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ATTACHMENT 1
ENERGY AUDIT TOOL SUBMITTAL REQUIREMENTS

OVERVIEW

The Department of Energy (DOE) is responsible for ensuring that only cost-effective weatherization measures are installed with DOE funds. Grantees must use energy audit tools (hereafter referred to as "energy audit" or just "audit") and procedures that ensure cost effectiveness of the Weatherization Assistance Program (WAP) and treat each weatherized building as a whole system.

Energy audit requirements for the WAP are described in the regulations governing the Program (10 CFR 440.21). Important details for intent are included in the Preamble to the December 8, 2000, Interim Final Rule. These energy audit requirements can be grouped into three functional categories: analytic methods, field procedures, and administrative requirements.

Note: The term "manufactured housing" is used throughout this guidance. Manufactured housing includes mobile homes and any housing assembled off-site that includes axles or a frame as a major design consideration for transport on public roads (e.g. light weight).

BASIC OUTLINE FOR EXPEDITED AUDIT SUBMISSION

This section outlines the required submittal for all Expedited audits. Standard audit submittals require all of these items and additional items outlined in Section IV of this attachment.

1. A formal request letter from the Grantee to DOE for approval of the specific audit tool for use in the WAP program.
2. A complete list of measures considered by the audit for installation as Energy Conservation Measures (ECMs) including:
    a. Lifespan of installed measure
    b. Accurate material and labor costs
    c. Statement of compliance with 10-CFR 440 Appendix A
3. Fuel cost for all fuel types considered by the audit
4. A list of items to be installed as General Heat Waste (GHW) measures (if any)
5. Sample audits (10 for each housing stock), including:
    a. Final energy savings report (recommended measures) and work order
    b. Field data collection forms and notes from actual Subgrantee audit
    c. Audit tool input report or database
    d. Photos of all four exterior sides of dwelling
    e. Target ASHRAE 62.2 calculations
6. Grantee specific Audit Procedures and Field Protocols for data collection and audit tool entry including:
    a. Field data collection forms and combustion safety protocols
    b. Written guidance for field data collection, audit software data entry, measure installations.

DETAILED DESCRIPTION OF SUBMITTAL REQUIREMENTS

This section provides more detailed information pertaining to the submittal requirements outlined in the previous section. *As mentioned previously*: Audit approval requests that are classified as Standard, have additional submission requirements, as outlined in Section IV of this Attachment.

I. Analytic Methods

A. *Measures Considered*: Grantees must provide a complete list of the weatherization measures typically "enabled" for evaluation by the energy audit. Include material and labor costs for these measures from a Subgrantee that is representative of conditions across the Grantee's entire service territory. Include the expected lifetime used in the SIR calculation of each measure.

B. *Sample Audits*: Grantee must provide ten sample audits for each housing type they are requesting approval for (e.g. site-built single family, manufactured housing, small multifamily building [building with 5-24 individually heated/cooled units] and multifamily buildings). Grantee must provide all input data, assumptions, and audit results (recommended measures) for these sample dwellings. The sample audits must be typical of those weatherized by the Grantee's program. If a Grantee is requesting a multifamily audit approval they should contact their DOE Project Officer (PO) to discuss sample audit requirements, as fewer than ten sample audits may be required. Grantee must provide completed field data collection forms, including any auditor notes and pictures, as well as audit tool data entry records, and ASHRAE 62.2 calculations for all sample audits. The audit results (recommended measures) report from the audit tool must show the entire measure cost, first-year savings estimate, Savings-to-Investment Ratio (SIR) for each measure, total job cost and overall job (cumulative) SIR. This report must also include a line item for Incidental Repair costs per WPN 12-9 Incidental Repair Measures Guidance.

II. Field Procedures

A. *Audit Procedures and Field Protocols*: Grantee must provide a detailed description of the energy audit procedures used for data collection and audit tool inputs. A copy of the field operations manual, field data collection forms, field guide, technical standards, installation guidelines, audit software user's manual and monitoring protocols must be provided to satisfy this requirement. Procedures are required for each major building type the audit will serve. The information provided must be enough to answer the following questions:

1. Is the program collecting sufficient field data to create accurate energy models?
    - All data entries required to effectively use the energy modeling software have been visually and/or diagnostically field verified, including all attics, walls and subspaces
    - Building diagnostics sufficiently address all measures considered by the audit
    - Combustion safety testing procedures cover all combustion appliances
2. How do different audit findings affect the auditor's actions and recommendations?
3. What advanced diagnostic and assessment techniques are routinely used by the auditor and/or crew?
4. What client education is routinely provided by the auditor and the installation crew?
5. Are the audit and installation procedures specifically tailored for the building type being served?
6. How is the data collected in the field entered into the audit software tool?

Building Model True-up with Actual Energy Bills: Model/energy use true-up is always a desirable feature because a good true-up demonstrates that the building is modeled correctly. While true-ups are recommended when possible for single-family buildings, true-ups are required for all whole building audits, (e.g., EA-QUIP, TREAT, eQUEST) of multifamily buildings.

B. *Weatherization Materials Installed*: Grantee must provide a formal statement that acknowledges only weatherization materials that meet or exceed the standards listed in 10 CFR 440 - Appendix A will be installed in eligible dwelling units. This statement must be provided for each major building type (e.g., site-built single family, manufactured housing, and multifamily).

   On a Grantee-by-Grantee basis DOE may approve additional non-Appendix A weatherization materials determined appropriate for WAP. The requirements to gain such approval(s) are set forth in Attachment 6 (Special Approval of Energy Conservation Materials).

   This statement must include a list of any weatherization materials not in Appendix A that have been approved for Grantee use per 10 CFR 440.21(b). This list should only contain materials installed as ECMs. Ancillary materials, incidental repair materials, as well as health and safety materials, as defined in WPN 12-9 are not "weatherization materials", therefore are not required to be listed in Appendix A.

C. *General Heat Waste Reduction Lists*: Grantees may install general heat waste (GHW) reduction measures in eligible dwellings. These weatherization materials have been determined by DOE to be generally cost effective, and do not require justification by a site-specific energy audit. GHW reduction materials are intended to be relatively low-cost items that are quickly and easily installed. Total GHW measure costs (including labor) must not exceed $250. These DOE-approved, presumptively cost-effective weatherization materials include**:**

   1. Water heater tank wrap (i.e., insulating blanket) conforming to the Standard Work Specifications;
   2. Water heater pipe insulation (on first six feet of hot water pipe exiting water heater);
   3. Faucet aerators;
   4. Low-flow showerheads;
   5. Limited weather stripping and caulking to increase comfort (does not include major air sealing work, which should be guided by blower door testing); and
   6. Furnace or air conditioner filters.

