Georgia Environmental Finance Authority
Weatherization Assistance Program

Weatherization Assistant Energy Audit

Policies and Procedures Manual

2020

Georgia Environmental Finance Authority
Weatherization Assistance Program

Energy Audits

1. Certified Energy Auditor

    a. General

        i. All persons who conduct energy audits must be a Certified Home Energy Professional Energy Auditor or Auditor in Training recognized by the Building Performance Institute. All Certified Energy Auditors must provide a copy of their certification to the Georgia Environmental Finance Authority (GEFA).

        ii. Auditor in Training: An Auditor in Training must be supervised by a certified Energy Auditor, must meet the milestones in their training plan, and shall be certified within a reasonable period of time (typically within 6-12 months).

        iii. Local agencies may contract out energy audit services to other certified energy auditors if needed. A copy of the auditors certification must be sent to GEFA.

        iv. GEFA reserves the right to revoke the validation of any energy auditor or Auditor in Training if major findings continue to be found during the audit review by the local or state QCI. GEFA will first require the auditor to receive additional training to correct the deficiencies identified in the audit review.

2. Approved Audit Tools

    a. General:

    i. The Weatherization Assistant (NEAT/MHEA Audit) as approved by the U.S. Department of Energy (DOE) shall be used by all agencies to conduct audits on site-built and manufactured homes. The audit tool will be used in determining the Savings to Investment Ratio (SIR) of each weatherization measure and the correct priority of weatherization improvements for each dwelling unit.

    ii. The current version to be used is: Version 8.9 - https://weatherization.ornl.gov/obtain/

    iii. The Georgia WAP received a conditional approval to use the Weatherization Assistant version 8.9 (NEAT/MHEA) from DOE as listed herein on April 30, 2019. GEFA's approval expires on April 30, 2024.

    iv. The NEAT audit will be used for all single family homes and buildings with four units or less with the exception of manufactured homes.

    v. The MHEA will be used on all manufactured homes.

    vi. Either the NEAT or MHEA audit can be used for manufactured homes where the building envelope has been altered with light conventional framing, manufactured homes installed on conditioned basements, and modular homes. Auditors will select the audit tool which will provide the best opportunity to maximize the energy savings for these irregular combined construction types.

vii. Georgia does not have an approved multi-family audit tool. Contact GEFA for guidance prior to accepting any application of a project larger than four units. Multi-family buildings must receive approval from GEFA and DOE prior to auditing.

b. Weatherization Assistant Program Setup

The local agencies are responsible for the setup of the Weatherization Assistant. To maintain consistency between the local agencies, GEFA is instituting the following:

i. The local agency is responsible for database preservation. This preservation should follow the agencies record retention policy.

ii. A list of mandatory Audit Library Measures to be considered in the audit of each unit is included in *Exhibit 1: Measures Considered.*
   a. Agencies will review measure and fuel costs at least annually. Agencies are required to keep up to date information on each measure cost (labor and materials are to be kept separate). GEFA will facilitate a NEAT/MHEA training at the annual Georgia Community Action Agency Conference at which time agencies will be required to update libraries.

   b. This list is reviewed annually by GEFA or its contractor and updated as the need arises.

   c. Agencies must adjust their Library Measure settings to reflect any updates or changes made to this list.

iii. Agencies are required to have estimated measure costs for all active measures.
   a. Measure Costs will include <u>all materials and labor</u> needed to meet the requirements of the Georgia Field Guides and program guidelines for the measure.

   b. Measure Costs must represent the average actual cost of each measure to ensure that dwellings are evaluated accurately and equitably for all allowable measures.

   c. Measure Costs cannot be inflated to avoid performing the measure.

iv. Agencies are required to update their Measure Costs annually, and whenever there is a significant change (15% or more) in a cost factor. Updates will include the Library Measure Costs and any User Defined Measure Costs.

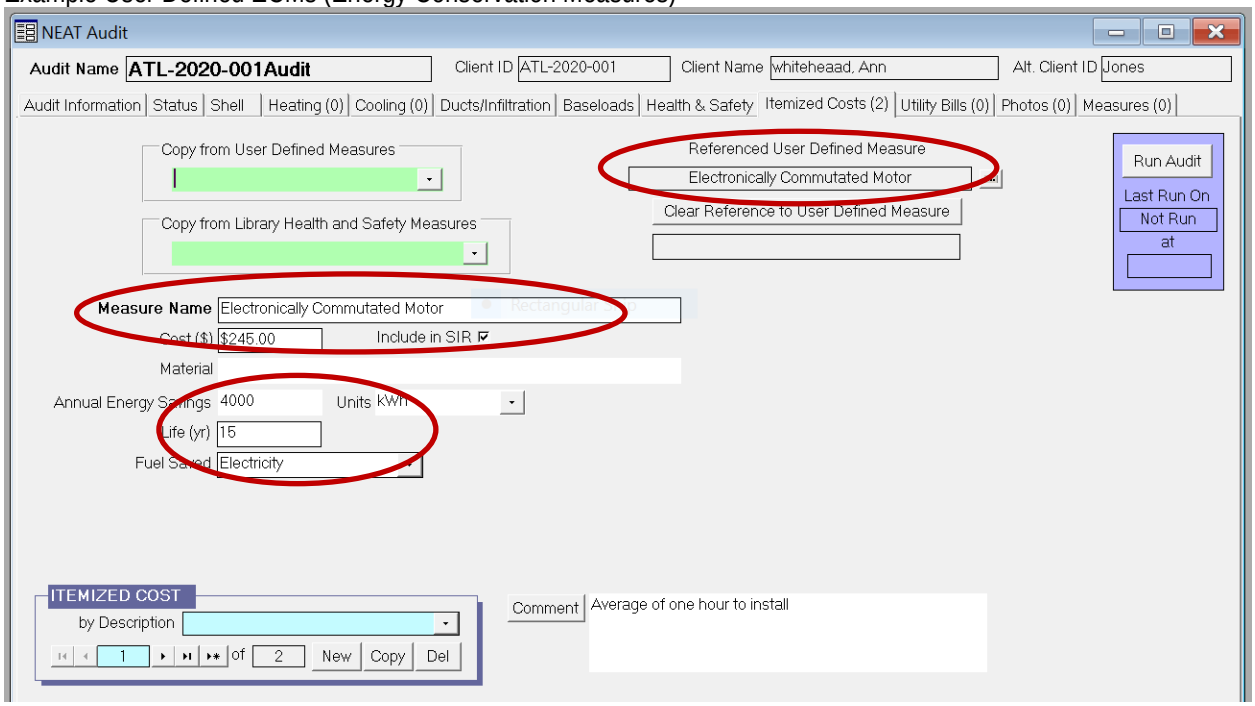
v. Agencies are responsible to maintain uniformity in measure costs across all devices used to run energy audits.

vi. When changes are made to any setup parameters, agencies must ensure steps are taken to preserve the existing database information so historical audits will not be altered. Agencies shall document the changes by creating a new name for audits, “Agency Name, WAP Library, year”. If there are changes to the libraries in the same year, add a date identifier to make sure historical audit information is not altered. Changes to libraries may only be made during the annual Georgia Community Action Agency conference NEAT/MHEA sessions.

vii. User Defined Energy Conservation Measures (ECMs) can be established with prior approval from GEFA and only during Annual Georgia Community Action Conference NEAT/MHEA sessions to insure

consistency. Approved User Defined ECMs must be created and active in an agency's library of measures. User Defined ECMs have a method for calculating energy savings. Default values are listed in the Approved User Defined ECMs Table below. *Note: This is an example and not an approved User Defined ECM.*

Example User Defined ECMs (Energy Conservation Measures)



*Either the Default amount, or a calculated amount can be used when running the audit. If calculated amount is used, a copy of the calculations must be included in the client file.
**Life of measure can be adjusted to the expected remaining life of the furnace.

viii. Minimum Acceptable SIR - Under Setup Library → Key Parameters are reviewed and revised as needed during annual Georgia Community Action Agency Conference, the *Minimum Acceptable SIR* shall be set to 1.0 in both the NEAT and MHEA.

ix. Fuel Costs - Agencies must review and adjust their fuel costs annually at annual Georgia Community Action Agency Conference, and must ensure steps are taken to preserve the existing database information so historical audits will not be subject to the new costs. In areas where the local agency has multiple fuel providers the agency may average like fuels with similar cost or create separate Fuel Cost Libraries.

x. NEAT Insulation Types - should list only allowable insulation types for each category. Each category should have at least one type listed. The R-values should align with manufacturer specs for each type of insulation the agency uses, and costs for each insulation type (listed under the Library Measures) must be economical and must represent the average actual cost. Where there are multiple feasible options for insulation, efforts should be made to select the insulation type with the highest SIR.

xi. Weather File - selection for the NEAT/MHEA weather file shall be based upon the physical location of the client home. The local agencies will select the weather file closest to the client home.

3. Energy Audit Prioritizations

a. General

i. Audit Determines Work - The NEAT/MHEA audit shall be used to determine all work to be done on a dwelling. Any work to be done on a dwelling must be documented and justified in the audit Recommended Measures Report. *No weatherization work may be conducted or funds expended on a client home without first completing the appropriate NEAT/MHEA audit.*

ii. Cost Effective Measures - Stand Alone Energy Conservation Measures (ECMs) and each package of measures which includes all ECMs and all Incidental Repair Measures (IRMs), must be "cost effective" as defined by DOE. Cost Effective means that each measure and package of measures installed in a dwelling unit must have a savings-to-investment ratio (SIR) which meets or exceeds 1.0. Per the NEAT/MHEA Recommended Measures report, a measure shall only be implemented where the SIR of that measure is a minimum of 1.0 (with the exception of air sealing), and where the Cumulative SIR is 1.0 or greater.

iii. ECM Measure Prioritization -The priority listing of activities will be based upon NEAT/MHEA SIR calculations and is limited to the ECMs listed in the NEAT/MHEA *Recommended Measures* report.

iv. Measure Skipping or Cherry Picking - By rule and policy, the energy audits will determine the optimum set of cost-effective measures and will prioritize those energy saving measures in order of cost-effectiveness. *Each dwelling will be evaluated for all eligible measures.* Once approved, all of the prioritized Energy Conservation Measures (ECMs) from the audit that meet the SIR ratio requirement must be installed in the unit in the order of cost-effectiveness, as funding allows. Deviating from the audit prioritized list of measures would be in conflict with the intent of the rules and is prohibited. Per WPN 19-4, Attachment 8, Measure Skipping of cost justified major measures is not permitted at any time. Major measures are as follows: air sealing, duct sealing, attic, wall and floor or belly insulation.

v. Declined Measure - Client education prior to work beginning 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.

Some examples of legitimate reasons for declining a measure could be:

- Declining exterior door replacement to preserve aesthetics of home.
- Declining refigerator replacement to preserve aesthetics of home.

vi. Evaluate All—When selecting replacement options in the audit NEAT/MHEA tool, "*Evaluate All*" will be used ***wherever possible*** to allow the audit tool to evaluate for all active measures and to select the one

with the highest SIR. If Evaluate All is not selected, an allowable justification must be listed in the comments section of the measure.

