

Washington State Low-Income Weatherization Program Evaluation Report For 2012

Executive Summary

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Introduction

Washington’s Weatherization Program provides services to improve the energy efficiency, durability, and health and safety of homes occupied by low-income households. Low-income weatherization services have been provided in Washington since 1977. The Housing Improvements and Preservation Unit within the Community Services and Housing Division of the Washington State Department of Commerce (Commerce) manages the Weatherization Program. Commerce contracts with 28 local agencies – including community action agencies, units of city and county governments, and three tribal groups – to deliver weatherization services including energy conservation education. Weatherization services are funded by a mix of federal, state, utility, and local sources.¹

The purpose of this evaluation report is to identify and document Weatherization Program outcomes, benefits, and costs for Commerce, local agencies, and stakeholders to:

- Assure prudent use of funds (accountability),
- Improve the quality and effectiveness of program services, and
- Assess Weatherization Program progress using measured key performance indicators.

This evaluation covers calendar year 2012. The evaluation is based on data from the following sources:

- Project data from the Weatherization Information Data System (WIDS) for projects with final inspections in 2012, and
- Program data from Commerce and previous evaluations (historical data).

This Executive Summary provides an overview of the evaluation results. More detailed results are contained in a separate PowerPoint presentation.

Program Delivery Outcomes

The influx of American Recovery and Reinvestment Act (ARRA) funds began to drive increased Weatherization Program production in October 2009. In 2010, production peaked at almost 9,000 units, two and a half times the pre-ARRA average (Figure 1).

Production declined to 7,451 units in 2011 as agencies spent their ARRA funds, but was still twice pre-ARRA levels. By the end of 2011, most of the ARRA funding had been spent. In 2012, production declined to pre-ARRA levels.

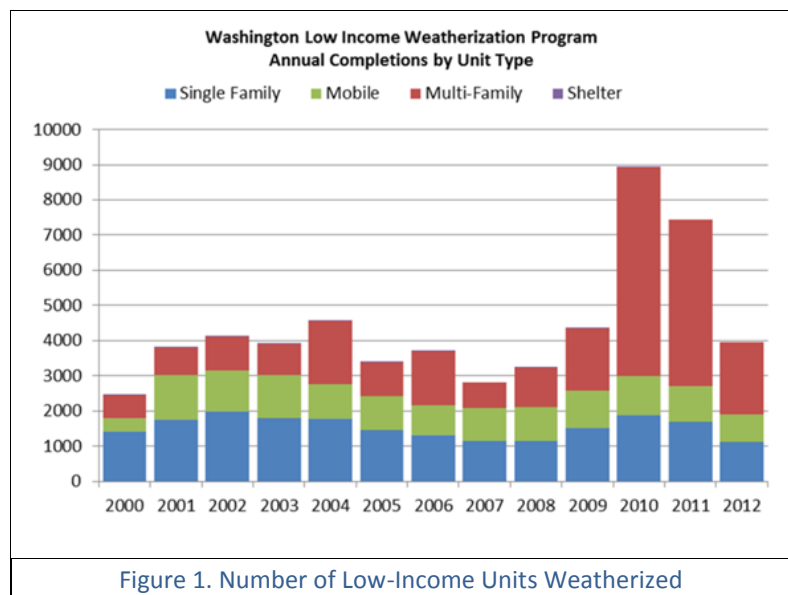


Figure 1. Number of Low-Income Units Weatherized

¹ In 2009, the Weatherization Program received a significant, temporary boost in funding from the U.S. Department of Energy through ARRA. Most of this funding was used in 2010 and 2011.

This evaluation identified the following key findings related to the delivery of the Weatherization Program:

- In 2012, production declined most significantly for multi-family units. However, these units still accounted for a little more than half of production, which is a larger share than the pre-ARRA period. Production for single-family units also declined, but the share of these units increased compared to 2011.
- Seattle and King County accounted for 40% of production in 2012. Multi-family units comprised a significant portion of production for these two agencies. The top 10 producers accounted for almost 80% of production.
- Federal funds accounted for 56% of direct costs, which is a decline from 2011, when it was 64%. Low-Income Home Energy Assistance Program (LIHEAP) funding was used most frequently and accounted for the largest share of direct costs.
- Over 75% of the units that were weatherized had electric heat and most of the rest were heated with natural gas. This was similar to historical values.
- Over 3.4 million square feet of ceiling, floor, and wall insulation was installed. On average, about nine measures were

installed for each housing project unit that was weatherized (Figure 2). Measures to improve the energy efficiency of the housing unit envelope were the most common, along with baseload measures including lighting and hot water system measures. These baseload measures tended