   Grantees must establish procedures guiding the installation of GHW materials and make installers aware of the circumstances that reduce the cost-effectiveness of these measures. A monetary limit on the installed cost for a GHW material may be used as a guide to cost-effectiveness.

   Grantees may request approval to install GHW materials not listed above. This is done by providing documentation of their cost-effectiveness from a representative number of site-specific energy audits or sample energy calculations. DOE may also accept reputable analytic reports or published articles that are generally accepted by the weatherization community to document the cost-effectiveness of potential GHW materials. A GHW material approval request may be submitted at any time, however this request may not be included in the State Plan, or Annual Application submittal. Previously approved Grantee specific GHW materials must be included in the General Heat Waste Reduction List submitted with the Audit Approval request each 5-year cycle.

D. *Health and Safety*: During the audit approval process, DOE will review the Health and Safety Plan located in the Master File of the Grantee's application. Grantee must provide a description of how the Health and Safety Plan is implemented in the field. The Grantee may reference the appropriate section(s) of the auditor's or field operations manual, field guide, technical standards, installation guidelines, and/or monitoring protocols to satisfy this requirement. Each major dwelling type must be addressed as applicable.

III. Administrative Requirements

A. *Energy Audit Procedures Required for Each Building Type Served*: 10 CFR 440.21(f)(7) requires Grantees use DOE-approved energy audit procedures that are specific to each major dwelling type representing a significant portion of the Grantee's weatherization program (i.e. site-built single-family, manufactured housing, small multifamily, and multifamily).

This requirement acknowledges the varying energy audit requirements of different dwelling types. DOE requires energy audit procedures to be approved specifically for use on single-family dwellings and manufactured housing at a minimum for all Grantees.

For energy audit purposes, DOE considers multifamily buildings to be those containing five dwelling units or more (see clarifying definition in WPN 16-5). Multiple single-family energy audits can be used in buildings with one to four dwelling units, and in small multifamily buildings (24 dwelling units or less per building) when the dwelling units are individually heated, cooled and ventilated. However, single family approval of a tool by itself does ***not*** constitute approval to use this tool in small multifamily buildings. Grantees must undergo the same approval process for multifamily dwellings per this Attachment, even when using an approved single-family tool for small multifamily buildings.

B. *Annual Review of Measure and Energy Costs*: Grantees must review and adjust as necessary, all measure costs and fuel prices used by the energy audit annually at a minimum. This annual update does not require the audit or priority list(s) to be re-approved more often than every five years. However, changes in measure costs or fuel prices affect the selection and order of measures. As part of its monitoring responsibilities, DOE will request a Grantee's or Subgrantee's current measure costs and fuel prices for comparison to the previously submitted costs.

C. *Other Administrative Requirements*: If a Grantee adopts an updated version of DOE-approved energy audit software, the Grantee must submit to DOE the name and version of the updated software and must provide at minimum: 1) a summary of the changes in the new version, and 2) enough detail for DOE to determine the engineering soundness of the revision[s]. DOE will contact the software developer to determine what changes have been made. If the energy estimating methods remain essentially unchanged (or have been improved) and the software still complies with program regulations, DOE will approve its use.

Standard Audit Approvals

Any request for DOE approval of an audit tool not listed in Attachment 3 is classified as a Standard request. The request must include the additional information in section IV of this Attachment. Grantees requesting approval for an audit tool listed in Attachment 3 are not required to submit these additional items, except: Grantees requesting approval of eQUEST are required to show how individual and overall SIRs are calculated (see section IV(c) below).

IV. Analytic Methods

A. Energy Estimating Methodology: Describe the methods used by the energy audit software to estimate annual energy use of the dwelling unit and the potential energy savings from weatherization retrofits. The description must provide enough detail for DOE to determine the engineering soundness of the technical approach. The Grantee may provide this description narratively or reference the appropriate sections of a users' manual for the energy audit software or other technical support documents. Whether described narratively or referenced from another document, the Grantee's submittal must answer the following questions:

1. What energy estimating method is used (e.g., modified degree-day, variable base degree day, ASHRAE bin, ASHRAE modified bin.
2. What format of climatic data is used (e.g., degree-day, bin, or hourly data)? If degree-day weather data is used, what base temperature is used and why? Which weather data sites are used by different Subgrantees in the Grantee territory?
3. Are existing energy use and energy requirements of the dwelling unit determined from actual energy bills, by generally accepted engineering calculations or, optionally, both?
4. Does the energy audit address all significant heating and cooling needs?
5. How are conductive, convective, and radiative heat losses (or gains) estimated?
6. How does the energy estimating method treat sensible and latent heat gains from internal sources?
7. How is the energy consumption of heating and cooling equipment estimated (e.g., steady-state efficiency, part-load curve) during the audit for pre- and post-weatherization?
8. How are blower door readings and the results of other tests (e.g., duct leakage) used by the energy estimating method?
9. How does the energy audit software address domestic hot water and/or household appliance measures?
10. Are estimated fuel/energy cost savings discounted to net present value?
11. For multifamily audits, what internal verification feature, such as trueing-up the model with actual energy consumption, does the audit use to validate each audit, or how does the Grantee otherwise ensure that the building is properly modeled?

B. Measure Interaction: Grantees must provide the following information to satisfy this requirement:

1. Describe how the energy audit tool accounts for the interaction between architectural (e.g., insulation, air sealing) and mechanical (e.g., furnace replacement, programmable thermostat) measures.
2. Provide audit results of a sample dwelling unit to document that, when moving from an architectural to a mechanical measure (or vice versa), the energy audit tool adjusts the estimated fuel cost savings of measures with lower, non-interacted savings-to-investment ratios (SIRs). The sample audit results must show the interacted and non-interacted energy savings and SIR for at least one architectural or mechanical measure. This will require a recommended measures list that includes at least one architectural and one mechanical measure. Provide a statement that the energy audit procedures will eliminate from consideration for installation any measure that has an interaction-adjusted SIR of less than one.

C. *Cost-effectiveness Requirements*: Grantees must provide the following information to satisfy this requirement:

1. Describe how SIRs are calculated for all individual weatherization measures and for the overall package of measures installed in a dwelling unit. Include a description of how user defined measures will be allowed, including who will be allowed to develop, procedures for development, and how Grantee will monitor the cost-effective use of user defined weatherization measures. List the costs included in the denominator of individual and overall SIR calculations, including at minimum the cost of materials, labor and on-site supervision.

2. Explain how the cost of air sealing, as an energy saving measure, is included in the SIR for the package of weatherization measures. Air sealing is the exclusive energy conservation measure that is not required to show a post-weatherization individual SIR of 1.0 or greater. The package of weatherization measures, including costs and projected savings for air sealing, must have a post-weatherization SIR of 1.0 or greater.