Some examples of situations when Evaluate All would not be selected are listed below:

- Basement Window does not meet egress.
- Windows are new and low-e double pane.
- Evaporative Coolers
- Electric Vent Damper
- Electric Vent Damper Lid
- Flame Retention Burner
- Floor Insulation of R-38
- High Efficiency Boiler
- IID
- Storm Windows
- Louvered Sunscreen
- Thermal Vent Damper
- Window Shading

vii. Fuel Switching or Fuel Conversions - The general practice of non-renewable fuel switching when replacing furnaces/appliances is not permitted; however, Fuel Switching is allowed when changing or converting a furnace/appliance using one fuel source to another on a limited, case-by-case basis with prior written approval from GEFA.

- Use of DOE funds is not permitted.
- Use of LIHEAP funds is permitted with prior written approval from GEFA.
- All other fuel conversions shall be reviewed and approved by GEFA in writing prior to the conversion.
- The energy savings of all ECMs shall be calculated based on the post-weatherization, post-fuel conversion, heating and cooling source. When doing a fuel conversion on a dwelling the Heating and Cooling tabs of the NEAT/MHEA audit will list the new heating and cooling systems as the replacement systems in order to allow the audit to accurately calculate the SIR of all ECMs effected by the heating and cooling loads. Since the NEAT/MHEA audit is not designed to evaluate for fuel conversions, auditors will have to select the new fuel source on the Heating tab, and will have to enter data for existing and anticipated equipment as a work around.

4. Energy Auditing On-Site Procedures

a. On-Site Visit

i. Agencies shall conduct a thorough energy audit of each approved client home prior to beginning the weatherization process. During the on-site visit the Auditor shall collect the following baseline data and record it in the client file.

a. NEAT/MHEA data collection. All applicable data pertaining to the building envelope necessary to run a complete energy audit (data about windows, doors, appliances, existing insulation, etc.) shall be gathered using the GEFA Weatherization Assessment form available on https://gefa.georgia.gov/energy-resources/weatherization-assistance-program/weatherization-program-documents.

b. Photo documentation of existing pertinent conditions and all diagnostic testing at time of audit.

c. Pre-Weatherization Blower Door CFM_{50}

d. Existing ventilation to estimate ASHRAE

e. Lead testing of painted surfaces that may potentially be disturbed during the WX process in all homes built or manufactured before 1978.

f. Spillage Testing of atmospheric vented combustion appliances

g. Combustion Analysis of appliances and ambient air

h. Combustible gas leak testing

i. Duct Leakage to the Outside testing

j. Additional Diagnostic testing:
There are many additional diagnostic tests and other data that can be collected during the WX process which can be very helpful in preparing the work order for the unit and ensuring the health and safety of the client. Auditors should not just rely on their experience but also the building science and technology available.

b. Field Collection Forms

i. The Auditor will use the GEFA Weatherization Assessment Form during the audit to ensure all necessary information is collected. Please see attachment - weatherization assessment form.

c. Photo Documentation

i. Photographs of the pre-weatherization conditions and diagnostic testing results of each dwelling must be taken. Photos will be organized and context should be included to describe the purpose of each photo as it pertains to weatherization. Photos should include but are not limited to; exterior sides of the dwelling, insulation levels, all appliances and their labels, all diagnostic test results, all H&S measures, all potential IRM or deferral reasons, any and all areas where work will be performed and where existing damage is present, etc.

ii. Agencies may store photographs in **electronic client files** with GEFA's written approval vs. printing out all photographs and placing in the client file. Please contact GEFA's WAP Program Manager to receive approval. Some suggestions for storage of photos might be Google Photos, Dropbox, One Drive, etc.

d. Pre-Weatherization Blower Door Testing

i. A pre-blower door test is required on all dwelling units.
   a. Data shall be captured and documented as part of the audit file in hard copy or electronic format.

ii. If environmental, structural, or other reasons prevent a test, it is to be documented in the audit file.

iii. The anticipated reduction under Air Infiltration in the audit tool will be calculated using the attached blower door reduction target table (attachment 1).

Table for Targeting Closure Rate as a Function of Pre-Test CFM at 50 Pa

	Pre-Test CFM															
Volume	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250	4500	4750	5000	5250	5500	5750
2,000	2000	2000	2000	2010	2101	2178	2239	2284	2315	2330	2330	2315	2285	2239	2200	2300
3,000	2000	2000	2000	2051	2151	2237	2309	2366	2409	2437	2451	2450	2436	2407	2363	2305
4,000	2000	2000	2000	2088	2196	2291	2371	2439	2492	2532	2559	2571	2571	2556	2528	2486
5,000	2000	2000	2000	2121	2236	2339	2428	2504	2568	2618	2656	2680	2692	2691	2677	2650
6,000	2000	2000	2017	2151	2273	2382	2479	2564	2636	2696	2744	2779	2802	2813	2811	2797
7,000	2000	2000	2039	2178	2306	2421	2525	2617	2698	2767	2823	2869	2902	2924	2933	2931
8,000	2000	2000	2059	2203	2336	2457	2568	2667	2775	2831	2896	2950	2993	3025	3045	3054
9,000	2000	2000	2077	2226	2364	2490	2607	2712	2806	2890	2963	3025	3077	3117	3147	3166
10,000	2000	2000	2094	2247	2389	2521	2642	2753	2854	2945	3025	3094	3154	3203	3241	3270
11,000	2000	2000	2110	2266	2413	2549	2675	2792	2898	2995	3081	3158	3225	3281	3328	3365
12,000	2000	2000	2124	2284	2434	2575	2706	2827	2939	3041	3134	3217	3290	3354	3409	3453
13,000	2000	2000	2138	2301	2454	2599	2734	2860	2977	3084	3183	3272	3352	3422	3483	3535

   a. The "Infiltration Credit" field on the ASHRAE calculator will be calculated at the same rate as the blower door target number.

   b. The agency will make every reasonable effort to achieve a reduction of at least what is is listed on the blower door reduction target table on the post-blower door CFM50.

   c. If the target reduction from the blower door reduction target table can not be achieved, a reasonable explanation must be included in the audit or on the QCI.

e. ASHRAE Estimate

i. An assessment of the existing ventilation must be conducted as part of each audit, and recorded using the current ASHRAE calculator. Auditors must measure the amount of air each exhaust fan is moving, estimate post-weatherization ventilation needs, and formulate a plan to achieve the needs.

f. Health & Safety Assessment

i. A Health & Safety assessment must be conducted at each dwelling prior to installing any weatherization measures using the GEFA Weatherization Assessment Form. This assessment is to be performed by the Auditor as part of the energy audit. The assessment must identify any actions that need to be taken to maintain the physical well-being of the occupants, to allow weatherization workers to effectively perform weatherization work, and to assess if any health and safety actions will become necessary as a result of weatherization work. Auditors are to complete the Health & Safety section in the GEFA Weatherization Assessment Form in conjunction with the Georgia WAP Health & Safety Plan to conduct the assessment. https://gefa.georgia.gov/document/health-and-safety-plan/download

ii. When a client meets the "At-Risk" definition outlined in the Health and Safety Plan, the auditor must include this information in the Audit Comments section when repairing or installing HVAC or water heaters.

g. Lead Testing

i. Lead testing of all painted surfaces that may potentially be disturbed during the Wx process must be tested in homes built or manufactured before 1978. The lead test will be saved in the client file and the client shall be informed of the testing and the results.

h. Spillage Testing

i. Spillage Testing shall be conducted on all category I and II combustion appliances in every client home as part of the energy audit. The purpose of this test is to document the current venting conditions of any combustion appliances and to determine if any corrective actions or a deferral are necessary.

i. Combustion Analysis & Combustible gas leak testing

i. A Combustion Analysis - shall be performed on ALL combustion appliances at the dwelling regardless of whether they are inside or outside the building envelope, and regardless of the appliances venting type. Auditors shall use the results to determine whether appliances are operating within safe ranges or if corrections are required. Combustion results must be compared to the BPI 1200 (2017) standards http://www.bpi.org/sites/default/files/ANSI%20BPI-1200-S-2017%20Standard%20Practice%20for%20Basic%20Analysis%20of%20Buildings.pdf
Results shall be documented in the Weatherization Assessment Form. A copy of the Combustion Analysis testing and photographs of the diagnostic results shall be included in the audit file.

ii. Gas Leak Testing - All accessible gas supply lines shall be leak tested for gas leaks and the results shall be documented on the Weatherization Assessment Form, appropriate measures shall be taken to address any leaks found per the Georgia WAP Health and Safety Plan.

5. Audit Measure Categories

Everything we do in the Weatherization program shall be categorized in to one of the following measure types: Energy Conservation Measure (ECM), Health & Safety Measure (HSM), or an Incidental Repair

Measure (IRM). The audit drives all work that will be installed in the unit. Items not on the audit, will not be installed or invoiced to GEFA.

a. ECM - Energy Conservation Measure:

i. An ECM is a procedure, including materials and labor, which is considered or performed for its anticipated energy savings (SIR of 1 or greater). An ECM often includes installation of ancillary items but will not include IRMs.

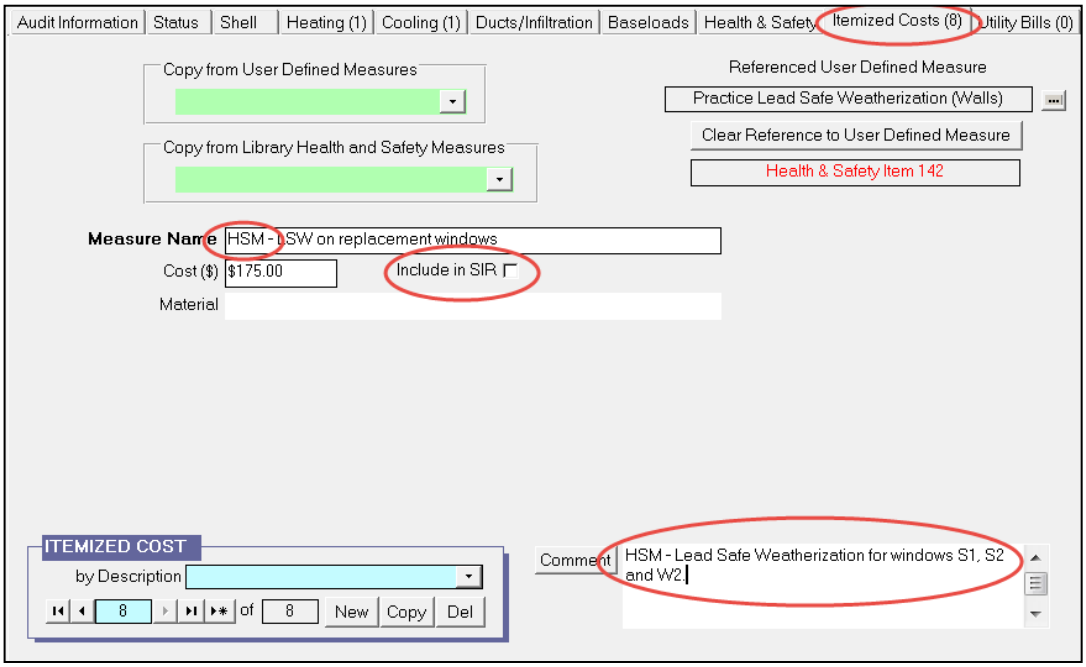
ii. ECMs do not need to be identified on the audit by the naming convention required with IRMs, and HSMs. Allowable ECMs are identified as recommended measures having an SIR of 1 or greater.

