

The following are protocols and guidelines for using the Home Energy Scoring Tool and entering the information based on what is observed on site. **These guidelines are in addition and supplementary to the Tool Tips displayed on the Scoring Tool. Be sure to open the Tool Tips on the Scoring Tool - they contain important guidance and information as well.**

Correctly interpreting your onsite observations and converting those interpretations into the appropriate data inputs is a critical part of accurately scoring a home. Complex homes will require greater interpretation, for which adherence to these guidelines will be most important – please reference this document whenever you’re unsure as to how you should characterize certain home components in the Scoring Tool. Remember, use your best judgement! These guidelines cannot possibly characterize every situation, and in many cases you’ll need to select the choice that most closely matches the situation you are assessing. **Some of the details in these guidelines only apply to those Assessors who are using the Home Energy Score web interface. If you are using a third party software or app to enter the data, please contact your program Partner and/or the software provider for more details and guidance about the system you are using.**

Contents – quick links to document sections:

1. [Scoring Tool Protocols](#)
2. [Data Entry Guidelines](#)
 - a. [About this Home](#)
 - b. [Roof/Attic](#)
 - c. [Foundation](#)
 - d. [Walls](#)
 - e. [Windows/Skylights](#)
 - f. [Systems](#)
 - i. [Heating](#)
 - ii. [Cooling](#)
 - iii. [Ducts](#)
 - iv. [Hot Water](#)
3. [Troubleshooting](#)
4. [Building America Solution Center](#)
5. [Home Energy Score Definitions](#)

Scoring Tool Protocols

- Do not share your Assessor login or allow others to score homes through your login; doing so will compromise your status as an Assessor and your access to the Scoring Tool may be blocked indefinitely.
- The Home Energy Score is only appropriate for scoring single family homes and townhouses/row houses/duplexes. **Do not** attempt to score mobile homes (manufactured housing), floating homes, or apartment/multifamily dwellings. If the floor of a dwelling is the ceiling of a separately owned/occupied dwelling below it (or vice versa), it is considered an apartment and should **not** be scored.
- Enter the home’s address appropriately – use the correct postal standardized version the address, or the Google maps validation feature when possible (select the “Corrected” address, if appropriate). Use correct punctuation (avoid using all caps!), keeping in mind the address you enter will appear on the Score report – ensure that it looks professional and does not contain typos. (If you are scoring two or more buildings that share the exact same address [i.e., a guest cottage or in-law house], use the proper address for the primary building and append an “A” to the street number of the secondary building [e.g. 1500 Main St. and 1500A Main St.]). **If you enter the address incorrectly, abort and delete the assessment. If you’ve already created the Score with an incorrect address, you must inform the Home Energy Score Team at assessor@ee.doe.gov for steps to correct the mistake and avoid possible repercussions at time of sale.**
- It is critical that you select the proper Assessment Type when you begin the data entry:

Assessment Type:	Description:
Initial (official)	First (original) official assessment – <u>one time only per house</u>
Final (official)	Final official test-out assessment, after improvements since the “Initial” score
QA	Quality Assurance evaluation assessment by QA Assessor. If the assessor needs to correct the QA assessment inputs, use this type for all runs. DO NOT use Corrected.
Alternative EEM	Alternative Energy Efficiency Measures assessment for creating a customized “projected score” label – see “HEScore Data Entry Guidelines”
Test	Experimental, practice, or trial (test) sessions – can be used for the same house as often as necessary
Corrected (official)	Corrections or changes to previously run Initial or Final scores
Mentor	For mentored sessions only – see the “HEScore Mentoring and QA Guidelines”. If the assessor needs to correct the input, use this type for all runs. DO NOT use Corrected
Preconstruction	For assessments created from building plans prior to the home’s construction. If the assessor needs to correct inputs, use this type for all runs. DO NOT use Corrected.