3. Describe how all incidental repair costs are included in the cost of the overall package of weatherization measures and the overall SIR (See WPN 12-9, Weatherization Assistance Program Incidental Repair Measure Guidance for more details).

ATTACHMENT 2
PRIORITY LIST SUBMITTAL REQUIREMENTS

OVERVIEW

The Department of Energy (DOE) is responsible for ensuring that only cost-effective weatherization measures are installed with DOE funds. Each Grantee must use advanced energy audit procedures to ensure cost effectiveness of the Weatherization Assistance Program (WAP) and treat each weatherized building as a whole system.

Energy audit requirements for the WAP are described in the regulations governing the Program (10 CFR 440.21). Priority List(s) are secondary to a Grantees' Energy Audit Submittal. Priority lists cannot be approved until Energy Audit Submittal Requirements are satisfied (for the housing type and audit tool). For example, if a Grantee wishes to use a priority list(s) for single-family homes and is approved to utilize NEAT, the priority list(s) for single-family homes must be developed through currently approved NEAT-generated audits (See Attachment 1 for Energy Audit Submittal Requirements).

PRIORITY LIST DEVELOPMENT CONSIDERATIONS

Subset of Similar Homes: Grantees that want to use a priority list must review eligible housing stock to determine which building characteristics dictate the selection and order of recommended weatherization measures. For example; upon evaluation, a Grantee may find that the list of recommended measures for a typical one-story ranch is different than the list for a three-story Victorian house.

The number of sample audits required to support the proposed priority lists depends on how clearly the Grantee defines the set of similar dwelling units for the priority list(s). For example, if the Grantee intends to use one priority list for all single-family dwellings when there is significant variation in housing stock, climatic conditions, fuel choices, heating/cooling equipment choices, or measure costs; then substantial audits are required to ensure measures are properly ranked.

Measures in each sample audit must be prioritized from the highest to lowest measure savings to investment ratio (SIR), and the overall (cumulative) SIR must be at least 1.0. The variability of buildings in a similar set usually decreases as the set is more clearly defined and the number of sets increase.

Circumstances where the priority list does not apply and when a site-specific audit is required: If an auditor's inspection determines that a measure should be considered for a dwelling, and that measure is not on the approved priority list for that building type, the appropriate, approved, site-specific energy audit must be conducted. If an auditor's inspection determines incidental repair measures (IRM) having a cost greater than the current limit for the priority list should be considered, then the appropriate approved site-specific energy audit must be conducted. A site-specific audit is required for all heating or cooling system replacements and anytime fuel-switching is considered (see Attachment 5).

***Incidental Repair Costs*:** A cost limit for incidental repairs (WPN 12-9) must be established for each priority list. This cost limit must be included during priority list development and must be consistent with the total job cost, including all incidental repairs, having an SIR of at least 1.0. The sample audits required to support the proposed priority list(s) must include costs for typically anticipated IRM to justify a maximum per unit cost of IRM for each priority list.

DESCRIPTION OF SUBMITTAL REQUIREMENTS

At a minimum, any Grantee priority list submittal must address these items:

1. Describe how each priority list was developed.
2. Identify the housing characteristics of the dwellings that each list applies to.
3. Describe how the subset of similar homes was determined.
4. Define the circumstances that will require site-specific audits rather than the use of the priority list.

To accomplish this, provide all input data, assumptions, and audit results (recommended measures) for dwelling units, which must include:

1. Description of the home type that the priority list applies to, (e.g. site-built, 1- and 2-story, natural gas heated, centrally air-conditioned homes with basements that have between 1,000 and 2,500 square feet of conditioned space).
2. Complete list of the weatherization measures typically "enabled" for evaluation by the energy audit tool that was used to produce the priority list, material and labor costs for each measure, and the expected lifetime of each measure used in the SIR calculation.
3. Fuel prices used in developing the priority list including an evaluation of historical fuel prices to determine the minimum fuel price that should be used to ensure weatherization measures are always cost-effective.
4. Description of the circumstances when fuel and/or materials price changes invalidate the submitted priority list.
5. Complete field data collection forms for the sample dwelling units, any auditor notes, and printouts of the data entry into the energy audit tool.
6. Recommended measures report from the audit tool showing the entire measure cost, first-year savings, SIR for each measure, total job cost and overall (cumulative) SIR.
7. Total incidental repair cost limit that triggers a site-specific audit.

ATTACHMENT 3
EXPEDITED ENERGY AUDITS FOR WAP

	Single Family (1-4 units)	**Manufactured Housing**	**Small Multifamily (5-24 units, each unit separately heated/cooled)**	**Large Multifamily (25+ units or central mechanical systems)**
EA-QUIP	Developer: Association for Energy Affordability, New York, NY			
	YES	NO	YES	YES
ECOS	Developer: JAI Software, Farmingdale, ME			
	YES	YES	NO	NO
eQUEST	Developer: Lawrence Berkeley National Laboratory, Berkeley, CA			
	NO	NO	YES	YES
OptiMiser	Developer: OptiMiser LLC, Denver, CO			
	YES	YES	NO	NO
REM	Developer: NORESCO, LLC, Boulder, CO			
	YES	YES	YES	YES
TREAT	Developer: Performance Systems Development (PSD), Ithaca, NY			
	YES	YES	YES	YES
Weatherization Assistant (NEAT, MHEA and MulTEA)	Developer: Oak Ridge National Laboratory (ORNL), Oak Ridge, TN			
	NEAT approved	MHEA approved	NEAT and MulTEA approved only for buildings with individually heated and cooled dwelling units	MulTEA approved only for buildings with individually heated and cooled dwelling units

"YES" means that the audit tool has been previously approved for this housing stock
"NO" means that the audit tool has not been previously approved for this housing type or that it is not designed for this housing type

ATTACHMENT 4
STANDARD ENERGY AUDITS FOR WAP

	Single Family (1-4 units)	Manufactured Housing	Small Multifamily (5-24 units, each unit separately heated/cooled)	Large Multifamily (25+ units or central mechanical systems)
AKWarm	Approved by DOE for use in Alaska			
	YES	YES	YES	YES
Computer Database System (CDS)	Approved by DOE for use in Montana			
	YES	YES	YES	NO
EA-5	Approved by DOE for use in Idaho			
	YES	YES	YES	NO
Hancock Energy Audit Tool (HEAT)	Developer: Hancock Software Inc., Framingham, MA			
	YES	YES	NO	NO
Puerto Rico Energy Audit Tool (PREAT)	Approved by DOE for use in Puerto Rico			
	YES	NO	NO	NO
Targeted Investment Protocol System (TIPS)	Approved by DOE for use in New York			
	YES	YES	YES	NO
WeatherWorks	Approved by DOE for use in Illinois			
	YES	YES	YES	NO
WxPRO	Approved by DOE for use in North Dakota and Nevada			
	YES	YES	NO	NO

"YES" means that the audit tool has been previously approved for this housing stock
"NO" means that the audit tool has not been previously approved for this housing type or that it is not designed for this housing type

Version changes to Standard audits require DOE approval prior to implementation.