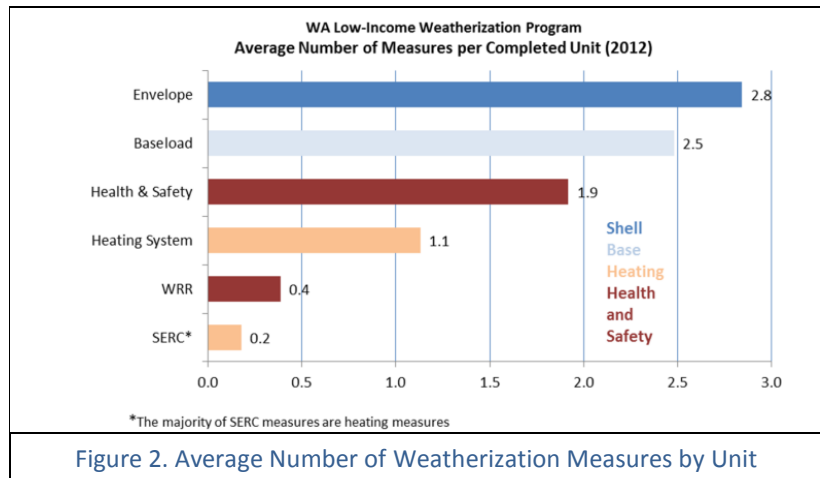


Figure 2. Average Number of Weatherization Measures by Unit

to be less expensive. Measures to improve the health and safety of the housing unit and necessary weatherization repairs accounted for about a quarter of the installed measures. These measures do not increase the energy efficiency of the housing unit, but are necessary for the health and safety of the occupants and to preserve the long-term integrity of the installed weatherization measures. On average, about one heating system measure was installed per completed unit in 2012, accounting for approximately 12% of the measures. These results are similar to 2011.

- The agencies reported serving almost 8,000 people in 2012 (the actual number is larger than this because not all households in multi-family units need to be reported). We estimate that more than half of the units that were weatherized had at least one occupant who was over 60 years old, under six years old, or disabled.

Program Benefits

In 2012, Washington’s Low Income Weatherization Program installed weatherization measures estimated to save weatherized households \$804,000 per year in energy costs.² The Weatherization Program also provides other benefits besides energy savings. These “non-energy” benefits³ accrue to:

- Utilities and ratepayers – mostly due to reductions in delinquent bills.
- Participants – due to water savings; health, safety, and comfort improvements; increased property value; and fewer moves.
- Society – due to benefits to the economy and emissions reductions.

These benefits accrue each year during the lifetimes of the weatherization measures.⁴

Key findings from the analysis of Weatherization Program benefits include:

- Over half (63%) of the estimated energy savings was from electricity. Single-family homes accounted for half of the energy savings, even though they only made up 28% of the units weatherized.
- The majority of estimated energy savings was due to envelope measures. Ceiling, wall, and floor insulation and air sealing accounted for 58% of estimated energy savings, similar to 2011. The top ten installed weatherization measures accounted for 89% of total estimated energy savings.
- The estimated annual energy cost savings for all units was \$203/unit (Figure 3). Single-family and mobile homes have more than three times the energy cost savings per unit than multi-family homes (see the findings below for cost information). Estimated average energy savings per unit is 29% higher in 2012 than in 2011. Average per-unit energy savings for all units is higher partly due to the shift to a higher proportion of single-family units.

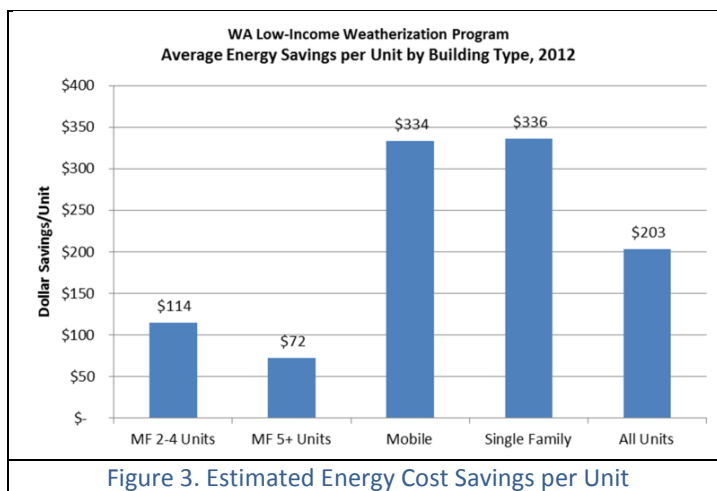


Figure 3. Estimated Energy Cost Savings per Unit

- In general, agencies with higher proportions of single-family units had higher per-unit energy savings.

