COLD CLIMATE HOUSING RESEARCH CENTER
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Alaska Housing
FINANCE CORPORATION

Weatherization Assistance Program Outcomes

by Cold Climate Housing Research Center
August 6, 2012

In 2008, 2009, and 2011 the Alaska State Legislature provided a total of $461 million to expand and enhance the Alaska Weatherization Assistance and Home Energy Rebate programs. This report uses data from Alaska Housing Finance Corporation's (AHFC) databases containing files about home energy assessments and energy efficiency retrofits performed under AHFC's Weatherization Assistance program. The focus of this report is an analysis of the energy and economic outcomes, with attention to direct program impacts in Alaska's 20 Senate Districts. As of March 5, 2012 the Weatherization Assistance Program has produced an average home energy efficiency savings of 28% for single-family homes and 18.5% for multi-family units. This increased home energy efficiency is directly related to an estimated average annual cost savings of $1,295/year for single-family homes and $396/year for multi-family units. Close to 5,700 single-family homes and 1,100 multi-family units have been retrofitted through the Weatherization Assistance Program, saving an estimated $7.8 million in annual energy costs, resulting in a direct and indirect economic impact of approximately $11.7 million. Total estimated statewide energy savings from the Weatherization Assistance Program to date is nearing 371 billion BTUs saved annually, which is roughly equivalent to 2.7 million gallons of #1 heating fuel or 3.7 million therms of natural gas.

Introduction

Overview

During 2007 and 2008 oil prices reached record highs, peaking at $147 per barrel in the summer of 2008[1] and displaying extreme volatility since then.[2] High worldwide crude oil prices resulted in very high home energy costs for Alaskans,[3] and placed many Alaskans, and the communities where they live, into crisis. Many Alaskans were forced to choose between heating their home and buying groceries. The 2008 spike in oil prices highlighted the volatility of the oil economy and underscored the importance of energy efficiency programs in securing the future of our communities and our economy.

In response, Alaska's policymakers developed a multifaceted strategy of immediate and long-term relief. In 2008, immediate economic relief came in the form of a cash distribution for every Alaska resident who applied for and received a permanent fund dividend in 2007. Mid- to long-term relief was offered through the funding of home energy efficiency retrofit programs. In 2008 the Alaska State Legislature (Legislature) passed Senate Bill 256 and Senate Bill 289. These bills provided $300 million to expand and enhance the Weatherization Assistance Program and establish the Home Energy Rebate Program. In a later special session, the Legislature added an additional $60 million to the Home Energy Rebate Program through House Bill 4001. Senate Bill 289 also expanded the Weatherization Assistance Program's eligibility requirements from 60% of median income to 100% of median income. In 2011 the Legislature appropriated an additional $101.5 million to the Weatherization Assistance and Home Energy Rebate Programs.[4] This allowed these programs to continue at a similar level through fiscal year 2012.

Legislative sponsors indicated that the goals of increased funding for home energy efficiency programs were to reduce home energy bills by 30%, create jobs, and increase affordability of home heating and

[1] J. Simpkins, Why crude oil prices could reach a record high in 2011. NuWire Investor, Retrieved on December 9, 2010: http://www.nuwireinvestor.com/articles/why-crude-oil-prices-could-reach-a-record-high-in-56583.aspx
[2] M. Moynihan, The Highest Oil Spike In History. The Huffington Post. Retrieved on September 22, 2008: http://www.huffingtonpost.com/michael-moynihan/the-highest-oil-price-spi_b_128437.html
[3] In March 2008 the national average for residential heating reached its highest point in a couple year period at $3.852 per gallon for #2 heating oil (http://www.eia.doe.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=W_EPD2F_PRS_NUS_DPG&f=W), while in Alaska the average was upwards of $5.50 per gallon and as high as $9.10 per gallon in some rural villages (www.commerce.state.ak.us/dca/pub/BulkFuelReportJune2008Update.pdf).
[4] SB160. www.legis.state.ak.us/PDF/27/Bills/SB0160Z.PDF.

electricity.[5] Dan Fauske, Alaska Housing Finance Corporation CEO/Executive Director, testified that "the intent addresses quality of life issues and improvement of the housing stock, but most importantly, maximizing the reduction of energy use in the state."[6] Dr. John Weis, aide to Senator Lyman Hoffman, testified about a further goal "to make certain that Alaskans suffering the most at the lowest income levels are receiving help first."[7] The Weatherization Assistance Program has assisted households at or below median income,[8] whereas the Home Energy Rebate Program has been available to all homeowners, thereby creating mechanisms to assist people at all income levels to improve their home's efficiency. In 2008, the Weatherization program funding was expected to help more than 17,000 households, generate an average home energy use reduction of nearly 30% per home, stimulate significant economic activity in the home retrofit market, and decrease the portion of monthly income Alaska homeowners spend on energy.[9] As of March 5, 2012 the Weatherization Assistance Program has retrofit over 6,800 homes, produced average energy efficiency savings of 28% for single-family homes, and saved an estimated $7.8 million in annual energy costs.

Although oil prices have fallen from the highs of $147/barrel since 2008, the cost of energy for many Alaskans remains high. In 2010, rural villages in Interior Alaska were paying up to $10/gallon for heating oil.[10] Industry experts predict oil prices will continue to rise over the long term; [11] therefore, reducing home energy costs through energy efficient retrofits add to the stability of Alaska's communities and economy.

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[5] Alaska State Senate Finance Committee testimony (2008, March 12). Retrieved on January 17, 2012: www.legis.state.ak.us/pdf/25/M/SFIN2008-03-121457.PDF

[6] Alaska Housing Finance Committee testimony (2008, April 3). Retrieved on January 17, 2012: www.legis.state.ak.us/pdf/25/M/HFIN2008-04-030842.PDF

[7] Ibid.

[8] **Median income.** Median income is the amount which divides the income distribution into two equal groups, half having incomes above the median, half having incomes below the median. The medians for households, families, and unrelated individuals are based on all households, families, and unrelated individuals, respectively. The medians for people are based on people 15 years old and over with income (U.S. Census Bureau Current Population Survey, Retrieved on March 14, 2012. http://www.census.gov/population/www/cps/cpsdef.html).

[9] Alaska State Senate Labor and Commerce Committee testimony (2008, March 4). Retrieved on January 17, 2012: www.legis.state.ak.us/pdf/25/M/SL!C2008-03-041332.PDF.
The calculation of 33,000 homes is based on the 17,000 homes mentioned in the committee testimony for the Weatherization Assistance Program, plus a conservative estimate of the number of homes anticipated to access the Home Energy Rebate Program. The minimum number of homes that could receive assistance from the $160,000 million appropriated in 2008 and 2009 is 16,000.

[10] Alaska Division of Community & Regional Affairs. Current Community Conditions: Fuel Prices Across Alaska January 2011 Update. Retrieved on November 5, 2011: www.commerce.state.ak.us/dca/pub/Fuel_Report_Jun_2010_Final.pdf).

[11] For further information, *see* J. Simpkins, Why crude oil prices could reach a record high in 2011. NuWire Investor, http://www.nuwireinvestor.com/articles/why-crude-oil-prices-could-reach-a-record-high-in-56583.aspx

The State of Alaska has allocated a total of $171 million in Weatherization Assistance, much of which has been used to retrofit more than 6,809 housing units as of March 5, 2012. These investments have resulted in an estimated annual energy cost savings of approximately $7.8 million and 371 billion BTUs;[12] roughly equivalent to 2.7 million gallons of #1 heating oil or 3.7 million therms of natural gas.

The following report analyzes outcomes from the Weatherization Assistance Program and presents an overview of statewide and regional impacts resulting from the investment by the State of Alaska. The body of the report contains estimated values based on aggregated totals for single-family, multi-family, and mobile homes. Appendix A is broken down into Senate districts and presents information about single-family and mobile home retrofits, excluding multi-family units. The report also contains a brief discussion of the Home Energy Rebate Program (a more comprehensive view of Home Energy Rebate Program outcomes is presented in a separate report, "Home Energy Rebate Program Outcomes," published March 29, 2012).

Energy Efficiency Benefits

Alaskans live in one of the most extreme climates in the United States. Heating and lighting their homes requires large amounts of energy that in turn equates to high home energy bills. Historically, home construction in Alaska mimicked the building styles used in more temperate climates, yet Alaska's average Heating Degree Days[13] (HDD) are more than twice the national average.[14] Building and retrofitting homes in a manner more consistent with Alaska's extreme climate can reduce these energy costs.

Alaska has approximately 307,000 homes in varying states of quality and energy efficiency.[15] The 2009 Alaska Housing Assessment report[16] presents comprehensive data on the quality of housing across Alaska. Findings from this study indicate that the energy consumption of homes varies from a regional

[12] In most cases figures are in MMBTUs because they are the units used in AKWarm energy modeling software used by AHFC's energy efficiency programs. An MMBTU is 1million BTUs.
[13] Heating Degree Days (HDD) are a climate statistic use to compare the severity and length of the heating season in different locations. From the U.S. Department of Energy. Retrieved on November 5, 2011: http://apps1.eere.energy.gov/states/residential.cfm/state=AK
[14] Ibid.
[15] U. S. Census Bureau. Retrieved on November 5, 2011: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk
[16] Alaska Housing Finance Corporation, 2009 AHFC Alaska Housing Assessment. Retrieved on January 17, 2012: cchrc.org/docs/reports/TR_2009_02_2009_AK_Housing_Assessment_Final.pdf

annual average of 75,818 BTU/ft^2 in urban Southeast and Southcentral communities (outside of Anchorage) to 115,833 BTU/ft^2 in isolated rural communities.[17] Further, home quality is assessed by the percent of homes unable to maintain warm indoor temperatures on the coldest days, the percent of homes that are drafty, and a number of other indicators of home quality and energy efficiency.[18] These indicators vary widely across Alaska's regions, but also highlight that in every community and region there is a continuum of housing from very inefficient to highly efficient.

Based on the above-cited home quality indicators, in 2008 CCHRC estimated that Alaska could save up to 18 trillion BTUs annually through energy efficiency improvements of Alaska's homes.[19] However, based upon the recent results of the Weatherization Assistance Program, if all Alaska homes were retrofitted to achieve a 28% energy savings, Alaskans could achieve up to 22 trillion BTUs in energy savings annually.

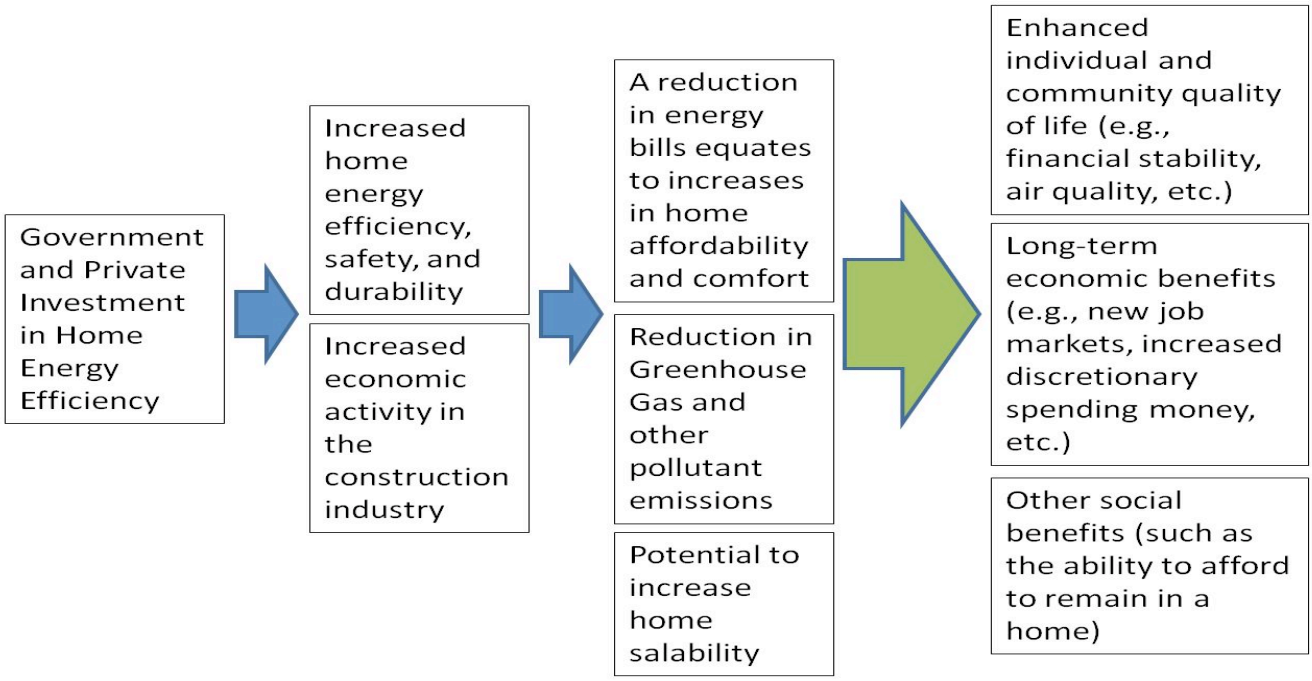
Program Goals

The 2008-2010 investments by the state in the Weatherization Assistance and Home Energy Rebate programs were intended to stimulate private investment in home retrofits, make homes more energy efficient, and reduce Alaskans' energy costs.[20] The investment in home retrofits was also expected to create jobs and stimulate the construction industry. Increased home energy efficiency also has direct implications for improved home comfort and durability, as well as reductions in greenhouse gas and particulate matter emissions from lower fuel consumption. Research has linked home energy retrofits to increased occupant health and safety and numerous other ancillary benefits.[21] Improved energy efficiency, environmental, and economic outcomes are associated with enhanced quality of life (better air quality, less financial stress, warmer homes, etc.) and long-term economic benefits (e.g., increased salability of homes, new employment markets, more discretionary spending money, increased knowledge and interest in energy efficient retrofits, etc.), and other associated social benefits

[17] Ibid. p. 13.
[18] This includes: unable to maintain temperature in house, window type, how warm the floor is, draftiness, ice build up inside the home, mold or mildew around the windows. Ibid. pp. 42-44.
[19] These calculations are based on estimates of the quality of existing homes in Alaska presented in the 2009 AHFC Alaska Housing Assessment prepared by Information Insights for CCHRC and AHFC. For more details on the calculations contact CCHRC at (907) 457-3454 or contact Dr. Davies directly at john@cchrc.org.
[20] Alaska Housing Finance Committee testimony (2008, April 3). Retrieved on January 17, 2012: www.legis.state.ak.us/pdf/25/M/HFIN2008-04-030842.PDF
[21] Ibid. and D. Jacobs, T. Kelly, & J. Sobolewski, (2007). Linking public health, housing, and indoor environmental policy: Successes and challenges at local and federal agencies in the United States. *Environmental Health Perspectives*, 115(6), 976-982.

(neighborhood stability from fewer people moving out of unaffordable homes).[22] Figure 1 represents the potential benefits that may be realized from home energy retrofit programs like the Weatherization Assistance Program.

Figure 1: Theory of Home Energy Efficiency Program Impacts[23]



Source: Mohatt, Wiltse, Cold Climate Housing Research Center, 2010

To carry out, manage, and report on the Weatherization Assistance Program, AHFC has undertaken substantial data collection and evaluation efforts, including the development of the Alaska Retrofit Information System (ARIS) database and Weatherization Manager (WxMgr) database. Both systems are used to collect and organize data about energy efficiency retrofits from AHFC's Weatherization Assistance program. This report uses data from these systems to present and analyze energy, economic, and environmental outcomes realized through the Weatherization Assistance Program as of March 5, 2012. The focus of this report is how well the Weatherization Assistance Program has reached its intended goals to date, with attention to the outcomes in Alaska's 20 Senate Districts.

[22] Ibid.
[23] D. Jacobs, T. Kelly, & J. Sobolewski, (2007). Linking public health, housing, and indoor environmental policy: Successes and challenges at local and federal agencies in the United States. *Environmental Health Perspectives*, 115(6), 976-982.

Alaska Weatherization Assistance Program

The Alaska Weatherization Assistance Program provides home weatherization services to households (homes, rentals, and multi-family dwellings) based on income eligibility. Alaska's Weatherization Assistance Program has been in existence for nearly 30 years and is funded by the state and by the federal government through the national weatherization assistance programs. Designated weatherization agencies and housing authorities provide services at no cost to qualified applicants. The passage of Senate Bill 289 in 2008 expanded the federal Weatherization Assistance Program's income eligibility requirements in Alaska from households earning up to 60% of area median income to households earning up to 100% of area median income. Senate Bill 256 infused $200 million into the expanded program that had previously been operating with around $4.8 million per year.[24] In 2010 the State Legislature appropriated another $64 million to the Weatherization Assistance Program.[25] While the income limits for the program were raised to 100% of area median income in 2008, the program prioritizes households with less than 60% of area median income, or with an elderly person, a disabled person, or a young child in residence. To meet the increased demand of the program expansion, AHFC engaged 14 Housing Authorities to perform weatherization assessments, expanding the number of existing weatherization agencies from five to nineteen. AHFC projected that the expansion of the Weatherization Assistance Program eligibility guidelines and funding would eventually help retrofit close to 17,000 households and serve almost 50,000 people.[26]

In the Weatherization Assistance Program, if applicants meet one of the qualifying criteria,[27] they are assigned a priority based on need. They are then placed on an active eligible list and their home is scheduled for a weatherization assessment. This assessment, once completed, provides weatherization and housing authority personnel with a list of recommended energy efficiency measures to apply to the home based on cost-effectiveness. State and federal program guidelines stipulate that the *Weatherization Assistance Program must address imminent health and safety issues along with, and in many cases prior to, energy efficiency upgrades.*[28] In the Alaska Weatherization

[24] Senate Finance Committee testimony on March 12, 2008 (SFIN2008-03-121457.pdf).
[25] S. Waterman (personal communication, November 3,2011)
[26] Senate Labor and Commerce Committee testimony on March 4, 2008 (SL&C2008-03-041332.PDF).
[27] The current Alaska Weatherization Assistance Program income guidelines are available online at: http://www.ahfc.state.ak.us/energy/weatherization_program.cfm.
[28] Weatherization Assistance Program mission as stated on the Weatherization Assistance Program Technical Assistance Center website (http://www.waptac.org).