ATTACHMENT 5
FUEL SWITCHING SUBMITTAL REQUIREMENTS

Administration: With prior Department of Energy (DOE) approval, fuel switching is allowed when cost effective or when justified for Health and Safety (H&S) reasons. DOE approval for fuel switching can be achieved in two ways, either on a case-by-case basis or as a policy administered by the Grantee.

Case-By-Case Fuel Switching Approval

For case-by-case fuel switching approval, the Grantee must submit the following to their Project Officer (PO) for DOE approval:

1. A short description of the proposed fuel switch and the reason for doing so
2. A complete energy audit with all supporting documentation that either;
    a. Demonstrates fuel switching is cost-effective when interacted with all other appropriate energy conservation measures for the building, or
    b. Properly supports the proposed switch as an H&S measure.
3. Supporting documentation must include the initial site assessment, available photos, additional ancillary equipment necessary for the fuel switch, e.g., new natural gas lines and additional or upgraded electrical equipment, and the energy audit's Input Report and Recommended Measures Report. The entire cost of the installation must be included in the cost of the ECM evaluation, including all ancillary costs (e.g. new utility line installation).

Grantee Administered Fuel Switching Approval

To assume responsibility for administering the fuel switching policy, Grantee must submit the following information to its PO.

1. A statement in the Energy Audit Procedures section of the Grantee's Annual Plan that fuel switching is allowable when the site-specific energy audit demonstrates the cost effectiveness of the fuel switch over the life of the measure as indicated by the Savings to Investment Ratio (SIR).
2. A statement that if a heat pump or other combined heating-and-cooling system is to replace a heating-only (or cooling-only) system, no savings will be attributed to the previously non-existent cooling (or heating) system, but that all the costs of running the system throughout the year will be included in the audit.
3. The audit libraries that contain:
    a. All utility cost information to provide accurate data for the fuel switch decision(s)
    b. The escalation rate of energy prices used in the energy audit over the life of the new measure
    c. All related charges associated with fuel-switching, (e.g., permits and new or improved utility connections)
4. Demonstration of Capability: In addition to accepting the administrative burden associated with making decisions about fuel switching internally, the Grantee must also demonstrate ability to analyze the information provided by the Subgrantee when a request for fuel switching is submitted. To demonstrate this internal capability to DOE, the Grantee must submit the following documents as part of their Plan:
    a. One complete sample audit for each type of fuel-switching scenario anticipated (e.g., one sample audit for switching from an oil boiler to a gas boiler, one sample audit for

switching from a gas furnace and central air conditioning combination to an electric heat pump, etc.) with all supporting documentation that demonstrates fuel switching is cost-effective when interacted with all other appropriate energy conservation measures for the dwelling.

   b. Supporting documentation must include a copy of the client utility bill(s) which list all charges for the pre-weatherization energy source(s). Cost information must include but is not limited to; the costs charged for the current energy commodity, base and service charges, taxes, supply and transmission charges and renewable energy or energy conservation adjustments.

5. If the Grantee opts to implement an internal fuel switching policy prior to the next energy audit procedures approval cycle, the above information associated with the Grantee fuel switch procedure must be submitted as supplemental information to the Master File section of the Grantee's Annual Plan.

Important: No fuel switching measures will be allowed using a DOE-approved priority list. The use of a priority list does not meet the DOE standard for case-by-case analysis because changes in cost cannot be captured and updated as is the case with an energy audit. A site-specific computerized energy audit must be used to demonstrate the cost effectiveness of fuel switching and ensure that the program requirement is met to provide greater energy efficiency and reduction of energy costs for low-income clients.

ATTACHMENT 6
REQUEST FOR SPECIAL APPROVAL OF ENERGY CONSERVATION MATERIAL

Only the materials listed in Appendix A to CFR Part 440 are approved to use in the Weatherization Assistance Program (WAP). These materials and their specifications are listed in **Attachment 7**. Other materials must be approved by the Department of Energy (DOE). In order to gain approval for other materials fill out the following form completely, attach any additional information required, and send the package to your Project Officer of Record (PO) for review.

1. Grantee Contact Information	
Grantee:	
Grantee Representative:	
Grantee Contact Email:	

2. Material Request Information
Material requested for approval
List standard(s) that apply to material's selection. These may include ASTM, ANSI, UL, NFPA, etc. Optionally, you may attach a product cut sheet or spec sheet for review
☐ - Alternatively, I have attached information pertaining to standards.

3. Audit Justification
Any ECM that is to be installed with WAP funds must be cost-justified by the Grantee's computerized audit tool. To demonstrate this, Grantee must provide at least 2 audits that include the specific material listed in section 2 of this form. The submitted audits must contain the fuel costs, accurate material installation costs, lifespan of installation, and SIR of the installed material at a minimum. For some installations, other information may be required.
☐- I have attached 2 audits with all requested information.

4. Priority Lists
Does Grantee use Priority List(s)? Yes ☐ No ☐
Will the material be included in any Priority List(s)? Yes ☐ No ☐
If you answered "Yes" to the second question, you must submit at least 5 computerized audits showing the materials position on each priority list where this material is used by the Grantee. These audits must be representative of the housing stock that matches the priority list previously approved by DOE for Grantee use and use the Grantee's currently approved audit tool. The submitted audit results must contain the fuel costs, accurate material installation costs, lifespan of installation, and SIR of the installed material at a minimum. For some installations, other information may be required.
☐ - I have attached 5 audits for each priority list per instructions.

ATTACHMENT 7
APPENDIX A TO PART 440
STANDARDS FOR WEATHERIZATION MATERIALS

[58 FR 12529, MAR. 4, 1993, AS AMENDED AT 69 FR 18803, APR. 9, 2004]

APPENDIX A TO PART 440—STANDARDS FOR WEATHERIZATION MATERIALS

The following Government standards are produced by the Consumer Product Safety Commission and are published in title 16, Code of Federal Regulations:

Thermal Insulating Materials for Building Elements Including Walls, Floors, Ceilings, Attics, and Roofs Insulation—organic fiber— conformance to Interim Safety Standard in 16 CFR part 1209;

Fire Safety Requirements for Thermal Insulating Materials According to Insulation Use—Attic Floor—insulation materials intended for exposed use in attic floors shall be capable of meeting the same flammability requirements given for cellulose insulation in 16 CFR part 1209;

Enclosed spaces—insulation materials intended for use within enclosed stud or joist spaces shall be capable of meeting the smoldering combustion requirements in 16 CFR part 1209.

