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Indiana WAP uses the Oakridge National Laboratory Weatherization Assistant User Manual (version 8.9) with the following clarifications and tools:

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## Definitions

**Ancillary Items** – Items necessary for the proper installation of weatherization measures as required by the material manufacturers, general construction, and/or WAP standards in order to achieve a finished product in a typical installation where no unusual or extensive repairs are needed. Ancillary items typically refer to *small* items such as hardware, fasteners, adhesive, sealant, etc. The costs of ancillary items and their installation shall be included within the cost of an individual ECM when calculating the SIR for the individual ECM. For questions related to material standards for ancillary items, see the most recent Department of Energy guidance: WPN 19-4, Attachment 7 (at the time of this writing)

**Energy Conservation Measure (ECM)** – Installation procedure performed for its anticipated energy savings. ECM costs must include all material, labor, and ancillary items and must meet a Savings to Investment Ratio (SIR) of 1.0 or greater to be installed with WAP funds with the exception of airsealing, which does not require an SIR of 1 or greater.

**Health and Safety (H&S) Measure** – The actions taken to eliminate a health and safety hazard, the elimination of which is necessary to effectively perform weatherization work, or the actions are necessary as a result of weatherization work. H&S measures are **not** required to be cost-justified (SIR of 1 or greater) and are not considered in the SIR calculation or the Average Cost Per Unit (ACPU). For questions related to specific H&S issues and allowable costs/measures, refer to the current IHEDA DOE approved Health and Safety Plan as developed from DOE WPN 17-7.

**Incidental Repair Measure (IRM)** – A repair necessary for the effective performance or preservation of newly installed weatherization materials, but not part of a standard installation. IRM installations must be associated with a specific ECM or group of ECMs. IRM costs must be included in the SIR calculation of the total package of weatherization measures. IRMs solely to protect existing materials in the dwelling is not an allowable cost. IRMs *must* be attached to an ECM.

- 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.

IRM costs for any measures that **do not** meet the definitions set forth in the regulating language and WPN 19-5 are subject to investigation and could be determined to be a disallowed cost.

**Package of Weatherization Measures** – The cost of all ECMs and their associated IRMs included in an audit. The cost of each ECM includes the cost of its ancillary items. The cost of all IRMs is added to the cost of the package of weatherization measures

when calculating the total package SIR for the whole project. H&S measures are exempt from cost-justification by the audit and are not considered in the SIR calculation or the ACPU of Department of Energy funds.

**Savings to Investment Ratio (SIR)** – Result of dividing the present worth of the lifetime energy cost savings by the total present worth cost of the installed measure, including the discounted rate of the savings and fuel escalation rates. Each ECM must yield a SIR ratio of 1.0 or greater to be included in the package of weatherization measures, and the total package of weatherization measures must yield a cumulative SIR of 1.0 or greater to be allowable expenditures of WAP funds.

## Key Parameters Guidance

Ensure all key parameters are correct.

- Economics
  - Real discount rate 3%
  - Minimum acceptable SIR is 1
- Set-points
  - Heating set-point (daytime) 68° F
  - Heating set-point (nighttime) 68° F
  - Cooling set-point (daytime) 78° F
  - Cooling set-point (nighttime) 78° F
  - Night Setback 3° F
- Insulation values must meet SWS standards
  - Duct insulation should be R-8
  - Water heater wrap added R-value R-11
  - In MHEA ensure the bag size and density are set per the manufacture recommendations
- Equipment
  - Ensure equipment values align with what is planned to be installed
    - For example, heat pump default is 13 SEER, however, 14 SEER is commonly installed. This will not evaluate properly. Ensure SEER matches what is planned to be installed.
- Window U-values
  - When evaluating windows, ensure the U-values are correct (this value is obtained from the specification of the window being installed.)
    - \*\*Note: If replacing a window, the file must contain photographs of the existing window in place

## Fuel Cost

Fuel cost must be updated annually. INCAA will provide natural gas and electric prices for larger utilities. Sub-grantees must find averages for oil, propane, wood, and pellets.

When calculating averages for non-electric or non-natural gas fuel, the sub-grantee shall average at least two local provider fuel costs with cost using the current cost to date and also the cost six months prior to current date. See example below:

Example #1 for propane:

Vendor A:

Current price (August 2019) is \$1.85 per gallon

Price six months prior to current date (Feb 2019) was \$2.45 per gallon

- $\$1.85 + \$2.45 = \$4.30$  per gallon
- $\$4.30$  divided by 2 = \$ 2.15 per gallon

Vendor B:

Current price (August 2019) is \$1.90 per gallon

Price six months prior to current date (February 2019) was \$ 2.80 per gallon

- $\$1.90 + \$2.80 = \$5.12$
- $\$5.12$  divided by 2 = \$2.56

Then add the two averages and divide by two:

$$\$2.15 + \$2.56 = \$4.71$$

$$\$4.71 \text{ divided by } 2 = \$2.36$$

\$2.36 will be the cost of propane fuel that will be shall be input to your NEAT/MHEA database

## Library Measures

Library measures including pricing shall be updated annually.