b. HSM - Health & Safety Measure:

i. Health and safety measures are those actions necessary to maintain the physical well-being of both the occupants and/or weatherization workers where the *actions MUST be taken to effectively perform weatherization work or the actions are necessary as a result of weatherization work*. The cost of an HSM includes associated materials and labor to install the measure. The cost of HSMs is to be tracked and reported separately, and is not added to the cost of any ECMs or to the cumulative SIR of the package.

ii. Auditors can use the predefined Health & Safety measures listed in the NEAT/MHEA system, and/or create as many User Defined Health & Safety measures as needed, as long as the HSM is an allowable Health & Safety Measure per the Georgia WAP Health and Safety Plan. User defined Health & Safety measures may only be added at the annual Georgia Community Action Agency conference during NEAT/MHEA sessions to ensure consistency.

iii. All HSMs must be included on the energy audit. They will be entered as an Itemized Cost so they appear on the input report under the Additional Measures section. When creating an HSM, the "include in SIR" box will not be selected. HSMs must be identified as an "HSM" in the title of the measure. See example below:

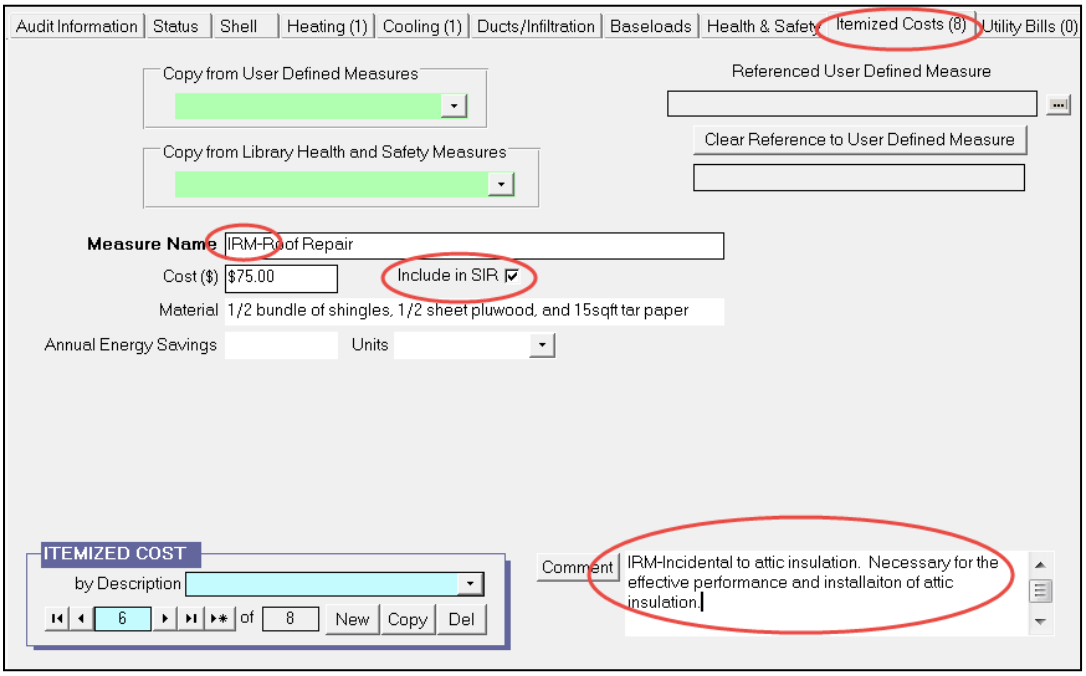


c. IRM - Incidental Repair Measure:

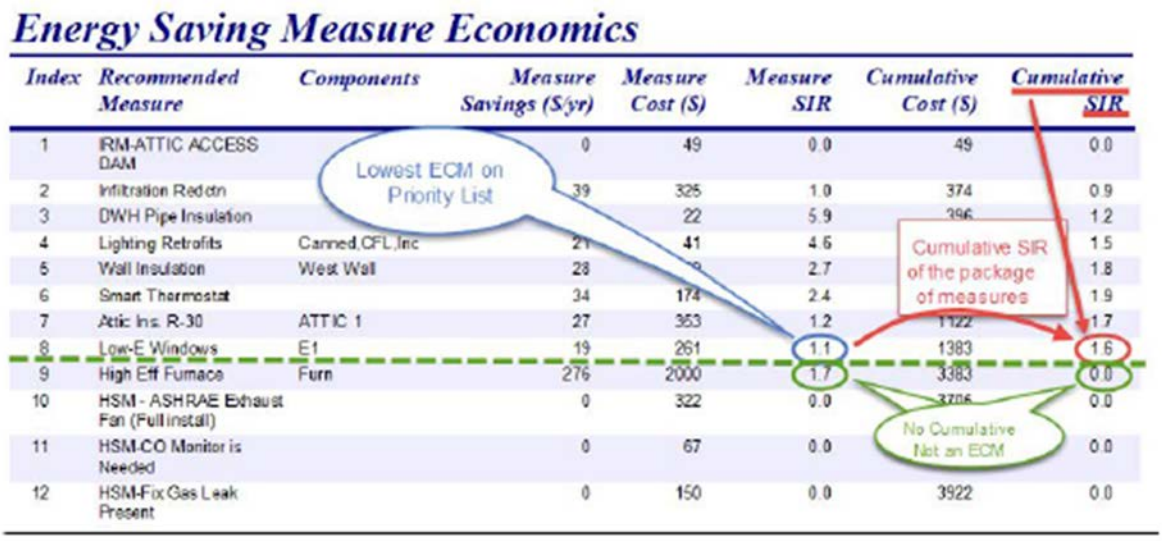
i. Incidental Repair Measures are those repairs which are ***necessary for the effective performance or preservation of one or more ECMs***. The IRM category is intended for a measure that is not typically part of the installation of an ECM, and is outside the manufacturers or industry standard for installation. IRMs either have no energy savings, or are beyond the normal scope of an ECM. Please see the Georgia Health and Safety Plan for more guidance on IRMs. https://gefa.georgia.gov/document/health-and-safety-plan/download

ii. IRMs will be audited as stand-alone measures, and their costs will be separate from ECMs and from HSMs. The cost of an IRM will include incidental repair materials and labor. The IRM costs are not added to an individual or partial group of ECM costs. The total cost of all IRMs is added to the cost of the package of weatherization measures to calculate the whole unit or cumulative SIR. For each weatherized building, the cost of the total package of ECMs, added to the cost of all IRMs for the building, must have a cumulative SIR of 1.0 or greater.

iii. All IRMs must be included on the energy audit. They will be entered as a Itemized Costs so they appear on the input report under the Additional Measures section. The box next to "Include in SIR" must be checked so the measure will be included in the cumulative SIR. IRMs must be identified as an "IRM" in the title of the measure. The comments section must indicate which ECM(s) it is incidental to, along with an explanation of how each IRM is necessary for the effective performance or preservation of the ECM. See example below:



iv. When an IRM is included in a package of measures, an auditor must verify that the Cumulative SIR is 1 or greater. The Cumulative SIR is found under the Energy Savings Measure Economics section of the Recommended Measures report. The cumulative SIR of the package is the cumulative SIR of the lowest ECM on the priority list, or the last ECM on the list. See example below:



v. If a package of measures does not have a qualifying SIR (cumulative SIR is less than 1), it would be necessary to remove the combination of the ECM and its related IRM with the lowest SIR. Agencies should save copies with all measures (ECM's and associated IRM's) in client file, and if measures can NOT meet SIR or cumulative goes below 1.0, this should be documented in the file. If the IRM was deemed necessary for effective performance of the ECM, then both the ECM and the IRM must be

removed in the attempt to meet the dwelling SIR. This process (removing the lowest ECM and its associated IRM) would continue until the package of measures (and each ECM) has a qualifying SIR. If one IRM is necessary to protect or enhance more than one ECM, (e.g. roof repair protecting attic insulation, sidewall insulation, and foundation insulation) then all of those ECMs together must be considered for removal until the SIR for the package of measures is 1.0 or greater. This process may result in deferral of the weatherization work until another funding source can be found to pay for the IRMs.

vi. IRMs must be limited to those minor repairs necessary for effective performance or preservation of measures installed by the Sub-grantee.

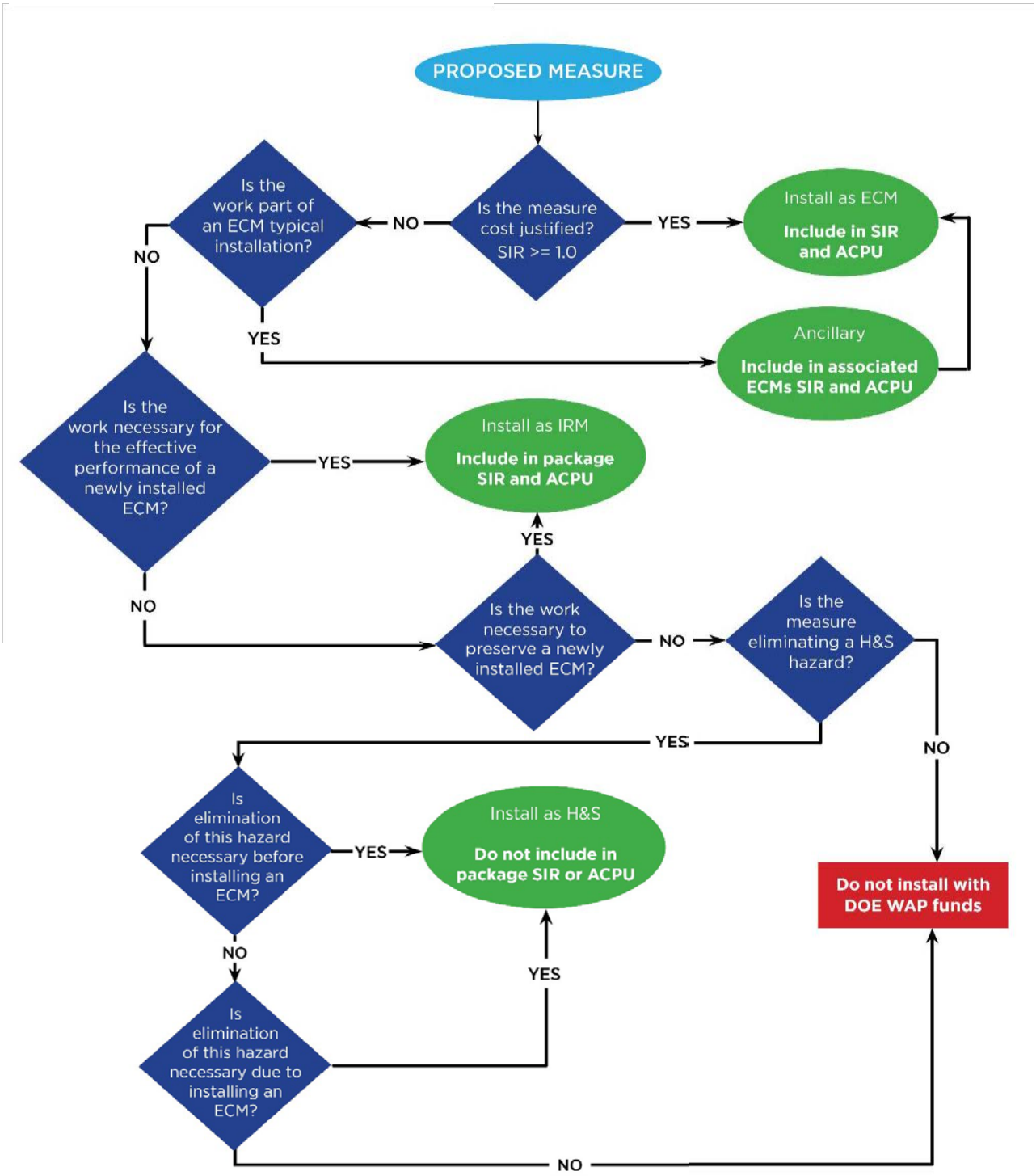
vii. DOE policy relating to the inclusion of IRMs in the package of weatherization measures is summarized as follows:

- Justification for the cost of each IRM and why it is necessary for the effective performance or preservation of an ECM must be documented in the client file with photos and written explanation.