Assistance Program, professional weatherization service providers prioritize and perform work based on program guidelines, assessment, performance testing, professional expertise, and experience.

The Weatherization Assistance Program is made up of two sub-programs, the Weatherization Assistance Program and the Enhanced Weatherization Assistance Program. The Weatherization Assistance Program is for income-eligible participants that live on the road and marine highway system, Enhanced Weatherization Assistance serves all other communities. The Enhanced Weatherization Assistance Program retrofits tend to be more expensive due to the challenges and expense of getting crews and materials to the area. Most Weatherization Assistance service providers strive to maximize fund use by providing services to entire geographic areas rather than just one home in a single community. Further recognizing these challenges, the Enhanced Weatherization Assistance Program can spend up to an overall average of $30,000 per home, while the Weatherization can spend up to an overall average of $11,000 per home.[29] This report uses the term "Weatherization Assistance Program" to refer to the combined programs' outcomes.

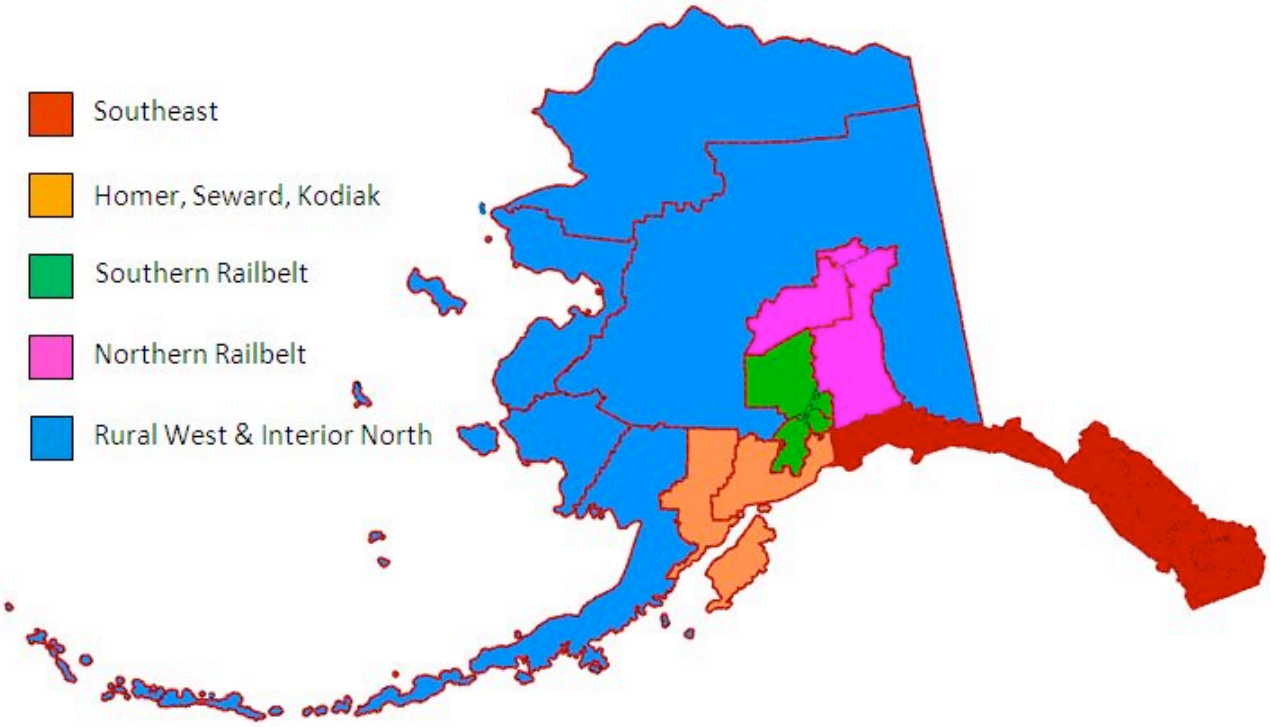
Weatherization Assistance Program guidelines *require health and safety issues be addressed prior to any energy efficiency measures*. Further, to maximize the benefit of the allocated funds, they require that energy efficiency measures be done from most cost-effective to least. As a result, weatherization service providers are often unable to perform some of the more costly measures, such as complete replacement of a heating system. Weatherization organizations often do more inexpensive measures like cleaning and tuning existing boiler and furnace systems, which the Weatherization agencies report can increase appliance efficiency by 5 - 10%.

For purposes of this study, the state has been divided into five separate regions based on geography and similar energy economies (types of fuel used, road or rail access, and heating degree days) (see Figure 2). The "Southeast" region includes House Districts 1 through 5 and is characterized by a wet climate, use of oil and electric for space heating, and hydroelectric power. "Homer, Seward, and Kodiak," which includes House Districts 35 and 36, are broken out as their own region because they do not have access to natural gas; rely heavily on oil, hydropower, and wind; and have similar energy economies and climates. The "Southern Railbelt" includes House Districts 13-34 and includes the Mat-Su, Anchorage, and Kenai districts. This region has a similar climate, access to natural gas, and generally lower energy costs. The "Northern Railbelt" includes Fairbanks, Denali, and District 12, which

[29] Weatherization Operations Manual, Effective April 1, 2011. Revision 2.

extends from North Pole to Palmer to Valdez; this region is characterized by a dominance of oil heat, coal fired electricity, and connectivity to the road system. The "Northern, West, and Interior" region includes rural districts of Northern, Western, and Interior Alaska, and is characterized by lack of road access, harsh climates, elevated energy and construction costs, and lower average incomes. The Northern, West, and Interior region is comprised of House Districts 6, and 37 through 40.

Figure 2: Alaska Energy Economy Regions



Home Energy Rebate Program

Alaska Housing Finance Corporation's (AHFC) Home Energy Rebate Program assists homeowners in completing energy efficiency improvements on their homes through a rebate of eligible retrofit costs, up to $10,000. To be eligible for the Home Energy Rebate Program a person must be the year-round occupant of the home. There are no income requirements or limitations.

The Home Energy Rebate Program is structured so that homeowners must pay for all retrofit costs up front and apply for rebates after completion. Retrofits are based upon a process similar to the one used by the Weatherization Assistance Program. An energy efficiency audit is conducted and recommendations are made by AHFC's AKWarm software. However, unlike the Weatherization Assistance Program, the homeowner makes the retrofit decisions. Once the retrofits have been performed, a second audit is conducted and the homeowner requests a rebate for allowable costs based upon these results.

Weatherization Assistance Program Outcomes

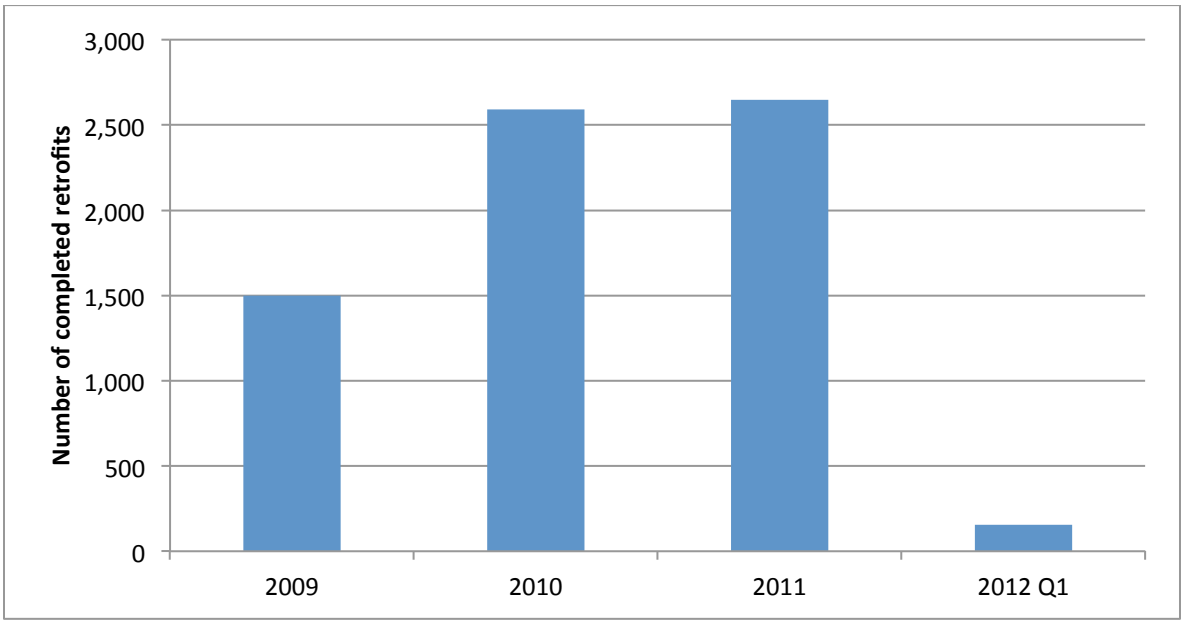
Households Served

Alaska Housing Finance Corporation's Weatherization Assistance Program works with housing authorities and weatherization agencies rather than directly with individual households. These organizations typically work in a specific region where they are already responsible for some portion of housing. AHFC reached agreements and trained the organizations on the reporting requirements of the Weatherization Assistance Program, which includes conducting assessments and training on energy efficiency retrofit techniques, as necessary. AHFC then implemented grant agreements with the partners to cover the costs of the anticipated work.

As of March 5, 2012[30] approximately 6,809 homes have been retrofitted through the Weatherization Assistance Program. Figure 3 below reflects the number of retrofits completed each year during the period covered in this report, April 2008 through March 5, 2012.

[30] These figures were drawn from the Alaska Retrofit Information System and Weatherization Manager Database on March 5, 2012.

Figure 3: Weatherization Assistance Program Retrofits Completed April 2008 through March 5, 2012



The Weatherization Assistance Program receives funds based on the number of approved applications in their respective geographical area of operations. The weatherization and housing authorities assess and perform the retrofits and submit an accounting of the work done and the corresponding costs. Table 2 displays Weatherization Assistance Program retrofit data by energy economy region as of March 5, 2012.

Table 2: Weatherization Assistance Program Single Family/Mobile Home/Multi-family Retrofits April 2008 - March 2012

Regions	Number of Homes Retrofit	Percent of Total Completed Retrofits Statewide	Average Age of Retrofit Homes (yrs)	Percent of Renter Occupied Housing Retrofits
Southeast	1,200	18%	36	23%
Homer, Seward, and Kodiak	347	5%	34	20%
Southern Railbelt	2,459	36%	31	30%
Northern Railbelt	1,238	18%	37	15%
Northern, West, and Interior	1,565	23%	31	7%

Source: Weatherization manager database, March 5, 2012; Wiltse, Dodge, 2012.

As seen in Table 2, the more urban Southern and Northern Railbelt regions comprise 54% of all the weatherization retrofits completed during this period. However, since these two regions account for

66% of the State's population, it is clear that the Weatherization Assistance Program is succeeding in helping Alaska's rural communities retrofit homes. According to 2010 U.S. Census data, 37% of all homes in Alaska are renter occupied, whereas statewide 20% of Weatherization-assisted homes are renter-occupied.

Table 3, which reflects a more detailed Senate District level view of participation in the Weatherization Assistance Program, note that three of the top four districts that have received the greatest number of retrofits are from off-road system communities. Looking at the five senate districts with the fewest weatherization retrofits, we note that four are in the Municipality of Anchorage, and the other is in Eagle River. This leads to the conclusion that the Weatherization Assistance Program is succeeding in serving rural or off-road communities where energy costs are higher.

Table 3: Weatherization Assistance Program Single-Family / Mobile / Multi-family Home Retrofits by Senate District

Total Number of Homes Retrofit Weatherization Assistance	Percent On-Road Weatherization Assistance	Percent Enhanced Weatherization	Percent Renter Occupied	**Senate District**
478	100%	0.0%	33%	A- Ketchikan/Sitka/Wrangell/Petersburg
305	100%	0.0%	16%	B- Juneau
784	81.1%	18.9%	11%	C- Cordova/SE Islands/ Interior Villages
442	100%	0.0%	12%	D - Fairbanks
397	100%	0.0%	22%	E - Fairbanks City
399	100%	0.0%	9%	F - North Pole/ Richardson & Glenn Hwy
219	100%	0.0%	11%	G - Greater Palmer/Wasilla
270	100%	0.0%	4%	H - Chugiak/Mat-Su
68	100%	0.0%	4%	I - Eagle River/Ft. Richardson/Elmendorf
401	100%	0.0%	41%	J - Anchorage
214	100%	0.0%	5%	K - Anchorage
276	100%	0.0%	55%	L - Anchorage
192	100%	0.0%	29%	M - Anchorage
164	100%	0.0%	27%	N - Anchorage
283	100%	0.0%	35%	O - Anchorage
189	100%	0.0%	65%	P - Anchorage
280	100%	0.0%	26%	Q- Kenai/Soldotna
348	59.5%	40.5%	20%	R - Homer/Seward/Kodiak/ Lake and Peninsula
662	0%	100%	4%	S - Bethel/Bering Straights
565	0%	100%	12%	T - Arctic/Bering Straits

Economic Outcomes

The energy, economic, and environmental outcomes reported herein are based upon completed assessments from April 5, 2008 through March 5, 2012. These assessments were taken from AHFC's Alaska Retrofit Information System (ARIS) and the Weatherization Manager Database. Energy savings for households are computed by using AKWarm, an AHFC-developed building energy modeling software which models expected energy consumption based on the home's construction, features, appliances, and results from tests conducted on the home by certified energy raters. Since 1997, at least six studies have been undertaken to evaluate the accuracy of AKWarm's residential energy assessment model and each has concluded that AKWarm produces a statistically accurate estimate of annual home energy.[31]

Using data from AHFC's Weatherization Manager Database, it is estimated that the State has allocated $171 million to weatherization retrofits, much of which has been used to retrofit 6,800 homes. The total estimated energy cost savings generated by the program are $7.8 million per year (see Table 4).

Table 4: Weatherization Assistance Program Economic Indicators April 2008 – March 2012

Total Estimated Program Funds Allocated*	$171 million
Total Energy Cost Savings to Date	$7.8 million

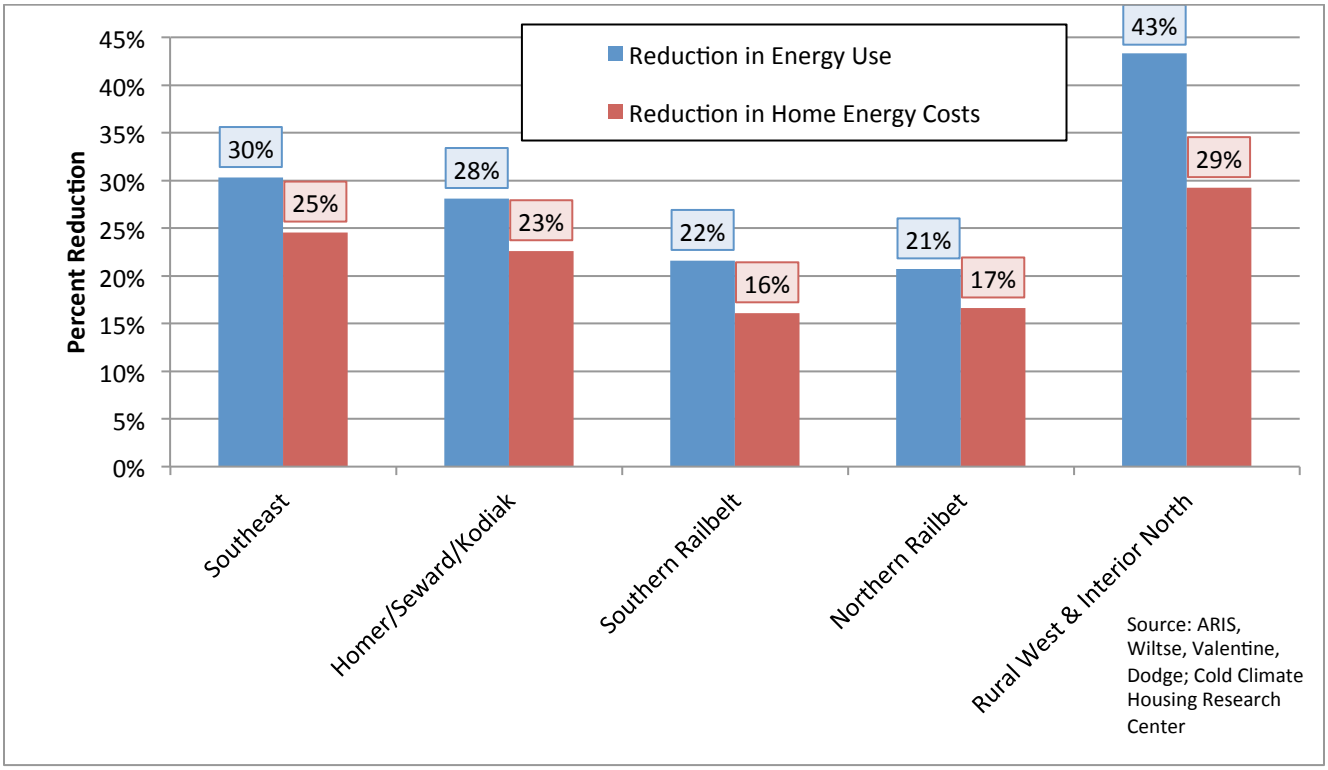
** Estimated program funds are based on the number of completed retrofits and include state, federal, and private matching funds. This table does not represent the actual AHFC expenses to date.*

Figures 4 and 5 illustrate that as of March 5, 2012, the Northern, West, and Interior region realized an average energy savings of 43% and an average annual cost savings of $1,889 (when Single family/Mobile home ($1,958) and Multi-family unit ($384) data are combined). This is significantly higher than the energy savings reported by the majority of the regions, which range from 21% to 30%. A high percentage of the work done through the Weatherization Assistance Program has targeted space heating reduction measures rather than appliance electrical consumption. In most areas of Alaska, the prices for heating fuel, whether natural gas or fuel oil, are lower than that for electricity.

