

AmeriCorps National Performance Measures
Pilot Year 1: 2010-2011
Output and Outcome Instrument Packet
HOUSING UNITS AND STRUCTURES WEATHERIZED OR RETROFITTED
TO IMPROVE ENERGY EFFICIENCY

*The information in this National Performance Measure packet pertains to **Pilot Year 1 (program year 2010-2011)**. See National Performance Measures, **Pilot Year 2 (program year 2011-2012)**, at the Resource Center for updated information.*

Environmental Stewardship Focus Area

National Performance Measures: *If you select one of these national performance measures, you must measure both the output and outcome.*

Output: Number of unduplicated housing units of low-income households and structures weatherized or retrofitted to significantly improve energy efficiency and reduce carbon emissions (EN1).

Outcome: Annual energy usage reduction for housing units and structures from weatherizing and retrofitting (in units) (EN7).

Note: To measure this outcome, use a software tool to calculate the expected energy saved based on changes made to the unit/structure.

Definition of Key Terms¹

- **Weatherization/retrofitted:**²
 1. *Weatherization* – Modifying a building to reduce energy consumption and costs and optimize energy efficiency. Whole-house weatherization includes the installation of modern energy-saving heating and cooling equipment and looks at how the house performs as a system.
 2. *Retrofit* - An energy conservation measure applied to an existing building or the action of improving the thermal performance or maintenance of a building.
- **Housing Unit:** single family home, mobile home, apartment unit, each side of duplex would count as 1.
- **Structures:** Shelters, such as homeless shelters or emergency shelters operated by nonprofit or public organizations; each structure would count as 1
- **Low income:** 200% of poverty or the updated level as found at: <http://www.waptac.org/si.asp?id=1318>.

¹ 2010 National Performance Measures: Background Information References and Authorities, Definitions, Suggestions Regarding Data Collection, and Additional Notes, CNCS: http://www.americorps.gov/pdf/09_0918_nofa_ac_background.pdf.

² See the U.S. Department of Energy for information on energy-saving strategies: <http://www.energysavers.gov/>.

- **Units** should be reported in MMBTUs (Million British Thermal Units). If expected-energy-saved is in kilowatt hours, follow the conversion formula below.
 1. First convert kilowatt hours to BTUs (1 kilowatt hour = 3,413 BTUs). Information for converting from kilowatt hours to BTUs can be found at: <http://www.uwsp.edu/cnr/wcee/keep/Mod1/Whatis/energyresourcetables.htm>
 2. Then convert the BTUs to MMBTUs (1 MMBTU = 1,000,000 BTUs).

Considerations for this National Performance Measure³

Output

- Will the households of the housing units that are weatherized or retrofitted meet the definition of low-income?
- Will other structures weatherized or retrofitted meet the criteria established in the Definition of Key Terms?

Outcome

- Will your service activity fit the definition of weatherizing or retrofitting to significantly improve energy efficiency and reduce carbon emissions?

Data Collection Challenges

Output

- Will you be able to verify low-income status of households where weatherization and retrofits are conducted?
- Will you be able to verify that structures, other than housing units, which are weatherized or retrofitted, are operated by nonprofit or public organizations?
- Will you be able to obtain a Certificate of Occupancy, written statement from resident/owner, or other certification that the weatherization or retrofit has been fully completed?
- Will you be able to avoid counting the households and other structures more than once?

Outcome

- Will you be able to get the specific data required on individual housing units or other structures to enter into the software tool you select?
- You will be required to measure the *expected* (vs. actual) energy savings of weatherization/retrofit techniques performed. Will you be able to select and download a software tool to calculate the expected BTUs saved and to determine if you will meet your target?
- Will you be able to learn how to use the software tool and enter data on every unit/structure that was weatherized/retrofitted? Does your organization have the technology resources and staff time required to learn and utilize the software tool, including tech support if needed?
- Do you know how to calculate kilowatt hours and/or BTUs to Million British Thermal Units (MMBTUs)?

³ For more on alignment of performance measures, see the AmeriCorps Toolkit: <http://nationalserviceresources.org/star/ac-program-toolkit>.

General

- After using the data collection instruments to document outputs and outcomes, do you have a safe place to store these documents? This “raw data” will provide evidence that you collected the data in a systematic manner and will verify the results reported.

Data Collection Strategies

- To avoid counting household homes and other structures more than once (unduplicated counts), list the zip codes in numerical order, followed by the address and name of the low-income household contact person in your instrument. Follow a standardized format for street addresses and other information to avoid identifying the same location in different ways. Consider developing your instrument in an Excel spreadsheet. This will allow you to add new locations and “sort” your list so that zip codes remain in numerical order followed by the address and to easily check to see if a location has already been counted (listed in your spreadsheet).
- Test different software tools before committing to one.
 - Be sure you have the technological capability to manage the tool.
 - If you need outside tech support, will you be able to get it from the software developer?
 - Be sure you will be able to collect the data required to do the calculations for each unit/structure.
 - Be sure you understand the reporting system, if this is a part of the software tool.