² Energy savings for Washington’s Low-Income Weatherization Program are estimated from project data provided in WIDS by local agencies using “deemed” savings calculations developed in consultation with the Cadmus Group in Portland, Oregon (with funding support from BPA). Savings are based as much as possible on the work of the Regional Technical Forum of the Northwest Power and Conservation Council. Cost savings are based on average residential energy rates for Washington

³ Non-energy benefits were not analyzed for the 2012 evaluation. In previous evaluations, the value of the non-energy benefits has been comparable in magnitude to the energy benefits.

⁴ The average measure life weighted by energy savings is approximately 30 years, so these savings will accrue for many years and have a present value of approximately \$15 million.

Program Costs

Total Weatherization Program direct unit costs⁵ for 2012 were \$22.8 million. Direct unit costs were reported by local agencies in WIDS for projects completed in 2012. The costs presented here only include the direct costs for installing weatherization measures for a project and do not include program administration costs or operation costs. The following key findings summarize the cost analysis results:

- The average direct unit costs by local agency covered a wide range. The average state-wide unit cost was \$5,753; for most agencies, the average cost was between \$4,000 and \$10,000. Direct costs were a little higher in 2012 compared to 2011, which is likely due to more comprehensive weatherization and a larger share of single-family units.
- The average direct unit costs for single-family and mobile homes were significantly more than multi-family unit costs (Figure 4). The average per-unit cost for all units was almost \$1,000/unit higher in 2012 than 2011, but costs for single-family and mobile units were very similar for 2011 and 2012. Thus, higher average costs for all units reflected the higher proportion of single-family units in 2012.

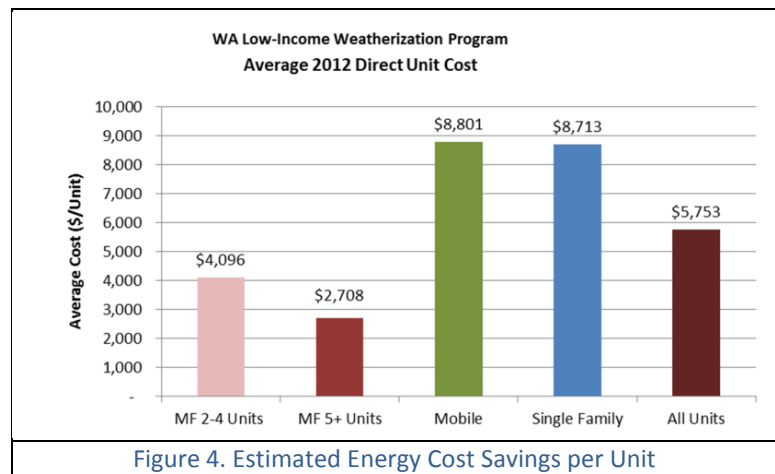


Figure 4. Estimated Energy Cost Savings per Unit

- A quarter of weatherized units had costs between \$4,000 and \$6,000. About a third of the units had costs less than \$3,000 and a little more than a third of the units had costs over \$6,000. Costs in 2012 shifted higher and were more broadly distributed than in 2011.
- The 10% of highest-cost units accounted for 27% of the total direct project costs in 2012. The 25% of highest-cost units accounted for 53% of total direct project costs. This cost curve is driven by large multi-family units with low costs. However, the curve is flatter than in 2011 because of lower numbers of multi-family units.
- High-cost units (over \$10,000/unit) have significantly more measures – 15 measures per unit compared to 8 measures per unit for lower-cost units. Clearly, more comprehensive weatherization was done in these higher-cost units (see findings below for cost-effectiveness).
- The large majority of direct project costs reported in WIDS were for weatherization measures. A little less than a quarter of the direct costs were for health and safety, repair, and other measures.

⁵ Direct unit costs are the labor and materials costs associated with installing weatherization measures for a project. They do not include program administration costs or other program operation costs not directly associated with project installation.

Program Cost-Effectiveness

The Weatherization Program cost-effectiveness analysis focuses on energy savings benefits and direct project costs. Previous evaluations have shown that other utility, participant, and societal benefits are equivalent to energy benefits. Total program costs are also greater than the direct unit costs reported in WIDS.

