, we progressively dropped observations with the greatest residuals (i.e., deviation between the observed savings and the modeled savings) over a series of iterations. Our final dataset consisted of 614 comparison group homes, and 507 treatment group homes. The average pre-weatherization consumption in each of these groups was 214 and 205 therms, for the comparison and treatment groups, respectively – this is approximately 20% lower than the average for the group prior to the progressive trimming, suggesting our final sample includes fewer installed measures (or combinations of measures), or that our final model may understate impacts by a few percent.

Our final model estimated annual savings according to the following formulation:

Source	SS	df	MS			
Model	1653876.22	10	165387.622	Number of obs =	1121	
Residual	209598.151	1110	188.827163	F(10, 1110) =	875.87	
				Prob > F =	0.0000	
				R-squared =	0.8875	
				Adj R-squared =	0.8865	
Total	1863474.37	1120	1663.8164	Root MSE =	13.741	

annsave	Coef.	Std. Err.	t	P> t	[90% Conf. Interval]	
c	-1.13709	2.093151	-0.54	0.587	-4.582892	2.308712
wrpu	.1851564	.0059079	31.34	0.000	.1754308	.1948821
td	5.975711	2.71817	2.20	0.028	1.500984	10.45044
tdpu	.0211655	.0055844	3.79	0.000	.0119723	.0303586
pw	-22.76942	2.654746	-8.58	0.000	-27.13974	-18.3991
pwpu	.2981993	.0084026	35.49	0.000	.2843667	.3120319
fa_qty	7.859298	1.186935	6.62	0.000	5.905334	9.813263
fathm	-3.850583	.4906416	-7.85	0.000	-4.658291	-3.042875
espu	.0759855	.0112734	6.74	0.000	.0574269	.0945441
esthm	-2.700549	1.031006	-2.62	0.009	-4.39782	-1.003279
_cons	2.366641	2.018352	1.17	0.241	-.9560247	5.689307

where:

- c: a dummy variable indicating a member of the comparison group
- wrpu: a multiplier on the annual pre-usage for dwellings with water heater replacements
- td: an indicator of having the temperature turned down on the water heater
- tdpu: a multiplier on the annual pre-usage for dwellings with temperature turndowns
- pw: a dummy variable indicating whether pipe wrap was installed
- pwpu: a multiplier on the annual pre-usage for dwellings with pipe wrap installations
- fa_qty: the number of faucet aerators installed
- fathm: the number of household members for dwellings receiving faucet aerators
- espu: a multiplier on the annual pre-usage for dwellings with showerhead installations
- esthm: the number of household members for dwellings receiving showerheads
- const: impacts not explained by the model parameters

All of the coefficients in this model are significant at the 90% confidence interval, coefficients are properly signed, and there is little unexplained savings (the constant is small). The model is, however, complex in that we have 9 terms for 5 measures, and it incorporates parameters for multipliers of pre-retrofit usage, fixed adjustments, and number of household members. We used this model to provide guidance for developing the individual measure algorithms, but note that we did not adopt all coefficients provided by the model due to the issues discussed in the following section.

Our model relies heavily on the annual pre-weatherization consumption for water heater usage. These values will be assessed as the average daily consumption from the time period May 15th through September 15th, multiplied by 365 days per year. For cases in which mid-summer usage is lacking, we developed a regression model to estimate the annual pre-retrofit consumption based upon information in the tracking system³. Using our treatment group sample, we constructed the following model to assess annual pre-retrofit consumption against the number of members in the household (pre-weatherization usage and number of occupants (thm), respectively):

³ We tried various models, including models that included dummy variables on the water heater measures installed. None was significantly better than a simple model based upon number of members in the household.

Source	SS	df	MS			
Model	1070399.41	1	1070399.41	Number of obs =	507	
Residual	4102852.79	505	8124.46098	F(1, 505) =	131.75	
				Prob > F =	0.0000	
				R-squared =	0.2069	
				Adj R-squared =	0.2053	
Total	5173252.20	506	10223.8186	Root MSE =	90.136	

preusage	Coef.	Std. Err.	t	P> t	[90% Conf. Interval]	
thm	34.75648	3.02803	11.48	0.000	29.76666	39.7463
_cons	130.1036	7.683007	16.93	0.000	117.443	142.7643

Development of Water Heater Algorithms

This section provides additional detail on the development of the final algorithms for water heater measure savings. We reference the results of an evaluation of the California Low-Income program⁴ referenced as LIEEP in this document. The LIEEP evaluation used billing analysis for assessing impacts of water heater measures, but was based upon a much larger and richer client dataset than was available in our study.

Water Heater Replacements

Natural Gas

Throughout our various model specifications and client trim levels, we found the most consistent coefficient of our models to be the multiplier on the water heater pre-usage. The final model showed savings for water heater replacements were 18.5% of pre-retrofit usage, or 38.9 therms.

We were unable to distinguish between the savings for high-efficiency and standard-efficiency water heater replacements in our model, however. Of the dwellings receiving water heater replacements in our treatment sample, 67% received high efficiency replacements.