Sample Instrument in this Packet

Weatherization/Retrofit Log

This log can be used to document both the output (EN1) and the outcome results calculated in the software tool (EN7).

For the **output (EN1)**, this instrument can be used to document the number of unduplicated low-income household homes and other structures that are weatherized and/or retrofitted. The log allows you to document the name of the resident or owner, the street address (including zip code), the type of dwelling or structure, the date when weatherization or retrofitting work was completed, and whether a Certificate of Occupancy (CO), a written statement (WS) from the resident or owner, or some other certification (OC) of completion was obtained.

The column at the end of this log documents the expected energy saved (**outcome EN7**). You can document the expected BTUs saved per housing unit/structure as counted in the output. BTUs will need to be calculated using your selected software tool, then converted to MMBTU's (Million British Thermal Units; 1 MMBTU = 1,000,000 BTUs) and totaled for reporting. (See “Information: Selecting Software to Calculate Energy Saved”, if you currently do not have software that addresses the outcome).

Selecting Software to Calculate Energy Saved

You will need to select software that can calculate energy saved. Information on the units of measure and two possible software options are described in this section.

Housing Units and Structures Weatherized or Retrofitted to Improve Energy Efficiency

Sample Instrument: Weatherization/Retrofit Log

Information: Selecting Software to Calculate Energy Saved

Weatherization/Retrofit Log

Instructions

What is the purpose?	<p>To determine how many low-income household homes and other structures are weatherized or retrofitted to significantly improve energy efficiency and reduce carbon emissions (output EN1).</p> <p>To determine the amount of expected energy saved in Million British Thermal Units (MMBTUs) for the housing units/structures that were weatherized or retrofitted (outcome EN7).</p>
Who should complete this instrument?	<p>Site supervisors or other staff who manage the weatherization/retrofit project and who can verify that a certification was obtained for work completed.</p> <p>If expected saved energy is measured in kilowatt hours, trained staff or supervisors will need to convert the kilowatt hours to Million British Thermal Units (MMBTUs).</p>
When should we complete this instrument?	<p>Document the name and address of the resident or owner as soon as weatherization and retrofitting efforts are scheduled and immediately after they are completed (received written documentation that the work was completed).</p> <p>Count up the number of certifications obtained and enter these sub-totals in the boxes at the bottom of the form. Add the numbers in these three boxes for the total number of homes and structures weatherized and/or retrofitted. You are encouraged to develop an Excel spreadsheet to facilitate maintaining unduplicated counts and calculating totals.</p> <p>Enter the expected energy saved after housing units/structures have been weatherized/retrofitted and data has been calculated to MMBTUs.</p>
What should we do to prepare?	<p>Verify that households meet the “low income” definition. Enter the name of the household or structure and address for each location where weatherization or retrofitting has been scheduled.</p>
What should we do afterwards?	<p>Enter the completion date once weatherization/retrofitting work is completed on each housing unit/structure. Check the appropriate certification box once written certification has been obtained. If no written certification is obtained, then check the “No” box and do not count that location towards your output target.</p> <p>Once service activities are completed, generate subtotals for the unduplicated locations where written certification was obtained and add up these subtotals to get a grand total. Add up the grand totals for all log sheets to get the total number of homes/structures weatherized or retrofitted.</p> <p>Keep electronic records or printouts of reports (calculations) from the software tool for your records.</p>
Can I use an alternative instrument?	<p>Different forms can be developed/used to document the number of unduplicated homes or structures where weatherization and retrofits were completed (output) and the expected energy savings (outcome). Remember to save the “raw” data as proof that a systematic process was used to document the outputs and outcomes.</p>

Weatherization/Retrofit Log

Program Name: _____ **Program Year:** _____

Form Completed by: _____

Instructions: For EN1, use this log to track the number of low-income household homes and other structures that are weatherized or retrofitted. For each location, enter the zip code, street address, name of the contact person, code for type of structure, and the date when the work was completed. Also, note whether a Certificate of Occupancy, written statement from the resident/owner, or other certification of completion was obtained. For EN7, use a software tool to calculate expected number of British Thermal Units (BTUs) saved annually per housing unit or structure that was weatherized or retrofitted, and then convert the BTUs to MMBTUs.

For EN1, report total number of unduplicated housing units where a certification was obtained verifying that the weatherization and/or retrofitting work was completed. For EN7, enter the expected annual savings of BTUs for each unit/structure and report the total number.