[31] A number of studies were submitted to AHFC and the EPA in 1998 documenting AKWarm's performance, including: D. Meisegeier, ICF, Inc., "BEES / Energy Star Home comparison analysis," May 27, 1997; Meisegeier, D., ICF, Inc., "AKWarm / Energy Star Home calibration analysis," March 5, 1998; and D.N. Wortman, P.E., Boulder Energy Associates, "AKWarm Evaluation Study," February 12, 1997; G. Salas, Simonson Management Services, (October 28, 2011) AKWarm – Equivalent Calculation [Letter, to Department of Energy]. MD Highland; Alaska Housing Finance Corporation has requested a legislative bill (HB 197) that recognizes AHFC as the authorizing agency to approve home energy rating systems (HERS) utilized in Alaska.

Because of this, the reduction in total home energy cost is a lower percentage than the associated reduction in energy use.

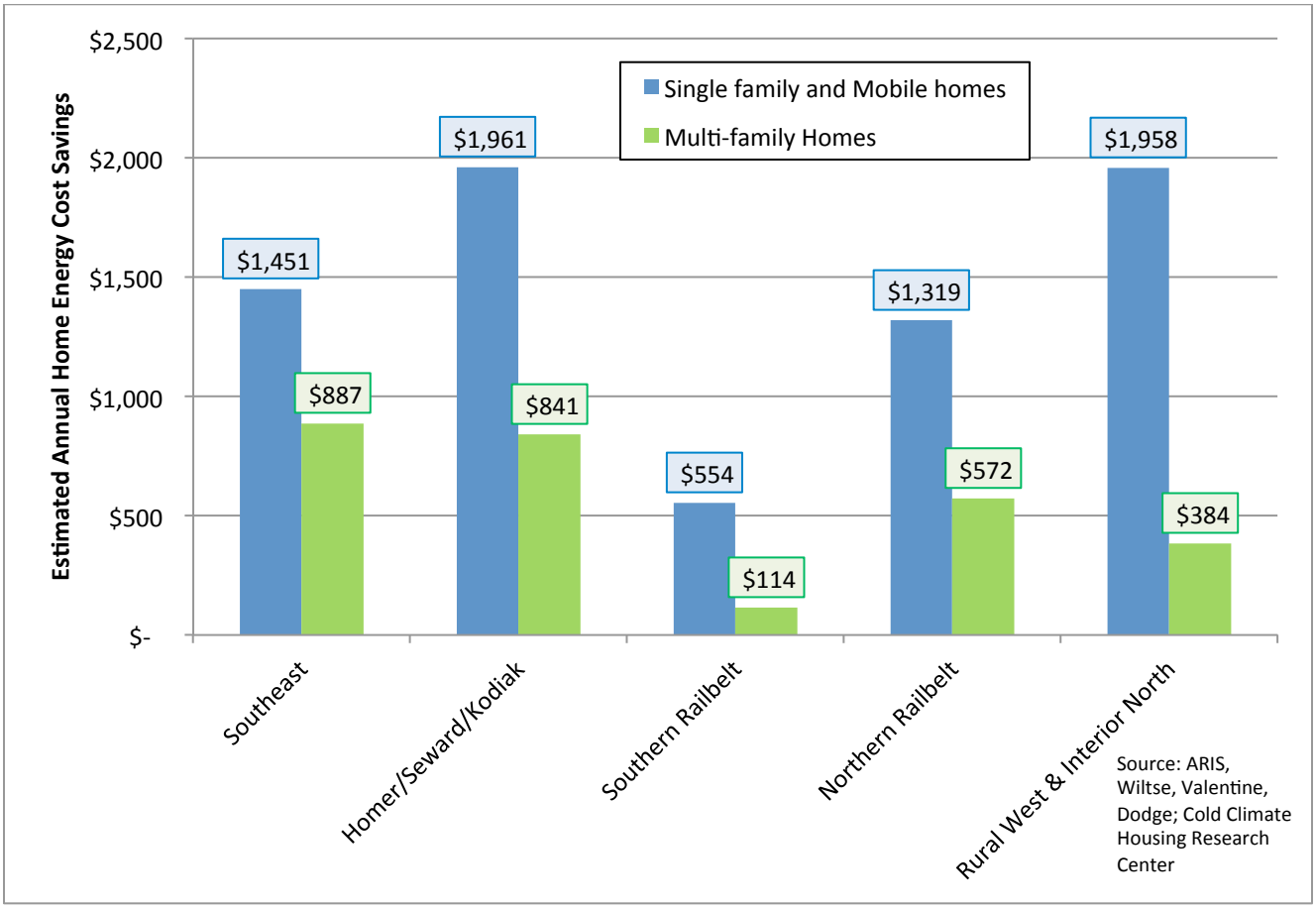
Figure 4: Regional Reductions in Single-Family / Mobile Home/ Multi-family Energy Use & Energy Costs



While the numbers in this report are for single family/mobile-home and multi-family unit data combined through March 5, 2012, Figure 5 shows the annual home energy cost savings broken out into these two categories. The average savings are greater for single-family dwellings or mobile homes, but this is an expected result based on the energy characteristics of multi-unit structures. A single unit within a larger building will have fewer exterior walls where heat loss occurs. Since Weatherization Assistance retrofits typically target the shell components, and given that single units in multi-unit structures typically have fewer shell components, there is less opportunity for improvement relative to the size of the unit. An analysis of outcomes from the Home Energy Rebate Program showed that when energy improvements of multi-unit structures are calculated on a whole-building basis, the reductions in energy use often exceed that of single-family homes, especially when unit owners pool their resources. This same optimization is possible in the Weatherization Assistance Program because service providers can often treat a multi-unit building as a whole. The Weatherization Assistance Program funds multi-unit retrofits differently than owner-occupied single-family homes. In urban

areas these rates range from $3,000-$6,000 per unit, with up to $10,000 per unit with owner contribution.[32] This clearly impacts the per unit savings realized through this program.

Figure 5: Average Weatherization Assistance Home Energy Cost Savings (Single-Family / Mobile Home and Multi-family)



The estimated cost savings (shown in Figure 5) are based on the modeled energy savings generated by AKWarm and current information on energy costs around Alaska. The actual cost savings are subject to variation due to energy use behavior of individual homeowners. If people use the energy in their homes in the same way they did prior to entering the program, then the cost savings estimates will be accurate, though varying with the rise and fall of energy costs. However, people's energy behavior may change as their homes become more efficient. For example a homeowner upgrading to low-

[32] Weatherization Operations Manual, Effective April 1, 2011. Revision 2.

energy light bulbs may keep the lights on more after the retrofit, a change in behavior not anticipated by the modeling software. A family may also choose to keep their home warmer instead of using energy cost savings for other living expenses.

Energy and Economic Outcomes

The economic and energy outcomes reported herein are based upon retrofits completed between April 2008 and March 5, 2012. Table 5 shows statewide annual average and total estimated impacts for the Weatherization Assistance Program through March 5, 2012.

Table 5: Weatherization Assistance Program Statewide Annual Outcome Estimates April 2008- March 2012

Total Annual Energy Savings	371 billion BTUs
Total Annual Energy Cost Savings	$7.8 million
Total Annual CO2 Emissions Reduced	19,731 net tons
Average Home Energy Savings	28%
Average Home Cost Savings	$1,295/year
Average Rental Unit Cost Savings	$396/year
Average Home Age	33.5 years
Pre Retrofit Rating Points	58.4
Post Retrofit Rating Points	72.6
Average Change in Rating Points	14.2
Source: Alaska Retrofit Information System, March 5, 2012; Wiltse, Dodge, 2012.	

Table 6: Statewide Estimated Reductions for Single-family / Mobile home/ Multi-family by Fuel Type

Coal	2.4 tons
Electricity	3,759,673 kWh
Natural Gas	916,314 Therms
Oil #1	595,654 gals
Oil #2	474,791 gals
Propane	44,358 gals
Wood, Birch	2,756 cords
Wood, Spruce	2,164 cords

Source: Alaska Retrofit Information System, March 5, 2012; Wiltse, Dodge, 2012.

As of March 5, 2012, the 6,809 homes retrofitted through the Weatherization Assistance Program show a total modeled annual energy savings of approximately 371 billion BTUs and a total estimated reduction in CO2 emissions of approximately 19,700 tons per year. This includes an estimated savings of 3.8 million kWh of electricity every year (see Tables 5 and 6). The Weatherization Assistance Program has also succeeded in reducing consumption of more than 900,000 therms of natural gas and over 1 million gallons of fuel oil (see Table 6). To put it in perspective, 371 billion BTUs are equivalent to almost 2.7 million gallons of #1 heating oil or 3.7 million therms of natural gas. Putting these impressive statewide savings into a more personal perspective, the average energy improvement for homeowners completing the program is 28%.

Regional Weatherization Assistance Program Outcomes

Moving from the broad overview of the statewide outcomes to a more regional analysis, following are interesting results to note. Table 7 displays Weatherization Assistance Program outcomes by region. The Northern, West, and Interior Region has by far the highest estimated average home energy reductions (43%) as a result of the Weatherization Assistance Program compared to the other regions, which ranged from 21-30%. Homes in the Northern, West, and Interior Region; and Homer, Seward, and Kodiak Region; have the greatest absolute cost savings with an estimated average annual savings of $1,889 and $1,774 respectively. This is followed by Southeast with an estimated average annual savings of $1,322. Homes in the Weatherization Assistance Program all have somewhat similar initial and post energy ratings.

Table 7: Weatherization Assistance Program Regional Annual Outcomes for Single-family / Mobile home/ Multi-family Estimates to Date

	Southeast (n=1,200)	Homer/ Seward/ Kodiak (n=347)	Southern Railbelt (n=2,459)	Northern Railbelt (n=1,238)	Northern, West, and Interior (n=1,565)
Total Energy Savings (million BTUs)	61,453	15,852	109,545	61,838	121,935
Total Cost Savings ($)	$1,586,83	$615,624	$1,084,719	$1,552,590	$2,955,610
Total CO2 Emissions Reduced (tons)	3,346	1,067	6,274	4,368	4,676
Average Home Energy Use Reduction	30%	28%	22%	21%	43%

Average Home Energy Costs Reduction	25%	23%	16%	17%	29%
Average Cost Savings per Home ($)	$1,322	$1,774	$441	$1,254	$1,889
Average As-Is Rating	53.3	58.8	60.1	61.0	56.7
Average Post Rating	70.8	76.0	71.6	70.8	77.5

Source: Alaska Retrofit Information System, Weatherization Manager database, March 5, 2012; Wiltse, Dodge, 2012.

As seen in Table 8, the Southeast region's retrofits resulted in nearly 1.3 million kWh in energy savings, followed by the Northern Railbelt at just over 900,000 kWh and the Northern, West, and Interior Region saved nearly 800,000 kWh. In some of these areas the State is paying Power Cost Equalization (PCE), and the electric reductions allow PCE dollars to stretch further in meeting rural community needs.

Table 8: Regional Estimated Annual Reductions by Fuel Type

	Southeast	Homer/ Seward/ Kodiak	Southern Railbelt	Northern Railbelt	Northern, West, and Interior
Coal (tons)	0.0	0.0	0.2	2.4	0.0
Electricity (kWh)	1,256,361	62,336	748,262	915,242	777,472
Natural Gas (therms)	0	0	870,491	3,192	42,632
Oil #1 (gals)	142,248	51,711	51,262	52,284	298,150
Oil #2 (gals)	145,087	36,779	11,455	242,674	38,796
Propane (gals)	4,435	9,245	16,651	8,854	5,174
Wood, Birch (cords)	680	12	304	305	1,455
Wood, Spruce (cords)	0	115	84	439	1,525

Source: Alaska Retrofit Information System, March 5, 2012; Wiltse, Dodge, 2012.

Home Improvements

Figure 6 below compares the percent energy savings from "As-Is" to "Post" assessments in six different heat loss areas, while Figure 7 on the following page displays the "As-Is" to "Post" percent change of three energy usage categories. Of the various housing components analyzed here, the greatest change was in the reduction of heating system loss (47%). The various building shell components (ceilings, floors, walls/doors, and windows) averaged from 17% to 38% improvements, with the greatest improvements made to ceilings and the lowest average improvements made to the wall/door combination. Improvements to the building shell components include both the addition of more insulation and air tightening measures. In general, increasing insulation has a secondary air tightening effect, and any envelope improvement has a secondary effect on heating system losses. Future

evaluation of the Weatherization Assistance Program should look at characterizing actual improvements made in greater detail.

Figure 6: Percent Savings Realized from Energy Retrofits

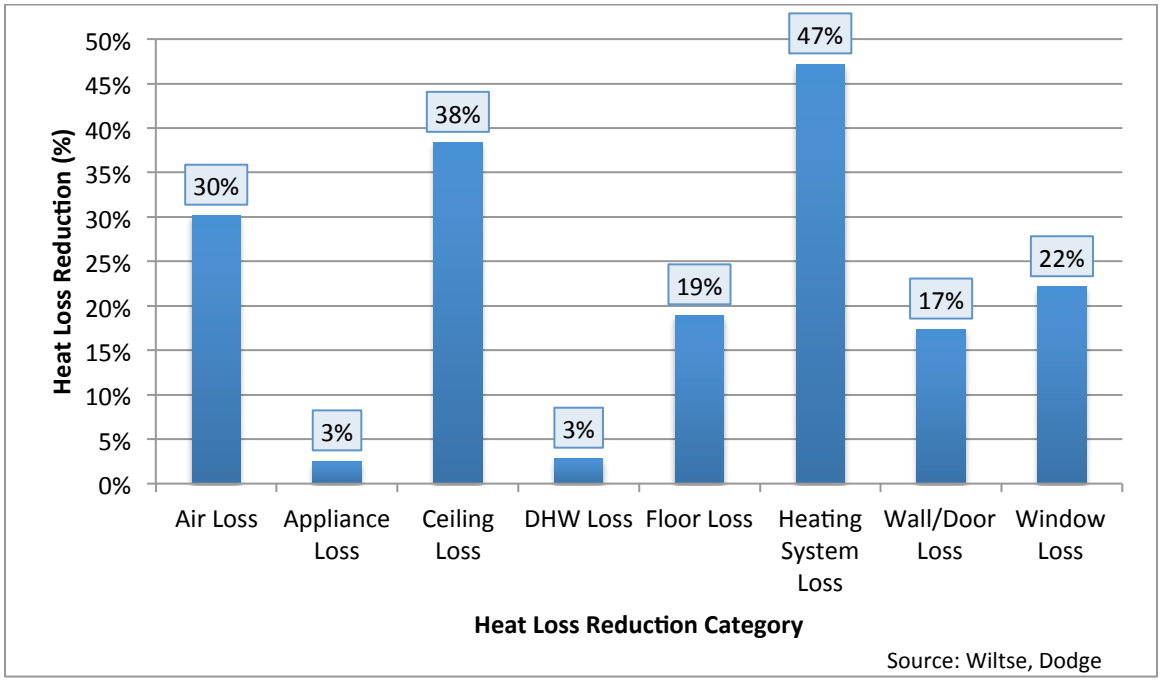
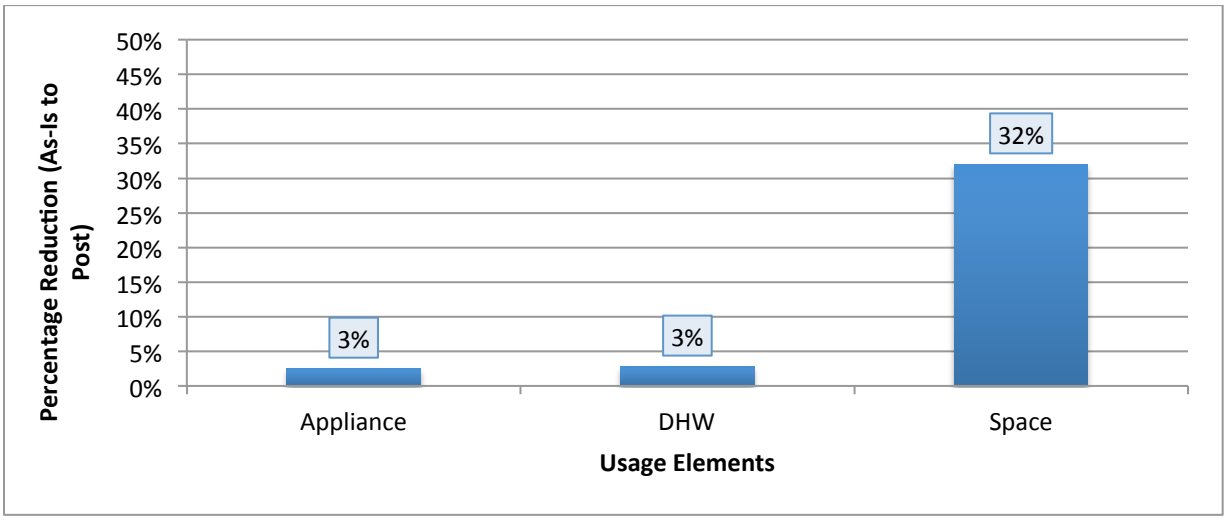


Figure 7 shows the changes in energy use between As-Is and Post ratings in three energy use categories. The percent change in energy use is greatest for space heating (32%) compared to appliances (3%) and domestic hot water (DHW) (3%), which follows from the relative importance of home heating in determining residential energy usage in cold climates and from the program's focus on shell improvement measures.

