

EVALUATION OVERVIEW

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Sustainable Energy Resources for
Consumers (SERC) Grant
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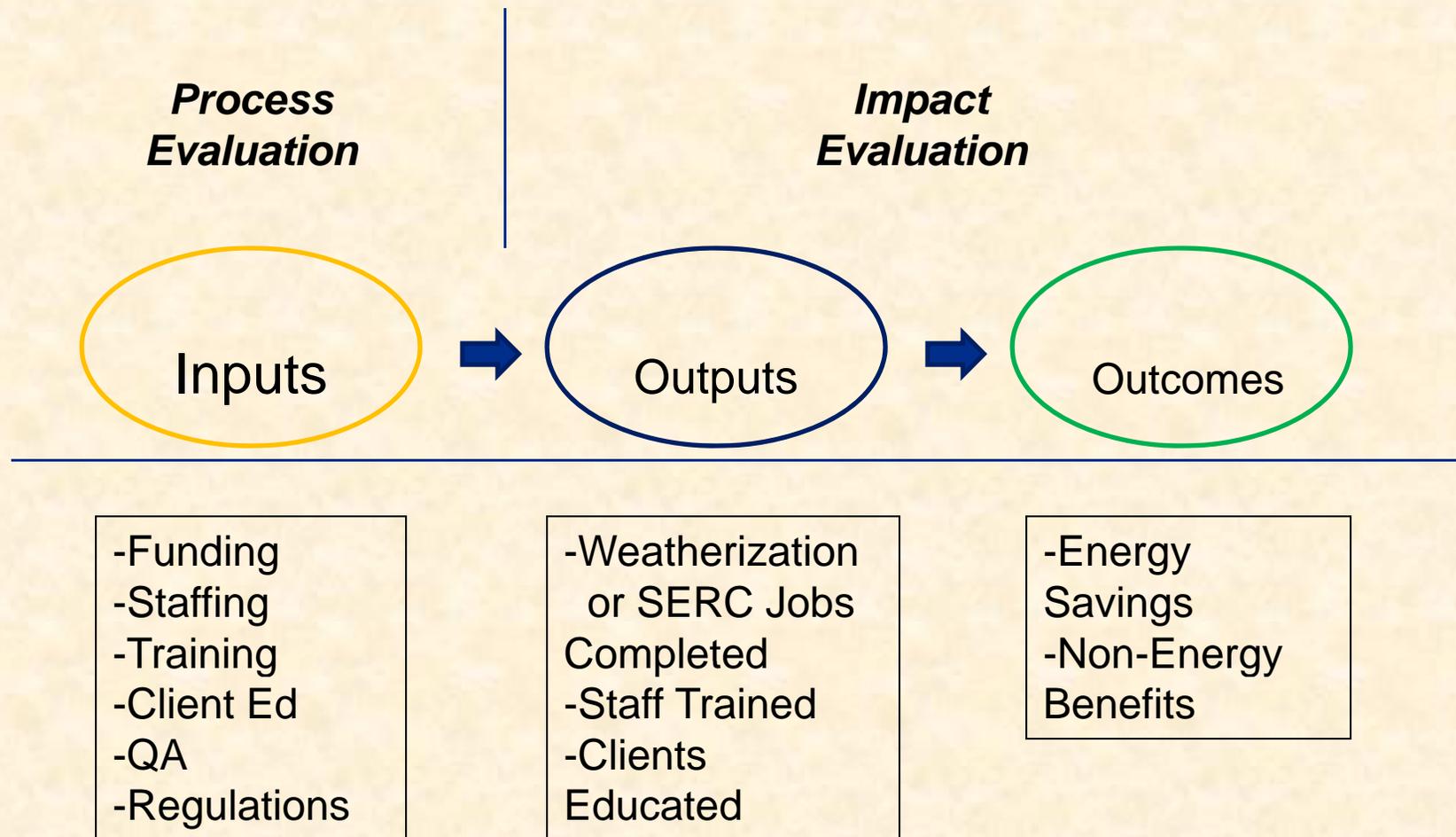
OUTLINE

- **What is program evaluation?**
- **Retrospective evaluation of WAP**
- **WAP ARRA Period Evaluation**
- **Evaluation of SERC**

WHAT IS PROGRAM EVALUATION?

- The *field of program evaluation* emerged to assist government policy makers measure the outcomes of government programs, estimate cost effectiveness, and identify ways in which programs could be better implemented and managed.
- Pushed by:
 - Government Results and Performance Act of 1993
 - Office of Management and Budget (OMB) – Performance Assessment Rating Tool (PART)
- Energy program evaluation is an active sub-field of program evaluation. The next International Energy Program Evaluation Conference is this August, in Boston.
- Well evaluated programs may be more competitive for scarce resources.