The following standards which are not otherwise set forth in part 440 are incorporated by reference and made a part of part 440. The following standards have been approved for incorporation by reference by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. These materials are incorporated as they exist on April 5, 1993 and a notice of any change in these materials will be published in the FEDERAL REGISTER. The standards incorporated by reference are available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: http://www.archives.gov/federallregister/codeloflfederallregulations/ibrllocations.html.

The standards incorporated by reference in part 440 can be obtained from the following sources:

Air Conditioning and Refrigeration Institute, 1501 Wilson Blvd., Arlington, VA 22209; (703) 524–8800.

American Gas Association, 1515 Wilson Blvd., Arlington, VA 22209; (703) 841–8400.

American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018; (212) 642–4900.

American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017; (212) 705–7800.

American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103; (215) 299–5400.

American Architectural Manufacturers Association, 1540 East Dundee Road, Palatine, IL 60067; (708) 202–1350.

Federal Specifications, General Services Administration, Specifications Section, Room 6654, 7th and D Streets, SW, Washington, DC 20407; (202) 708–5082.

Gas Appliance Manufacturers Association, (703) 525–9565.

National Electrical Manufacturers Association, 2101 L Street, NW, Suite 300, Washington, DC 20037; (202) 457–8400.

National Fire Protection Association, Batterymarch Park, P.O. Box 9101, Quincy, MA 02269; (617) 770–3000.

National Standards Association, 1200 Quince Orchard Blvd., Gaithersburg, MD 20878;
(301) 590–2300.
(NSA is a local contact for materials from ASTM).

National Wood Window and Door Association, 1400 East Touhy Avenue, Des Plaines, IL 60018; (708) 299–5200.

Sheet Metal and Air Conditioning Contractors Association, P.O. Box 221230,
Chantilly, VA 22022–1230; (703) 803–2980.

Steel Door Institute, 712 Lakewood Center North, 14600 Detroit Avenue, Cleveland, OH 44107; (216) 899–0100.

Steel Window Institute, 1230 Keith Building, Cleveland, OH 44115; (216) 241–7333.

Tubular Exchanger Manufacturers Association, 25 North Broadway, Tarrytown, NY 10591; (914) 332–0040.

Underwriters Laboratories, Inc., P.O. Box 75530, Chicago, IL 60675–5330;

(708) 272–8800.

More information regarding the standards in this reference can be obtained from the following sources:

Environmental Protection Agency, 401 M Street, NW, Washington, DC 20006;

(202) 554–1080.

National Institute of Standards and Technology, U.S. Department of Commerce, Gaithersburg, MD 20899, (301) 975–2000

Weatherization Assistance Programs Division, Conservation and Renewable Energy, Mail Stop 5G–023, Forrestal Bldg, 1000 Independence Ave, SW, Washington, DC 20585; (202) 586–2207.

THERMAL INSULATING MATERIALS FOR BUILDING ELEMENTS INCLUDING WALLS, FLOORS, ATTICS, AND ROOFS

(Standards for conformance)

Insulation-mineral fiber:	
Blanket insulation	ASTM C665-98.
Roof insulation board	ASTM C726-00a.
Loose-fill insulation	ASTM C764-99.
Insulation-mineral cellular:	
Vermiculite loose-fill insulation	ASTM C516–80 (1990).
Perlite loose-fill insulation	ASTM C549–81 (1986).
Cellular glass insulation block	ASTM C552–88.
Perlite insulation board	ASTM C728–89a.
Insulation-organic fiber:	
Cellulosic fiber insulating board	ASTM C208–72 (1982).
Cellulose loose-fill insulation	ASTM C739–88.
Insulation-organic cellular:	
Preformed block-type polystyrene insulation	ASTM C578–87a.
Rigid preformed polyurethane insulation board	ASTM C591–85.
Polyurethane or polyisocyanurate insulation board faced with aluminum foil on both sides	FS HH-I–1972/1 (1981).
Polyurethane or polyisocyanurate insulation board faced with felt on both sides	FS HH-I–1972/2 (1981). And Amendment 1, October 3, 1985.
Insulation—composite boards:	
Mineral fiber and rigid cellular polyurethane composite roof insulation board	ASTM C726–88.
Perlite board and rigid cellular polyurethane composite roof insulation	ASTM C984–83.
Gypsum board and polyurethane or polisocyanurate composite board	FS HH–I–1972/4 (1981).
Materials used as a patch to reduce infiltration through the building envelope	Commercially available.

THERMAL INSULATING MATERIALS FOR PIPES, DUCTS, AND EQUIPMENT SUCH AS BOILERS AND FURNACES

(Standards for conformance)

Insulation—mineral fiber:	
Preformed pipe insulation	ASTM 1 C547–77.
Blanket and felt insulation (industrial type)	ASTM C553–70 (1977).
Blanket insulation and blanket type pipe insulation (metal-mesh.covered) (industrial type)	ASTM C592–80.
Block and board insulation	ASTM C612–83.
Spray applied fibrous insulation for elevated temperature	ASTM C720–89.
High-temperature fiber blanket insulation	ASTM C892–89.
Duct work insulation	Selected and applied according to ASTM C971–82.
Insulation—mineral cellular:	
Diatomaceous earth block and pipe insulation	ASTM C517–71 (1979)
Calcium silicate block and pipe insulation	ASTM C533–85 (1990).
Cellular glass insulation	ASTM C552–88.
Expanded perlite block and pipe insulation	ASTM C610–85.
Insulation—Organic Cellular:	
Preformed flexible elastomeric cellular insulation in sheet and tubular form	ASTM C534–88.
Unfaced preformed rigid cellular polyurethane insulation	ASTM C591–85.
Insulation skirting	Commercially available.

FIRE SAFETY REQUIREMENTS FOR INSULATING MATERIALS ACCORDING TO INSULATION USE

(Standards for conformance)

Attic floor	Insulation materials intended for exposed use in attic floors shall be capable of meeting the same smoldering combustion requirements given for cellulose insulation in ASTM C739–88.
Enclosed space	Insulation materials intended for use within enclosed stud or joist spaces shall be capable of meeting the smoldering combustion requirements in ASTM C739–88.
Exposed interior walls and ceilings	Insulation materials, including those with combustible facings, which remain exposed and serve as wall or ceiling interior finish, shall have a flame spread classification not to exceed 150 (per ASTM E84–89a).
Exterior envelope walls and roofs	Exterior envelope walls and roofs containing thermal insulations shall meet applicable local government building code requirements for the complete wall or roof assembly.
Pipes, ducts, and equipment	Insulation materials intended for use on pipes, ducts and equipment shall be capable of meeting a flame spread classification not to exceed 150 (per ASTM E84–89a).