Figure 7: Percent Change in Energy Use



Other impacts

Homeowners and communities experience many additional benefits from home energy efficiency improvements. While this report does not document them, national research indicates that home energy efficiency improvements are linked to positive public health outcomes such as improved indoor air quality[33] and benefits associated with utility ratepayers, households, and the community.[34] Further, ratepayers benefit from reduced rate subsidies, lower bad-debt write-off, fewer energy bills in arrears, and fewer disconnects due to lack of payment.[35] Additionally, homeowner benefits include water and sewer savings, increased property value, improved home stability, and reduced involuntary moves.[36] Finally, national research shows that societal benefits include improved outdoor air quality, reduced environmental impacts from power plants, and broad economic impacts from job growth, increases in personal income, and increased property tax revenue.[37]

Home energy efficiency impacts a home's operating costs, longevity, and the health of its occupants, and therefore should improve a home's salability; however this is only beginning to have an impact on

[33] D. Jacobs, T. Kelly, & J. Sobolewski (2007). Linking public health, housing, and indoor environmental policy: Successes and challenges at local and federal agencies in the United States. *Environmental Health Perspectives*, 115(6), 976-982.
[34] M. Schweitzer & B. Tonn (2006). Non-energy benefits of the US Weatherization Assistance Program: A summary of their scope and magnitude. *Applied Energy*, 76, 321-335.
[35] Ibid., p. 323-326.
[36] Ibid., p. 327-329.
[37] Ibid., p. 329-332.

home salability in Alaska.[38] Increased home stability, resulting from fewer people moving due to the cost of energy, has significant implications for high school completion, health and safety, and community economic stability.[39] Future research into the impacts of AHFC's Weatherization Assistance Program could better quantify such related and long-term outcomes leading to a better understanding of the full depth and magnitude of program impacts.

Conclusion

The Weatherization Assistance Program has produced significant energy savings for homeowners in Alaska. This increased home energy efficiency translates into significant annual cost savings for homeowners and more money in household budgets. As of March 5, 2012, just over 6,800 Alaska homes have completed the Weatherization Assistance Program, with approximately $7.8 million dollars in estimated annual homeowner cost savings. Total estimated annual energy savings from the Weatherization Assistance Program to date is nearing 371 billion BTUs annually, which is roughly equivalent to 2.7 million gallons of #1 heating oil or 3.7 million therms of natural gas.

Future research and analysis could focus on three core areas of consideration: assessing program participation for barriers or gaps; describing program activity and outcomes in a greater level of detail; and evaluating the further impacts of the program. Future analysis of the program could parse out in greater detail the types of retrofit work done, cost of individual improvement options, and realized paybacks for various options. Similarly, future evaluation could assess how agencies and authorities choose certain improvement options and whether the choices being made reflect the best energy improvement actions, as well as evaluating other home improvement work that may have been stimulated by the Weatherization Assistance Program, such as improvements to home durability and health and safety. For assessing broader and more distant outcomes, research could focus on articulating how the Weatherization Assistance Program has contributed across the economic, social, and environmental sectors of Alaskan communities.

[38] Personal communications, various bankers, assessors, and appraisers, October – November 2011.
[39] M. Schweitzer & B. Tonn (2006). Non-energy benefits of the US Weatherization Assistance Program: A summary of their scope and magnitude. *Applied Energy*, 76, 321-335.

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Appendix A: Senate District Reports

Alaska Housing Finance Corporation

Weatherization Assistance Program Outcomes

Senate District A – Ketchikan/Wrangell

Senate Representative: Bert Stedman (R)
House Representatives: Kyle Johansen (R)
Peggy Wilson (R)

Description

Senate District A is located in Southeast Alaska and experiences a maritime climate with moderate winter temperatures. Primary fuel sources are oil and electricity generated from hydropower.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	333
Average Home Age	39.5

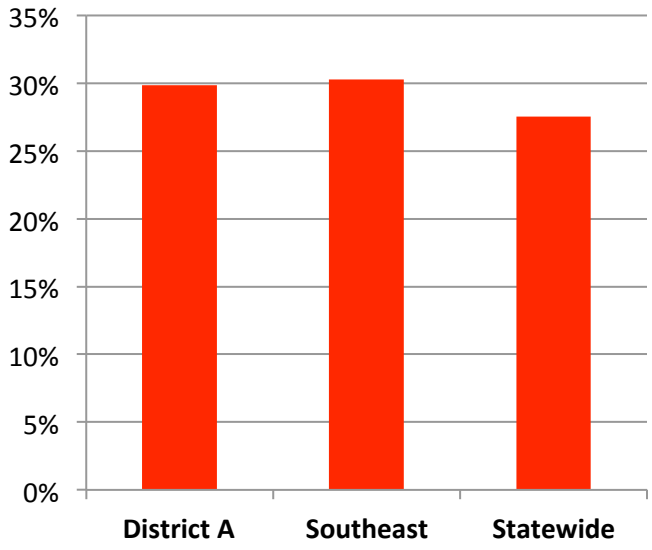
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	18.5 billion BTUs
Cost Savings	$524,734
CO2 Reduction	2.3 million lbs.

Per Home Averages per year	
Energy Savings	55.5 million BTUs
Cost Savings	$1,587

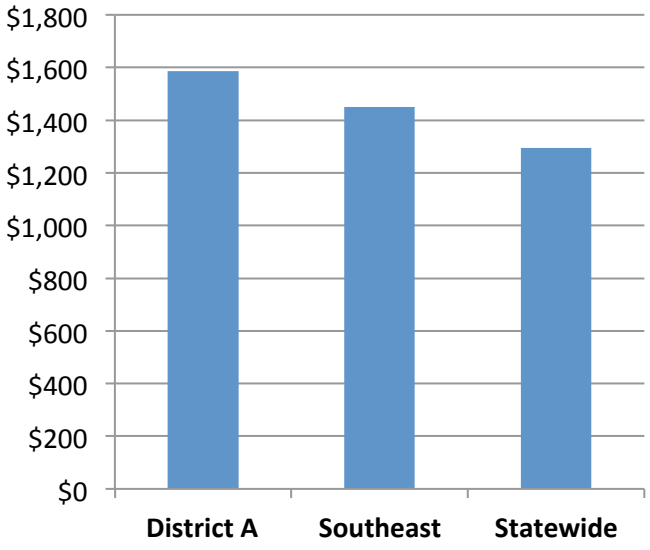
The total estimated BTUs saved in Senate District A are roughly equivalent to 135,688 gallons of #1 heating oil per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. I n Senate District A, 18% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in the more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 30% annual energy savings, which are on par with the Southeast and Statewide averages. Homes in this district have realized higher average cost savings when compared with Southeast and Statewide averages.

Of Note for Senate District A:

Annual cost savings from energy efficiency upgrades represent an estimated **$524,734.**

Highlighted Single Home Energy Retrofit:

Estimated:

80% energy reduction.

Yearly cost savings **- $3,725**.

Retrofit Actions: Improved the insulation in the ceiling and walls, replaced fireplace with direct vent device.

Estimated Yearly Fuel Use Changes in District A

Wood Use Reduction	146 cords
Coal Use Reduction	0 tons
Electric Use Reduction	435,290 kWh
Gas Use Reduction	0 therms
Oil 1/Oil 2 Use Reduction	101,596 gals
Propane Use Reduction	1,419 gals

Senate District B – Juneau

Senate Representative: Dennis Egan (D)
House Representatives: Beth Kertula (D)
Cathy Muñoz (R)

Description

Senate District B is located in Southeast Alaska and experiences a maritime climate with moderate winter temperatures. Primary fuel sources are oil and electricity generated from hydropower and firewood.

Weatherization Assistance Program Participation since 2008

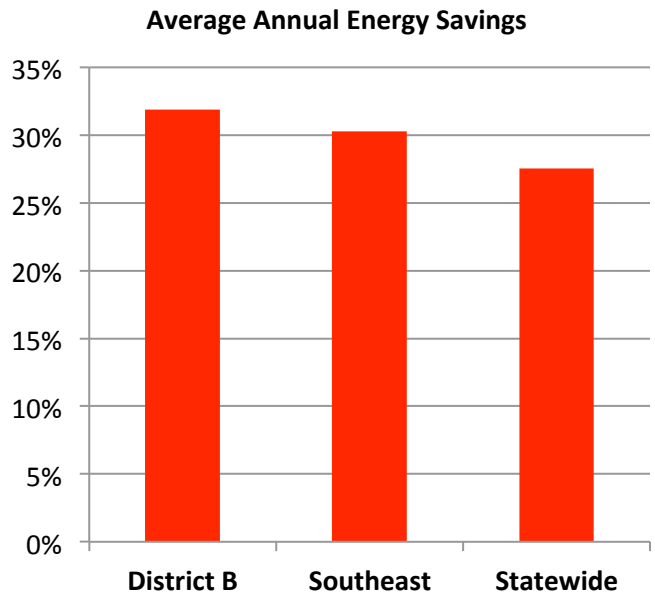
# Completed Retrofits	241
Average Home Age	37.5

Weatherization Assistance Program Outcomes Estimated Yearly Savings

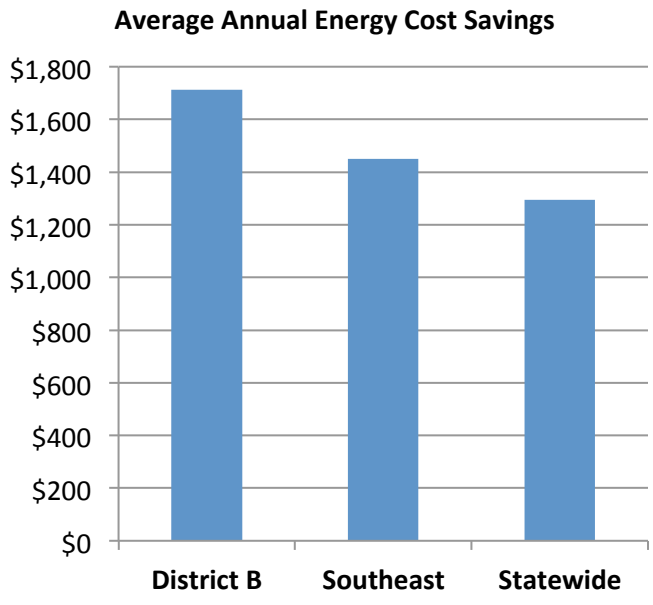
District Wide Totals	
Energy Savings	14.1 billion BTUs
Cost Savings	$420,608
CO2 Reduction	1.7 million lbs.

Per home averages per year	
Energy Savings	57 million BTUs
Cost Savings	$1,713

The total estimated BTUs saved in Senate District B are roughly equivalent to 103,813 gallons of #1 heating oil per year.



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. In Senate District B, 66% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 32% annual energy savings, greater than the Southeast and Statewide averages. Homes in this district also realized significantly higher average energy cost savings when compared with Southeast and Statewide averages.

Of Note for Senate District B:

Annual cost savings from energy efficiency upgrades represent an estimated **$420,608.**

Highlighted Single Home Energy Retrofit:

Estimated:

68% energy reduction.

Yearly cost savings **- $10,356**.

Retrofit Actions: In addition to health and safety considerations, the typical retrofits in this District included adding insulation in ceiling, upgrading boiler, tightening structure.

Estimated Yearly Fuel Use Changes in District B

Wood Use Reduction	130 cords
Coal Use Reduction	0 tons
Electric Use Reduction	405,173 kWh
Gas Use Reduction	0 therms
Oil 1/Oil 2 Use Reduction	77,381 gals
Propane Use Reduction	0 gals

Senate District C – Cordova/Southeast Islands/Interior Villages

Senate Representative: Albert Kookesh (D)
House Representatives: Alan Dick (R)
William "Bill" Thomas, Jr. (R)

Description

Senate District C is located in Southeast Alaska and experiences a maritime climate with moderate winter temperatures. It also spans a large region throughout Interior Alaska and experiences a continental climate with large temperature extremes and cold winters. Primary fuel sources are oil and electricity generated from hydropower and firewood.

Weatherization Assistance Program Participation since 2008

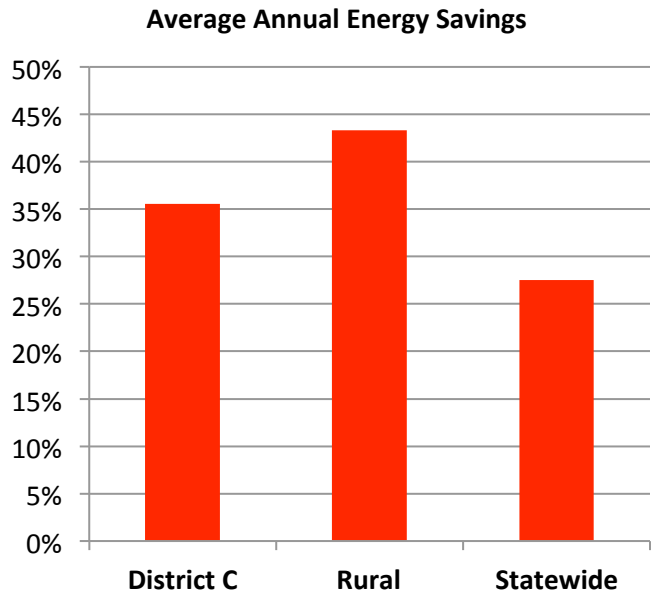
# Completed Retrofits	698
Average Home Age	31.1

District Wide Totals	
Energy Savings	57.1 billion BTUs
Cost Savings	$919,799
CO2 Reduction	3.1 million lbs.

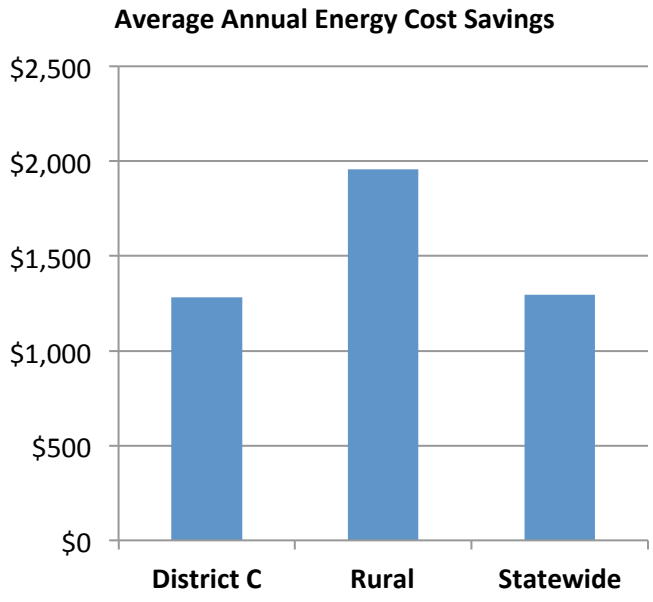
Per home averages per year	
Energy Savings	75.9 million BTUs
Cost Savings	$1,280

The total estimated BTUs saved in Senate District C are roughly equivalent to 419,852 gallons of #1 heating oil per year.

Weatherization Assistance Program Outcomes Estimated Yearly Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. In Senate District C, 15% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 36% annual energy savings, significantly greater energy savings compared to the Statewide average. Homes in this district realized average cost savings when compared with the Statewide average.

Of Note for Senate District C:

Annual cost savings from energy efficiency upgrades represent an estimated **$919,799.**

Highlighted Single Home Energy Retrofit:

Estimated:

73% energy reduction.