- The total cost of the package of weatherization measures including any IRMs must have a calculated SIR of 1.0 or greater.

Please see WPN 19-5 IRM flow chart on next page.

Attachment 1 - WPN 19-5 Definition Flow Chart



ACRONYMS

ACPU: Average Cost Per Unit
ECM: Energy Conservation Measure
H&S: Health & Safety
IRM: Incidental Repair Measures
SIR: Savings to Investment Ratio

d. User Defined Measures

IRMs and HSMs, can also be created as User Defined Measures in the Setup Library without prior GEFA approval but must follow the approved WAP Health and Safety plan. In addition to the other setup rules listed above, the Energy Savings field will be set to "No Energy Savings."

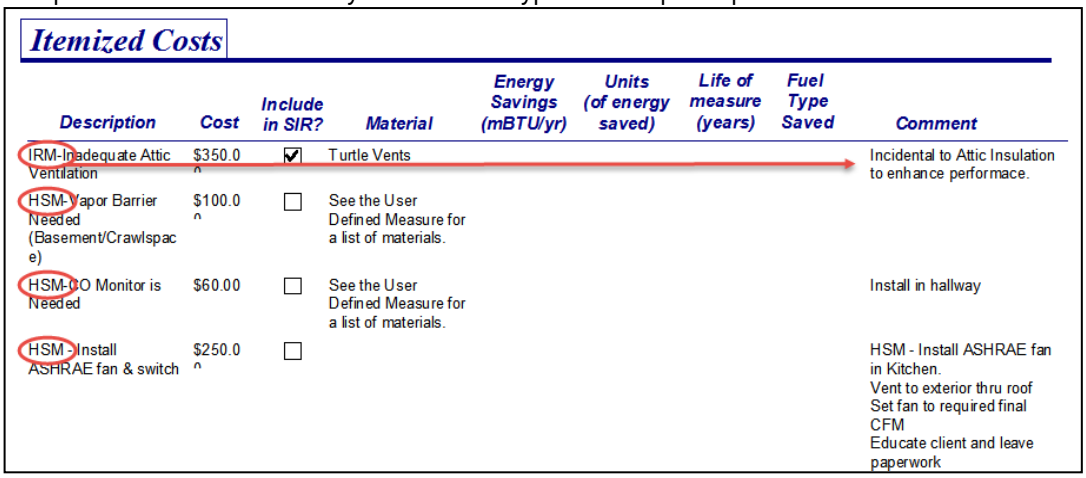
6. Identifying Measures on the Audit

a. Identifying a Measure by Type on Audit: Since the audit is the tool we use to document and justify every measure we install on a dwelling, it is important that every measure shall be identified on the audit as one of the three measure types. Identifying the measure type completes the justification process of an ECM and an HSM, and partially completes the justification process for an IRM. Each Measure is to be identified by type and meet the additional justification requirements listed in Table 1.

b. Table 1. How to Identify and Justify a Measure on the Audit

	ECM Energy Conservation Meausre	HSM Health and Safety Measure	IRM Incidental Repair Measure
How to identify Measure Type on Audit	ECMs appear on Recommended Measures Report with a measure SIR of 1 or greater	Listed as an itemized cost with "HSM" written in front of the measure name and **not** included in SIR calculation.	Listed as an itemized cost with IRM written in front of the measure name and included in the SIR calculation.
Additional justification required	None	None as long as it is an approved HSM in Georgia's Health and Safety plan.	Yes – must document the ECM the IRM is incidental to.

Example 1: Measures identified by the Measure Type on the Input Report



Itemized Costs

Description	Cost	Include in SIR?	Material	Energy Savings (mBTU/yr)	Units (of energy saved)	Life of measure (years)	Fuel Type Saved	Comment
IRM-Inadequate Attic Ventilation	$350.00	☑	Turtle Vents					Incidental to Attic Insulation to enhance performace.
HSM-Vapor Barrier Needed (Basement/Crawlspace)	$100.00	☐	See the User Defined Measure for a list of materials.					
HSM-CO Monitor is Needed	$60.00	☐	See the User Defined Measure for a list of materials.					Install in hallway
HSM - Install ASHRAE fan & switch	$250.00	☐						HSM - Install ASHRAE fan in Kitchen. Vent to exterior thru roof Set fan to required final CFM Educate client and leave paperwork

7. Standard File Formatting

a. Completed audits shall be organized per the Georgia WAP Required File Documentation Checklist available on GEFA's WAP documents website at https://gefa.georgia.gov/energy-resources/weatherization-assistance-program/weatherization-program-documents It is important to keep uniformity across all agency files, to help state and federal agencies determine if the file is complete, and to aid in reviewing of electronic files.

8. FTP File Upload for State QCI Monitoring

a. The state QCI monitor will notify the agency at least 15 days in advance of a monitoring visit. Agencies will be required to load complete Client files to the GEFA FTP Site located here https://ftp.gefa.ga.gov/EFTClient/Account/Login.htm at least five business days prior to the site visit. These FTP client file uploads will be organized in the same format as the Georgia WAP Required File Documentation Checklist. If the agency has received prior written approval from GEFA to store photographs digitally, then digital photographs should be uploaded.

9. Standard Audit Settings and Methods

a. Audit Information

The following information will be used to determine which selections will be made on the Audit Information Tab:

i. Setup Library—Select the library that was effective on the work-start date (the date the on-site audit was started). Auditors will ensure the setup library complies with all settings listed herein.

ii. Fuel Cost Library—Select the library that was effective on the work-start date.

iii. Supply Library—Select the library that was effective on the work-start date.

iv. Weather File—Select closest weather station.

b. Shell

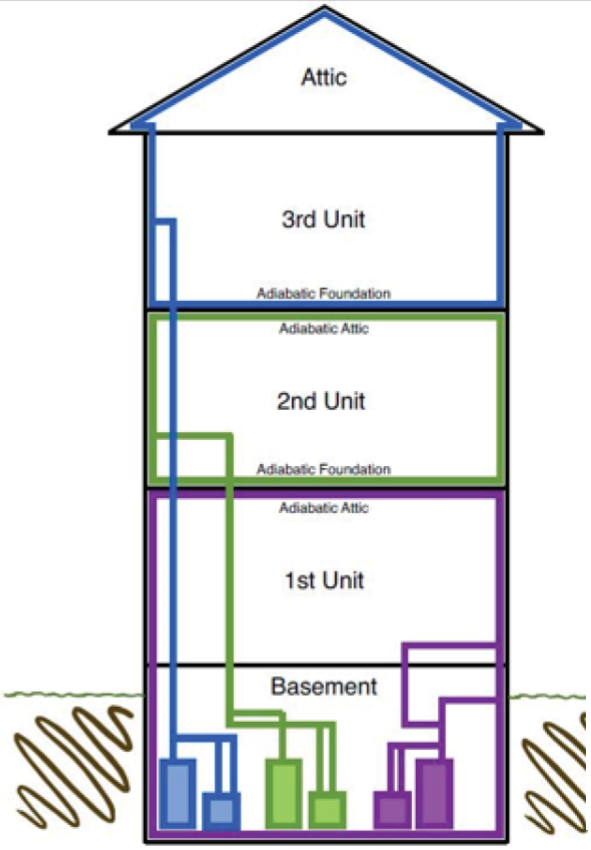
The Shell tab and its respective sub-tabs will be used to enter all aspects of the thermal boundary so the audit can accurately evaluate dwelling energy loads, and determine which opportunities to improve the thermal boundary will be cost effective.

c. Walls

i. Information about each wall on the thermal boundary of a dwelling will be gathered and input into the audit. *This excludes walls associated with a foundation, or a finished or unfinished attic.*

ii. Shared walls on multifamily buildings such as townhomes, duplexes, etc of 4 units or less, must only use the exterior walls of each unit and not adiabatic surfaces in the audit. See diagram on next page.

- As described to the right, each unit is visually separated by different color lines. Each unit is modeled separately which is necessary for the energy modeling to properly calculate (heat loss, savings-to-investment, etc.).
- The term "Adiabatic" means no heat transfer. This term should be used to model surfaces that join with other heated areas (i.e. heated apartments).
- The middle floor ("2nd Unit), should contain two adiabatic surfaces. The foundation and the attic.
- All basement characteristics should be modeled ONLY for the 1st unit.



iii. Inputs will accurately reflect the building type, orientation, surface area and existing insulation type and thickness.

iv. Whenever possible the audit will determine if wall insulation will be added.

v. Auditors will select the most cost effective insulation type to be added.

vi. If the wall cavity is already filled with insulation or it is not feasible to install additional insulation, Auditors can select "None" for the Added Insulation Type and will note the condition in the comment section. Copies of thermal imaging is highly recommended to be included in client file with the initial audit.

vii. If there is no wall cavity, and the interior side of the wall is finished, Auditors can select "None" for the Added Insulation Type and will note the condition in the comment section. Copies of thermal imaging is highly recommended to be included in client file with the initial audit.

d. Windows

i. Information about each window on the thermal boundary of a dwelling will be gathered and input into the audit.

ii. Each window will be set to "evaluate all" to ensure the window is evaluated for both weatherization and replacement with a Low-E window unless excluded in iii., or iv. below.

iii. All windows on the thermal boundary must be evaluated for replacement on the audit unless they are:
   a. in a bedroom which does not have a window that meets egress,

   b. or they are double paned low-e windows in excellent condition.

iv. All windows on the thermal boundary must be evaluated for weatherization or air sealing on the audit unless they are:
   a. in excellent operating condition and there are no opportunities to air seal the window.

v. Basement Windows: Only basement windows in a conditioned basement on the thermal boundary should be evaluated on the audit. To evaluate, the auditor should create an additional wall with a surface area 2 to 5 feet larger than the total surface area of all of the basement windows. Label the wall “BSMT Windows”. Orient the wall to the direction with the majority of the basement windows. And assign all the basement windows to that wall.

vi. Egress: When none of the windows in a bedroom meets egress, the window(s) in that room cannot be replaced by weatherization. Auditors should still evaluate the window(s) to be sealed or weatherized by choosing Weatherize in the retrofit options field. And it should be noted in the comment field that the windows in that room do not meet egress.

vii. LSW for Windows: the cost of Lead Safe Weatherization for windows should never be included in the window ECM. When LSW is required, it should be included on the audit as one HSM for all the Windows requiring LSW.

viii. Methods for evaluating windows: There are two methods for estimating window cost. By Square foot (NEAT) and United Inch (MHEA), or by inputting the Actual Cost of each window.

   a. SqFt/United Inch: Calculate the agencies average cost per SqFt for the NEAT and United Inch for the MHEA and enter these into the Setup Library under Costs on the Library Measures tab. List the typical Labor and Other costs respectively. If the Additional costs field is used to adjust the cost of any windows, an explanation must be provided in the comment section.