STORM WINDOWS

(Standards for conformance)

Storm windows:	
Aluminum insulating storm windows	ANSI/AAMA 1002.10–83.
Aluminum frame storm windows	ANSI/AAMA 1002.10–83.
Wood frame storm windows	ANSI/NWWDA I.S. 2–87. (Section 3)
Rigid vinyl frame storm windows	ASTM D4099–89.
Frameless plastic glazing storm	Required minimum thickness windows is 6 mil (.006 inches).
Movable insulation systems for windows	Commercially available.

STORM DOORS

(Standards for conformance)

Storm doors—Aluminum:	
Storm Doors	ANSI/AAMA 1102.7–89.
Sliding glass storm doors	ANSI/AAMA 1002.10–83.
Wood storm doors	ANSI/NWWDA I.S. 6–86.
Rigid vinyl storm doors	ASTM D3678–88.
Vestibules:	
Materials to construct vestibules	Commercially available.
Replacement windows:	
Aluminum frame windows	ANSI/AAMA 101–88.
Steel frame windows	Steel Window Institute recommended specifications for steel windows, 1990.
Wood frame windows	ANSI/NWWDA I.S. 2–87.
Rigid vinyl frame windows	ASTM D4099–89.

REPLACEMENT DOORS

(Standards for conformance)

Replacement doors—Hinged doors:	
Steel doors	ANSI/SDI 100–1985.
Wood doors:	
Flush doors	ANSI/NWWDA I.S. 1–87. (exterior door provisions)
Pine, fir, hemlock and spruce doors	ANSI/NWWDA I.S. 6–86.
Sliding patio doors:	
Aluminum doors	ANSI/AAMA 101–88.
Wood doors	NWWDA I.S. 3–83.

CAULKS AND SEALANTS

(Standards for conformance)

Caulks and sealants:	
Putty	FS TT–P–00791B, October 16, 1969 and Amendment 2, March 23, 1971.
Glazing compounds for metal sash	ASTM C669–75 (1989).
Oil and resin base caulks	ASTM C570–72 (1989).
Acrylic (solvent types) sealants	FS TT–S–00230C, February 2, 1970 and Amendment 2, October 9, 1970.
Butyl rubber sealants	FS TT–S–001657, October 8, 1970.
Chlorosulfonated polyethylene sealants	FS TT–S–00230C, February 2, 1970 and Amendment 2, October 9, 1970.
Latex sealing compounds	ASTM C834–76 (1986).
Elastomeric joint sealants (normally considered to include polysulfide, polyurethane, and silicone)	ASTM C920–87.
Preformed gaskets and sealing materials	ASTM C509–84.

WEATHERSTRIPPING

(Standards for conformance)

Weatherstripping	Commercially available.
Vapor retarders	Selected according to the provisions cited in ASTM C755–85 (1990). Permeance not greater than 1 perm when determined according to the desiccant method described in ASTM E96–90.
Items to improve attic ventilation	Commercially available.
Clock thermostats	NEMA DC 3–1989.

HEAT EXCHANGERS

(Standards for conformance)

Heat exchangers, water-to-water and steam-to-water	ASME Boiler and Pressure Vessel Code, 1992, Sections II, V, VIII, IX, and X, as applicable to pressure vessels. Standards of Tubular Exchanger Manufacturers Association, Seventh Edition, 1988.
Heat exchangers with gas-fired appliances	Conformance to AGA Requirements for Heat Reclaimer Devices for Use with Gas-Fired Appliances No. 1–80, June 1, 1980. AGA Laboratories Certification Seal.
Heat pump water heating heat recovery systems	Electrical components to be listed by UL.

BOILER/FURNACE CONTROL SYSTEMS

(Standards for conformance)

Automatic set back thermostats	Listed by UL. Conformance to NEMA DC 3–1989.
Line voltage or low voltage room thermostats	NEMA DC 3–1989.
Automatic gas ignition systems	ANSI Z21.21–1987 and Z21.21a-1989. AGA Laboratories Certification Seal.
Energy management systems	Listed by UL.
Hydronic boiler controls	Listed by UL.
Other burner controls	Listed by UL.

WATER HEATER MODIFICATIONS

(Standards for conformance)

Insulate tank and distribution piping	(See insulation section of this appendix).
Install heat traps on inlet and outlet piping	Applicable local plumbing code.
Install/replace water heater heating elements	Listed by UL.
Electric, freeze-prevention tape for pipes	Listed by UL.
Reduce thermostat settings	State or local recommendations.
Install stack damper, gas-fueled	ANS1 Z21.66–1988, including Exhibits A&B, and ANSI Z223.1–1988.
Install stack damper, oil-fueled	UL 17, November 28, 1988, and NFPA 31–1987.
Install water flow modifiers	Commercially available.

WASTE HEAT RECOVERY DEVICES

(Standards for conformance)

Desuperheater/water heaters	ARI 470–1987.
Condensing heat exchangers	Commercially available components and in new heating furnace systems to manufacturers' specifications.
Condensing heat exchangers	Commercially available (Commercial, multi-story building, with teflon-lined tubes institutional) to manufacturers' specifications.
Energy recovery equipment	Energy Recovery Equipment and Systems Air-to-Air (1978) Sheet Metal and Air-Conditioning Contractors National Association (SMACNA).

BOILER REPAIR AND MODIFICATIONS/EFFICIENCY IMPROVEMENTS

(Standards for conformance)

Install gas conversion burners	ANSI Z21.8–1984, (for gas or oil-fired systems), ANSI Z21.17–1984, ANSI Z21.17a-1990, and ANSI Z223.1–1988. AGA Laboratories Certification seal.
Replace oil burner	UL 296, February 28, 1989 Revision and NFPA 31–1987.
Install burners (oil/gas)	ANSI Z223.1–1988 for gas equipment and NFPA 31–1987 for oil equipment.
Re-adjust boiler water temperature or install automatic boiler temperature reset control	ASME CSD–1–1988, ASME CSD–1a-1989, ANSI Z223.1–1988, and NFPA 31–1987.
Replace/modify boilers	ASME Boiler and Pressure Vessel Code, 1992, Sections II, IV, V, VI, VIII, IX, and X. Boilers must be Institute of Boilers and Radiation Manufacturers (IBR) equipment.
Clean heat exchanger, adjust burner air shutter(s), check smoke no. on oil-fueled equipment. Check operation of pump(s) and replacement filters	Per manufacturers' instructions.
Repair combustion chambers	Refractory linings may be required for conversions.
Replace heat exchangers, tubes	Protection from flame contact with conversion burners by refractory shield.
Install/replace thermostatic radiator valves	Commercially available. One pipe steam systems require air vents on each radiator; see manufacturers' requirements.
Install boiler duty cycle control system	Commercially available. NFPA 70, National Electrical Code (NEC) 1993 and local electrical codes provisions for wiring.