Yearly cost savings **- $15,224**.

Retrofit Actions: Added insulation in the ceiling and floor, tightened structure.

Estimated Yearly Fuel Use Changes in District C

Wood Use Reduction	2,289 cords
Coal Use Reduction	0 tons
Electric Use Reduction	467,606 kWh
Gas Use Reduction	0 therms
Oil 1/Oil 2 Use Reduction	102,459 gals
Propane Use Reduction	10,045 gals

Senate District D – Fairbanks

Senate Representative: Joe J. Thomas (D)
House Representatives: Bob Miller (D)
David Guttenberg (D)

Description

Senate District D is located in Interior Alaska, on the railbelt, and experiences a continental climate with large temperature extremes and cold winters. The primary fuel source is oil.

Weatherization Assistance Program Participation since 2008

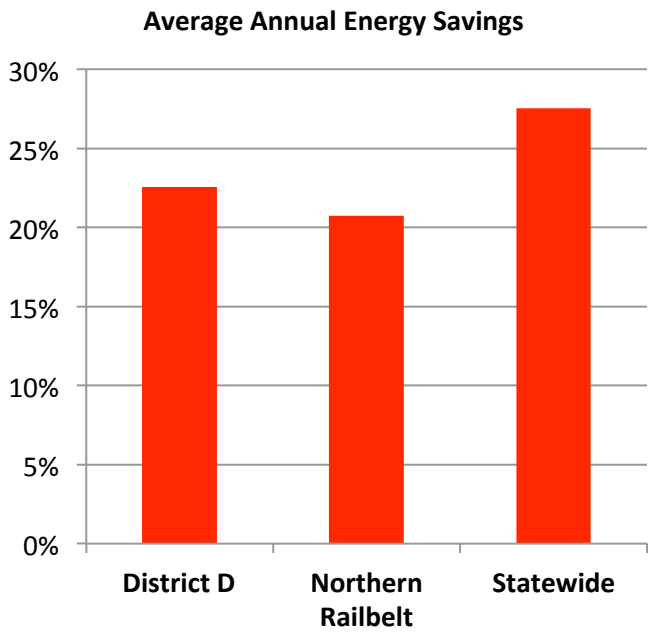
# Completed Retrofits	418
Average Home Age	33.1

District Wide Totals	
Energy Savings	22.2 billion BTUs
Cost Savings	$488,595
CO2 Reduction	2.6 million lbs.

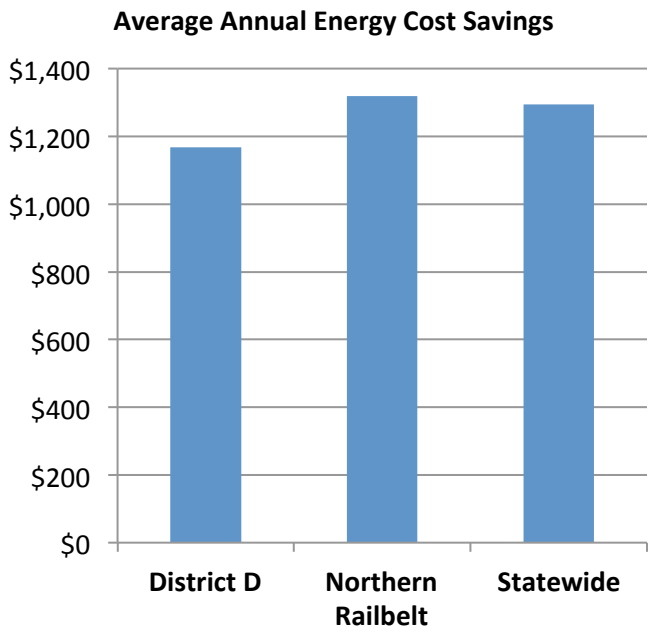
Per home averages per year	
Energy Savings	53 million BTUs
Cost Savings	$1,167

The total estimated BTUs saved in Senate District D are roughly equivalent to 163,296 gallons of #1 heating oil per year.

Weatherization Assistance Program Outcomes Estimated Yearly Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. In Senate District D, 22% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 23% annual energy savings, which are on par with the Northern Railbelt Region average.

Of Note for Senate District D:

Annual cost savings from energy efficiency upgrades represent an estimated **$488,595.**

Highlighted Single Home Energy Retrofit:

Estimated:

69% energy reduction.

Yearly cost savings **- $5,989**.

Retrofit Actions: Insulated rim joists, sealed air leaks, upgraded wood stove.

Estimated Yearly Fuel Use Changes in District D

Wood Use Reduction	460 cords
Coal Use Reduction	2.2 tons
Electric Use Reduction	328,154 kWh
Gas Use Reduction	0 therms
Oil 1/Oil 2 Use Reduction	83,603 gals
Propane Use Reduction	2,051 gals

Senate District E – Fairbanks

Senate Representative: Joe Paskvan (D)
House Representatives: Scott Kawasaki (D)
Steve M. Thompson (R)

Description

Senate District E is located in Interior Alaska, on the railbelt, and experiences a continental climate with large temperature extremes and cold winters. The primary fuel source is oil.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	325
Average Home Age	46.6

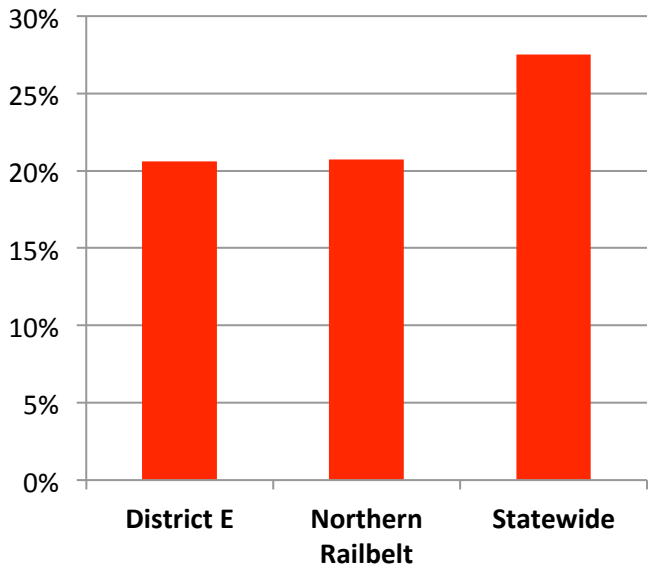
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	16.7 billion BTUs
Cost Savings	$460,056
CO2 Reduction	2.6 million lbs.

Per home averages per year	
Energy Savings	51.7 million BTUs
Cost Savings	$1,419

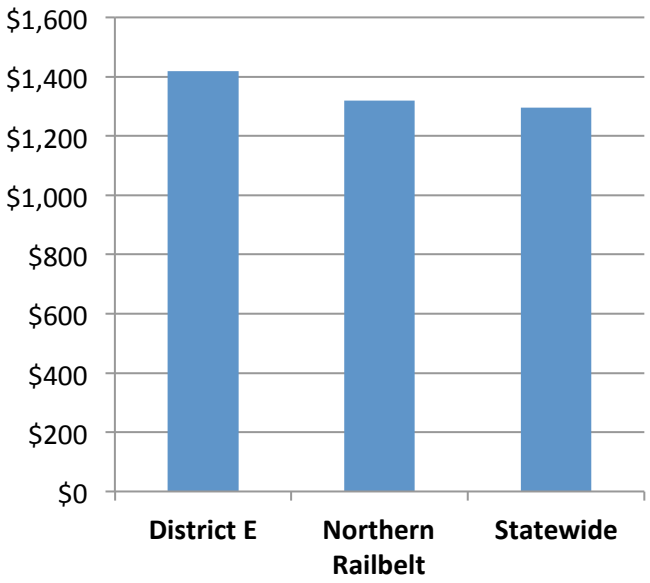
The total estimated BTUs saved in Senate District E are roughly equivalent to 123,116 gallons of #1 heating oil per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. In Senate District E, 12% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 21% annual energy savings, which are on par with the Northern Railbelt average. Homes in this district have realized greater average cost savings when compared with the Northern Railbelt Region and Statewide averages

Of Note for Senate District E:

Annual cost savings from energy efficiency upgrades represent an estimated **$460,056.**

Highlighted Single Home Energy Retrofit:

Estimated:

64% energy reduction.

Yearly cost savings **- $10,626**.

Retrofit Actions: Insulated walls, ceiling; replaced doors and windows; sealed air leaks.

Estimated Yearly Fuel Use Changes in District E

Wood Use Reduction	101 cords
Coal Use Reduction	0 tons
Electric Use Reduction	150,679 kWh
Gas Use Reduction	801 therms
Oil 1/Oil 2 Use Reduction	102,115 gals
Propane Use Reduction	774 gals

Senate District F – North Pole/Chikaloon

Senate Representative: John B. Coghill, Jr. (R)
House Representatives: Tammie Wilson (R)
Eric Feige (R)

Description

Senate District F covers Interior Alaska and eastern Alaska. The northern portion of the district experiences a continental climate with large temperature extremes and cold winters, while southern areas have more moderate winter temperatures. Primary fuel sources are oil, gas, and firewood.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	388
Average Home Age	31.5

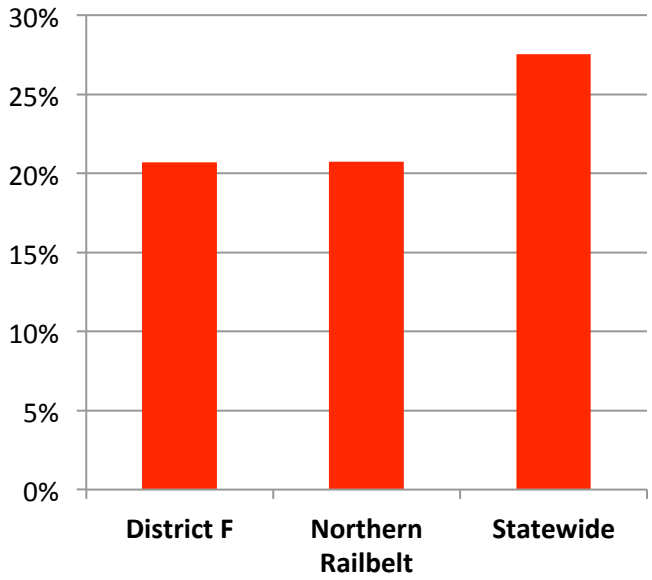
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	20.8 billion BTUs
Cost Savings	$542,716
CO2 Reduction	3.1 million lbs.

Per home averages per year	
Energy Savings	54.5 million BTUs
Cost Savings	$1,401

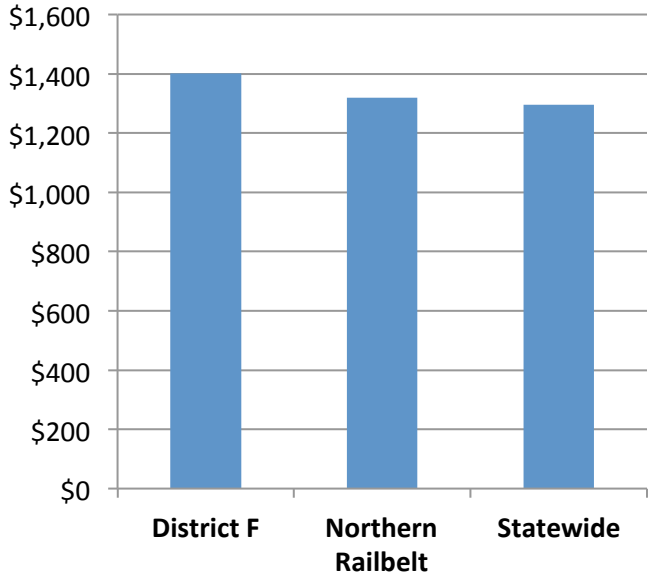
The total estimated BTUs saved in Senate District F are roughly equivalent to 153,116 gallons of #1 heating oil per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. In Senate District F, 18% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 21% annual energy savings, which are on par with the Northern Railbelt average. Homes in this district have realized greater average cost savings compared with the Northern Railbelt and Statewide averages.

Of Note for Senate District F:

Annual cost savings from energy efficiency upgrades represent an estimated **$542,716.**

Highlighted Single Home Energy Retrofit:

Estimated:

48% energy reduction.

Yearly cost savings **- $6,563**.

Retrofit Actions: Insulated walls, ceiling; replaced doors and windows; tightened structure.

Estimated Yearly Fuel Use Changes in District F

Wood Use Reduction	278 cords
Coal Use Reduction	0 tons
Electric Use Reduction	411,269 kWh
Gas Use Reduction	2,244 therms
Oil 1/Oil 2 Use Reduction	95,442 gals
Propane Use Reduction	6,029 gals

Senate District G – Palmer/Wasilla

Senate Representative: Linda Menard (R)
House Representatives: Carl Gatto (R)
Wes Keller (R)

Description

Senate District G is located on the railbelt and experiences a transitional maritime climate with moderately cold winter temperatures. The primary fuel source is natural gas.

Weatherization Assistance Program Participation since 2008

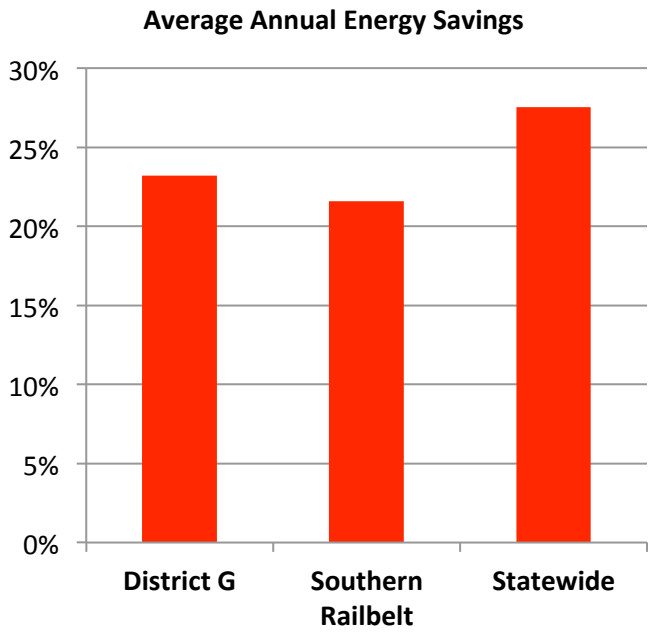
# Completed Retrofits	199
Average Home Age	29.8

Weatherization Assistance Program Outcomes Estimated Yearly Savings

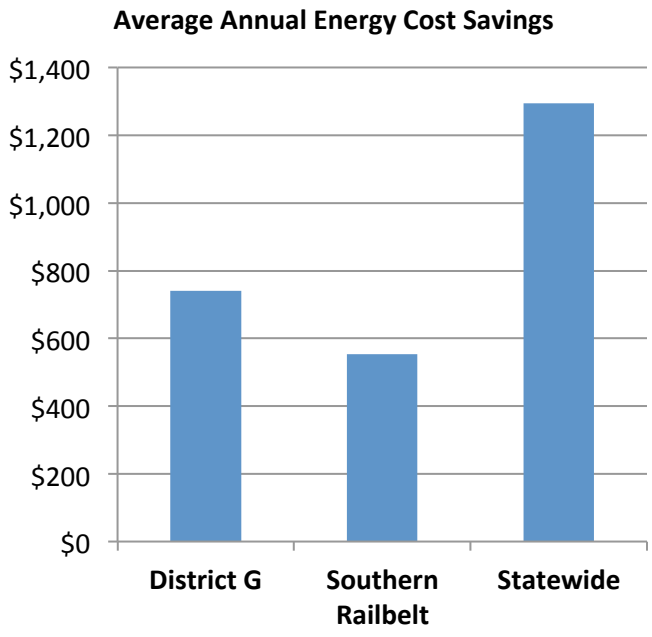
District Wide Totals	
Energy Savings	11.2 billion BTUs
Cost Savings	$147,934
CO2 Reduction	1.3 million lbs.

Per home averages per year	
Energy Savings	56.3 million BTUs
Cost Savings	$740

The total estimated BTUs saved in Senate District G are roughly equivalent to 82,155 gallons of #1 heating oil per year.



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. In Senate District G, 38% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 23% annual energy savings, greater than the Southern Railbelt average. Homes in this district have realized greater average cost savings than the Southern Railbelt average.

Of Note for Senate District G:

Annual cost savings from energy efficiency upgrades repre

.

sent an estimated **$147,934.**

Highlighted Single Home Energy Retrofit:

Estimated:

24% energy reduction.

Yearly cost savings **- $8,442**.

Retrofit Actions: Insulated the ceiling, tightened the structure.