   b. Actual Cost: In the Setup Library, under Costs on the Library Measures tab, leave the Windows and Labor costs at zero, and set the other cost to include the average cost of labor and ancillary items (typically $50). Then use the Additional Costs field for each window on the audit to include the actual cost of the window. If the Actual Cost method is used an explanation

in the comment section is not required. *This is one of the few times an explanation is not required for additional costs listed.

e. Doors

Information about each door on the thermal boundry of a dwelling should be gathered and input into the audit. All doors on the thermal boundry must be evaluated for replacement on NEAT audits by including the door type, condition, and leakiness.

i. WINDOW AND DOOR REPAIRS: Window and door repairs are allowable as IRMs to preserve the integrity of the associated ECM(s), when they meet the definitions and requirements of IRMs listed above.

ii. Window or door repairs are only allowable as an ancillary cost to an ECM that would typically require such a repair as a part of the ECM installation.

iii. WINDOW AND DOOR REPLACEMENTS: Window and door replacement(s) must first be modeled and treated as ECM(s) if cost justified. Window and door replacements shall not be included in the air sealing ECM. Window and door replacements are allowable as IRMs to preserve the integrity of the associated ECM(s), when they meet the definitions and requirements of IRMs listed above.

iv. LSW for Doors: the cost of Lead Safe Weatherization for doors should never be included in the door ECM. When LSW is required, it should be included on the audit as an HSM. If a door is being replaced as an IRM, the cost of LSW for that door should be included in the IRM.

v. Replacing Doors with Glass: The goal of replacing a door is to increase the thermal resistance and air tightness of that door. If an existing door on the thermal boundry has glass in it, the auditor can evaluate to replace the door with a more energy efficient door with glass similar to the existing door. The glass in the replacement door must be double paned, Low-e glass and the door must audit with an SIR of 1 or greater. If a door with similar glass does not have the required SIR, the audit should be re-run with a replacement door without glass. If a replacement door has glass in it, a photo of the existing door must be included in audit photos.

vi. If a client refuses the replacement of a door on the thermal boundry, the auditor should evaluate the situation to determine if the declined measure is allowable and should document the situation accordingly.

vii. Sliding glass doors should be evaluated as windows on the Windows tab.

f. Attics

Information about all attics that are part of the thermal boundry shall be gathered and input into the audit. When there are multiple attics, or attics of differing types or materials, auditors should create multiple attics and evaluate each to complete the thermal boundary.

i. The auditor shall identify the existing insulation type(s) and depth(s).

ii. Wherever possible the Audit shall determine how much attic insulation shall be added. Auditors should select the added insulation Measure and Type, but should not enter anything in the Added R Value or Max Depth fields. These fields should be left blank whenever possible so the audit will determine how much insulation to add.

iii. If there is more than one type of existing insulation, the type that best represents the majority of the existing insulation shall be selected, and the depth shall be the combined depth of each type of insulation.

iv. If there are large sections of an attic (> 30sq ft) where the insulation type or the average depth differs substantially from another, each section should be entered into the audit as a separate attic. Auditor may use an average R-value if REDcalc is used and documented in the job file (each area shown in the attic diagram). https://www.redcalc.com/parallel-path-r-value/

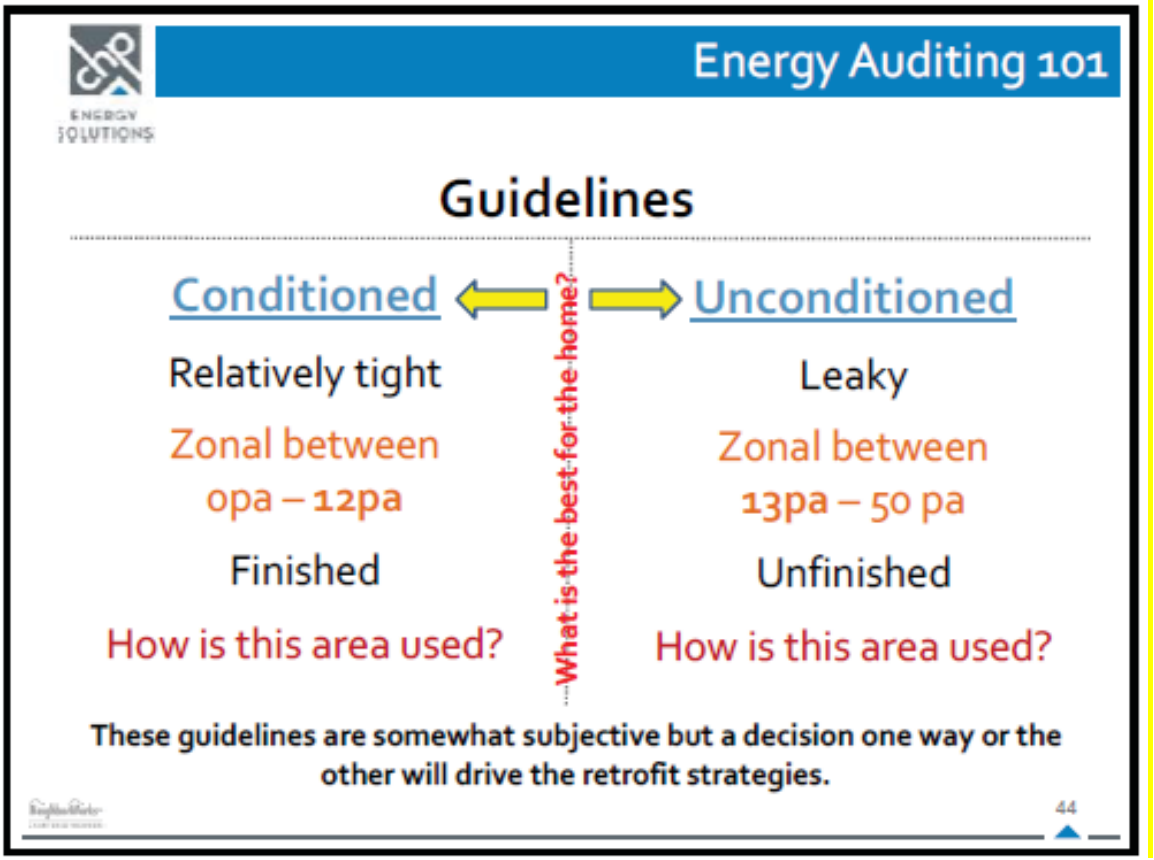
v. As a best practice, dwellings with finished attics, or mulitiple attics should include a diagram showing each attic listed on the audit.

g. Foundations

Information about all foundations that are part of the thermal boundry shall be gathered and input into the audit. Where there are multiple foundations, or foundations of differing types or materials, auditors should create multiple foundations and evaluate each to complete the thermal boundary. When evaluating foundations, the goal is to choose the strategy that will allow you to complete the thermal and air boundary as much as possible, or the strategy that provides maximum allowable completion.

i. The auditor shall identify the existing insulation type(s) on the audit.

ii. The auditor shall determine the best location of the foundation thermal and air boundary.



iii. The air sealing, or infiltration reduction strategy must align with the thermal boundary strategy selected.

iv. When the thermal strategy is evaluated, if the NEAT/MHEA leaves a substantial portion of the thermal and/or air boundary incomplete, the auditor must provide additional documentation to show how the strategy selected provides maximum allowable completion.

v. Whenever possible, the Audit tool should determine how much insulation shall be added.

vi. As a best practice, dwellings with multiple foundations should include a diagram documenting each foundation listed in the audit.

h. Appliance Specs (HVAC, Water Heater, Refrigerator)

Wherever possible the manufacturer's specifications for the appliance inputs, outputs, efficiency, consumption, etc. shall be used in the energy audit. If this data cannot be found on the nameplate of the appliance, in the Preston's Guide, or the manufacturer's website, auditors must document how the Specifications were derived in the comment section for the appliance.

I. The Shipped from Factory ratings should be used whenever possible.

II. Derating Heating and Cooling Systems must follow the guidance in WPN 19-4. When addressing a system that utilizes a compressed refrigerantt cycle to provide heating or cooling the following derating formula may be used.
Degraded Efficiency = (Base EFF)*.99_{age}
Where:
- Base EFF = Typical efficiency of pre-retrofit equipment when new Seasonal Energy Efficiency Ratio (SEER), Energy Efficiency Ratio (EER), or Heating Seasonal Performance Factor (HSPF)
- Age = Age of equipment in years

i. Heating

Information about each heating system on a dwelling will be gathered and input into the audit. The Heating tab of the audit must represent the type of heating system which will be in operation ***post-weatherization*** regardless of whether the heating system will be replaced as an ECM or HSM. This will ensure the SIR of all measures tied to the heat load is properly calculated since the heat load is determined by the post-weatherization furnace.

i. Heating Replacement as an ECM: To properly evaluate a dwelling, the existing heating system must be listed, along with a reasonable replacement option. The replacement option selected must be an active and allowable measure. The replacement info must be entered regardless of the age or condition of the existing heating system. If the existing system is a brand new 96% efficient furnace, auditors still need to enter in a replacement to show that replacing the furnace will not have a payback.

ii. Heating Replacement as a HSM: The replacement system will be audited first using the "Evaluate All" option to see if the furnace can be replaced as an ECM--(except for fuel conversions). If a Heating system replacement does not have an SIR of 1 or greater, and it is determined that it is necessary to replace the system based on other reasons per Georgia's Health and Safety Plan, then the Heating system will be replaced as a HSM. To replace the system as a HSM, the auditor should:
   a. select the appropriate mandatory Replacement System Option in the Replacement System Options field. *Note: This is one instance where it is permissible to select "replacement mandatory" from the measure options.*

   b. leave the Include in SIR box Un-checked.

   c. Change the name of the System Code to "HSM".

iii. Heating Replacement with funding other than DOE: The replacement heating system must be entered into the energy model to ensure accurate calculations of proposed ECM's.

iv. Fuel Conversion: DOE funds will never be used to pay for a Fuel Conversion.

a. If an auditor thinks that a fuel conversion is to be done on the home, the auditor must contact GEFA for prior written approval. Since the NEAT Audit limits the replacement options to only those heating systems that will work with the primary heating fuel, auditors will have to work around the audit by selecting an existing furnace type similar to the type of furnace to be installed, which will allow the appropriate Replacement system to be selected. Then use the comments field to document what the actual existing heat source is, and that a fuel conversion is allowable with prior written state approval.

v. Fireplace as the Primary Heat Source:

a. If a fireplace is the primary source of heat for a dwelling, the following imputs should be used.
Input Units: Lbs per hour
Input Rating: 8
Output Capacity: 32 kBTU/hr
Steady State Efficiency: 50%

b. In homes where the fireplace is not the primary source of heat, it is not necessary to simulate a fire as part of the Spillage test. If there is a natural draft appliance in the home, it should be noted on the Health & Safety Assessment that using the fireplace could cause the appliance to backdraft. Appropriate Client education should be administered, and signed for by the client.

vi. Duct Insulation

All uninsulated duct located outside the thermal envelope will be evaluated to be insulated using the NEAT audit, and will be insulated when using the MHEA audit.

a. MHEA: Since there is not a way to evaluate duct to be insulated using the MHEA, all un-insulated duct located outside the thermal envelope shall be insulated as part of a belly or attic Insulation measure.