HEATING AND COOLING SYSTEM REPAIRS AND TUNE-UPS/EFFICIENCY IMPROVEMENTS

(Standards for conformance)

Install duct insulation	FS HH-I–558C, January 7, 1992 (see insulation sections of this appendix).
Reduce input of burner; derate gas-fueled equipment	Local utility company and procedures if applicable for gas fueled furnaces and ANSI Z223.1–1988 (NFPA 54–1988) including Appendix H.
Repair/replace oil-fired equipment	NFPA 31–1987.
Replace combustion chamber in oil-fired furnaces or boilers	NFPA 31–1987.
Clean heat exchanger and adjust burner: adjust air shutter and check CO2 and stack temperature. Clean or replace air filter on forced air furnace	ANSI Z223.1–1988 (NFPA 54–1988) including Appendix H.
Install vent dampers for gas-fueled heating systems	Applicable sections of ANSI Z223.1–1988 (NFPA 54–1988) including Appendices H, I, J, and K. ANSI Z21.66–1988 and Exhibits A & B for electrically operated dampers.
Install vent dampers for oil-fueled heating systems	Applicable sections of NFPA 31–1987 for installation and in conformance with UL 17, November 28, 1988.
Reduce excess combustion air:	
A: Reduce vent connector size of gas-fueled appliances	ANSI Z223.1–1988 (NFPA 54–1988) Part 9 and Appendices G & H.
B: Adjust barometric draft regulator for oil fuels	NFPA 31–1987 and per manufacturers' (furnace or boiler) instructions.
Replace constant burning pilot with electric ignition device on gas-fueled furnaces or boilers	ANSI Z21.71–1981, Z21.71a-1985, and Z21.71b-1989.
Readjust fan switch on forced air gas or oil-fueled furnaces	Applicable sections and Appendix H of ANSI Z223.1–1988 (NFPA 54–1988) for gas furnaces and NFPA 31–1987 for oil furnaces.
Replace burners	See power burners (oil/gas).
Install/replace duct furnaces (gas)	ANSI Z223.1–1988 (NFPA 54–1988).
Install/replace heat pumps	Listed by UL.
Replace air diffusers, intakes, registers, and grilles	Commercially available.
Install/replace warm air heating metal ducts	Commercially available.
Filter alarm units	Commercially available.

REPLACEMENT FURNACES, BURNERS, AND WOOD STOVES

(Standards for conformance)

Chimneys, fireplaces, vents and solid fuel burning Appliances	NFPA 211–1988.
Gas-fired furnaces	ANS1 Z21.47–1987, Z21.47a–1988, and Z21.47b–1989. ANSI Z223.1–1988 (NFPA 54–1988).
Oil-fired furnaces	UL 727, August 27, 1991 Revision and NFPA 31–1987.
Liquified petroleum gas storage	NFPA 58–1989.
Ventilation fans:	
Including electric attic, ceiling, and whole house fans	UL 507, August 23, 1990 Revision.

AIR CONDITIONERS AND COOLING EQUIPMENT

(Standards for conformance)

Air conditioners:	
Central air conditioners	ARI 210/240–1989.
Room size units	ANSI/AHAM RAC–1–1982.
Other cooling equipment:	
Including evaporative coolers, heat pumps and other equipment	UL 1995, November 30, 1990.

SCREENS, WINDOW FILMS, AND REFLECTIVE MATERIALS

(Standards for conformance)

Insect screens	Commercially available.
Window films	Commercially available.
Shade screens:	
Fiberglass shade screens	Commercially available.
Polyester shade screens	Commercially available.
Rigid awnings:	
Wood rigid awnings	Commercially available.
Metal rigid awnings	Commercially available.
Louver systems:	
Wood louver systems	Commercially available.
Metal louver systems	Commercially available.
Industrial-grade white paint used as a heat-reflective measure on awnings, window louvers, doors, and exterior duct work (exposed)	Commercially available.

ATTACHMENT 8
MEASURE SKIPPING CLARIFICATION

"Measure skipping" is defined as follows: *Not installing, in order of decreasing Savings to Investment Ratio (SIR), the cost-justified Energy Conservation Measures (ECMs) and related Incidental Repairs Measures (IRM) included in the work scope produced by the Department of Energy (DOE) approved energy audit tool or priority list.*

"Major Measure" is defined as follows: *A high priority measure, which if skipped, would result in "partial" weatherization of a unit. Major measures are as follows: air sealing, duct sealing of ducts outside the thermal boundary, attic insulation, wall insulation and floor or belly insulation.*

Measure Skipping **of cost-justified *major measures* is not permitted at any time.**

Alteration of the cost-justified work order must be addressed in the following ways:

Funding limitations: If all funds available to be spent on the job will not cover the entire work scope, then measures may be removed from the work order starting with the lowest SIR measure and working up the list from there. The work order must remain overall cost-effective or the job must be deferred. Necessary Health and Safety (H&S) measures may NOT be removed from the work order; however, ECMs can be removed.

Prior to work beginning: Client education is important to inform a client of planned measures and material use. Resistance from a client to install any measures and/or materials planned as a result of an energy audit-directed work order or priority list should be addressed with either additional education and/or re-running the energy audit with a different - but acceptable - material to determine if the substitute material is cost effective. If no cost-effective option for the material can be identified, the auditor should again explain and discuss the situation with the building owner or occupant. If the building owner or occupant still declines a measure, not defined as a *major measure*, the **auditor must include in the client file a comprehensive justification, including background/source documents that support the decision to skip a specific measure.** All other weatherization measures must be installed. If the auditor **cannot access background/source documents that justifies the building owner/occupant's decision to decline a measure *or* the measure is defined as a "major measure,"** the situation must be fully documented in the client file and the job must be deferred due to client refusal.

Inadequate training: A lack of training for Subgrantees is not an allowable reason to skip measures. Standard procedure should be to postpone job(s) requiring priority measures that cannot be installed due to lack of trained staff until adequate training is acquired.

After a job has begun: Due to scheduling, measures are sometimes installed with a lower priority first. If during the installation process, the client declines a higher priority measure, work must stop at the time the client declined the higher priority measure. No further installation is allowed and the job must be inspected by a Quality Control Inspector (QCI) and closed out as a completed unit. This should be clearly explained in client file documentation. Some agencies include a statement for client signature that states the client is aware and accepts all WAP rules, including the specific services and measures determined by an energy audit.

A General Heat Waste (GHW) measure, as previously approved in the Grantee's energy audit, may be skipped for any documented reason (including declined by client). GHW measures are not prioritized by the energy audit tool. The measures may be at the top of an approved priority list; however, there is no strict prohibition from skipping an individual GHW measure. If a Grantee choses to include ECMs in the SIR calculations that could have been approved as GHW, then the prioritized measure must be treated as other prioritized measures and skipping is not allowed.