Estimated Yearly Fuel Use Changes in District G

Wood Use Reduction	41 cords
Coal Use Reduction	0.2 tons
Electric Use Reduction	121,065 kWh
Gas Use Reduction	79,141 therms
Oil 1/Oil 2 Use Reduction	10,491 gals
Propane Use Reduction	5,102 gals

Senate District H – Mat Su/Chugiak

Senate Representative: Charlie Huggins (R)
House Representatives: Mark Neuman (R)
Bill Stoltze (R)

Description

Senate District H is located on the railbelt and experiences a transitional maritime climate with moderately cold winter temperatures. The primary fuel source is natural gas.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	267
Average Home Age	26.6

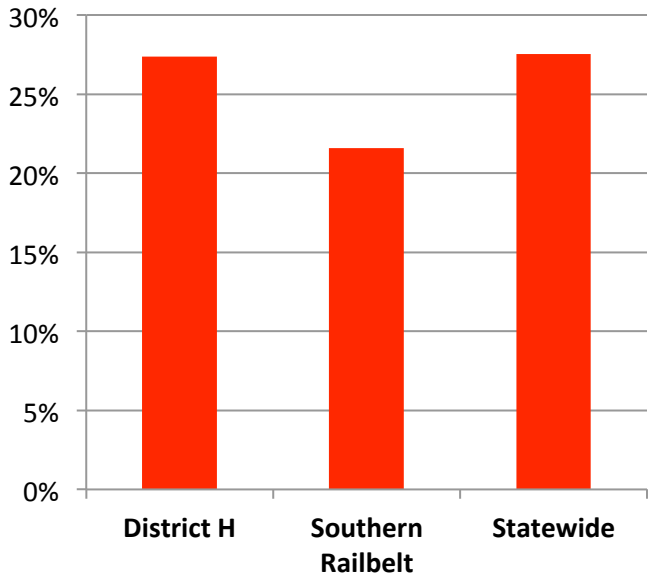
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	15.9 billion BTUs
Cost Savings	$272,338
CO2 Reduction	1.6 million lbs.

Per home averages per year	
Energy Savings	58.8 million BTUs
Cost Savings	$1,016

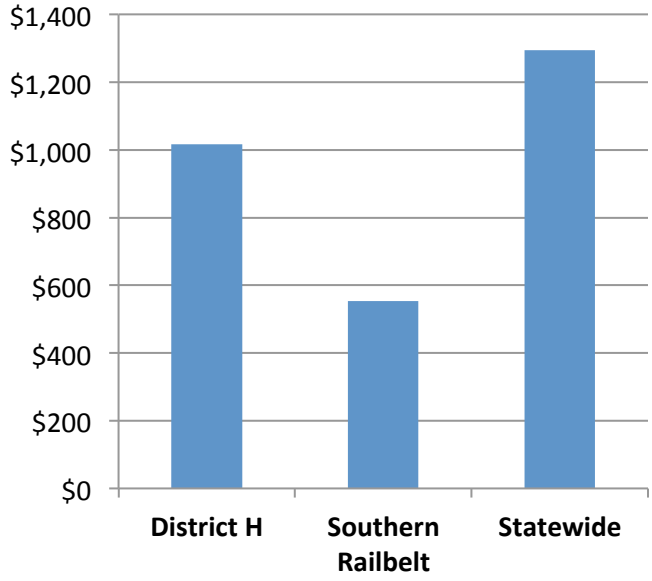
The total estimated BTUs saved in Senate District H are roughly equivalent to 116,923 gallons of #1 heating oil per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. In Senate District H, 27% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 27% annual energy savings, realizing energy savings greater than the Southern Railbelt average and similar to those realized Statewide. Homes in this district have realized significantly higher cost savings compared with the Southern Railbelt average.

Of Note for Senate District H:

Annual cost savings from energy efficiency upgrades represent an estimated **$272,338.**

Highlighted Single Home Energy Retrofit:

Estimated:

62% energy reduction.

Yearly cost savings **- $3,189**.

Retrofit Actions: Insulated the ceiling and walls.

Estimated Yearly Fuel Use Changes in District H

Wood Use Reduction	219 cords
Coal Use Reduction	0 tons
Electric Use Reduction	207,988 kWh
Gas Use Reduction	44,977 therms
Oil 1/Oil 2 Use Reduction	36,378 gals
Propane Use Reduction	5,766 gals

Senate District I – Eagle River/Anchorage

Senate Representative: Fred Dyson (R)
House Representatives: Anna Fairclough (R)
Dan Saddler (R)

Description

Senate District I is located in Southcentral Alaska, on the railbelt, and experiences a transitional maritime climate with moderately cold winter temperatures. The primary fuel source is natural gas.

Weatherization Assistance Program Participation since 2008

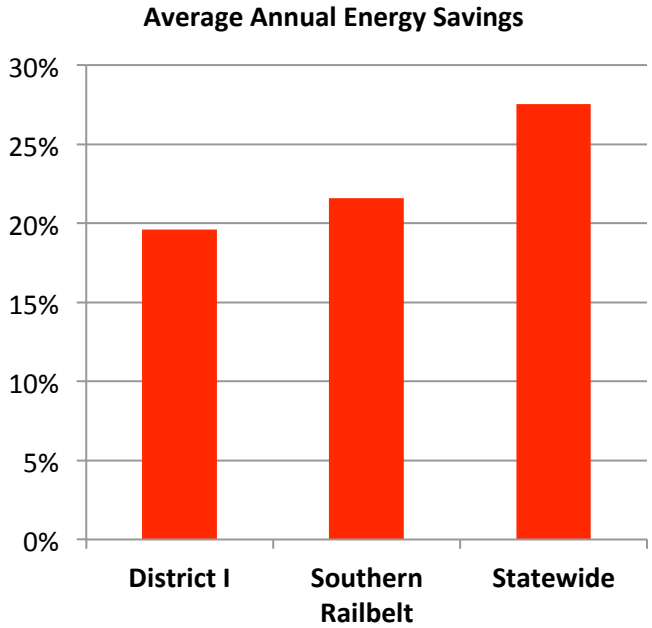
# Completed Retrofits	66
Average Home Age	38.2

Weatherization Assistance Program Outcomes Estimated Yearly Savings

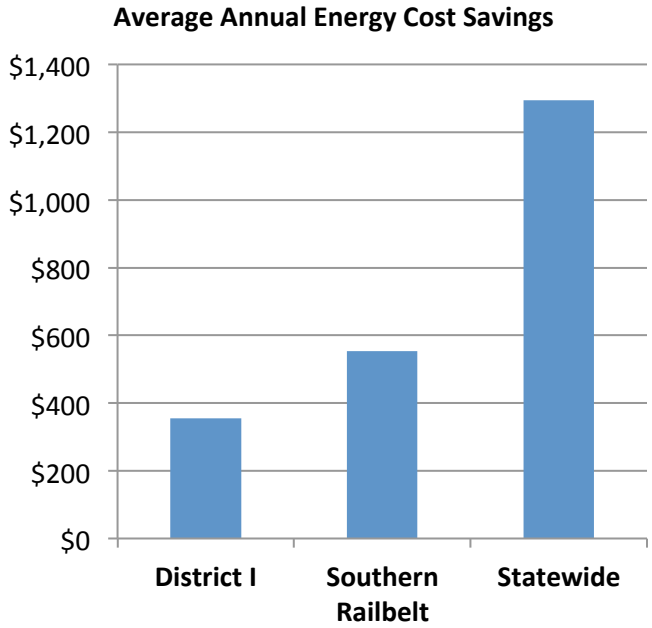
District Wide Totals	
Energy Savings	3.4 billion BTUs
Cost Savings	$23,767
CO2 Reduction	0.4 million lbs.

Per Home Averages per year	
Energy Savings	50.3 million BTUs
Cost Savings	$356

The total estimated BTUs saved in Senate District I are roughly equivalent to 33,737 therms of natural gas per year.



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues before addressing energy efficiency concerns. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 20% annual energy savings, which are on par with the Southern Railbelt average.

Of Note for Senate District I:

Annual cost savings from energy efficiency upgrades represent an estimated **$23,767.**

Highlighted Single Home Energy Retrofit:

Estimated:

48% energy reduction.

Yearly cost savings **- $1,125**.

Retrofit Actions: Insulated the ceiling and walls, upgraded woodstove and oil-fired boiler.

Estimated Yearly Fuel Use Changes in District I

Wood Use Reduction	0 cords
Coal Use Reduction	0 tons
Electric Use Reduction	10,803 kWh
Gas Use Reduction	33,368 therms
Oil 1/Oil 2 Use Reduction	0 gals
Propane Use Reduction	0 gals

Senate District J – Anchorage

Senate Representative: Bill Wielechowski (D)
House Representatives: Pete Petersen (D)
Max Gruenberg, Jr. (D)

Description

Senate District J is located in Southcentral Alaska on the railbelt, and experiences a transitional maritime climate with moderately cold winter temperatures. The primary fuel source is natural gas.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	236
Average Home Age	40.1

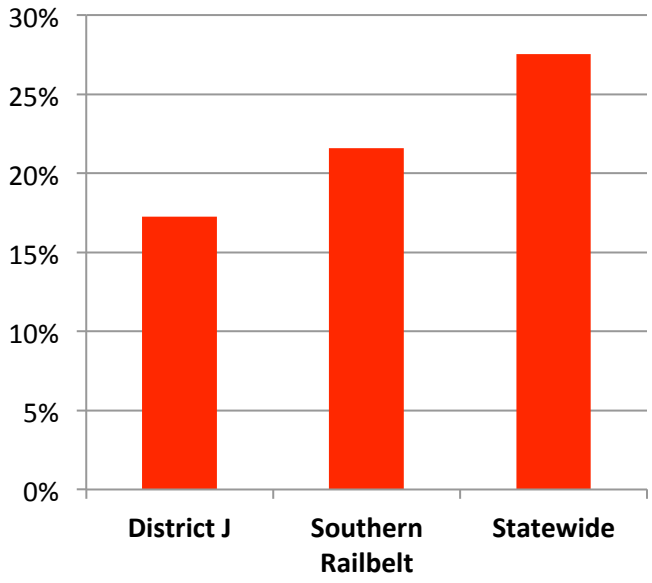
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	8.0 billion BTUs
Cost Savings	$57,532
CO2 Reduction	1.0 million lbs.

Per home averages per year	
Energy Savings	36.2 million BTUs
Cost Savings	$262

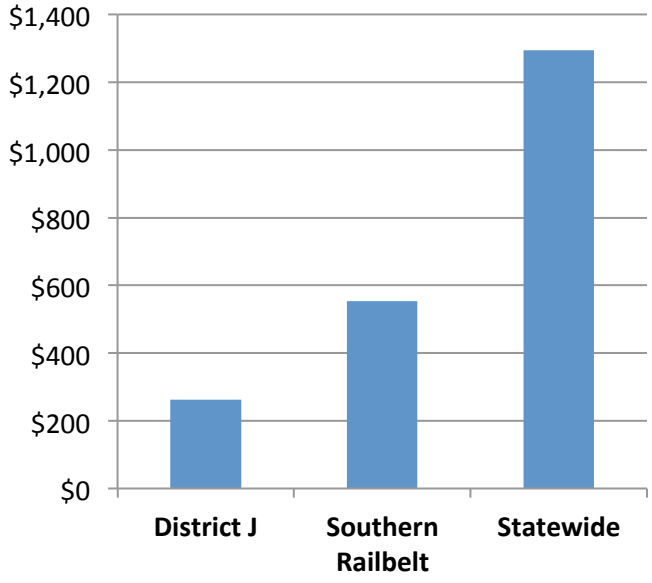
The total estimated BTUs saved in Senate District J are roughly equivalent to 79,568 therms of natural gas per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues before addressing energy efficiency concerns. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 17% annual energy savings, lower than the Southern Railbelt average.

Of Note for Senate District J:

Annual cost savings from energy efficiency upgrades represent an estimated **$57,532.**

Highlighted Single Home Energy Retrofit:

Estimated:

38% energy reduction.

Yearly cost savings **- $672**.

Retrofit Actions: Insulated the ceiling and foundation, tightened structure.

Estimated Yearly Fuel Use Changes in District J

Wood Use Reduction	0 cords
Coal Use Reduction	0 tons
Electric Use Reduction	40,364 kWh
Gas Use Reduction	78,191 therms
Oil 1/Oil 2 Use Reduction	0 gals
Propane Use Reduction	0 gals

Senate District K – Anchorage

Senate Representative: Bettye Davis (D)
House Representatives: Lance Pruitt (R)
Sharon Cissna (D)

Description

Senate District K is located in Southcentral Alaska, on the railbelt, and experiences a transitional maritime climate with moderately cold winter temperatures. The primary fuel source is natural gas.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	203
Average Home Age	40.1

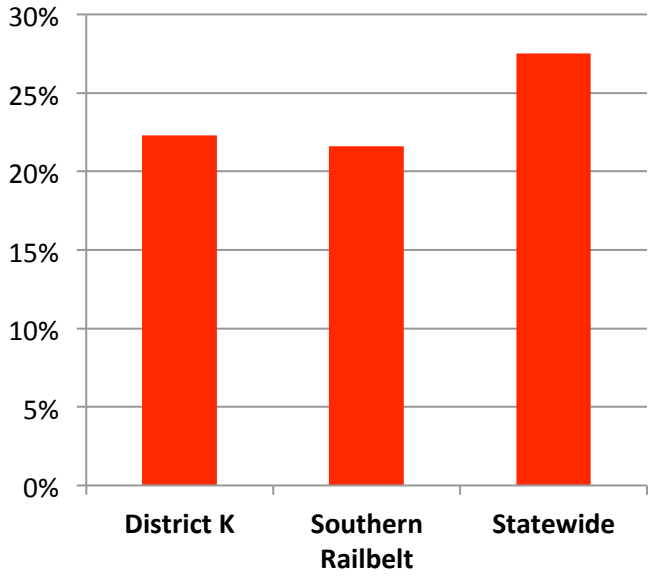
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	10.7 billion BTUs
Cost Savings	$74,453
CO2 Reduction	1.3 million lbs.

Per home averages per year	
Energy Savings	55.2 million BTUs
Cost Savings	$384

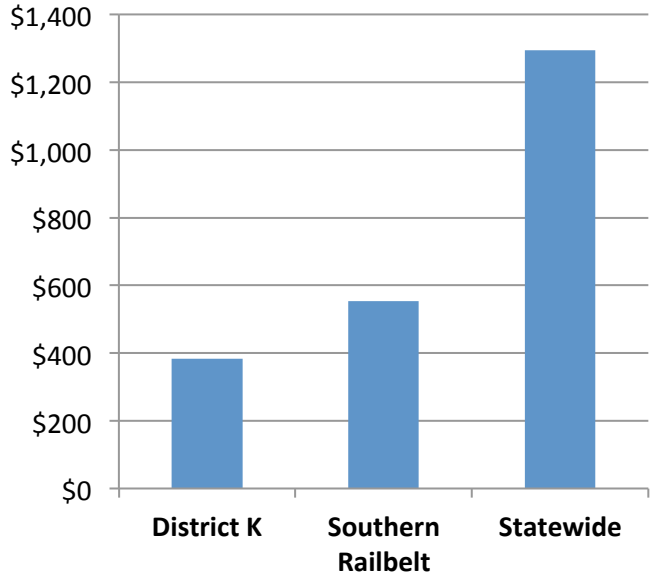
The total estimated BTUs saved in Senate District K are roughly equivalent to 107,340 therms of natural gas per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues before addressing energy efficiency concerns. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 22% annual energy savings, on par with the Southern Railbelt average.

Of Note for Senate District K:

Annual cost savings from energy efficiency upgrades represent an estimated **$74,453**

Highlighted Single Home Energy Retrofit:

Estimated:

59% energy reduction.

Yearly cost savings **- $1,563**.

Retrofit Actions: Tightened the structure and replaced the heating system.

Estimated Yearly Fuel Use Changes in District K

Wood Use Reduction	0 cords
Coal Use Reduction	0 tons
Electric Use Reduction	22,632 kWh
Gas Use Reduction	106,568 therms
Oil 1/Oil 2 Use Reduction	0 gals
Propane Use Reduction	0 gals

Senate District L – Anchorage

Senate Representative: Johnny Ellis (D)
House Representatives: Les Gara (D)
Berta Gardner (D)

Description

Senate District L is located in Southcentral Alaska, on the railbelt, and experiences a transitional maritime climate with moderately cold winter temperatures. The primary fuel source is natural gas.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	120
Average Home Age	47.8

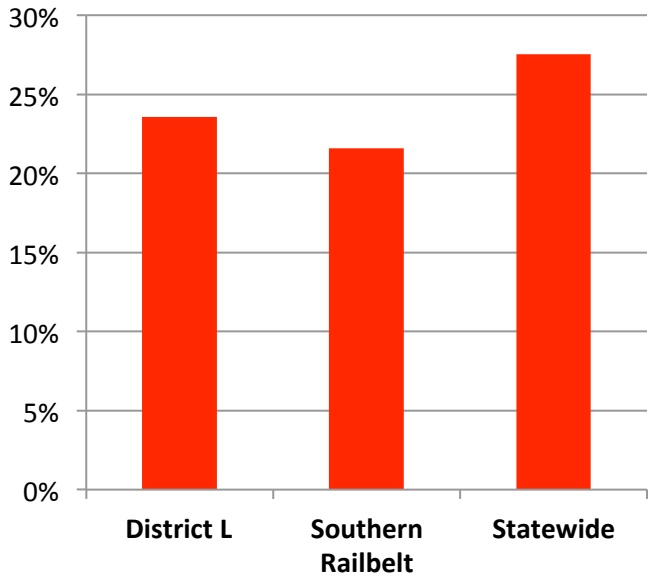
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	7 billion BTUs
Cost Savings	$49,798
CO2 Reduction	0.8 million lbs.