- Always select “Initial” for the first official assessment, even in cases where the home has recently been updated or improved and will likely not be scored again. Absolutely no home should have more than one “Initial” session.
 - Select “Final” for the official test-out assessment following improvements made after an “Initial” score – do not select “Final” unless the house has already had an “Initial” score.
 - “Corrected” must be selected for sessions incorporating corrections to “Initial” or “Final” scores only - do not select “Corrected” for corrections to unofficial scores.
 - “Mentor” should only be selected for mentoring sessions – see the “HEScore Mentoring and QA Guidelines” document or follow the guidance of your mentor.
 - “Preconstruction” should only and always be selected for assessments being done from building plans or blueprints prior to a home’s construction, even if a previous preconstruction assessment is being corrected.
- Utilize the **Home Energy Score Assessor Calculator** to determine weighted averages, find values for multiple systems, and calculate accurate equipment efficiencies or defaults. The calculator is provided to each new Assessor as an attachment to your confirmation email, or can be easily obtained from the Portal or by notifying us at assessor@ee.doe.gov.
 - Use the Tool Tips in the Home Energy Scoring Tool. The Tool Tips are accessed by clicking on the question mark icons available throughout the Tool, and provide important and helpful information regarding each entry or selection. If more detail or clarity is needed, refer to the guidance below.
 - Measure the conditioned floor area (CFA) manually. Do not use real estate listings (MLS), appraisals, county records or websites such as Zillow to determine CFA square footage, as these sources are often inaccurate and/or out of date.
 - Proofread your data entries thoroughly using the Summary View before finalizing the inputs and generating the Score report. Once finalized, the data cannot be changed. If there was an error to an official score (“Initial” or “Final”), you must select “Corrected” as the assessment type when you correct/re-enter the data to generate a new Score report.

- Avoid opening the Home Energy Scoring Tool in multiple tabs or logging on to the Tool in more than one instance at a time. Doing so may cause an error and the Tool may lock your session.
- You must officially Score at least one home within a six month period in order to remain an active Assessor, otherwise your account will be de-activated without prior notification.

Data Entry Guidelines

Some of the details in these guidelines only apply to those Assessors who are using the Home Energy Score web interface. If you are using a third party software or app to enter the data, please contact your program Partner and/or the software provider for more details and guidance about the system you are using.

Address

Please see the [third bullet](#) under protocols (above). It is of utmost importance that the address be entered correctly, so that it aligns with other official records. Once the address is registered and the data entry begins, the address cannot be changed. If the address is entered incorrectly the data entry should be aborted and the session should be deleted. If the Score has already been created, notify assessor@ee.doe.gov of the error. **In either case the home must be scored again using the correct address and the original assessment type – do not use “Corrected” as the assessment type when the address entry is being corrected.**

Section 1: About This Home

Assessment Date - Enter the date when the assessment inspection was done so that the score reflects the conditions at the time of the inspection.

Year built – Enter the date the majority of the house was built. If the house was an 800 ft² bungalow built in 1950, but a 1500 ft² addition was added in 1975, enter the year built as 1975.

Number of bedrooms – A bedroom is defined as a room purposely built as such and defined as such by local ordinance. If there are more than 10 bedrooms, select 10.

Stories Above Ground Level – If a house has a level that is 50% or more below grade that level should be characterized as a basement. For example, if more than half of the lower (walk-out) level of a two level ranch is below grade, the house should be characterized as 1 story, with a basement for the foundation. For houses considered to have a half story above, round up to the next whole number. For example, Cape Cod’s are sometimes characterized as 1½ stories; in the Scoring Tool they should be

entered as 2 stories, unless the upper ½ story is actually an unconditioned attic. Split level or tri-level homes should often be entered as having two foundations, as follows:

- a.) If there are two full levels on either side of the split, the house is 2 stories and the two foundation types will be basement and either crawlspace or slab-on-grade.
- b.) If there are two full levels on one side of the split, one full level (usually over crawlspace) on the other side, and the lowest full level is more than 50% above grade, the house is 2 stories and the two foundation types are slab-on-grade and crawlspace – if there is no crawlspace then only one foundation type (slab-on-grade) is necessary.
- c.) If there are two full levels on one side of the split and one full level (usually over crawlspace) on the other side, and the lowest level is more than 50% below grade, the house is 1 story and the two foundation types are basement and either crawlspace or slab-on-grade.