We allocated savings according to the following methodology: The program installs units with an energy factor of 0.59 and 0.62 for standard and high-efficiency replacements, respectively, resulting in a weighted energy factor of 0.610 for units replaced in our study group. We assumed an in-place efficiency of 0.54, which is the standard efficiency of water heaters sold in 1991. The savings were assessed in proportion to the change in energy factor for each type of replacement, resulting in a usage multiplier of 0.132 for standard efficiency units and 0.211 for high-efficiency units, equating to savings of 13.2% of pre-retrofit consumption for standard efficiency units, and 21.1% savings for high-efficiency units. This equates to 27.7 therms savings for standard efficiency units and 44.3 therms savings for high efficiency replacements in our study sample.

The legacy algorithms estimated savings of 34 therms for standard efficiency replacements and 40 therms for high efficiency replacements, which compare well with the revised estimates. We note that these estimates are significantly higher than those found in the LIEEP study (19 therms for all water heater replacements). The reason for this discrepancy may be attributable to lime-scale formation on the heating elements, which can significantly decrease the burner efficiency.

⁴ Impact Evaluation of the 2002 California Low Income Energy Efficiency Program, Final Report, June 17, 2005. West Hill Energy & Computing, Inc, et. al.

In its publication Non-Chemical Technologies for Scale and Hardness Control (DOE/EE-0162), DOE reports that scale buildup on the heated surface in water heaters has a significant impact on the burner efficiency (Table B7).

Table B7. Impacts of scale thickness on water heater energy consumption

Scale Thickness (inches)	Increased Energy Consumption (%)
1/32	8.5
1/16	12.4
1/8	25
1/4	40

These findings indicate that even very small amounts of lime-scale can have significant impacts on burner efficiency. Although water supplied by larger municipalities is typically softened during treatment, it is often not sufficient to assure that little or no scaling of pipes or water heaters will occur. Moreover, low income households are less likely to have the resources to install or replace water softening equipment, and to regularly purchase softening salt.

Based upon the review of water hardness in Iowa, we can assume that some scaling is likely to exist on old water heaters – indeed, our previous estimates of water heater replacement were largely premised entirely on these results.

Figure B2 shows the hardness of surface waters as determined by the US Geological Study. With the exception of extreme southern California, the state has moderate to low levels of water hardness. This is in contrast to water hardness in Iowa, which is rated high to extremely high throughout the state. These findings suggest that lime-scale formation on the existing water heaters is more salient in Iowa, which may account for the relatively higher savings of water heater replacements determined in this study.

Given the consistency of the coefficients from various regression models, we feel that our final regression model provides a reasonable estimate for savings of water heater replacements in Iowa. Based upon these findings, we will estimate standard efficiency replacements at 13.2% of pre-weatherization annual water heater fuel consumption, and high-efficiency replacements at 21.1% of pre-weatherization annual water heater fuel consumption.