Per home averages per year	
Energy Savings	58.9 million BTUs
Cost Savings	$419

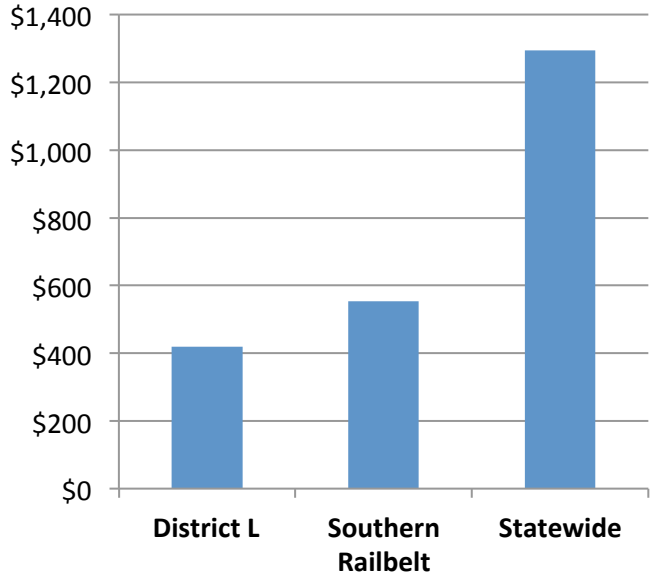
The total estimated BTUs saved in Senate District L are roughly equivalent to 70,263 therms of natural gas per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues before addressing energy efficiency concerns. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 24% annual energy savings, greater than the Southern Railbelt average.

Of Note for Senate District L:

Annual cost savings from energy efficiency upgrades represent an estimated **$49,798.**

Highlighted Single Home Energy Retrofit:

Estimated:

35% energy reduction.

Yearly cost savings **- $1,391**

Retrofit Actions: Tightened the structure and replaced the heating system.

Estimated Yearly Fuel Use Changes in District L

Wood Use Reduction	0 cords
Coal Use Reduction	0 tons
Electric Use Reduction	26,882 kWh
Gas Use Reduction	69,345 therms
Oil 1/Oil 2 Use Reduction	0 gals
Propane Use Reduction	0 gals

Senate District M – Anchorage

Senate Representative: Hollis French (D)
House Representatives: Mike Doogan (D)
Lindsey S. Holmes (D)

Description

Senate District M is located in Southcentral Alaska, on the railbelt, and experiences a transitional maritime climate with moderately cold winter temperatures. The primary fuel source is natural gas.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	135
Average Home Age	42.6

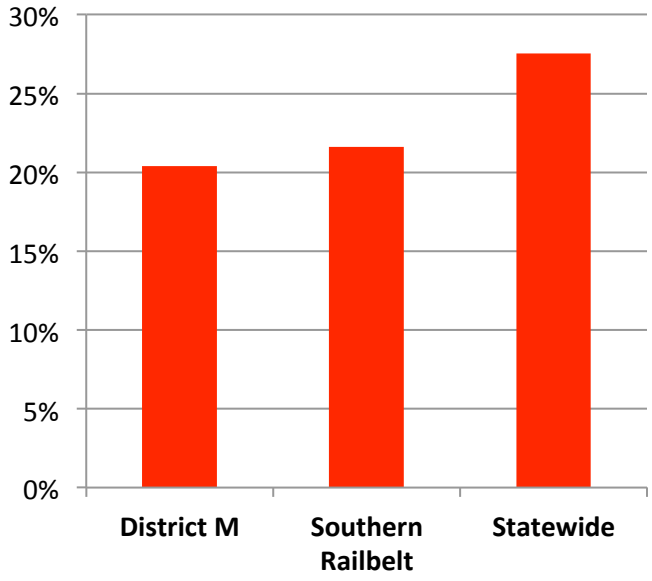
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	6.3 billion BTUs
Cost Savings	$44,568
CO2 Reduction	0.7 million lbs.

Per home averages per year	
Energy Savings	46.5 million BTUs
Cost Savings	$328

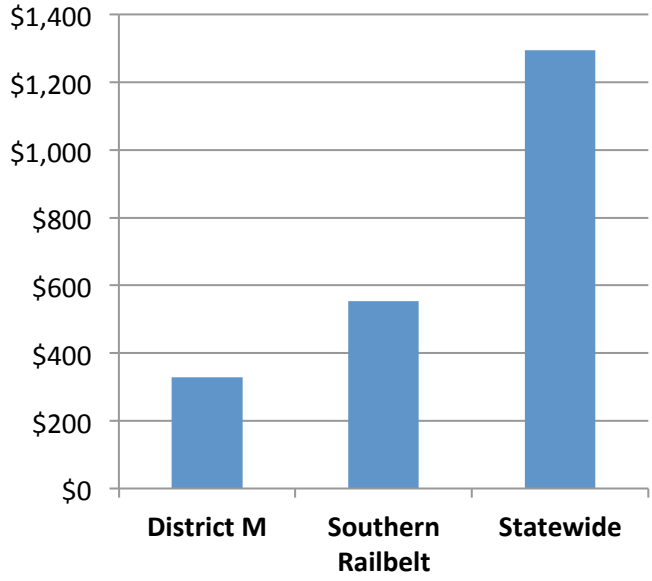
The total estimated BTUs saved in Senate District M are roughly equivalent to 63,140 therms of natural gas per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues before addressing energy efficiency concerns. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 20% annual energy savings, on par with the Southern Railbelt average.

Of Note for Senate District M:

Annual cost savings from energy efficiency upgrades represent an estimated **$44,568.**

Highlighted Single Home Energy Retrofit:

Estimated:

35% energy reduction.

Yearly cost savings **- $418**

Retrofit Actions: Improved the insulation in the attic and crawlspace; insulated and sealed ducting; upgraded heating system to a smaller, more efficient unit.

Estimated Yearly Fuel Use Changes in District M

Wood Use Reduction	0 cords
Coal Use Reduction	0 tons
Electric Use Reduction	20,215 kWh
Gas Use Reduction	62,451 therms
Oil 1/Oil 2 Use Reduction	0 gals
Propane Use Reduction	0 gals

Senate District N – Anchorage

Senate Representative: Lesil McGuire (R)
House Representatives: Mia Costello (R)
Craig W. Johnson (R)

Description

Senate District N is located in Southcentral Alaska, on the railbelt, and experiences a transitional maritime climate with moderately cold winter temperatures. The primary fuel source is natural gas.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	146
Average Home Age	33.7

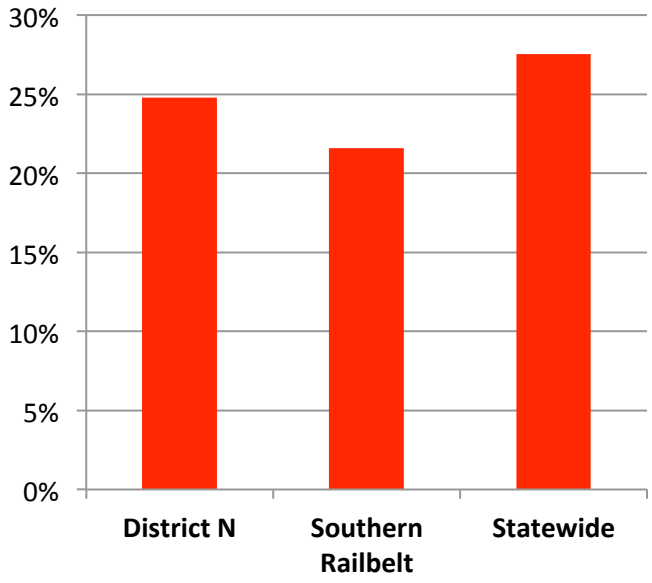
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	10.7 billion BTUs
Cost Savings	$73,767
CO2 Reduction	1.3 million lbs.

Per home averages per year	
Energy Savings	62.5 million BTUs
Cost Savings	$434

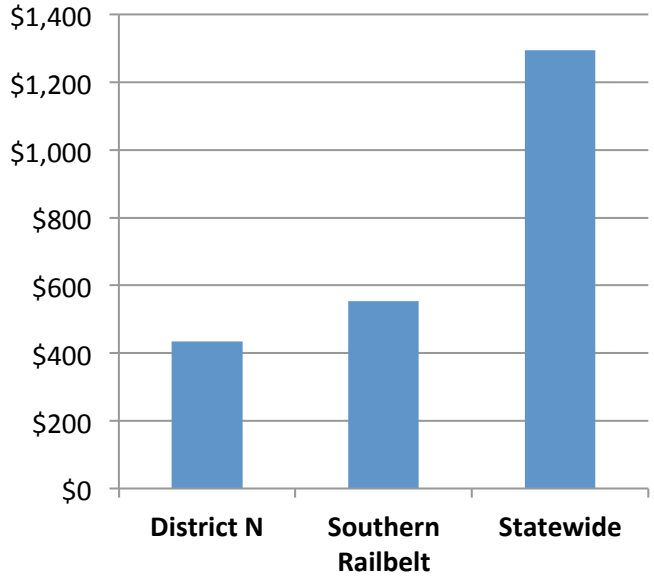
The total estimated BTUs saved in Senate District N are roughly equivalent to 107,061 therms of natural gas per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues before addressing energy efficiency concerns. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 25% annual energy savings, greater than the Southern Railbelt average.

Of Note for Senate District N:

Annual cost savings from energy efficiency upgrades represent an estimated **$73,767.**

Highlighted Single Home Energy Retrofit:

Estimated:

49% energy reduction.

Yearly cost savings **- $1,222**.

Retrofit Actions: Improved the insulation in the attic and crawlspace; insulated and sealed ducting; upgraded heating system to a smaller, more efficient unit.

Estimated Yearly Fuel Use Changes in District N

Wood Use Reduction	0 cords
Coal Use Reduction	0 tons
Electric Use Reduction	12,934 kWh
Gas Use Reduction	106,620 therms
Oil 1/Oil 2 Use Reduction	0 gals
Propane Use Reduction	0 gals

Senate District O – Anchorage

Senate Representative: Kevin Meyer (R)
House Representatives: Chris Tuck (D)
Charisse E. Millett (R)

Description

Senate District O is located in Southcentral Alaska, on the railbelt, and experiences a transitional maritime climate with moderately cold winter temperatures. The primary fuel source is natural gas.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	188
Average Home Age	30

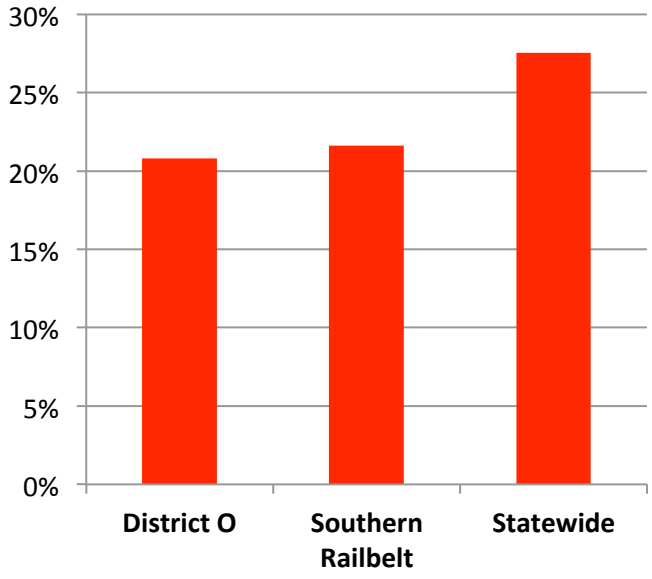
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	9 billion BTUs
Cost Savings	$66,768
CO2 Reduction	1.1 million lbs.

Per home averages per year	
Energy Savings	49.1 million BTUs
Cost Savings	$368

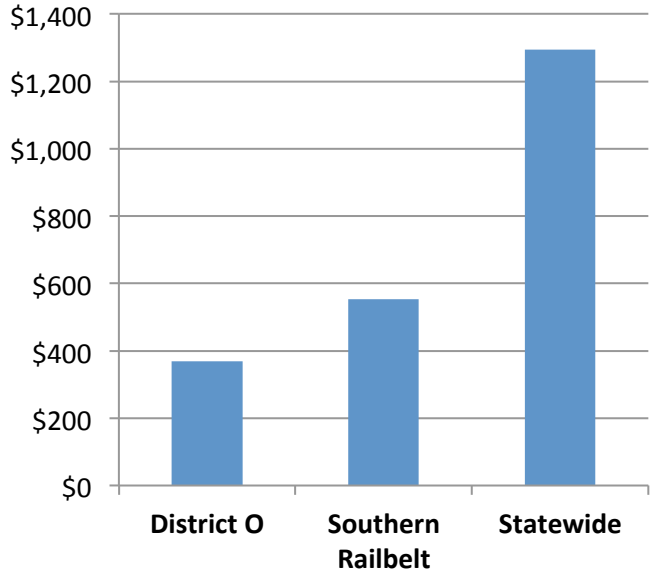
The total estimated BTUs saved in Senate District O are roughly equivalent to 90,288 therms of natural gas per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues before addressing energy efficiency concerns. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 21% annual energy savings, on par with the Southern Railbelt average.

Of Note for Senate District O:

Annual cost savings from energy efficiency upgrades represent an estimated **$66,768.**

Highlighted Single Home Energy Retrofit:

Estimated:

43% energy reduction.

Yearly cost savings **- $2,159**.

Retrofit Actions: Tightened the structure and replaced the heating system.

Estimated Yearly Fuel Use Changes in District O

Wood Use Reduction	3 cords
Coal Use Reduction	0 tons
Electric Use Reduction	52,705 kWh
Gas Use Reduction	87,797 therms
Oil 1/Oil 2 Use Reduction	0 gals
Propane Use Reduction	0 gals

Senate District P – Anchorage

Senate Representative: Cathy Giessel (R)
House Representatives: Bob Lynn (R)
Mike Hawker (R)

Description

Senate District P is located in Southcentral Alaska, on the railbelt, and experiences a transitional maritime climate with moderately cold winter temperatures. The primary fuel source is natural gas.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	67
Average Home Age	37.1

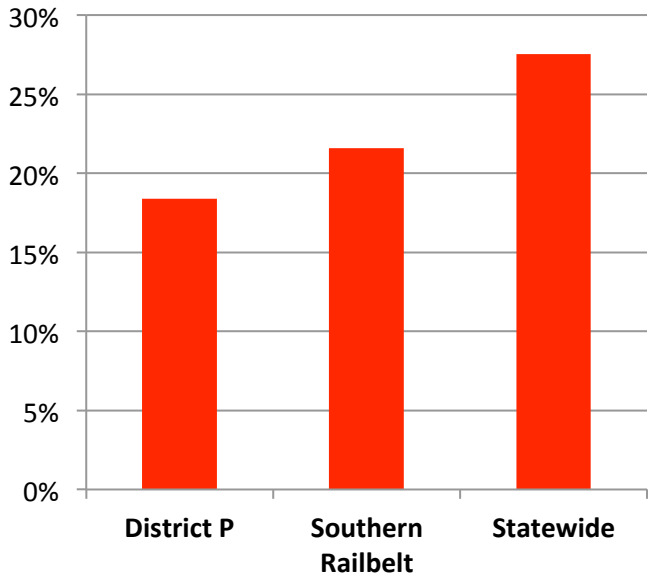
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	3.9 billion BTUs
Cost Savings	$32,789
CO2 Reduction	0.5 million lbs.

Per home averages per year	
Energy Savings	57.8 million BTUs
Cost Savings	$489

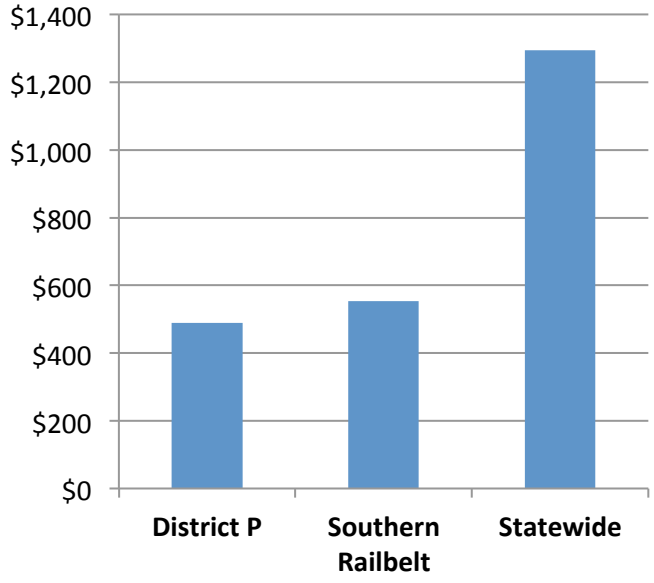
The total estimated BTUs saved in Senate District P are roughly equivalent to 38,879 therms of natural gas per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues before addressing energy efficiency concerns. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 18% annual energy savings, lower than the Southern Railbelt average.

Of Note for Senate District P:

Annual cost savings from energy efficiency upgrades represent an estimated **$32,789.**

Highlighted Single Home Energy Retrofit:

Estimated:

23% energy reduction.

Yearly cost savings **- $951**.

Retrofit Actions: Tightened the structure.