b. NEAT: All uninsulated supply and return ducts will be evaluated using the “Uninsulated Supply Ducts” section of the heating tab, even though the button label in the audit says, “Uninsulated Supply Ducts”.

c. NEAT: If more than three uninsulated duct sizes are present, similar duct sizes should be combined so that all uninsulated duct will be represented in the three spaces provided in the audit.

d. NEAT: Duct can be combined by averaging the size to represent the total surface area of the uninsulated duct (i.e. 10’ of 6” round duct and 10’ of 8” round duct can be combined and listed as 20’ of 7” round duct).

e. NEAT: Since only one location can be selected, Attic or Subspace, the location with the majority of the uninsulated duct should be chosen.

f. Uninsulated Duct on secondary HVAC systems which will be operable Post-Weatherization should be evaluated to be insulated using NEAT, and should be insulated using MHEA.

g. Uninsulated duct in a crawl-space that is inside the thermal envelope (or will be post-Wx) can be evaluated to be insulated (NEAT).

j. Cooling

Information about each cooling system on a dwelling will be gathered and input into the audit. The Cooling tab of the audit must represent the type of cooling system which will be in operation post-weatherization regardless of whether the cooling system will be replaced as an ECM, a HSM, or not at all. This will ensure the SIR of all measures tied to the cooling load is properly calculated since the cooling load is determined by the post-weatherization equipment. Client file should include an AHRI certification for the replacement system. Air conditioning systems being replaced should meet the following applicable efficiency levels

i. AC > 14.5 SEER / 12 EER
ii. Heat Pump > 14.5 SEER / 12 EER air-source heat pump
iii. Replacement system must be properly sized to the improved condition of the home in accordance with NEAT, ACCA Manual J, or other approved methods.
iv. If existing system does not have a label, reference table on next page to determine SEER rating.

Heating and Cooling Efficiencies Based on Manufactured Date

March 20, 2015

Manufactured Date	Cooling Efficiency				Heat Pump Heating Efficiency
	Central Air Conditioner or Heat Pump	Room or Window Air Conditioner			
	(SEER)	(EER)	(SEER)[1]	(SEER)[2]	(HSPF)
<1970	6.0	6.0	5.5	6.5	5.0
1970	6.0	6.0	5.5	6.5	5.0
1971	6.1	6.0	5.5	6.5	5.2
1972	6.3	6.0	5.5	6.5	5.2
1973	6.5	6.1	5.6	6.7	5.3
1974	6.6	6.3	5.7	6.8	5.4
1975	6.8	6.4	5.9	7.0	5.4
1976	7.0	6.5	6.0	7.1	5.5
1977	7.2	6.7	6.1	7.3	5.6
1978	7.4	6.8	6.2	7.4	5.6
1979	7.5	6.9	6.3	7.6	5.7
1980	7.7	7.0	6.4	7.8	5.8
1981	7.9	7.2	6.6	7.9	5.8
1982	8.1	7.3	6.7	8.1	5.9
1983	8.2	7.4	6.8	8.2	6.0
1984	8.4	7.6	6.9	8.4	6.1
1985	8.6	7.7	7.0	8.5	6.1
1986	8.8	7.8	7.1	8.7	6.2
1987	9.0	8.0	7.3	8.8	6.3
1988	9.1	8.1	7.4	9.0	6.3
1989	9.3	8.2	7.5	9.2	6.4
1990	9.5	8.3	7.6	9.3	6.5
1991	9.7	8.5	7.7	9.5	6.5
1992	9.9	8.6	7.8	9.6	6.6
1993	10.0	8.7	8.0	9.8	6.7
1994	10.2	8.9	8.1	9.9	6.7
1995	10.4	9.0	8.2	10.1	6.8
1996	10.6	9.0	8.2	10.1	6.9
1997	10.7	9.0	8.2	10.1	6.9
1998	10.8	9.0	8.2	10.1	7.0
1999	10.9	9.0	8.2	10.1	7.1
2000	11.0	9.25	8.4	10.4	7.2
2001	11.1	9.5	8.7	12.1	7.2
2002	11.1	9.75	8.9	11.0	7.3
2003	11.2	9.75	8.9	11.0	7.3
2004	11.6	9.75	8.9	11.0	7.4
2005	11.9	9.75	8.9	11.0	7.5
2006	12.3	9.75	8.9	11.0	7.6
2007	12.7	9.75	8.9	11.0	7.6
2008	13.0	9.75	8.9	11.0	7.7
>2008	13.0	9.75	8.9	11.0	7.7

[1]Fan runs continuously (assumed in Version 8.3)

[2]Fan runs only when cooling

Below are the equations used in the Weatherization Assistant's National Energy Audit Tool (NEAT) on the Heating and Cooling forms to convert a manufactured date for a heat pump or air conditioner into an efficiency. These equations were used to develop the values in the preceding table.

Central Air Conditioner or Heat Pump Cooling Efficiency (SEER)

1970 and earlier	SEER = 6.0
1971 – 1996	SEER = [(year manufactured - 1990) x 0.1786] + 9.5
1997 - 2002	SEER = [(year manufactured - 1997) x 0.075] + 10.75
2003 - 2007	SEER = [(year manufactured - 2003) x 0.36] + 11.2
2008 and later	SEER = 13.0

Heat Pump Heating Efficiency (HSPF)

1970 and earlier	HSPF = 5.0
1971 - 2007	HSPF = [(year manufactured - 1976) x 0.06875] + 5.5
2008 and later	HSPF = 7.7

Room (Window) Air Conditioner Cooling Efficiency (EER)

1972 and earlier	EER = 6.0
1973 - 1994	EER = [(year manufactured - 1972) x 0.1304] + 6.0
1995 - 1998	EER = 9.0
1999 - 2001	EER = [(year manufactured - 1999) x 0.25] + 9.0
2002 and later	EER = 9.75

Conversion of Room Air Conditioner EER to SEER

SEER = (EER x 0.9) + 0.1	Fan runs continuously (assumed in Version 8.3)
SEER = (EER x 1.2) – 0.7	Fan runs only when cooling

Home Energy Saver Equipment Efficiencies

Lawrence Berkeley National Laboratory
http://hes-documentation.lbl.gov/calculation-methodology

Heating and Cooling Equipment Efficiencies - Legacy System

In the detailed inputs level of the model, users can select the purchase year for their heating and cooling systems as an alternative to entering an efficiency value for the equipment. In these cases, we derive a shipment-weighted efficiency based on the purchase year of the equipment. A shipment-weighted efficiency is the average efficiency for all units sold within a particular year weighted by the number of units in each efficiency bin (AHAM 1996). Efficiencies for furnaces are measured as AFUE, or Annual Fuel Utilization Efficiency rating, which represents the seasonal or annual efficiency of the furnace. Heat pumps efficiency is shown as HSPF, Heating Seasonal Performance Factor.

The cooling efficiency for Central Air Conditioners and Electric Heat Pumps are rated by the seasonal efficiency of the equipment or SEER. Room Air Conditioners are rated by EER or Energy Efficiency Ratio, the ratio of the cooling output (in BTU) divided by the electrical energy consumption (in watt-hours).

Green shaded values did not have data available so the last available year is copied forward.

Yellow shaded values did not have data available so the first available year is copied backward.

Heating Equipment Efficiencies

Year	Gas Furnace (AFUE)	Electric Furnace (AFUE)	Oil Furnace (AFUE)	Propane Furnace (AFUE)	Gas Boiler (AFUE)	Oil Boiler (AFUE)	Heat Pump (HSPF)	Wall Furnace (AFUE)
1970	60.0	98	70.0	60.0	70.0	72.0	6.21	50.0
1971	61.4	98	71.8	61.4	71.2	73.6	6.21	54.8
1972	62.7	98	73.6	62.7	72.3	75.2	6.21	59.5
1973	62.7	98	73.6	62.7	72.3	75.2	6.21	59.5
1974	62.7	98	73.6	62.7	72.3	75.2	6.21	59.5
1975	65.8	98	73.6	62.7	72.3	75.2	6.21	59.5
1976	66.1	98	74.1	63.0	72.3	75.2	6.21	59.5
1977	66.4	98	74.5	63.3	72.3	75.2	6.21	59.5
1978	66.7	98	75.0	63.6	72.3	75.2	6.21	59.5
1979	68.7	98	75.5	64.8	72.3	75.2	6.21	59.5
1980	70.6	98	76.0	65.9	72.3	75.2	6.21	59.5
1981	70.4	98	76.8	67.1	77.4	77.4	6.21	63.1
1982	70.3	98	77.5	68.4	77.4	77.4	6.21	63.1
1983	70.1	98	78.3	69.6	77.4	77.4	6.20	63.1
1984	72.6	98	78.6	73.0	77.4	77.4	6.36	63.1
1985	72.9	98	78.6	73.8	77.4	77.4	6.39	63.1
1986	73.7	98	79.6	74.3	78.2	81.6	6.55	64.2
1987	74.3	98	79.8	75.1	78.2	81.6	6.71	64.2
1988	74.9	98	80.4	75.8	78.2	81.6	6.88	64.2
1989	74.7	98	80.4	75.5	79.7	83.1	6.92	65.6
1990	76.7	98	80.3	75.7	79.7	83.1	7.03	65.6
1991	77.5	98	80.8	76.9	79.7	83.1	7.06	65.6
1992	82.1	98	80.8	83.2	79.7	83.1	7.10	65.6
1993	82.4	98	80.9	83.8	79.7	83.1	7.10	65.6
1994	82.4	98	80.9	83.9	79.7	83.1	7.10	65.6
1995	82.3	98	80.9	84.1	79.7	83.1	7.10	65.6
1996	82.7	98	80.9	84.1	79.7	83.1	7.40	65.6
1997	82.9	98	80.9	84.1	79.7	83.1	7.10	65.6
1998	82.6	98	80.9	84.1	79.7	83.1	7.40	65.6
1999	82.6	98	80.9	84.1	79.7	83.1	7.40	65.6
2000	82.6	98	80.9	84.1	79.7	83.1	7.40	65.6
2001	83.1	98	80.9	84.1	79.7	83.1	7.40	65.6
2002	83.1	98	80.9	84.1	79.7	83.1	7.40	65.6
2003	83.5	98	80.9	84.1	79.7	83.1	7.40	65.6
2004	83.6	98	80.9	84.1	79.7	83.1	7.40	65.6
2005	83.9	98	80.9	84.1	79.7	83.1	7.40	65.6
2006	84.0	98	80.9	84.1	79.7	83.1	7.90	65.6
2007	84.1	98	80.9	84.1	79.7	83.1	7.90	65.6
2008	84.8	98	80.9	84.1	79.7	83.1	7.90	65.6
2009	84.8	98	80.9	84.1	79.7	83.1	7.90	65.6
2010	84.8	98	80.9	84.1	79.7	83.1	7.90	65.6

Cooling System Efficiencies

Year	Room AC (EER)	Central AC (SEER)	Heat Pump (SEER)
1970	5.80	6.50	5.50
1971	5.89	6.58	5.86
1972	5.98	6.66	6.21
1973	6.00	6.75	6.21
1974	6.10	6.85	6.21
1975	6.20	6.97	6.21
1976	6.40	7.03	6.87
1977	6.55	7.13	6.89
1978	6.72	7.34	7.24
1979	6.87	7.47	7.34
1980	7.02	7.55	7.51
1981	7.06	7.78	7.7
1982	7.14	8.31	7.79
1983	7.29	8.43	8.23
1984	7.48	8.66	8.45
1985	7.70	8.82	8.56
1986	7.80	8.87	8.70
1987	8.06	8.97	8.93
1988	8.23	9.11	9.13
1989	8.48	9.25	9.26
1990	8.73	9.31	9.46
1991	8.80	9.49	9.77
1992	8.88	10.46	10.60
1993	9.05	10.56	10.86
1994	8.97	10.61	10.94
1995	9.03	10.68	10.97
1996	9.08	10.68	11.00
1997	9.09	10.66	10.97
1998	9.08	10.92	11.29
1999	9.07	10.96	11.29
2000	9.30	10.95	11.21
2001	9.63	11.07	11.30
2002	9.75	11.07	11.31
2003	9.75	11.19	11.46
2004	9.71	11.29	11.56
2005	9.95	11.32	11.60
2006	10.02	13.17*	13.17*
2007	9.81	13.66	13.66
2008	9.93	13.76	13.76
2009	9.93	13.76	13.76
2010	9.93	13.76	13.76

*New Federal CAC/HP standard took effect January 23, 2006. Standard level is 13 SEER. Because no SWEF data are available since 2003 that splits out CAC from HP, both products are set to the average for the combined product class (per AHRI data for DOE rulemaking).