Figure B2. Surface water hardness in the United States

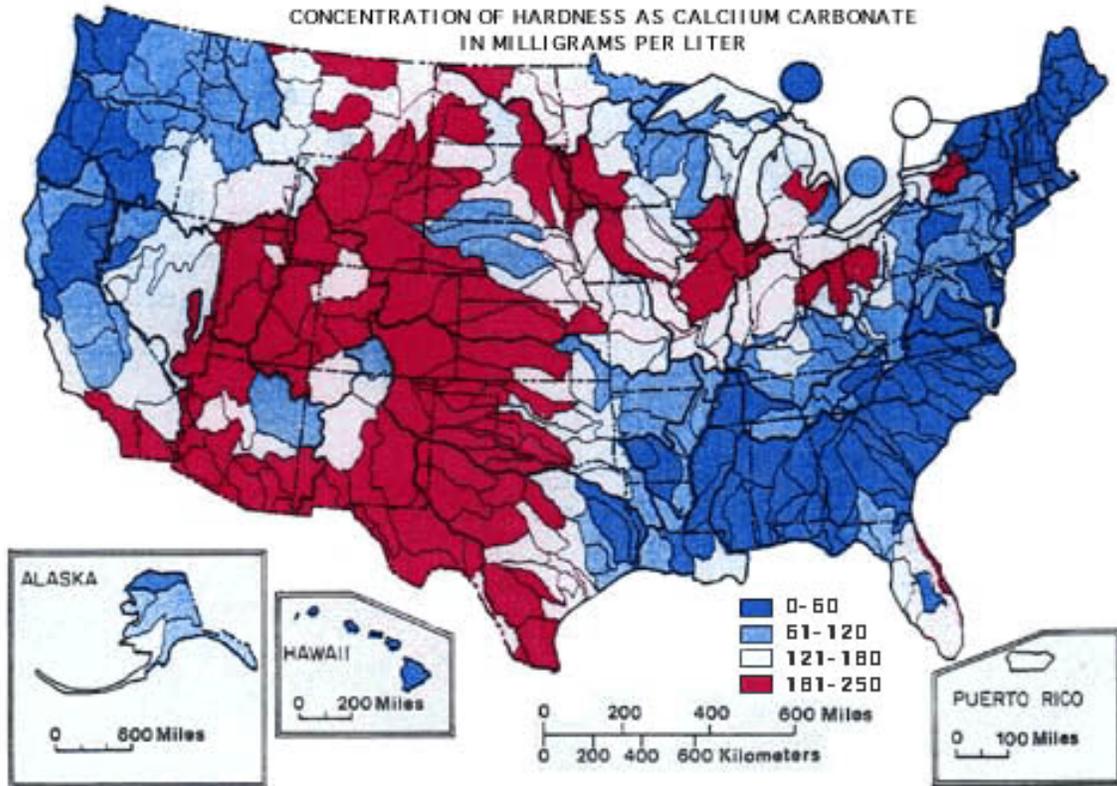


Figure 5.—Mean hardness as calcium carbonate at NASQAN stations during 1975 water year. Map at bottom is colored to show station data representing flow from the accounting unit.

Source: US Geological Survey. <http://water.usgs.gov/>

Electricity

Savings for natural gas water heater replacements cannot be used to project savings for electric water heater replacements due to two key differences: 1) electric water heaters tend to be better insulated, and 2) although scale may form in electric water heaters, it does not create an insulating barrier on the burners as can happen on gas water heaters since the heating elements are completely contained within the tank.

We conducted a billing analysis designed to assess electric water heater replacement savings by comparing shoulder-period savings for dwellings receiving electric water heaters with those that did not. Our results were inconclusive due to small samples.

In the absence of empirical results, we made the following assumptions:

- no savings for standard efficiency electric water heater replacements
- higher-efficiency electric water heater replacements were estimated to save 174 kWh per year based upon the following: annual electric water heater consumption of 4,000 kWh per year with an energy factor of 0.88 for existing units, replaced by units with an energy factor of 0.92. Based upon these assumptions, savings are estimated to average 174 kWh per year ($4,000 \text{ kWh} * 0.88/0.92$).

In our literature review, we found one reference to high efficiency electric water heater replacement in the LIEEP study, which cites 118 kWh savings for high-efficiency electric water replacements in multi-family dwellings. Our result is somewhat higher, but not unreasonably high considering that multi-family water heaters are often smaller than those found in single-family dwellings, and over 90% of dwellings weatherized in Iowa are single-family dwellings.

Efficient Showerheads

Natural Gas

According to the our regression model, savings increases as a percentage of the annual water heater usage, but is partially offset by a negative multiplier on the number of household members for efficient showerheads. This seems counter-intuitive, as one would assume that as the number of household members increases, the savings should also increase proportionally. This could be explained by considering limitations of the water heater to provide an adequate supply of hot water for households with more members -- the time spent in a shower may be lower for dwellings with more occupants, in order to conserve hot water for a series of showers. Efficient showerheads reduce the usage of hot water, which may result in occupants extending shower lengths as hot water remains available for a longer period of time. Also, the regression equation specifies that the overall showerhead savings are calculated in part as a percentage of total pre-retrofit water heater energy consumption, which increases with the number of members of the household, thereby offsetting some of the reduction in savings.

Using our relationship between household membership and pre-retrofit usage (above), we constructed an estimate of showerhead savings using our model results (Table B8):

Table B8 Showerhead savings weighted by number of occupants

Household Members	Annual Consumption (therms)	Showerhead Savings (therms)	Weight
1	165	9.8	35.1%
2	200	9.8	21.2%
3	234	9.7	14.0%
4	269	9.6	12.8%
5	304	9.6	9.2%
6	339	9.5	4.3%
7.7	398	9.4	3.4%
Weighted Average		9.7	

Notes:

Dwellings with more than 6 members averaged 7.7 members per dwelling
 Weighting factors were developed using results of the 2000 - 2006 SLICE impacts

We see that the modeled showerhead savings changes very little with the number of household members. The weighted average savings of 9.7 therms is within the range of other measured results of 8.2 therms in the LIEEP study and 10.3⁵ therms from a summary of Pacific Gas and Electricity study, however it is considerably lower than previous estimates used in SLICE (22 therms).

⁵ Proctor et.al. Savings and Showers: It's All In The Head. Home Energy. July/August, 1994.

Based upon our model results, and confirmation from the LIEEP and the PG&E studies, we will use a fixed estimate of 9.7 therms savings per showerhead for estimating savings of natural gas water heaters.

Electricity

We used the gas savings as the basis for estimating savings of showerhead replacements for dwellings with electric water heaters. Assuming gas water heater burner efficiency is 80%, and electric resistance heating efficiency is 100%, we estimate electricity savings for faucet aerators to be 227 kWh ($0.8 * 970,000 \text{ btu}/3413 \text{ btu per kWh}$).