Interior Floor to Ceiling Height – If there are different ceiling heights, average the heights using a weighted average calculation based on areas, and round to the nearest whole number – the “Averaging Calculator” tab in the **Home Energy Score Assessor Calculator** (aka **Assessor Calculator**) can be used for this. If the calculated average height is exactly between two whole numbers, round up to the nearest whole number. For example, if the average ceiling height is calculated as 8.4 ft., round to the nearest whole number (8 ft.); however, if the average ceiling height is calculated as 8.5 ft., round up to 9 ft.

Conditioned Floor Area (all stories combined) square feet – This must be based on actual measurements done by the Assessor. Measuring the outside dimensions of the house is often a preferred method for calculating floor areas, as long as it can be done accurately. Do not use real estate listings (MLS), appraisals, county records or websites such as Zillow to determine square footage, as these are often inaccurate and/or out of date. Conditioned floor area must include all conditioned spaces that are intentionally heated and/or cooled including conditioned basements, but must not include conditioned crawl spaces. An area is considered conditioned only if there are duct registers, radiators, or some permanent source of heating and/or cooling present which provides conditioning - closets, cupboards, stairwells, and hallways within the conditioned envelope are considered part of the conditioned area. Many auditors have been trained that a basement should be considered conditioned if the ducts and/or HVAC system are in the space, but for Home Energy Score there must be direct delivery to the basement area for it to be considered conditioned (i.e., “unintentionally conditioned” does not count). Do not include commas in the value entered for the conditioned floor area entry.

Direction faced by front of house – Enter the compass direction the house is facing. This can be readily determined with a compass or compass app, or by looking up the home’s address on map software (such as Google Maps) and ascertaining the compass direction. Exception: If the dwelling is an end townhouse unit and the front door is on the long side, characterize the front of the townhouse as the

short side opposite the back of the unit. For instance, if the long side with the front door of the end unit is facing west and the short side with the back door is facing south, enter “north” as the direction the front of the townhouse is facing, even if there is no door on that side. (The Scoring Tool assumes a 5:3 front to side wall ratio for standard homes and a 3:5 front to side wall ratio for townhouses.)

Air leakage rate – If a blower door test has been conducted on the house and the results are available, enter them as @CFM50. Do not include commas in the entry. If a blower door test result is not entered, the Assessor will need to characterize whether the house has been previously air sealed. “Air sealed” means professionally treated to seal or control all major air leakage pathways. Do not confuse air sealed with weatherization, and do not assume a home is air sealed if the homeowner says it is – you must observe physical evidence (i.e. foam sealed top plates, etc.). If there is no physical evidence that the house has been professionally air sealed you must assume it is not. New construction should only be considered to have been professionally air sealed if it meets the requirements of a new home efficiency label, e.g. Energy Star, LEED, etc., or there is documented evidence.

Section 2: Roof, Attic & Foundation

Roof / Attic - If there is more than one type of roof construction or finish, or more than one type of ceiling, attic, or insulation type, you should enter the information as two roof/attic types by clicking “Enter a second roof / attic”. If there are more than two types, combine the most similar of the types to narrow the number of entries to two, and calculate weighted average R-values for the combined areas appropriately.

Attic area – Attic area is the ft² surface area of all attic areas, including cathedral or vaulted ceiling surface areas and knee wall surface areas. If skylights are present, they should be included as well. If there is just one attic/roof type, the attic area will be the same size as the upper story conditioned floor area you measured while determining the house conditioned floor area. If there is more than one roof/attic type, click “Enter a second roof / attic”. Additional fields will be displayed so that the characteristics of a second roof/attic type can be entered – be sure to enter the correct area for each attic. If there are more than two roof/attic types, combine those that are most similar to narrow down the variables to just two and use the “Averaging Calculator” in the **Assessor Calculator** to perform a UA calculation in order to determine the overall insulation R-value of the types that were combined. For example, knee wall attic areas can be combined with flat attic areas. Sloped attic areas (vaulted ceilings and cathedral ceilings) can be calculated with the “Cathedral Ceiling Area” Calculator in the **Assessor Calculator**.