Derating Efficiency by Age with 0.99 Maintenance Factor

Age	Installed SEER										
	6	7	8	9	10	11	12	13	14	15	16
1	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	15.8
2	5.9	6.9	7.8	8.8	9.8	10.8	11.8	12.7	13.7	14.7	15.7
3	5.8	6.8	7.8	8.7	9.7	10.7	11.6	12.6	13.6	14.6	15.5
4	5.8	6.7	7.7	8.6	9.6	10.6	11.5	12.5	13.4	14.4	15.4
5	5.7	6.7	7.6	8.6	9.5	10.5	11.4	12.4	13.3	14.3	15.2
6	5.6	6.6	7.5	8.5	9.4	10.4	11.3	12.2	13.2	14.1	15.1
7	5.6	6.5	7.5	8.4	9.3	10.3	11.2	12.1	13.0	14.0	14.9
8	5.5	6.5	7.4	8.3	9.2	10.2	11.1	12.0	12.9	13.8	14.8
9	5.5	6.4	7.3	8.2	9.1	10.0	11.0	11.9	12.8	13.7	14.6
10	5.4	6.3	7.2	8.1	9.0	9.9	10.9	11.8	12.7	13.6	14.5
11	5.4	6.3	7.2	8.1	9.0	9.8	10.7	11.6	12.5	13.4	14.3
12	5.3	6.2	7.1	8.0	8.9	9.8	10.6	11.5	12.4	13.3	14.2
13	5.3	6.1	7.0	7.9	8.8	9.7	10.5	11.4	12.3	13.2	14.0
14	5.2	6.1	6.9	7.8	8.7	9.6	10.4	11.3	12.2	13.0	13.9
15	5.2	6.0	6.9	7.7	8.6	9.5	10.3	11.2	12.0	12.9	13.8
16	5.1	6.0	6.8	7.7	8.5	9.4	10.2	11.1	11.9	12.8	13.6
17	5.1	5.9	6.7	7.6	8.4	9.3	10.1	11.0	11.8	12.6	13.5
18	5.0	5.8	6.7	7.5	8.3	9.2	10.0	10.8	11.7	12.5	13.4
19	5.0	5.8	6.6	7.4	8.3	9.1	9.9	10.7	11.6	12.4	13.2
20	4.9	5.7	6.5	7.4	8.2	9.0	9.8	10.6	11.5	12.3	13.1

Age	Installed HSPF										
	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
1	5.0	5.4	5.9	6.4	6.9	7.4	7.9	8.4	8.9	9.4	9.9
2	4.9	5.4	5.9	6.4	6.9	7.4	7.8	8.3	8.8	9.3	9.8
3	4.9	5.3	5.8	6.3	6.8	7.3	7.8	8.2	8.7	9.2	9.7
4	4.8	5.3	5.8	6.2	6.7	7.2	7.7	8.2	8.6	9.1	9.6
5	4.8	5.2	5.7	6.2	6.7	7.1	7.6	8.1	8.6	9.0	9.5
6	4.7	5.2	5.6	6.1	6.6	7.1	7.5	8.0	8.5	8.9	9.4
7	4.7	5.1	5.6	6.1	6.5	7.0	7.5	7.9	8.4	8.9	9.3
8	4.6	5.1	5.5	6.0	6.5	6.9	7.4	7.8	8.3	8.8	9.2
9	4.6	5.0	5.5	5.9	6.4	6.9	7.3	7.8	8.2	8.7	9.1
10	4.5	5.0	5.4	5.9	6.3	6.8	7.2	7.7	8.1	8.6	9.0
11	4.5	4.9	5.4	5.8	6.3	6.7	7.2	7.6	8.1	8.5	9.0
12	4.4	4.9	5.3	5.8	6.2	6.6	7.1	7.5	8.0	8.4	8.9
13	4.4	4.8	5.3	5.7	6.1	6.6	7.0	7.5	7.9	8.3	8.8
14	4.3	4.8	5.2	5.6	6.1	6.5	6.9	7.4	7.8	8.3	8.7
15	4.3	4.7	5.2	5.6	6.0	6.5	6.9	7.3	7.7	8.2	8.6
16	4.3	4.7	5.1	5.5	6.0	6.4	6.8	7.2	7.7	8.1	8.5
17	4.2	4.6	5.1	5.5	5.9	6.3	6.7	7.2	7.6	8.0	8.4
18	4.2	4.6	5.0	5.4	5.8	6.3	6.7	7.1	7.5	7.9	8.3
19	4.1	4.5	5.0	5.4	5.8	6.2	6.6	7.0	7.4	7.8	8.3
20	4.1	4.5	4.9	5.3	5.7	6.1	6.5	7.0	7.4	7.8	8.3

Option 1: De-rated Efficiency = Original Rating X 0.99^age

Option 2: De-rated Efficiency = (Original Rating) X (1 - 0.01)^age

k. Ducts/Infiltration

i. Infiltration Reduction Strategy: Each audit must contain a written strategy for reducing air infiltration at the thermal boundary by using the attached blower door reduction target table . The Air sealing strategy will align with the thermal boundary strategy. On most homes this can be documented in the comments section of the "Ducts/Infiltration" tab of the NEAT/MHEA audit. More complex single-family and multi-family homes may require diagrams to document the strategy. A diagram is recommended on all homes as a best practice.

ii. Auditors are required to:

a. Measure and document the total leakage of the home using a blower door.

b. Use blower door and other methods listed in the Georgia Field Guide to identify air-sealing opportunities.

c. Air-sealing opportunities will be prioritized in the following order:

i. Opportunities that can be addressed in conjunction with the thermal boundry strategy

ii. Between the conditioned space and the attic

iii. Between the conditioned space and attached garage

iv. Between the conditioned space and the basement or crawl space

v. Between the conditioned space and outside (Lowest Priority)

d. Formulate a cost-effective strategy to reduce air infiltration, based on the prioritization of the air-sealing opportunities and the budget of the measure.

e. Document the strategy in the comments section of the Ducts/Infiltration tab.

iii. Duct Sealing

As a best practice Duct Leakage should be evaluated for reduction on all homes.

a. The goal is to achieve a 1.0 pascal or less for each supply and return register reading. If the goal cannot be achieved, an explanation will be documented on the audit or in the production notes.

b. Duct Sealing and Infiltration Reduction will be evaluated as separate measures. The additional duct leakage information allows the audit to more accurately calculate energy savings, and generally allows for a greater investment in the two measures.

   i. Duct Leakage Method for a NEAT audit can be Whole House Blower Door Measurements or Duct Blower Measurements.

   ii. Duct Leakage Method for a MHEA audit is the Pressure Pan Measurement.

iv. Duct Leakage Testing

a. Duct Leakage Testing will be conducted on all dwellings with ducts.

b. As a Best Practice, auditors will measure duct leakage and use the audit to evaluate the energy savings of sealing the ducts separate from other Air Infiltration Reduction costs.

c. There are several approved methods for measuring Duct Leakage: Whole House Blower Measurements Method, Duct Blaster Measurements Method, or Pressure Pan Measurements Method.

d. Whole House Blower Measurements Method:

   i. To perform Whole House Blower Door measurement, enter the initial audit blower door reading in the Air leakage Rate (cfm)/ Before Weatherization (Existing) box.
   ii. Enter the target ending blower door reading in the Air Leakage Rate (cfm)/ After Weatherization (target or actual) box.
   iii. The Before Weatherization (existing) and After Weatherization (target or actual) input reading should be entered.
   iv. The After Weatherization reading may be the target.
   v. Click enter to accept the default value.

e. Duct Blaster Measurements Method:

   vi. Both Supply and Return static pressures need to be measured in the field. Typically, one is measured and then the other. Static duct pressures are measured with the furnace air blower on. The blower door should NOT be running.
   vii. Supply static pressure: It is best to insert the manometer hose in the supply plenum. If this is not possible, or not practical, insert the hose in the nearest supply register and snake the hose as close as you can to the plenum. You can close the register through which you are testing, or tape it shut, to get a better reading.
   viii. Return static pressure: It is best to insert the manometer hose in the return plenum. If this is not possible, or not practical, insert the hose in the nearest return register and snake the hose as close as you can to the plenum.
   ix. After Duct Sealing: In most cases, add 5 Pa to the Before Duct Sealing result.
   x. Before Duct Sealing (Existing): Input the data as measured in the field.
   xi. After Duct Sealing (Target or Actual):
   xii. Total Leakage: 12% of total conditioned floor area of home
   xiii. Leakage to Outside: 8% of total conditioned floor area of home

Duct sealing target must be met for the measure to pass at final inspection and/or QCI. Result can be lower than target but, if higher, must be within 10% of target.
If target is not achieved at Final or QCI due to changes to the pressure boundary of the home that occurred after weatherization was completed, these changes must be clearly documented to determine if the measure should pass. If you don't believe the target as calculated above is achievable, you can write in your own target. You MUST explain your reasoning for this in Comments.
Duct Sealing Cost. Input amount needed for duct sealing. SIR must be 1.0 or greater. NEAT will not accept $0 for duct sealing. If you cannot achieve a duct sealing measure with an SIR >= 1.0, then uncheck Evaluate Duct Sealing.

f. Pressure Pan Measurements Method:

i. Pressure Pan Measurements is used for MHEA Audits. Instead of target blower door for after duct sealing, it asks for a a sum of all pressure pan readings in the home. The target is typically the number of registers in the home, with the aim being 1.0 Pa per register (or less).

b. Baseloads

Information about each baseload system on a dwelling will be gathered and input into the audit.

i. Water Heating
   a. The existing equipment will be listed to allow audit to evaluate for showerheads and baseload costs.

   b. All Showerheads should be evaluated for replacement. If the client refuses to have a showerhead replaced, the showerhead should be removed from the evaluation, and the flow, usage, and reason for refusal should be noted in the comments section of the audit. This refusal shall not be treated as measure skipping.

ii. Refrigerators
   a. If the existing equipment is listed in the NEAT/MHEA refrigerator database, the consumption information can be used to evaluate the SIR of a replacement fridge. Auditor must click on the Refresh button after all Existing and Replacement fields have been entered to adjust consumption to current conditions.

   b. If the existing equipment is not listed, the agency should measure the consumption with a meter to determine the SIR of a replacement.

   c. Auditors can use metered consumption on homes that are listed in the database if they are concerned that the listed consumption is not an accurate representation of actual consumption.

d. If a client refuses a refrigerator replacement, the auditor will evaluate the situation to determine if the declined measure is allowable or legitimate. If it is declined for a legitimate reason, the replacement refrigerator info shall be removed from the evaluation, the reason for the declined measure shall be noted in the comments section of the audit.

iii. Lighting Systems

a. All incandescent bulbs in use for 1 hour or more each day, will be evaluated for replacement.

b. Incandecent Bulbs in Vanities, Flood Lights, and fixtures candelabra and other non-standard sized bulbs will be evaluated for replacement with similar LED bulb(s).

c. Incandescent Can lighting will be evaluated for replacement with LED Retrofit Can Lights. Air-tight LED retrofit can lights could also be considered for installation as part of an air-sealing measure.

d. LED light bulbs will be used wherever possible.

c. Health & Safety

A Health & Safety measure will be created on the itemized costs tab for every Health & Safety item identified as the agency's responsibility on the Health & Safety evaluation.

i. The cost of Health & Safety measures will be accurate estimates of the actual cost.

ii. The Health & Safety measures will be active in order to have selections on the Health & Safety tab create an itemized cost for the measure.