This is much lower than the previous estimate of 700 kWh per year reported in the evaluation of the CY 2006 Iowa weatherization program, however it is comparable to results of other studies which found 237 kWh (2) and 241 kWh (3).

Faucet Aerators

Natural Gas

We constructed a table similar to the one used for showerheads to assess a weighted average savings for faucet aerators. This table included separate columns and weighting factors to assess the impacts of 1, 2, or 3 aerators installed. The overall weighted average savings for each aerator installed was 1.9 therms, which computes to an average of 3.25 therms per dwelling. This compares well with our previous estimate of 3 therms per dwelling, and a measured value of 3.6 therms per dwelling of the LIEEP study.

Our algorithms will use a fixed estimate of 1.9 therms savings per faucet aerator for natural gas water heaters.

Electricity

We used the gas savings as the basis for estimating savings of faucet aerators in dwellings with electric water heaters. Assuming gas water heater burner efficiency is 80%, and electric resistance heating efficiency is 100%, we estimate electricity savings for faucet aerators to be 44.5 kWh ($0.8 * 190,000 \text{ btu}/3413 \text{ btu per kWh}$).

Our result of 44.5 kWh compares with 64 kWh savings reported in the CY 2006 Iowa weatherization evaluation, but agrees closely with results from LIEEP study, which found 43.4 kWh per aerator.

Pipe Wrap

Natural Gas

The major deficiency in our regression model of water heater measure savings is an apparent overstatement of pipe wrap savings. Our regression model specifies pipe wrap insulation as 30% of the pre-weatherization water heater minus 23 therms, yielding savings in excess of 40 therms for a typical water heater. Moreover, savings in excess of 20 therms was observed in several variations of the regression models constructed for this analysis. These estimates are much higher than those reported in the LIEEP study (4.6 therms) and for those previously reported in the Iowa evaluations (4 therms).

We were unsuccessful in a search of the literature for other measured results of pipe wrap insulation. We also contacted the major manufacturers of pipe wrap insulation, again, with no results.

Although we acknowledge the existence of considerable losses along inlet and outlet pipes of a water heater, the level of savings from our regression model do not seem justified. For example, if one were to assume that copper was a perfect thermal conductor (indeed it is quite a good conductor of heat) and if pipe wrap were 100% effective at reducing losses, then in fact savings would be nil, as heat would simply travel to the uninsulated section of pipe to the section of pipe beyond the insulation. On the other hand, if in fact copper were an extremely poor conductor of heat, then there would be little to save along the pipe, so again savings would be virtually nil. In actual fact, the problem is more complex than this, as one must consider thermal-induced circulation in the pipe, and the fact that copper is not a perfect thermal conductor, and of course pipe wrap is not a perfect insulator.

In order to determine the rate at which an insulated pipe heats up, we conducted a test designed to measure the rate that an insulated pipe heats up. We logged temperatures at 15 second intervals along the inlet pipe to a water heater, with loggers were placed at 9 inches from the water heater along the inlet pipe, at 15 inches, and at 36 inches. In addition, we logged the temperature on the outside of the pipe insulation at 12 inches and 24 inches from the water heater. Finally, we logged ambient temperature in the basement space near the water heater. We repeated this experiment twice.

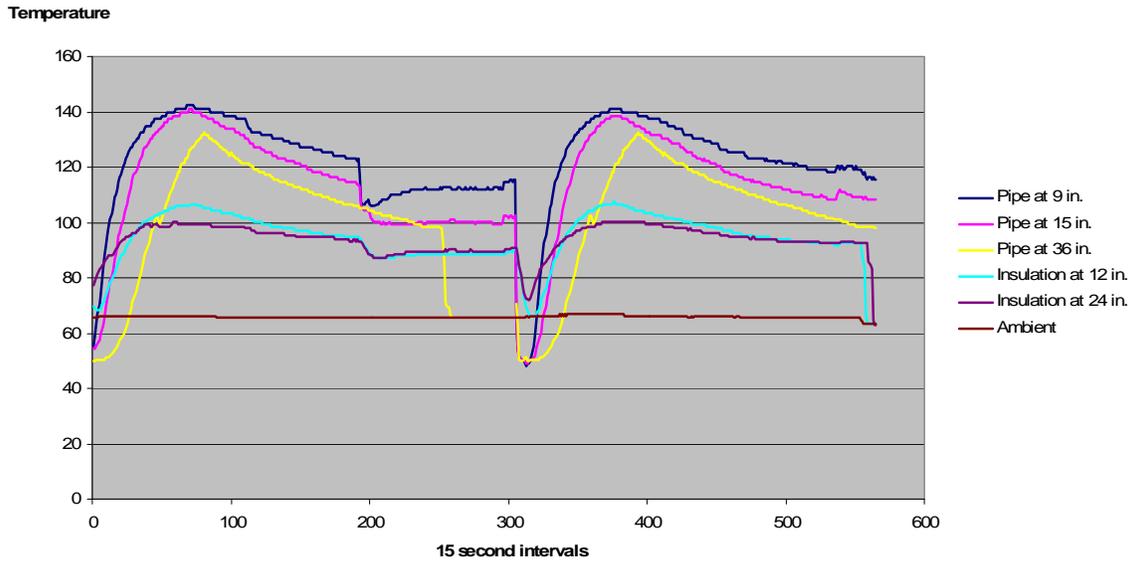
We measured temperature of the water leaving the water heater at 142 °F, and cleared the inlet pipe by running hot water for several minutes. The incoming water temperature was measured to be 50 °F.