HOUSING UNIT/STRUCTURE				OUTPUT (EN1)				OUTCOME (EN7)		
Zip Code	Street Address	Last Name	First Name	Structure Type(1)	Date Completed	Certification Type(2) (check one)				Expected MMBTUs saved annually (3)
						CO	WS	OC	No	
						CO	WS	OC	No	
						CO	WS	OC	No	
						CO	WS	OC	No	
						CO	WS	OC	No	
						CO	WS	OC	No	
						CO	WS	OC	No	
						CO	WS	OC	No	
						CO	WS	OC	No	
Certification Subtotals:										

Notes:

(1) Structure Type: **FH** = Single Family Home, **MH** = Mobile Home, **AU** = Apartment Unit, **DU** = Duplex Unit, **OS** = Other Structure

(2) Certification Type: **CO** = Certificate of Occupancy, **WS** = Written statement from resident/owner, **OC** = Other certification, **No** = No certification obtained

(3) Some energy saved will be in kilowatt hours; convert those to BTUs (1 kilowatt hour = 3,413 BTUs) and then Million BTU's (1 MMBTU = 1,000,000 BTUs) before reporting. Information for converting from kilowatt hours to BTUs can be found at: <http://www.uwsp.edu/cnr/wcee/keep/Mod1/WhatIs/energyresourcetables.htm>.

TOTALS

(Output) Total unduplicated housing units (CO+WS+OC): _____

(Outcome) Expected Total Units Saved Annually (MMBTUs): _____

Selecting Software to Calculate Energy Saved

Instructions

What is the purpose?	To determine the amount of expected energy saved for the units/structures that were weatherized or retrofitted (outcome EN7).
Who should complete this instrument?	Site supervisors or other staff who manage the weatherization/retrofit project and are trained to enter data in the software tool to calculate BTU results for the outcome measure.
When should we complete this instrument?	As soon as weatherization and retrofitting efforts are completed (received written documentation that the work was completed), calculate the expected energy savings based on the data entered into the software tool you selected.
What should we do to prepare?	Select, download, test, and learn the software tool that will calculate expected energy savings in BTUs. Next learn how to convert BTUs to Million British Thermal Units (MMBTUs).
What should we do afterwards?	<p>After calculating the energy saved for each structure that was weatherized/retrofitted, enter the MMBTUs (Million British Thermal Units) in the Weatherization/Retrofit Log.</p> <p>Once service activities are completed, generate subtotals for the energy saved in each log sheet; add up the subtotals for all log sheets to get the total units of MMBTUs saved.</p> <p>Keep electronic records or printouts of reports (calculations) from the software tool for your records.</p>
Can I use an alternative instrument?	<p>You will need to calculate energy savings for the outcome using a software tool. You have a choice of software to choose from. Make sure you know how to use the software you choose.</p> <p>Remember to save the “raw” data as proof that a systematic process was used to document the output and outcome.</p>

Selecting Software to Calculate Energy Saved

Units of Measure

Energy saved will be reported to the Corporation in Million British Thermal Units (MMBTUs). Use the database software tool to calculate BTUs (British Thermal Units) based on the calculations of the database (software tool) that you select. Most energy saved will be in kilowatt hours or BTUs; convert those to MMBTUs before reporting (1 kilowatt hour = 3,413 BTUs, 1 MMBTU = 1,000,000 BTUs).

Software Tool

Select an energy audit/weatherization software tool that calculates expected energy saved based on the changes that you make to the home/structure. The software tool should take into account things like geographic location and degree days as well as features of the structure. While you are not required to use either of these software tools, there are two available for free from the U.S. Department of Energy:

(1) **Home Energy Saver Pro:** <http://hespro.lbl.gov/pro>

The Home Energy Saver web site is an interactive do-it-yourself home energy assessment tool, combined with extensive decision-support content. Its aims are to support national initiatives to increase consumer interest in energy efficiency and to foster market activities that capture those opportunities. The site is developed and maintained by the Lawrence Berkeley National Laboratory with sponsorship from the U.S. Department of Energy (DOE) and others.

(2) **Weatherization Assistant** is an energy audit software tool developed for the Department of Energy Weatherization Assistance Program by the Oak Ridge National Laboratory. The Weatherization Assistant contains the **National Energy Audit Tool (NEAT)** for site-built single-family houses and the Manufactured Home Energy Audit (MHEA) for mobile homes. In addition, Version 8 of the Weatherization Assistant provides expanded optional capabilities that are useful in implementing and administering weatherization programs, including agency-related contact information, client data intake, recording of health and safety issues, recording of diagnostic measurements, work orders, status tracking, simplified cost accounting, inventory control, report generation, site mapping, and digital photo storage.

Weatherization Assistant is free software that can be downloaded from this site:

<http://www.waptac.org/sp.asp?id=6874>.