

## **2005 National Evaluation of the Weatherization Assistance Program: Purpose, Goals, and General Design**

### **PURPOSE**

The U.S. Department of Energy's (DOE's) Weatherization Assistance Program was created by Congress in 1976 under Title IV of the Energy Conservation and Production Act. The purpose and scope of the Program as stated in 10CFR 440.1 is "to increase the energy efficiency of dwellings owned or occupied by low-income persons, reduce their total residential expenditures, and improve their health and safety, especially low-income persons who are particularly vulnerable such as the elderly, persons with disabilities, families with children, high residential energy users, and households with high energy burden."

In 1990, DOE sponsored a comprehensive evaluation of the Program. Oak Ridge National Laboratory (ORNL) managed the five part study which was based primarily on data from the 1989 program year and supplemented by data from 1991-92. In more recent years, ORNL has conducted three metaevaluations<sup>1</sup> of the Program's energy savings using studies conducted by individual states and is in the process of conducting a fourth such study.

However, in Program Notice 05-1, DOE announced that it would undertake a new national evaluation of the Program because the Program that was evaluated in the early 1990's is vastly different from the Program of today. DOE stated that the new evaluation should provide a comprehensive review of Program performance and enable DOE to make any necessary improvements and guide the direction of the Program into the next decade.

### **GOALS**

Based on input received from a Network Planning Committee<sup>2</sup> and guidance received from DOE, the goals of the 2005 National Evaluation are as follows:

- Characterize the scope of the Program by examining the local and state agencies implementing the Program, housing units and clients served, types of measures used, implementation approaches, sources of funding, and types and extent of utility partnerships.

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<sup>1</sup>Metaevaluations refer to the analysis of analyses, and are a more rigorous alternative to the narrative discussion of research studies. Metaevaluations involve the statistical analysis of a collection of analysis results from individual studies for the purpose of integrating the findings.

<sup>2</sup>The Network Planning Committee met on March 23-24, 2005 and was comprised of about 40 members representing states, local agencies, DOE headquarters and regions, advocacy organizations, and state training centers.

- Establish national and regional (three climate zones) energy and costs savings being achieved under the Program from heating, cooling, and baseload energy uses and by the principal building types served (large multifamily—5 or more units, small multifamily—2-4 units, mobile homes, and other single-family units).
- Quantify the occurrences of non-energy benefits in weatherized houses and the value of non-energy benefits attributable to the Program from client, utility, Program, and societal perspectives.
- Characterize state and agency expenditures and determine the cost effectiveness of the Program on a national and regional basis.
- To the extent possible, determine the performance of individual measures and methods of implementing each measure.
- Identify explanatory factors and process variables affecting energy savings, cost effectiveness, and measure performance, and specifically evaluate the impact of different state and agency implementation approaches with regard to audits, client education, training, and monitoring.
- For the hot climate region, understand how all aspects of weatherization (e.g., housing stock, funding levels, crew experience, reduced heating loads, hot summers and need for air conditioning) interact to explain observed performance and deviation (if any) from other regions, and to be able to identify clear processes for improvement.

## **GENERAL DESIGN**

The general design envisioned for the 2005 National Evaluation is shown in the attached Design Matrix tables. The goals identified above are shown as rows in these tables and represent the overall issues and analyses that will be undertaken under the evaluation. The columns represent the sampling frames that are currently envisioned as being needed for the evaluation, with those under the single-family and multifamily headings primarily driven by the samples needed to determine Program energy savings.

Three examples explain the interplay between the rows and the columns:

- A large sample of single-family homes will likely be sampled so that billing data can be collected on these homes and used to calculate energy savings. However, given that these houses will be sampled, information other than just billing data will be collected and used for other analysis rows such as the characterization studies, non-energy benefits studies, cost-effectiveness studies, etc.

- A sample of single-family houses with bulk fuel heating systems submetered is envisioned because analysis of delivery data are not reliable for these homes. Since evaluation personnel will have to install metering in these houses, detailed diagnostic and survey information can be collected that would be useful in the study of non-energy benefits and measure performance, for example.
- Agencies will be contacted not only to collect client information in their files on homes used in other samples, but agencies will be asked to complete surveys describing their implementation of audits, client education, training, and monitoring so that these programs and factors can be studied.

Looking ahead, it is envisioned that a final report would be written for each of these rows; reports by columns are not envisioned. For example, a report on non-energy benefits will be written that might describe for each sample frame the data collected, the analysis of these data, and the results, and then discuss how these results were pulled together to determine the non-energy benefits attributable to the Program as a whole.

### 2005 National Evaluation Design Matrix

Issues/Analyses/Reports	Data Collection Field Studies (Samples)			
	State	Agency	Utility	Client
Characterizations				
Energy savings:				
Heating (primary heating fuel)				
Cooling				
Baseload				
Non-energy benefits				
Cost effectiveness		Agency overhead costs		
Measures				
Explanatory factors and process variables:				
Audit				
Client education				
Training				
Monitoring				
Other factors and variables				
Hot climate				

## 2005 National Evaluation Design Matrix

Issues/Analyses/Reports	Data Collection Field Studies (Samples)				
	Single family, mobile homes, and small multifamily units				
	Metered heating fuel (natural gas or electric)	Bulk heating fuel	Cooling	Baseload (HW, ref., and lighting)	Intermediate measure diagnostics
Characterizations	Measures installed	Measures installed	Measures installed		
Energy savings:					
Heating (primary heating fuel)	Primary heating fuel billing data	Heating fuel metered, indoor and outdoor temperature			
Cooling	Electric billing data	Electric billing data?	Metered AC use, indoor and outdoor temperature		
Baseload					
Non-energy benefits	Data available from agencies: repairs made, non-energy problems fixed, diagnostics	Agency data and own diagnostics	Agency data and own diagnostics		
Cost effectiveness	Measure costs	Measure costs			
Measures	Measurements available from agencies: blower door, ducts (pressure pan), SSE	Agency data and own diagnostics	Agency data and own diagnostics		
Explanatory factors and process variables:					
Audit					
Client education					
Training					
Monitoring					
Other factors and variables					
Hot climate					

### 2005 National Evaluation Design Matrix

Issues/Analyses/Reports	Data Collection Field Studies (Samples)				
	Large multifamily units				
	Metered heating fuel (natural gas or electric)	Bulk heating fuel	Cooling	Baseload (HW, ref., and lighting)	Intermediate measure diagnostics
Characterizations	Measures installed				
Energy savings:					
Heating (primary heating fuel)	Primary heating fuel billing data				
Cooling					
Baseload					
Non-energy benefits					
Cost effectiveness	Measure costs				
Measures					
Explanatory factors and process variables:					
Audit					
Client education					
Training					
Monitoring					
Other factors and variables					
Hot climate					