We found that the temperature reached 131 °F at the logger 3 feet from the water heater in only 20 minutes, and then declined. We speculate that the declining temperature is due to water circulation within the pipe as heated water rises and cooler water falls to take its place, with the warmed water migrating into the section of the pipe beyond the insulation. The surface of the pipe insulation ranged between 88 °F and 106 °F.

We found that the heat travels very quickly up the pipe, and there is apparent mixing with cooler water beyond the length of the pipe insulation. We did not measure the temperature of the pipe beyond the insulation, however we did note that it was uncomfortably warm to the touch at end of the three-foot insulated section, and indeed was warm for several feet beyond the pipe insulation.

Though we cannot draw specific conclusions regarding efficacy of pipe insulation savings from these results, it provides an illustration of the thermal characteristics of the insulated pipe. However we can conclude that although pipe insulation helps retain heat along the insulated section of pipe, the thermal conductivity of the pipe and circulation of the water inside the pipe tends to wick the heat from the insulated section into the uninsulated section of the pipe.

Figure B3. Temperature variation along an insulated water heater inlet pipe



Our test confirms the reasoning that a substantial portion of the heat lost along inlet and outlet pipes is transferred beyond the insulated section of the pipe. Given these findings, we opted to use a more conservative estimate of pipe wrap savings consistent with our previous analysis (4 therms). Note that in deviating from our regression model in this fashion, we are also indirectly influencing the estimates of the other water heater measures towards the conservative, as the 'extra' savings that were ascribed to pipe insulation in the regression is not distributed amongst the remaining measures.

Electricity

In our initial formulation, we extrapolated savings for electric water heater pipe wrap installations based upon the natural gas savings. Assuming gas water heater burner efficiency is 80%, and electric resistance heating efficiency is 100%, we estimate electricity savings for pipe wrap to be 93.8 kWh ($0.8 * 400,000 \text{ btu} / 3413 \text{ btu per kWh}$). This compares with 98 kWh reported in the CY 2006 Iowa low-income evaluation.

We found this estimate to be somewhat higher than determined in the LIEEP study, which found 58 kWh in single family dwellings.

Given that the results of our temperature monitoring suggests that circulation in wrapped pipes may result in transferring the heat loss in pipes beyond the insulated section rather than mitigating the losses, we choose to use the more conservative finding from the LIEEP study of 58 kWh for all dwellings.

Temperature Reduction

Natural Gas

The previous Iowa evaluations estimated water heater temperature reduction savings to be 18 therms. Our regression model estimates savings as 6 therms plus 2% of the pre-retrofit usage. The percentage multiplier is relatively small, considering that 90% of all pre-retrofit usage ranged from 72 to 368 therms. Savings over this range would range between 7.4 and 13.3 therms. The

90% confidence intervals on the model coefficients are relatively large, with the fixed part of savings ranging from 1.5 to 10.5 therms, and the multiplier ranging from 1.2% to 3.0%. Given the relative uncertainty of these parameters, we have opted to use a fixed value extrapolated using the average consumption of our treatment group. This provided a value of 10 therms (rounded from 9.75 therms), which is the value we will assign to this measure in the revised algorithms.

Electricity

Savings for temperature reductions on electric water heaters was based upon the natural gas findings, adjusting for typical efficiency factors using values for the typical R-value of existing (typically older) water heaters of R8 for natural gas, and R12 for electricity and for burner efficiency, gas water heater burner efficiency is 80%, and electric resistance heating efficiency is 100%. Savings are estimated as $156 \text{ kWh} (0.8 * (1/12) / (1/8)) * 1 \text{ MBtu}/3413 \text{ btu per kWh}$.

Comparison of Savings from Legacy and Revised Algorithms for Water Heater Measures

Table B9. Comparison of the Average Savings of Measures (Therms)

	Legacy Algorithms ¹			Revised Algorithms	
	1993	2005	2006	2005	2006
Water Heating Measures					
High-efficiency Water Heater Replacement	-	51	40	56	57
Standard-efficiency Water Heater Replacement	-	42	34	36	30
Temperature turndown	33	16	18	10	10
Jacket	17	11	-	11	-
Efficient showerhead	40	23	22	10	10
Pipe Wrap	8	5	4	4	4
Efficient Faucet Aerators	6	3	3	3	3

Notes:

¹ Savings include a whole-house billing analysis adjustment factor

Average savings are reduced slightly for standard-efficiency water heater replacements, water heater temperature reduction, and efficient showerheads as compared to estimates made using the legacy algorithms.