Unless the house is single story on slab, crawlspace, or unconditioned basement, the attic area will not be the same as the conditioned floor area. For example, if a single story house has a conditioned basement (directly beneath), the attic ft² will be half of the total conditioned area. Do not include

Data Entry Guidelines

HOME ENERGY SCORE

eaves or attic spaces over unconditioned areas such as porches or garages. Use the “Floor-Roof Area” checker in the **Assessor Calculator** to verify that your attic area calculation is logical. The total (combined) roof/attic area must be at least as large as the total (combined) foundation area.

Construction and Exterior Finish - Choose the predominant characteristics. If the home’s actual roof construction or exterior finish is not one of the choices in the Tool, select the most similar choice. If the home has a bitumen membrane or some type of rubber or plastic membrane finish, choose “Tar and Gravel” as the Exterior Finish.

(Roof) Insulation Level – This is in reference to the roof component only, not the attic floor. Select the nearest R-value from the dropdown menu choices – if there is no insulation in the roof, select R-0. Roof insulation R-value should be de-rated based on the current installation quality using the **Assessor Calculator**. If the roof insulation cannot be readily determined, try to estimate the installation depth and quality based on historical local building practices and codes. If the attic is vented, any insulation installed in the roof component (against the roof decking or sheathing) is irrelevant - select R-0. If there are multiple insulation levels, perform a UA calculation (w/ the **Assessor Calculator**) and round to the nearest R-value on the dropdown menu. If a calculated R-value falls halfway between two menu choices, choose the lower (least energy efficient) value.

Roof Color – Choose the color of the roof from the following six choices:

White	Smooth building material surfaces covered with a fresh or clean, stark white paint or coating.
Light	Masonry, textured, rough wood, or gravel surfaces covered with a white paint or coating.
Medium	Off-white, cream, buff, or other light-colored brick, bare metal, concrete block, or painted surfaces and white-chip marble-colored roofs. (continued next page...)
Medium dark	Brown, red, or other dark colored-brick, concrete block, roofs with gravel, red tile, stone, or tan to brown shingles.
Dark	Dark brown, dark green, or other very dark-colored painted, coated, or shingled surfaces.
Cool Color	If the homeowner knows the reflectivity of the roof, choose cool color and enter the absorptance value, i.e. the inverse of the reflectance.

Attic or Ceiling Type – Choose the type from the dropdown menu. If Cathedral Ceiling is chosen the insulation value must be entered under “Roof: Insulation Level”, as the Attic floor insulation data entry field will become hidden.

Attic Floor Insulation – This entry is for flat attic insulation, vaulted attic insulation, and knee wall insulation. Select the nearest R-value from the dropdown menu choices. Attic insulation R-value should be de-rated based on the current installation quality using the **Assessor Calculator**. If there are varying levels of insulation, perform a UA calculation with the “R-Value – Weighted Average” calculator in the **Assessor Calculator** and round to the nearest R-value on the dropdown menu. If a calculated R-value falls halfway between two menu choices, choose the lower value. If you combine an attic knee wall surface area with a flat attic area, you’ll likely need to perform a UA calculation to determine the overall R-value since knee wall insulation is often significantly different from flat attic insulation. Be sure to de-rate the insulation based on the quality of the current install, and to account for any voids (uninsulated areas, such as the attic hatch) by performing a weighted average R-value calculation on the **Assessor Calculator**. A void of just 2% (uninsulated space) can have a significant impact on the overall R-value.