Since the audit must list every measure which will be performed on a unit, the itemized cost tab shall be used to create all HSMs, IRMs and ECMs (except for HVAC Replacements) which will be conducted on the home. Follow the instructions under the associated measure type to create these measures.

EXHIBIT I: MEASURES CONSIDERED

Weatherization Measures for the National Energy Audit Tool (NEAT)

1. Air-Sealing:
   - Building Envelope Air Sealing
   - Duct Sealing

2. Building Insulation:
   - Attic R-11
   - Attic R-19
   - Attic R-30
   - Attic R-38
   - Attic R-49
   - Sill Box insulation
   - White roof coating
   - Foundation Wall Insulation
   - Floor R-11
   - Floor R-19
   - Floor R-30
   - Floor R-38
   - Wall Insulation
   - Kneewall Insulation
   - Duct Insulation

3. Doors and Windows:
   - Window Sealing
   - Door Replacement
   - Storm Windows
   - Window Replacement
   - Low E windows
   - Window shading
   - Sun Screen fabric
   - Sun scree louvered
   - Window Film/Screening/Reflective Materials

4. HVAC Systems:
   - Thermal vent damper
   - Electric vent damper
   - IID
   - Electric vent damper IID
   - Flame retention burner
   - Furnace Tune-up
   - Replace Heating System
   - High Efficiency Furnace
   - Programmable/Smart Thermostat

Tune-up Air Conditioner
Replace Air Conditioner
Evaporative Cooler
Install/Replace Heat Pump

5. Baseloads:

Lighting Retrofits
Refrigerator Replacement
Water Heater Tank Insulation
Water Heater Pipe Insulation (first 6')
Low Flow showerheads (≤ 2.5 GPM)
Water Heater Replacement

6. General Heat Waste:

General Heat Waste (GHW) expenditures are capped at $250 total.
Limited Weatherstripping and caulking to increase comfort
HVAC filters (12 month supply)

Weatherization Measures for the Manufactured Home Energy Audit (MHEA)

1. Air-Sealing:

General Air Sealing
Seal Ducts

2. Building Insulation:

Wall fiberglass Batt insul
Wall fiberglass Batt insul in addition
Wall fiberglass loose insul
Wall fiberglass loose insul in addition
Wall cellulose loose insul
Wall cellulose loose insul in addition
Floor cellulose loose insul
Floor cellulose loose insul in addition
Floor fiberglass loose insul
Floor fiberglass loose insul in addition
Roof cellulose loose insul
Roof cellulose loose insul in addidtion
Roof fiberglass loose insul
Roof fiberglass loose insul in addition
Add skirting
Add skirting on Addition
White Roof Coat
White Roof Coat in Addition

3. Doors and Windows:

Replace marked doors (mandatory)
Replace wooden doors

Replace wooden doors in addition
Storm doors
Storm doors in addition
Window sealing
Window sealing in addition
Replace single pane windows
Replace single pane windows in addition
Plastic storm windows
Plastic storm windows in addition
Glass storm windows
Glass storm windows in addition
Add awnings
Add awnings in addition
Add shade screens
Add shade screens in addition

4. HVAC Systems:

Tune heating system
Replace Heating System
Setback Thermostat
Evaporative cooling
Tune cooling system
Replace dx cooling equipment

5. Baseloads:

Lighting Retrofits
Refrigerator Replacement
Water Heater Replacement
Water Heater Tank Insulation
Water Heater Pipe Insulation (first 6')
Low Flow showerheads (≤ 2.5 GPM)

6. General Heat Waste:

General Heat Waste (GHW) expenditures are capped at $250 total.

Limited Weather-stripping and Caulking to Increase Comfort
HVAC Filters (12 month supply)

Table for Targeting Closure Rate as a Function of Pre-Test CFM at 50 Pa

	Pre-Test CFM															
Volume	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250	4500	4750	5000	5250	5500	5750
2,000	2000	2000	2000	2010	2101	2178	2239	2284	2315	2330	2330	2315	2285	2239	2200	2300
3,000	2000	2000	2000	2051	2151	2237	2309	2366	2409	2437	2451	2450	2436	2407	2363	2305
4,000	2000	2000	2000	2088	2196	2291	2371	2439	2492	2532	2559	2571	2571	2556	2528	2486
5,000	2000	2000	2000	2121	2236	2339	2428	2504	2568	2618	2656	2680	2692	2691	2677	2650
6,000	2000	2000	2017	2151	2273	2382	2479	2564	2636	2696	2744	2779	2802	2813	2811	2797
7,000	2000	2000	2039	2178	2306	2421	2525	2617	2698	2767	2823	2869	2902	2924	2933	2931
8,000	2000	2000	2059	2203	2336	2457	2568	2667	2775	2831	2896	2950	2993	3025	3045	3054
9,000	2000	2000	2077	2226	2364	2490	2607	2712	2806	2890	2963	3025	3077	3117	3147	3166
10,000	2000	2000	2094	2247	2389	2521	2642	2753	2854	2945	3025	3094	3154	3203	3241	3270
11,000	2000	2000	2110	2266	2413	2549	2675	2792	2898	2995	3081	3158	3225	3281	3328	3365
12,000	2000	2000	2124	2284	2434	2575	2706	2827	2939	3041	3134	3217	3290	3354	3409	3453
13,000	2000	2000	2138	2301	2454	2599	2734	2860	2977	3084	3183	3272	3352	3422	3483	3535
14,000	2000	2000	2150	2316	2473	2621	2761	2891	3012	3125	3228	3323	3408	3485	3553	3612
15,000	2000	2000	2162	2331	2491	2642	2785	2919	3045	3162	3271	3370	3461	3544	3618	3683
16,000	2000	2000	2173	2344	2507	2662	2808	2946	3076	3197	3310	3415	3511	3599	3679	3750
17,000	2000	2001	2183	2357	2523	2680	2830	2971	3105	3230	3347	3457	3558	3651	3735	3812
18,000	2000	2009	2193	2369	2537	2698	2850	2995	3132	3261	3382	3496	3601	3699	3789	3871
19,000	2000	2016	2202	2380	2551	2714	2869	3017	3157	3290	3415	3533	3642	3745	3839	3926
20,000	2000	2022	2210	2391	2564	2729	2887	3038	3182	3318	3446	3567	3681	3788	3887	3978
21,000	2000	2029	2218	2401	2576	2744	2904	3058	3204	3343	3475	3600	3718	3828	3931	4028
22,000	2000	2035	2226	2410	2587	2757	2920	3077	3226	3368	3503	3631	3752	3867	3974	4074
23,000	2000	2040	2233	2419	2598	2770	2936	3094	3246	3391	3529	3661	3785	3903	4014	4118
24,000	2000	2046	2240	2427	2608	2783	2950	3111	3265	3413	3554	3689	3816	3938	4052	4160
25,000	2000	2051	2246	2436	2618	2794	2964	3127	3284	3434	3578	3715	3846	3970	4088	4200

Table for Targeting Closure Rate as a Function of Pre-Test CFM at 50 Pa

	Pre-Test CFM															
Volume	6000	6250	6500	6750	7000	7250	7500	7750	8000	8250	8500	8750	9000	9250	9500	9750
2,000	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900
3,000	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900
4,000	2431	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900
5,000	2610	2557	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900
6,000	2771	2732	2682	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900
7,000	2918	2892	2855	2806	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900
8,000	3052	3038	3014	2978	2930	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900
9,000	3175	3172	3159	3135	3100	3054	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900
10,000	3288	3295	3292	3279	3256	3222	3178	3124	3200	3300	3400	3500	3600	3700	3800	3900
11,000	3392	3409	3416	3413	3400	3377	3344	3301	3249	3300	3400	3500	3600	3700	3800	3900
12,000	3489	3514	3530	3536	3533	3521	3498	3466	3425	3374	3400	3500	3600	3700	3800	3900
13,000	3578	3612	3636	3651	3657	3654	3641	3619	3588	3548	3498	3500	3600	3700	3800	3900
14,000	3662	3703	3735	3758	3772	3778	3774	3762	3740	3710	3671	3622	3600	3700	3800	3900
15,000	3740	3788	3827	3858	3880	3893	3898	3895	4000	4125	4250	4375	4500	4625	4750	4875
16,000	3813	3867	3913	3951	3981	4002	4015	4019	4015	4125	4250	4375	4500	4625	4750	4875
17,000	3881	3942	3994	4039	4075	4103	4123	4136	4140	4136	4250	4375	4500	4625	4750	4875
18,000	3945	4012	4070	4121	4164	4199	4226	4245	4257	4260	4256	4375	4500	4625	4750	4875
19,000	4006	4077	4142	4198	4247	4288	4322	4348	4367	4378	4381	4377	4500	4625	4750	4875
20,000	4063	4139	4209	4271	4326	4373	4413	4445	4470	4488	4499	4501	4500	4625	4750	4875
21,000	4116	4198	4273	4340	4400	4453	4499	4537	4569	4593	4610	4619	4622	4625	4750	4875
22,000	4167	4254	4333	4405	4470	4528	4580	4624	4661	4692	4715	4731	4740	4743	4750	4875
23,000	4216	4306	4390	4467	4537	4600	4657	4706	4749	4785	4814	4837	4853	4861	4863	4875
24,000	4261	4356	4444	4525	4600	4668	4730	4784	4832	4874	4909	4937	4959	4974	4982	4984
25,000	4305	4403	4495	4581	4660	4733	4799	4858	4912	4958	4999	5033	5060	5081	5095	5103

Table for Targeting Closure Rate as a Function of Pre-Test CFM at 50 Pa

	Pre-Test CFM															
Volume	10000	10250	10500	10750	11000	11250	11500	11750	12000	12250	12500	12750	13000	13250	13500	13750
2,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
3,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
4,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
5,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
6,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
7,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
8,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
9,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
10,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
11,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
12,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
13,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
14,000	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500
15,000	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875
16,000	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875
17,000	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875
18,000	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875
19,000	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875
20,000	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875
21,000	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875
22,000	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875
23,000	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875
24,000	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875
25,000	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875