Refrigeration Measures

We conducted an analysis to determine the average savings of refrigerator and freezer exchanges and removals. In this analysis, we compared savings for WAP dwellings receiving refrigeration appliances during the calendar years 2004, 2005, and 2006 with co-participants who did not receive refrigeration appliances. To reduce the effect of electric heating and water heater impacts on our results, we restricted our dwellings to those with natural gas heating and water heating.

Methodology

We weather-normalized consumption using ten weather regions discussed in Section 3. In all cases, we required at least ten billing periods with between 330 and 370 days in the pre- and post-periods. We accepted normalization models with 't' values of at least 2.0 for heating and cooling slopes. In addition, we required that the overall model was significant at 97.5% (F-test)⁶.

We conducted three analyses, one for dwellings that received only refrigerator exchanges. The second analysis specified the treatment group as dwellings receiving only freezer exchanges. In each case, the comparison group received no refrigeration measures. The third analysis assessed impacts of dwellings receiving only refrigerator or freezer removals (no exchanges). There were too few of these homes to assess statistically valid results.

We compared the number of dwellings with central, room, and no air conditioning in the treatment and comparison groups to dispel doubts of differences in air-conditioning usage. We found no significant differences (Table B10).

Table B10. Comparison of percentage of dwellings with air conditioning in the treatment and comparison groups

	Central		Room		None	
	Treat- ment	Compar- -ison	Treat- ment	Compar- -ison	Treat- ment	Compar- -ison
Refrigerators Only	49.4%	50.4%	40.4%	38.6%	10.2%	11.0%
Freezers Only	54.0%	50.4%	37.5%	38.6%	8.5%	11.0%

Results

Table B11 provides the results of the analyses.

⁶ A t-value of 2.0 indicates 90% confidence on the regression coefficient.

The F-test is the ratio of the variance of the model explained by the regression model to the variance of the residuals (the portion not explained by the model). When used for prediction purposes, the significance of the F-test should be approximately 4 times greater than what would be accepted for a valid model. In our case, 90% confidence would be considered acceptable for a valid model (uncertainty of 10%), 97.5% confidence (uncertainty of 2.5%) is considered acceptable for predictions based upon the model.

Table B11. Results of Billing Analysis of Refrigeration Measures

	Treatment Group					Weighted Comparison Group					Net Savings	
	n	NAC	90% CI	Savings	90% CI	n	NAC	90% CI	Savings	90% CI		90% CI
Refrigerator Exchange Only	318	8,562	343	903	155	515	8,102	294	210	119	693	194.6
Freezer Exchange Only	84	9,248	764	987	245	507	8,216	314	250	129	738	280.9

The analysis of savings of refrigerator exchanges found that overall average savings totaled 903 kWh \pm 155 kWh at 90% confidence for the treatment group. The comparison group savings averaged 201 kWh kWh \pm 155 kWh. Net savings were 693 kWh kWh \pm 195 kWh, which is the value we shall assign to refrigerator exchanges. This is also the value we will use for refrigerator removals, for the rare cases where a refrigerator is removed without an exchange.

The analysis of savings of freezer exchanges showed average savings of 987 kWh \pm 245 kWh for the treatment group, and 250 kWh \pm 129 kWh in the comparison group. Net savings were 738 kWh kWh \pm 281 kWh, which is the value we shall assign to refrigerator exchanges. This is also the value we will use for freezer removals for the rare cases where a freezer is removed without an exchange.

Comparison with Field Metering Data

The agencies meter all refrigeration appliances that may be removed or exchanged for at least a two-hour period. These data are then used to assess whether an appliance exchange is cost-effective. Three options are available to the homeowner: no action, removing the appliance without replacement, or exchanging the old unit for a new one. In some cases, a two-for-one swap is made; most of these are a single, larger refrigerator in exchange for a refrigerator and freezer.

We extrapolated annual consumption from the metering data to compare with the observed results for all refrigerators metered through the WAP for the calendar year 2004-2007 programs.

The distribution of the annual electricity usage extrapolated from the 2 hour metering is shown in Figures B4 and B5 for refrigerators and freezers, respectively for each of the three categories of action. In both charts, we see that the exchanged units had far higher annual consumption from those with no action (as we would expect). In addition, we can see the relatively small number of appliances that are removed in comparison to those replaced or where no action was taken.