Foundation - If there is more than one type of foundation construction or foundation insulation type you should enter the information as two foundation types by clicking “Enter a second foundation / floor”. If there are more than two types, combine the most similar of the types to narrow the number of entries to two, and calculate weighted average R-values for the combined areas appropriately.

Foundation area – Enter the ft² area for each foundation type. If there is just one foundation type, the foundation area will be the same size as the **lower story** conditioned floor area you measured while determining the house conditioned area, excluding cantilevered areas or bump outs, etc. If there is more than one foundation type, including cantilevers and bump outs, click “Enter a second foundation / floor”. Additional fields will be displayed so that the characteristics of a second foundation type can be entered – be sure to enter the correct area for each. If there are **more than two** foundation types, combine the most similar types to narrow down the variables to just two and use the **Assessor Calculator** to perform a UA calculation if necessary in order to determine the overall insulation R-value of the combined types. The total (combined) foundation area must not be greater than the total (combined) roof/attic area.

Foundation Type – Choose the type from the dropdown menu. If Slab-on-grade is chosen an insulation value must be entered under “Foundation walls insulation level” - see below. An unconditioned garage under a conditioned living space should be characterized as an “Unvented crawlspace”. For a house built on an open foundation such as on piers, the foundation type should be characterized as “Vented crawlspace”. Also, if the house has significant bump-outs or cantilevered areas, or living space built over a carport or outdoor area, a second foundation type should be entered for those spaces and “Vented crawlspace” should be chosen as that foundation type. Cellars under houses with rubble foundations should be classified as “Vented crawlspace” if “Unconditioned basement” does not seem appropriate – use your best judgement.

Floor Insulation above basement or crawlspace – If the foundation type is basement or crawlspace, the insulation value between that space and the floor above should be entered. Select the nearest R-value from the dropdown menu. If there is no insulation, select R-0. If there are multiple insulation levels within one foundation type, perform a UA calculation and round to the nearest menu choice. If a calculated R-value falls halfway between two menu choices, choose the lower value. Be sure to account for insulation voids, which can reduce the R-value significantly.

Foundation Walls Insulation level – If the foundation wall is insulated, select the nearest R-value from the menu choices. If there is no insulation, select R-0. If there are multiple insulation levels, perform a UA calculation and round to the nearest dropdown menu choice. If a calculated R-value falls halfway between two menu choices, choose the lower value. If the foundation type is Slab-on-grade and you have specific evidence that insulation is installed under or around the perimeter of the slab, select R-5; otherwise select R-0.

PLEASE NOTE - Both the foundation and floor insulation fields must have a value entered. If one of them does not apply to the house, select R-0 for the field that does not apply. Unlike the roof and attic, it is okay to enter non-zero values in both of these insulation fields. For example, a conditioned crawlspace might have insulation on both the foundation wall and between the floor joists of the crawlspace ceiling – both values should be entered. If there is no insulation at all, select R-0 for both.

Section 3: Walls

If the wall construction or characteristics on one or more sides of the home is different from the others, select No for “...same on all sides?” and then enter the data for each individual side of the home. If all sides of the home are constructed the same and have the same characteristics, the data only needs to be entered once. For townhouses, enter the information about the exterior (exposed) walls only.

Townhouse – This includes row houses, duplexes, townhomes, or any house sharing a wall with another house. Select the position relative to the other units: middle, right (end) or left (end). The right and left positions are determined by street view, facing the front of the house from the street (see exception for “Direction faced by front of house”, above). When “Townhouse” is selected the Scoring Tool automatically changes the front/back to side wall ratio from 5:3 to 3:5.

Construction and Exterior Finish – If there is more than one type on a single wall choose the predominant type. If the home’s wall construction or exterior finish is not one of the choices, select “Wood Frame” and “Wood Siding”.