Estimated Yearly Fuel Use Changes in District P

Wood Use Reduction	3 cords
Coal Use Reduction	0 tons
Electric Use Reduction	20,978 kWh
Gas Use Reduction	36,650 therms
Oil 1/Oil 2 Use Reduction	537 gals
Propane Use Reduction	395 gals

Senate District Q – Kenai/Soldotna

Senate Representative: Thomas Wagoner (R)
House Representatives: Kurt Olson (R)
Mike Chenault (R)

Description

Senate District Q is located in Southcentral Alaska, on the railbelt, and experiences a maritime climate with moderate winter temperatures. Primary fuel sources are natural gas and oil.

Weatherization Assistance Program Participation since 2008

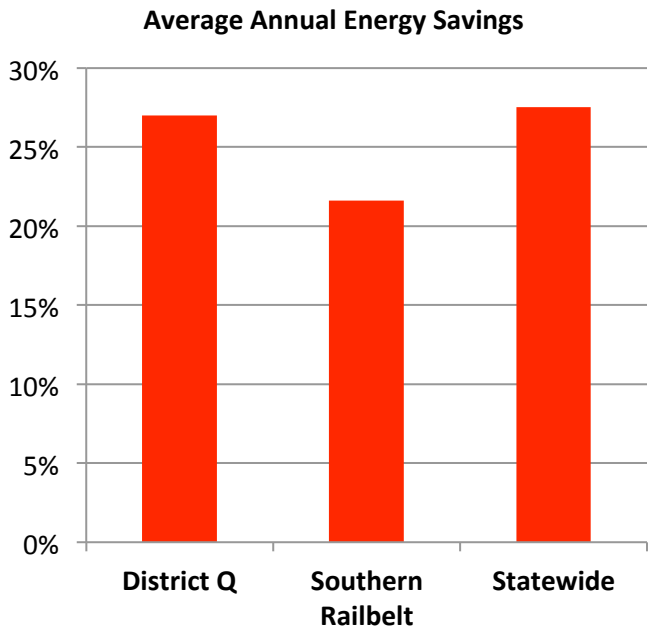
# Completed Retrofits	201
Average Home Age	30.8

Weatherization Assistance Program Outcomes Estimated Yearly Savings

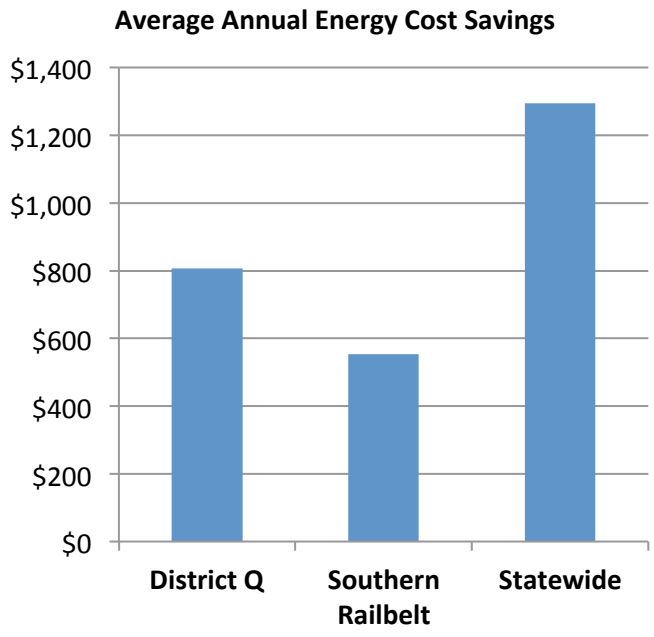
District Wide Totals	
Energy Savings	13.3 billion BTUs
Cost Savings	$168,818
CO2 Reduction	1.4 million lbs.

Per home averages per year	
Energy Savings	66 million BTUs
Cost Savings	$808

The total estimated BTUs saved in Senate District Q are roughly equivalent to 97,714 gallons of #1 heating oil per year.



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. In Senate District Q, 18% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 27% annual energy savings, realizing energy savings greater than the Southern Railbelt average, and on par with the Statewide average. Homes in this district have realized greater cost savings than the Southern Railbelt average.

Of Note for Senate District Q:

Annual cost savings from energy efficiency upgrades represent an estimated **$168,818.**

Highlighted Single Home Energy Retrofit:

Estimated:

87% energy reduction.

Yearly cost savings **- $8,895**

Retrofit Actions: Added insulation in the floor and walls; and tightened the structure.

Estimated Yearly Fuel Use Changes in District Q

Wood Use Reduction	162 cords
Coal Use Reduction	0 tons
Electric Use Reduction	173,711 kWh
Gas Use Reduction	69,784 therms
Oil 1/Oil 2 Use Reduction	15,310 gals
Propane Use Reduction	5,387 gals

Senate District R – Homer/Kodiak

Senate Representative: Gary Stevens (R)
House Representatives: Paul Seaton (R)
Alan Austerman (R)

Description

Senate District R is located in Southcentral Alaska, on the railbelt, and experiences a maritime climate with moderate winter temperatures. Primary fuel sources are oil, firewood, electricity generated from natural gas, wind, and hydro.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	289
Average Home Age	34.3

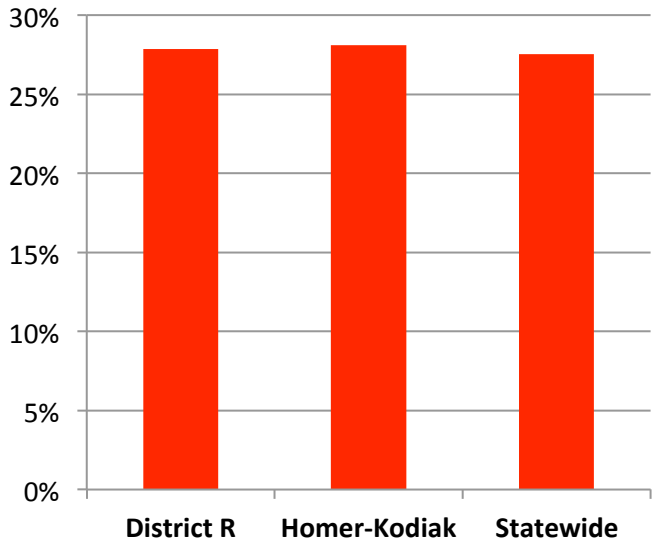
Weatherization Assistance Program Outcomes
Estimated Yearly Savings

District Wide Totals	
Energy Savings	14 billion BTUs
Cost Savings	$566,869
CO2 Reduction	1.9 million lbs.

Per home averages per year	
Energy Savings	48.9 million BTUs
Cost Savings	$1,897

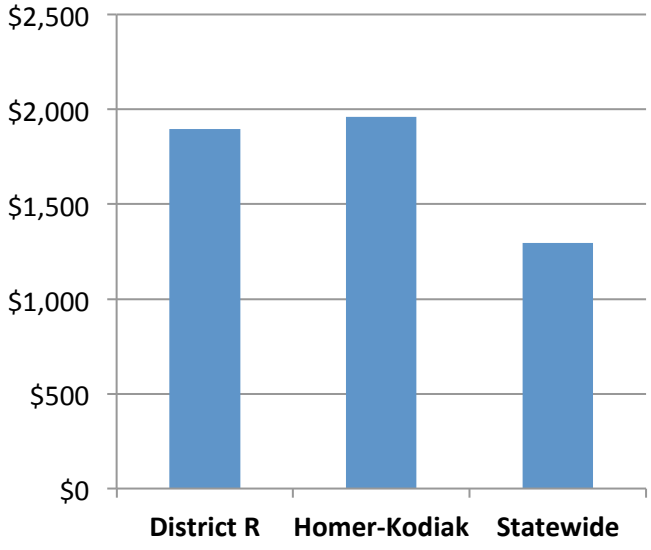
The total estimated BTUs saved in Senate District R are roughly equivalent to 103,174 gallons of #1 heating oil per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. In Senate District R, 17% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 28% annual energy savings, which are on par with Homer-Kodiak and Statewide averages. Homes in this district have realized significantly higher average cost savings compared to the Statewide average.

Of Note for Senate District R:

Annual cost savings from energy efficiency upgrades represent an estimated **$566,869.**

Highlighted Single Home Energy Retrofit:

Estimated:

60% energy reduction.

Yearly cost savings **- $8,520**.

Retrofit Actions: Added insulation in the floor and walls; tightened the structure; and replaced the heater.

Estimated Yearly Fuel Use Changes in District R

Wood Use Reduction	142 cords
Coal Use Reduction	0 tons
Electric Use Reduction	132,287 kWh
Gas Use Reduction	0 therms
Oil 1/Oil 2 Use Reduction	73,402 gals
Propane Use Reduction	9,245 gals

Senate District S – Bristol Bay/Aleutians/Bethel

Senate Representative: Lyman Hoffman (D)
House Representatives: Bryce Edgmon (D)
Bob Herron (D)

Description

Senate District S is located in rural West Alaska and experiences a maritime and transitional / continental climate with cool summers and moderate to cold winter temperatures. Primary fuel sources are oil and electricity generated from diesel.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	604
Average Home Age	31.3

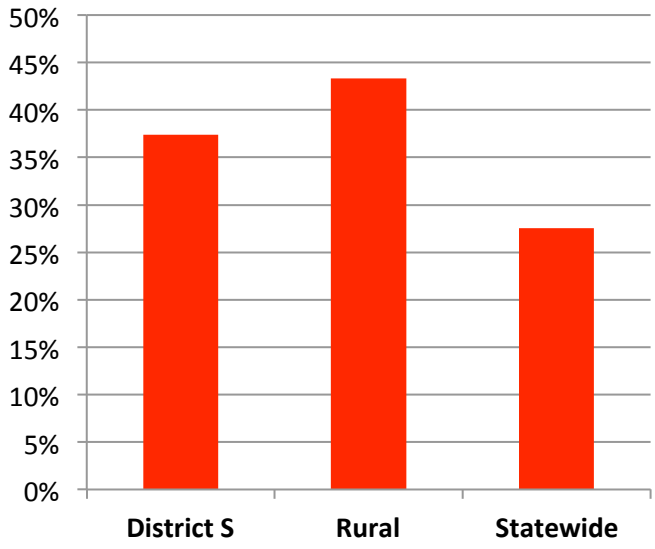
Weatherization Assistance Program Outcomes Estimated Yearly Savings

District Wide Totals	
Energy Savings	42.3 billion BTUs
Cost Savings	$1,234,491
CO2 Reduction	4.0 million lbs.

Per home averages per year	
Energy Savings	54.2 million BTUs
Cost Savings	$1,730

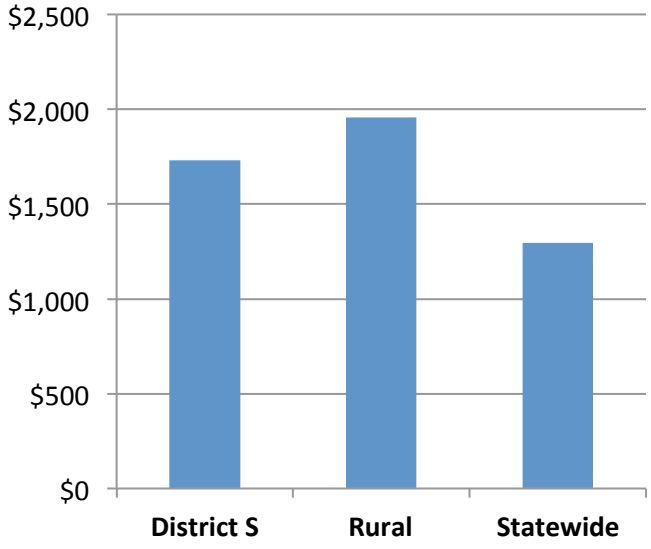
The total estimated BTUs saved in Senate District S are roughly equivalent to 311,017 gallons of #1 heating oil per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. In Senate District S, 40% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 37% annual energy savings, realizing significantly more energy savings than the Statewide average. Homes in this district have realized average cost savings that are significantly higher than the Statewide average.

Of Note for Senate District S:

Annual cost savings from energy efficiency upgrades represent an estimated **$1,234,491.**

Highlighted Single Home Energy Retrofit:

Estimated:

83% energy reduction.

Yearly cost savings **- $7,004**.

Retrofit Actions: Added insulation in the floor, walls and attic; replaced windows and doors; tightened the structure; and upgraded the secondary heater (woodstove).

Estimated Yearly Fuel Use Changes in District S

Wood Use Reduction	1,226 cords
Coal Use Reduction	0 tons
Electric Use Reduction	245,302 kWh
Gas Use Reduction	0 therms
Oil 1/Oil 2 Use Reduction	159,801 gals
Propane Use Reduction	77 gals

Senate District T – Bering Straits/Arctic

Senate Representative: Donald Olson (D)

House Representatives: Neal W. Foster (D)
Reggie Joule (D)

Description

Senate District T is located in rural West Alaska and experiences a transitional, continental climate with cool summers and cold winter temperatures. It is also located in rural North Alaska and experiences an arctic climate with cold temperatures. Primary fuel sources are oil and natural gas.

Weatherization Assistance Program Participation since 2008

# Completed Retrofits	547
Average Home Age	31.7

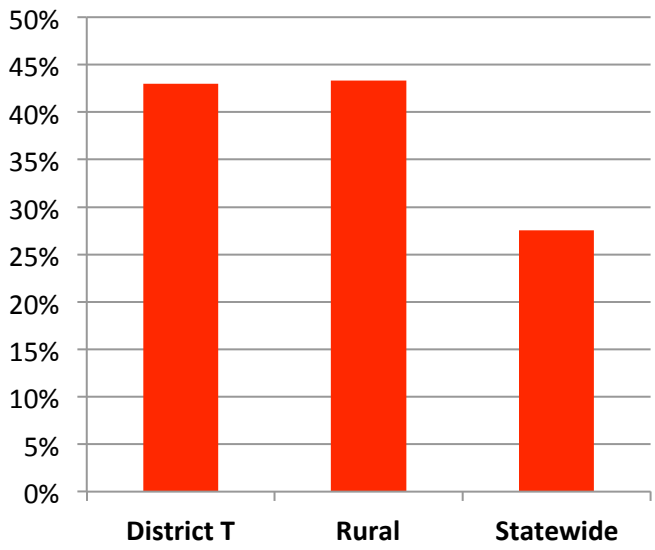
Weatherization Assistance Program Outcomes
Estimated Yearly Savings

District Wide Totals	
Energy Savings	40.3 billion BTUs
Cost Savings	$1,174,114
CO2 Reduction	3.8 million lbs.

Per home averages per year	
Energy Savings	73.4 million BTUs
Cost Savings	$2,161

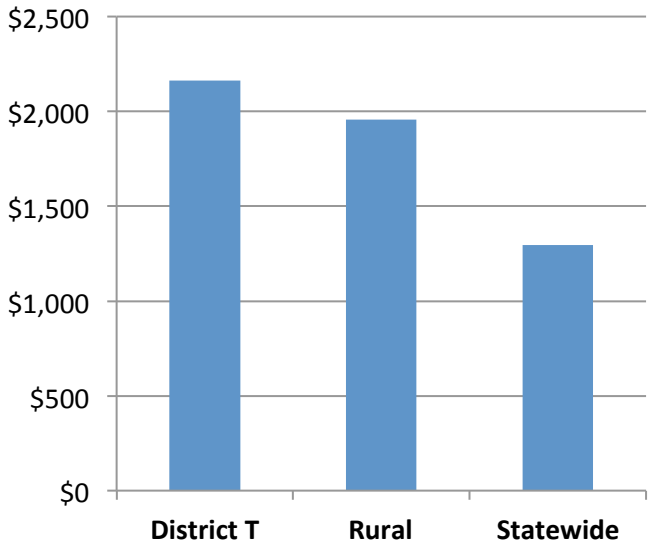
The total estimated BTUs saved in Senate District T are roughly equivalent to 296,294 gallons of #1 heating oil per year.

Average Annual Energy Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012

Average Annual Energy Cost Savings



Source: Valentine, Wiltse, Dodge, Cold Climate Housing Research Center, 2012.

The Weatherization Assistance Program requires that retrofits resolve health and safety issues, like air quality, before addressing energy efficiency concerns. In Senate District T, 65% of unventilated homes received some form of mechanical ventilation with their retrofit. Because of this emphasis on health and safety, typically the contractor does not have sufficient remaining funds to invest in more expensive energy efficiency upgrades, like replacing boilers. In this district weatherization retrofits consisted primarily of air tightening and increasing envelope insulation. These retrofits achieved 43% annual energy savings, realizing energy savings on par with the Rural Region and significantly higher than the Statewide average. Homes in this district have realized average cost savings nearly twice the Statewide average.

Of Note for Senate District T:

Annual cost savings from energy efficiency upgrades represent an estimated **$1,174,114.**

Highlighted Single Home Energy Retrofit:

Estimated:

64% energy reduction.

Yearly cost savings **- $10,272**.

Retrofit Actions: Added insulation in the walls and ceiling; replaced windows and doors; tightened the structure.

Estimated Yearly Fuel Use Changes in District T

Wood Use Reduction	805 cords
Coal Use Reduction	0 tons
Electric Use Reduction	249,905 MWh
Gas Use Reduction	42,632 therms
Oil 1/Oil 2 Use Reduction	134,005 gals
Propane Use Increase	938 gals