Figure B4. Distribution of annual usage for refrigerators from 2 hour metering data

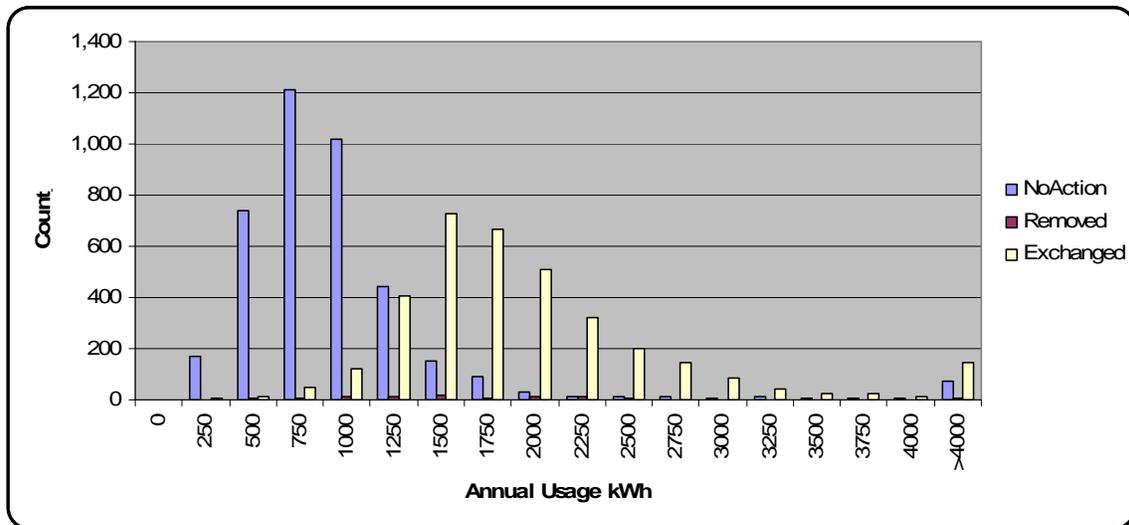
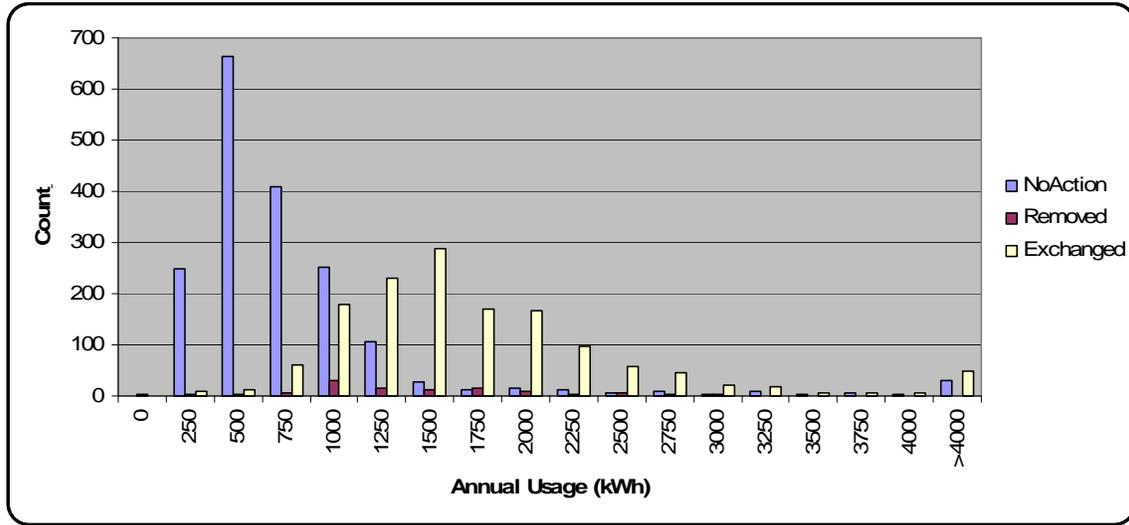


Figure B5. Distribution of annual usage for freezers from 2 hour metering data



The average annual consumption of each refrigeration measure projected from the 2 hour metering period is shown in Table B12. Note that we would expect these values to be somewhat higher than actual annual consumption due to metering period overlapping the defrost/recovery cycles of the appliances.

Table B12. Annual consumption of refrigeration appliances from 2 hour metering data

	Measure	N	Average Annual Usage (kWh)
Refrigerator	No Action	4,009	876
	Removed	99	1,702
	Exchanged	3,494	1,951
Freezer	No Action	1,823	717
	Removed	110	1,381
	Exchanged	1,420	1,668

The average annual consumption of the exchanged refrigerators was 1,951 kWh per year based upon the 2 hour metering projections. DOE’s Energy Star Rating requires maximum consumption of between 325 and 790 kWh per year depending on the size and configuration of the units. Currently-available Energy-Star refrigerators have somewhat better performance, ranging between 171 and 632 kWh per year⁷. These ranges suggest that our observed savings of 693 kWh per unit are conservative.

⁷ DOE’s database of Energy Star refrigeration appliances: www.energystar.gov/index.dfm?c=refrig.pr_refrigerators

The average consumption of exchanged freezers based upon the 2 hour metering period was 1,688 kWh per year. DOE’s Energy Star Rating requires maximum annual consumption between 243 and 817 kWh per year for freezers, depending upon configuration. The annual consumption of currently-available freezers ranges from 193 to 719 kWh per year. Here again we see that our observed savings of 738 kWh per unit are reasonable, albeit less conservative than our findings for refrigerators.