EVALUATION COMPONENTS



TYPES OF EVALUATION DESIGNS

- **Random Controlled Trial (RCT)**
Experimental
 - E.g., households randomly assigned to treatment versus control group
- **Quasi-experimental**
 - E.g., a control group is identified that is comparable to the treatment group
- **Non-experimental**
 - E.g., case studies

DATA COLLECTION METHODS

- **Direct observation**
- **Direct measurement**
- **Secondary data collection**
- **Survey research**
- **Focus Groups**

WAP RETROSPECTIVE EVALUATION PROCESS EVALUATION QUESTIONS

- **What happened in PY 2008?**
- **How did the national weatherization network operate?**
- **What were its strengths and weaknesses?**
- **How were DOE's grants to states leveraged with other sources of funding?**
- **How were weatherization staff trained?**
- **Grantees and subgrantees are being asked to complete comprehensive surveys**

WAP RETROSPECTIVE EVALUATION IMPACT EVALUATION -- OUTCOMES

Outcome	Approach
National Energy Savings PYs 2007 and 2008	Collect pre- and post WX billing histories homes heated with natural gas, electricity along with a comparable number of control homes. Sample 400 agencies, sample 1/3 homes weatherized. Sampled agencies provide detailed program, housing and building data. ~ 1000 utilities will be contacted. ~10K treatment homes, ~10K control homes. 90% confidence +- 10%
Cost Effectiveness – PYs 2007 and 2008	Collect data on weatherization expenditures. Compare to energy cost savings.
Non-Energy Benefits – PY 2008	Use output and outcomes results plus secondary sources plus analysis to determine. Example – GHG emission reductions.

ADDITIONAL WAP RETROSPECTIVE EVALUATION TASKS

- **Bulk fuel studies: SF propane, MH propane, SF fuel oil, Large MF fuel oil**
- **Indoor Air Quality Study**
- **Case Studies – high performance subgrantees, exemplary client education program**
- **Occupant Survey**
- **Weatherization Staff Survey**
- **Field Process Study – observe wx activities in the field**

WAP RETROSPECTIVE EVALUATION SURVEYS AND DATA FORMS:

http://weatherization.ornl.gov/evaluation_nr_omb.shtml

- **S1 All States Program Information Survey**
- **S2 All Agencies Program Information Survey**
- **S3 Subset of Agencies Program Information Survey**
- **S4 Occupant Survey**
- **S5 Weatherization Staff Survey**
- **DF1 All States Agencies Information Data Form**
- **DF2 Housing Unit Information Data Form**
- **DF3 Building Information Data Form**
- **DF4 Electric & Nat. Gas Bills Info from Agencies**
- **DF5 Electric & Nat. Gas Info from Utilities (collected at utility level)**
- **DF6 Metered Fuels and & AC Study Data Form**
- **DF10 All Agencies Program Overview Data Form**

***Those highlighted in blue will be utilized for the SERC Evaluation**

WAP ARRA PERIOD EVALUATION

- **Will focus on PY's 2009, 2010, and 2011**
- **Many surveys and data forms will be re-utilized**
- **Surveys and case studies will be revised to capture unique WAP ARRA Period issues (e.g., inclusion of SERC technologies, Davis-Bacon, changes in the Wx Community, new programs and initiatives)**

WAP ARRA PERIOD EVALUATION: ADDITIONAL TASKS

- **Weatherization Innovation Pilot Program (WIPP)**
- **Sustainable Energy Resources for Consumers Program (SERC)**
- **Weatherization energy savings persistence**
- **Social Network Analysis study**
- **Deferral (walk away) study**
- **GHG emissions/voluntary carbon markets at agency-level**
- **Lessons learned from both evaluations**
- **Underperforming Study**

SERC EVALUATION IMPACT QUESTIONS

- How do the projected energy savings compare to resulting savings upon application of the measures?
- What is the SIR for the measures rigorously evaluated?
- How can the weatherization community assist with raising the SIR of a measure to ≥ 1 , and under what conditions?
- How does modification of occupant energy consumption behavior factor into home energy savings with sustainable energy technologies?
- Which technologies are deserving of inclusion on the approved installation measures list for WAP based on SIR or cost-effectiveness?
- How do these technologies impact energy security (defined as household access to home energy and measured by total number of utility interruptions pre-and post installation) across socio-economic status of the populations served?

SERC EVALUATION PROCESS QUESTIONS

- **Were the approved agencies able to allot the proposed number of innovative or renewable technology units to willing households?**
- **What were the barriers to meeting project goals?**
- **What are the issues associated with implementing innovative strategies or measures for reducing home energy consumption?**
- **Did the technologies operate as expected? Were there any installation problems?**
- **How well did SERC projects harmonize with standard weatherization process and treatments offered under WAP?**
- **How much, if any, follow-up with occupants is necessary to promote maximum savings as a result of the new technology, measure, or outreach?**
- **Should WAP transition into the sustainable energy resources arena for home weatherization retrofit post-ARRA?**