Sub-grantees may only install LED lighting. CLF lighting is not an allowable cost. Costs should reflect LED lighting prices with wattage as close as possible. Please note in the comment area that the lighting installed is LED lighting and cost and not CFL cost.

## Active Measures

All measures shall remain active in NEAT except the following:

- White roof coating
- Window shading (awning)
- Sunscreen fabric
- Sunscreen louvered
- Window film

- Thermal vent damper
- IID
- Electric vent damper IID
- Flame retention burner
- Evaporative cooler

All measures shall remain active in MHEA except the following:

- Wall cellulose insulation
- Wall cellulose insulation in addition
- Floor cellulose loose insulation
- Roof cellulose loose insulation
- Roof cellulose loose insulation in addition
- White coat roof
- White coat roof in addition
- Add awnings
- Add awnings in addition
- Add shade screens
- Add shade screens in addition
- Evaporative cooling

\*\*Please note: All sub-grantees currently (11/2020) have A/C tune up and A/C replacements turned off in the software. As of 11/2020, sub-grantees will need to turn on A/C tune ups and A/C replacement in the software\*\*

## Itemized cost

Do not use itemized costs to model **major** energy conservation measures. Determining energy savings for a specific measure in a building can be challenging without the assistance of an energy modeling tool. Additionally, any energy savings entered in the itemized cost section is not interacted with the rest of the building components, so an overestimate of energy savings is likely.

### **Aerators:**

The savings are based on 1 gallon of water saved per day and the energy required to heat 365 gallons of water from an inlet temp of 55<sup>0</sup> F to 120<sup>0</sup> F with an energy factor of .6 for gas heaters and an energy factor of .9 for electric heaters. Do not replace a lower flow aerators with a higher flow aerator!

Energy saved by appliance:

- Gas - .328 MBtu
- Electric - .218 MBtu

## Insulation types

Ensure all insulation types utilized are added to the appropriate tab and that costs are accurate in the library.

## Furnace modeling guidance

Please note a furnace may **not** be modeled under itemized cost. NEAT requires the new AFUE information so it may interact properly with rest of the building components.

Follow the steps below for furnace replacement:

- Enter the existing furnace information into the Heating Tab
- Under Replacement select Evaluate All
  - Do this even if the unit needs replaced for health and safety reasons
- After all data for the house is entered run the audit
- If the furnace indicates to replace as an ECM use Base Funds (per WPN 17-7)
- If it is not included as an ECM, but still requires replacement for health and safety reasons then select High efficiency Replacement Mandatory.
  - **DO NOT CHECK INCLUDE SIR BOX.**
- Rerun audit and the furnace should be the first line of your Health and Safety Measures Report when modeled correctly

## Air conditioning information

Air conditioning information is required to be entered into NEAT/MHEA and this includes window units. Air conditioning replacements and tune ups are only allowed when cost justified by NEAT/MHEA.

### Derating Heating/Cooling Systems

Unlike combustion appliances, air conditioners and heat pumps cannot be accurately measured for efficiency while on-site. When addressing a system that utilizes a compressed refrigerant cycle to provide heating or cooling (does not apply to evaporative coolers), the following derating formula may be used.

$$\text{Degraded Efficiency} = (\text{Base EFF}) * .99^{\text{age}}$$

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.

For example: An existing HVAC unit that is 20 years old, was originally rated at 10 SEER.

$$\text{Degraded SEER} = 10 * .99^{20}$$

$$\text{Degraded SEER} = 8.18$$

To calculate this you will need to use the algebra function  $x^y$

On a calculator you will enter 10 x .99 then the  $x^y$  button and then 20(or however the old the furnace age is). This will give you the answer 8.17906 and you will round up to 8.18

## Evaluate Duct Sealing

Please note, sub-grantees may only evaluate duct sealing when a duct blaster has been used to quantify the duct leakage, otherwise, the duct sealing cost should be included with infiltration with a note in the comment that it includes ducts as directed by ORNL in the training series:

[https://www.weatherizationassistanttraining.org/crs\\_MM.php?S=5&L=13&C=77&M1=265&M2=409&VID=43](https://www.weatherizationassistanttraining.org/crs_MM.php?S=5&L=13&C=77&M1=265&M2=409&VID=43)

## Proper Work Orders

The NEAT/MHEA “Measure Report” is not a proper “Work Order”. A proper Work Order must be in the file and provided to the Weatherization Professionals performing the work. Work Orders should provide crews and contractors with sufficient information to clearly understand the scope of work and the materials required to perform that work. The Work Order may be generated from NEAT or another mechanism the sub-grantee has in place.