Comparison of Revised Algorithm Savings with Previous Results

The estimates of savings for refrigeration measures installed in the Iowa weatherization programs in recent years are compared with the revised estimates in Table B13.

Table B13. Savings for refrigeration measures

Measure	Savings (kWh per Year)	
	Legacy	Revised
Refrigerator Exchange	869	693
Refrigerator Removal	1,021	693
Freezer Exchange	662	738
Freezer Removal	712	738

Lighting Measures

We assessed electricity savings for a subset of clients weatherized during the 2004-2006 calendar year low income programs in Iowa. We used a direct (non-weather normalized) assessment of the change in usage for the non-heating and non-cooling (shoulder) periods including April through May, and September 15th through November 15th. This design minimizes the effects of including heating and/or cooling savings from building envelope measures.

We limited our treatment to dwellings that did not receive refrigeration measures and, did not have electric water or space heating, thereby eliminating impacts of savings for these measures from our analysis. Our treatment sample consisted of 327 dwellings, with an average 61 days in the pre and post periods.

The vast majority of weatherized dwellings received lighting measures during 2004-2006 calendar years, ranging from 83% to 89%. Given the small percentage of dwellings not receiving lighting -- as well as the restrictions placed on dwellings with regards to heating, water heating fuels and refrigeration measure installations -- it was not possible to compare savings between those receiving lighting measures with those that did not. Consequently, we used the LIHEAP population for our comparison group -- our only restriction was for non-electric space heating (we have no data on water heating fuel in the LIHEAP data; if we had then we would have included that restriction also). A random sample yielded 1,324 dwellings without electric heating, also with an average of 61 days in the pre and post periods.

Results

We found that the annualized consumption based upon the shoulder-only usage was 4,937 kWh for the treatment group, and 4,939 kWh for the comparison group after weighting our comparison group on usage. Net treatment group savings averaged 287 kWh (Table B14).

Table B13. Results of billing analysis for lighting measures

Group	n	Annual Baseload (kWh) ¹		Savings (kWh)		Net Savings (kWh)	
		90% CI	90% CI	90% CI	90% CI	90% CI	
Comparison	1,324	4,939	97.9	-4	32.0		
Treatment	327	4,967	192.7	283	79.9	287	85.1

¹ Annual baseload is calculated using the average daily usage during the shoulder (non-heating and non-cooling) periods

Development of the Savings Algorithms

The basic calculation for lighting savings is:

$$\text{Savings (kWh)} = (\text{Wattage of existing bulb} - \text{wattage of replacement bulb}) * \text{average daily burn time} * 365/1000$$

The most uncertain parameter in these equations is the average daily burn-time for the installed bulbs. The weatherization program installs eight distinct sizes of CFL bulbs, ranging in wattage

from 5 to 30 watts. Table B15 provides a listing of the bulbs and recommended replacement criteria for each bulb.

Table B15. Compact fluorescent bulb sizes and replacement recommendations

<u>CFL Wattage</u>	<u>Wattage of Replaced Bulb</u>
5	20
11	40
14	60
15	60
20	75
23	100
25	100
30	120

Our sample consisted of 327 dwellings receiving 1,811 bulbs, or 5.4 bulbs per house. Eighty-six percent of these were split evenly between the 15, 20, and 23 watt CFL bulbs. An additional 10% was 25 watt replacements.

Using the formula for lighting savings denoted above, we calculated the average burn time using the average observed household savings, the wattage of the existing and replacement CFL bulbs. We calculated the average burn-time to be 2.1 hours per bulb.

In order to assess the validity of our findings, we compared our findings with those found in an assessment of compact fluorescent usage prepared for the California Measurement Advisory Council (CALMAC) by Kema, Inc⁸. The study is arguably the most exhaustive investigation of actual measured run-times conducted to date (as opposed to self-reported hours of operation). Hundreds of CFL installations⁹ in California were measured, providing measured burn times of CFLs by room type.

The CALMAC study found that the average operating hours varied by location within the house, from a low of 1.2 hours per day (laundry room) to 3.5 hours per day. (kitchen). Overall, the average run-time was found to be 2.34 hours per day for 1,514 bulbs measured in the study.

The study did not find statistically-significant differences in bulb usage between northern, middle, and southern areas of California, so we do not expect that bulb usage is significantly different from the typical dwelling in Iowa.

We are comfortable using our finding of 2.1 hours burn time determined in the billing analysis given the close agreement between these findings and the CALMAC finding of 2.34 hours.

Consequently, our final equation of lighting savings is:

$$\text{Savings (kWh)} = (\text{Wattage of existing bulb} - \text{wattage of replacement bulb}) * 2.1 * 365/1000$$

⁸ Kema, Inc. **CFL Metering Study**, February 25, 2005.

⁹ The building stock in California did not reflect the low-income population, and one might argue that low-income dwellings are more (or less) likely to be occupied during the day. We simply do not have data to make such an argument, and have accepted the CALMAC results as reasonable representations of bulb burn time for this study.