ATTACHMENT 9
MAXIMUM LIFETIMES OF WEATHERIZATION MEASURES

OVERVIEW

This attachment sets the maximum allowable measure lifetimes that can be used in all Department of Energy (DOE) approved energy audits for all Weatherization Assistance Program (WAP) Grantees. DOE will monitor to this effect.

Energy Conservation Measure (ECM) lifetimes are critical inputs to energy audits because they so strongly affect the cost effectiveness of weatherization measures. DOE has historically limited ECM lifetimes to the default values established by the Oak Ridge National Laboratory (ORNL) during its development of the Weatherization Assistant (WA). DOE and ORNL are now reviewing those lifetimes, and have updated some of them, as part of the WA modernization that is in progress.

REVISED MEASURE LIFETIMES

The maximum allowable lifetimes for the following measures have been updated. Grantees may adopt those lifetimes by submitting a notification to your DOE Project Officer (PO) with supporting documentation as defined later in this Attachment.

Table 9.1 ECM Lifetimes, years

Measure	Previous Default	Updated Allowable Default
Attic Insulation[1]	20	30
Wall Insulation[2]	20	30
Floor Insulation[3]	20	30
Kneewall Insulation[3]	20	30
Fossil Fuel Furnaces & Boilers[4]	15 or 18	20

Notes:

1. Applies only to blown-in (e.g., cellulose, fiberglass) and batt insulation
2. Applies only to dense pack insulation, rigid insulation and full-cavity batt insulation in fully enclosed air-tight cavities
3. Applies to loose and batt insulation installed in fully enclosed air-tight cavities, and rigid insulation
4. Applies to standard and condensing fossil fuel fired units

Table 9.2 at the end of this Attachment is a complete, current list of the maximum allowable measure lifetimes.

DOE will consider other changes on a case-by-case basis. A Grantee or WAP network-affiliated organization may request a longer allowable measure lifetime(s) by submitting the request, along with documentation justifying the request, to the appropriate PO(s).

DISCUSSION

DOE with ORNL's assistance collected and analyzed information and recommendations from Grantees that requested specific ECM lifetime changes. The Grantees provided supporting documentation from manufacturers, suppliers and weatherization providers in order for DOE to determine if any of the requested ECM lifetimes could justifiably be extended. As of the release date of this Weatherization Program Notice, DOE supports the updated lifetimes for those measures listed above.

The maximum allowable lifetime of any WAP measure is being limited to 30 years because the fuel cost indices which are forecasted by the Energy Information Agency do not extend beyond 30 years. Since future fuel cost is integral to the determination of measure Savings to Investment Ratios (SIRs), measure life cannot extend beyond the forecasted period.

Several sources support increasing the lifetimes of fossil-fuel fired heating equipment as described above. However, these sources did not address electrical Heating Ventilation and Air Conditioning (HVAC) equipment such as electric furnaces, heat pumps and air conditioners. The maximum allowable lifetimes for electrically heated and cooled equipment remain the same as previously approved.

SUBMITTAL REQUIREMENTS FOR ADOPTING TABLE 9.1 UPDATED MEASURE LIFETIMES

WAP Grantees wishing to adopt the new maximum measure lifetimes described above must submit a notification to their DOE PO along with a copy of the Grantee's measure library that shows the updated lifetimes of all measures being considered by the Grantee.

SUMMARY OF ALLOWABLE MAXIMUM MEASURE LIFETIMES

Table 9.2 presents the current list of the maximum allowable measure lifetimes, including the increased allowable lifetimes of the measures described above.

Table 9.2
Allowable Default ECM Lifetimes

#	Measure Type	Measure Name	Life (yr)
1	Building Insulation	Attic insulation: blown in and batt	30
2	Building Insulation	Attic insulation: all other types	20
3	Building Insulation	Sillbox insulation	20
4	Building Insulation	Foundation wall insulation	20
5	Building Insulation	Slab insulation	20
6	Building Insulation	Floor insulation: loose and batt types installed in fully enclosed air-tight cavities, and rigid insulation	30
7	Building Insulation	Floor insulation: all other types including loose and batt not installed in fully enclosed air-tight cavities	20
8	Building Insulation	Wall insulation: dense pack insulation, rigid insulation and full-cavity batt insulation in fully enclosed air-tight cavities	30
9	Building Insulation	Wall insulation: all other types	20
10	Building Insulation	Kneewall insulation: loose and batt types installed in fully enclosed air-tight cavities, and rigid insulation	30
11	Building Insulation	Kneewall insulation: all other types including loose and batt types not installed in fully enclosed air-tight cavities	20
12	Building Insulation	Duct insulation	20
13	Building Insulation	Manufactured home skirting	10
14	Building Insulation	White roof coating	7
15	Building Insulation	Radiant barrier	15
16	Ducts/Infiltration	Whole house air sealing	10
17	Ducts/Infiltration	Duct sealing	10
18	Doors and Windows	Storm window	15
19	Doors and Windows	Window replacement	20
20	Doors and Windows	Door replacement	20
21	Doors and Windows	Storm door	10
22	Doors and Windows	Window shading: awning	10
23	Doors and Windows	Sun screen: fabric or screen	10
24	Doors and Windows	Sun screen: louvered	15
25	Doors and Windows	Window film	15
26	HVAC Systems	Thermal vent damper	10
27	HVAC Systems	Electric vent damper	10
28	HVAC Systems	Intermittent Ignition Device (IID)	10
29	HVAC Systems	Electric vent damper and IID	10
30	HVAC Systems	Flame retention burner	10
31	HVAC Systems	Heating system tuneup	3
32	HVAC Systems	Heating system replacement: fossil fuel fired furnaces and boilers, standard and condensing	20
33	HVAC Systems	Heating system replacement: all other heating systems except heat pumps	18
34	HVAC Systems	Smart/programmable thermostat	15
35	HVAC Systems	Air conditioner tuneup	3
36	HVAC Systems	Air conditioner replacement	15

37	HVAC Systems	Evaporative cooler	15
38	HVAC Systems	Heat pump replacement	15
39	Baseloads	Lighting retrofit: fluorescent and compact fluorescent	(Note 5)
40	Baseloads	Lighting retrofit: LED	(Note 6)
41	Baseloads	Lighting retrofit: halogen	(Note 7)
42	Baseloads	Refrigerator replacement	15
43	Baseloads	Water heater tank insulation	13
44	Baseloads	Water heater pipe insulation	13
45	Baseloads	Low flow showerhead	15
46	Baseloads	Water heater replacement	13
47	Baseloads	Water heater setpoint reduction	13

Notes:

5. 10,000 hours
6. 30,000 hours
7. 4,000 hours