## Actual Costs and Estimated Costs

Ensure that actual costs are close to estimated library costs. If they are not close, you assume the risk of measures going from cost effective to not being cost effective, thus disallowing a measure that was completed. A disallowed measure may result in a payback. As an auditor, pay close attention to measures that are close to 1 to ensure costs do not exceed library costs. If they do, use the additional cost windows to correct for the difference in costs.

## Incidental Repairs

Ensure that all incidental repairs are modeled as itemized costs without energy savings but that they are included in SIR. Per WPN 19-5, “all incidental repair measures must be modeled separately and related to a specific energy conservation measure (ECM)”. These incidental repairs will appear as the first measures on the recommended measures report when modeled correctly. If they do not appear as the first measures, recheck your inputs as this is signaling you that something is not correct on the inputs.

## Lifetime of Measures

Water heaters have a lifetime of 13 years per WPN 19-4, this is defaulted to 15 years under the hot water equipment supply tab, sub-grantees will need to correct this. **Please see table 9.2 in attachment 9 from WPN 19-4 for all other allowed lifetimes.**

Sub-grantees may increase the lifetime measures following the table below

| Measure                                    | Lifetime |
|--|----------|
| Attic insulation—see 1 below               | 30       |
| Wall Insulation—see 2 below                | 30       |
| Floor Insulation—see 3 below               | 30       |
| Kneewall Insulation—see 3 below            | 30       |
| Fossil Fuel Furnaces & Boilers—see 4 below | 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

Updated lifetime measures and how to correctly adjust these in your database can be found on the [www.intelligentweatherization.org](http://www.intelligentweatherization.org) website.

## Weatherization Assistant (NEAT/MHEA) Version 8.9 30-year Lifespan Instructions

### Using the most recently updated Fuel Price Indices

You cannot directly analyze a measure with a lifetime of more than 25 years in the Weatherization Assistant because you cannot enter a lifetime of greater than 25 for a weatherization measure or fuel price indices for beyond 25 years in the Setup Library. However, there is a workaround method for analyzing a measure with a 30-year lifetime. The workaround involves setting the lifetime for the measure to 24 and entering an “artificial” fuel price index for year 24 that equivalently calculates (simulates) a 30-year lifetime (i.e., all measures designated as having a 24-year lifetime will actually be analyzed as if they had a 30-year lifetime).

\* NOTE: The method involves Year 24 and because there is a flaw with using Year 25. Here are the steps you will need to perform:



1. Copy an existing Setup Library and name it with something like “30-Year Calculations” in the name. NOTE: This will provide you with a separate, unique setup library to investigate the impact of 30-year lifetimes while keeping the original setup library unchanged for other analyses that you perform.

2. You will need to update all the fuel indices to match those in the attached table. First, open the attached spreadsheet and select cells E3:E210, next use the “Copy” function (or use Ctrl+C). Then in WA 8.9, enter the Setup Library, select the Fuel Price Indices tab, then click the tab labeled “Price Index” which should highlight all the cells below the tab. Use the function Ctrl+V, to paste the copied cell contents into the selected cells. WA will give you a warning about pasting the contents of 208 cells, select Yes to proceed.

3. Once you have updated the fuel price indices in step 2, then verify that the updated UPWs are correct by spot checking the numbers that are automatically calculated for Year 24 (should be within +/- 0.01). NOTE: The numbers provided below will simulate a 30-year lifetime analysis consistent with the 2019 price indices entered for all other years. Although you may be performing analyses for just one or two fuels, we’re providing indices for all fuels for completeness. a. Natural Gas: 23.01

b. Oil: 23.79

c. Electricity: 20.40

d. Propane: 27.75

e. Wood: 19.60

f. Coal: 19.99

g. Kerosene: 23.79

h. Other: 19.60

4. Go to the Library Measures form and change the lifetime to 24 years for any measure that you want to analyze with a 30-year lifetime.

5. Close the Setup Library, return to the Main Menu, click on NEAT, enter or select an audit, and on the Audit Information form select “30-Year Calculations” as the Setup Library.

When you click on “Run Audit”, all measures designated with a lifetime of 24 will be analyzed as if they had a 30-year lifetime.

\* NOTE: The “artificial” fuel price indices entered for Year 24 do NOT impact the calculations for Year 23 or before. The “artificial” fuel price indices entered for Year 24 DO impact Year 25 calculations, so a lifetime of 25 should NEVER be used in the “30-Year Calculations” Setup Library.

Appendix D

[Link to AFU information for water and space heating equipment](#)

<https://www.ahridirectory.org/Search/SearchHome?ReturnUrl=%2f>