Key findings from the cost-effectiveness analysis include:

- Direct project cost per unit divided by energy savings is an indicator of dollars spent per unit of energy savings. Lower costs are better. The average direct unit cost per unit of energy savings (\$/MBtu) in 2012 was \$491/MBtu. This is significantly less than the 2011 value of \$600/MBtu.
- Agencies with low proportions of single-family production tended to have higher costs per unit of energy savings. All four of the agencies with more than half their production in large multi-family units had above-average costs per unit of energy savings. However, some agencies that do not have large multi-family shares have above-average costs per unit of energy savings.
- Simple energy payback is based on the direct unit costs divided by the estimated annual energy

savings. It does not include other non-energy benefits. Single-family and mobile units had shorter paybacks than multi-family units (Figure 5). This shows that even though single-family units had much higher costs, they also had much higher energy savings than multi-family units. Compared to 2011, multi-family units had longer paybacks in 2012 and single-family and mobile units had shorter payback. Overall, 2012 payback was a little less (in 2011, payback was 30 years for all units).

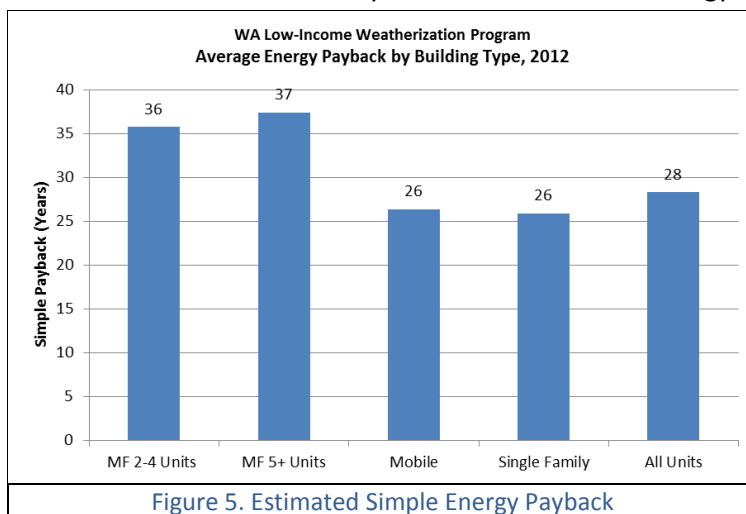


Figure 5. Estimated Simple Energy Payback

- Energy savings estimates closely tracked project costs. Higher-cost units tended to have higher energy savings. The 10% of highest-cost units accounted for 27% of total program direct unit cost and 23% of savings. The top 25% accounted for 53% of the cost and 51% of the savings.

Summary

The following conclusions summarize the key results from the 2012 evaluation of Washington's Low Income Weatherization Program.

- 2012 production declined to pre-ARRA historical levels.
- Multi-family production declined the most but still accounted for more than half of production and was higher than historical levels. While single-family production also declined, these units made up a larger share of production than in 2011.
- Production was concentrated in a few local agencies – Seattle and King County accounted for 40% of production and the top 10 producers accounted for almost 80% of production. Also note that Seattle and King County accounted for 31% of the direct costs and 24% of the energy savings. The top 10 producers accounted for 74% of the costs and 71% of the energy savings.
- Four envelope measures – ceiling, wall, and floor insulation and air sealing – accounted for 58% of the estimated energy savings.
- Compared to 2011, there was evidence of more comprehensive weatherization in 2012. Estimated average energy savings per unit was 29% higher in 2012. This was partly due to an increase in the proportion of single-family units, which have higher per-unit energy savings.
- Average unit cost was 20% higher in 2012. This also reflects the shift toward single-family units, which have higher per-unit cost.
- Large multi-family units accounted for 42% of the units, but only 13% of estimated energy savings and 20% of total direct costs. Conversely, single-family units accounted for 28% of units, 51% of energy savings, and 43% of the costs.
- The direct cost per unit of energy saved was 18% lower in 2012 than 2011. This improvement is an indicator of program cost-effectiveness.

The results of this evaluation suggest that Weatherization Program cost-effectiveness improved in 2012 partly due to the shift to single-family production. While large multi-family units contributed to higher production, more people served, and lower unit costs, they also had fewer measures installed and produced less energy savings. During the ARRA period, production was a key goal and there was a shift to multi-family production to meet this goal. This evaluation indicates that this trend reversed and production returned to historical levels.

This is the fourth in a series of evaluations of the Weatherization Program conducted by the WSU Energy Program. We recommend that the Weatherization Program consider how it would like to continue this evaluation work in the future to best support their program operation. In particular, we recommend developing the cost tracking and metrics that will allow for ongoing program evaluation.