HIGH RIGOR: Evaluation Category and ORNL Tasks

	<p><u>Technologies:</u></p> <ul style="list-style-type: none"> •Solar PV •PV: Shingles •Wind •Hot Water: <ul style="list-style-type: none"> Solar Tankless/On-demand Condensing HeatPump/Hybrid •Heat Pump: Geothermal •Solar Thermal Heat •Roofing: Cool Roof •In-Home Monitors •Window Upgrades •Centralized Building Controls •Combination HW and Boiler •Heat Pump: Mini-Split <ul style="list-style-type: none"> Ductless 	<ul style="list-style-type: none"> • Administer housing or building, and program information surveys. (Sampling based on scope of project/number of units treated/appropriateness of random assignment/ aggregate-level selection) • Implement Random Controlled Trial if project RCT identified • Collection of billing data at utility level pre- and post –installation (one year of data to be collected Summer /Fall 2012) • Control group billing data pulled from sub-sample of agencies selected from national evaluation (impact analysis) • Post-treatment Quality Assurance review to ensure accurate installation/consumer use of technology • Develop and administer client satisfaction survey with focus on renewable technologies • Collection of cost of measures from agencies (projected and actual) • Calculate SIR: $\{ \text{Energy Savings (Energy Savings+Lifetime+DiscountRate+..)} / \text{Measure Cost} \}$ • Final Report
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MODERATE RIGOR: Evaluation Category and ORNL Tasks

	<p><u>Technologies:</u></p> <ul style="list-style-type: none"> • Heat Pumps: Air • Replacement of improperly sized HVAC Equipment • Wood Pellet Stoves • Ultra Cooling Systems • Central AC Units • High Efficiency Furnaces • Heat Recovery Ventilators • Biomass Thermal Units • Evaporative Cooling Systems • Energy Star/Efficient Appliances • Insulation • Whole House Retrofits • Other: Lighting, Windows, Ceiling Fans 	<ul style="list-style-type: none"> • Administer housing or building, and program information survey instruments at agency level. • Deemed energy savings estimates (based on number and types of measures installed in unit, and recognized average energy savings derived from the literature with consideration for varying confounding variables: (climate region, housing characteristics, etc.) • Collection of cost of measures from agencies • Estimate of cost-effectiveness • Final Report
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GRANTEE EVALUATION RESPONSIBILITIES

- **Provide contact information for household recipients**
- **Notify occupants of possible participation in an occupant survey through first point of SERC project contact with the household**
- **Respond to grantee program information surveys and provide information for billing history analyses through survey completion in Summer/Fall 2012:**
 - **S4 Occupant Survey**
 - **DF2 Housing Unit Information Data Form**
 - **DF3 Building Information Data Form**
 - **DF4 Electric & Nat. Gas Bills Info from Agencies**
 - **Participation in Structured Interviews addressing SERC process questions**
- **Implement Random Controlled Trial if identified as RCT project with ORNL support**
 - **Note: Those projects conducting independent project evaluations will still be expected to participate in the ORNL evaluation if included in the sample plan and will be requested to provide details regarding their evaluation plans to ORNL**

BILLING HISTORY ANALYSES

- **What energy savings can be attributed to SERC overall and to SERC technologies or projects?**
- **Billing histories will be collected for approximately 4000 treatment homes.**
- **Control home data will be collected from the National WAP ARRA Evaluation sample**
- **Sub-grantees will be required to complete several data forms:**
 - **DF2 Housing Unit Information Data Form**
 - **DF3 Building Information Data Form**
 - **DF4 Electric & Nat. Gas Bills Info from Agencies**
- **The project will approach utilities for bills in Fall 2012 as part of the National WAP ARRA Evaluation collection of billing histories task.**

HOME INSPECTIONS

- **What is the quality of installation of SERC technologies?**
- **Appropriate sub-grantees will be asked to provide lists of weatherized homes.**
- **Approximately 75-100 homes will be randomly chosen for inspection post-SERC installation for quality assurance purposes.**

OCCUPANT SURVEYS

- **What are the perceptions and satisfaction levels of households participating in SERC projects?**
- **Appropriate sub-grantees will be asked to provide lists of households that received services by activity category.**
- **Approximately 400 households will be surveyed. Sub-grantees are requested to communicate potential for occupant participation in this survey to the household**

RANDOMIZED CONTROLLED TRIALS (RCTs)

- **Using an experimental design, what are the impacts of treatment?**
- **RCT will be conducted on technologies within the high rigor category**
- **Projects selected for RCT design will be contacted by ORNL**
- **Households will be randomly assigned to receive SERC technologies.**
- **Billing history analyses will have greater credibility.**
- **OMB expects this experimental design to be implemented when appropriate per the interest of the White House**

SERC EVALUATION SCHEDULE

	1 st Quarter 2011	2 nd Quarter 2011	3 rd Quarter 2011	4 th Quarter 2011	1 st Quarter 2012	2 nd Quarter 2012	3 rd Quarter 2012	4 th Quarter 2012
Home Inspections			X					
Occupant Surveys						X		
Grantee Surveys			X	X	X	X	X	
Billing Analyses							X	X
Final Report								X

SERC EVALUATION PROJECT TEAM

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 - Tim Hendrick; hendricktp@ornl.gov
- **Subcontracting Team**
 - APPRISE, Inc.
 - Energy Center of Wisconsin