Insulation – Select the nearest R-value for wall cavity insulation from the dropdown choices. Do not calculate and enter a wall assembly R-value – the Scoring Tool already accounts for the wall assembly

components, so only the cavity insulation R-value is required for the “Insulation Level” entry. If there are multiple insulation levels, perform a UA calculation with the **Assessor Calculator** and round to the nearest R-value on the dropdown menu. If a calculated R-value falls halfway between two menu choices, choose the lower value. If the wall insulation cannot be readily determined, try to estimate the installation depth and quality based on historical local building practices and codes. For fiberglass insulation you can use the default de-rated values in the chart below, based on the type of wall construction and the year built:

Default Fiberglass Batt R-values	Year of Construction		
	1990+	1980-89	1950-79
2 x 4, 16" o.c.	R-7	R-7	R-3
2 x 6, 24" o.c.	R-13	R-11	R-3

Section 4: Windows & Skylights

Skylights - If there are multiple skylight types, enter the skylight characteristics of those that make up the largest combined area. Solar tubes/sun tunnels can also be characterized as skylights.

Skylight Area – Enter the total skylight area of all skylights in the house combined. Assessors are not expected to measure skylights precisely, but should attempt to estimate length and width dimensions each within 6 inches to calculate the window area as accurately as is reasonable.

Panes, Frame Material, Glazing Type – Choose from the dropdown menu choices. If there are multiple types, choose the predominant type.

U-Factor and SHGC – If this info is available the “Actual skylight specification” button should be clicked and these values should be entered instead of the window characteristics. This info can only be found on the NFRC label attached to the window pane by the manufacturer, or in the new purchase documentation.

Windows - If the windows are the same on all sides of the house, only one set of characteristics should be entered. If at least one side is different from the others, distinct window characteristics must be entered for each side of the house. If there are multiple types of windows on the same side, enter the characteristics of the predominant type for that side. Windows in all conditioned areas must be included. Windows in unconditioned areas, such as unconditioned basements or attics, must not be included.

Window Area – Enter the total window area from each side of the house. The right and left sides of the house are determined by street view (facing the front of the house from the street). The glass in entry doors (excluding storm doors) should be considered as window area, as should sidelights. Assessors are not expected to measure each window precisely, but should attempt to estimate horizontal and vertical dimensions each within 6 inches to calculate the window area as accurately as is reasonable.

Panes, Frame Material, Glazing Type – Select from the dropdown menu choices. If there are multiple types on a side, choose the predominant type. Storm windows should be characterized as an additional pane only, i.e. a single pane window with a storm window should be characterized as “Double-pane”. Storm window frame material is irrelevant.

U-Factor and SHGC – If this info is available the “Actual window specification” button should be clicked and these values should be entered instead of the window characteristics. This info can only be found on the NFRC label attached to the window pane by the manufacturer, or in the new purchase documentation.

Section 5: Systems

System Efficiency Values for heating, cooling and hot water equipment should always be entered instead of the year installed. Please utilize the “Equipment Efficiency Calculator” tab in the **Assessor Calculator** to determine the efficiency of an appliance. The Calculator provides more accurate calculated efficiencies than the Scoring Tool, since the Scoring Tool significantly de-rates efficiencies when the year installed is entered. The Calculator requires you to enter the age of the equipment, which is determined by the year of manufacture. If this date is not printed on the service data plate and is not available from the homeowner’s documentation, it can be determined from the serial number on the service data plate. Go to www.buildingcenter.org to look up the serial number code by manufacturer, which should enable you to determine the age of the equipment to input into the **Calculator**.

Percent of conditioned floor area served by system – enter the percentage of the conditioned floor area served by the system as a whole number. If there is only one system, enter 100. If there are multiple systems, the sum of the percentages must equal 100. If there is a second system, scroll down (past “Ducts”) and click 'Enter a second system'. The screen will expand to provide a second set of data entry fields for the second system. Calculate or estimate the percentage of the home served by each system, based on the square footage that each system serves. If there are more than two systems, combine similar systems and enter the system size-weighted average efficiency, which can be determined using the **Assessor Calculator**. For example, if a home is serviced by two heat pumps and one gas furnace, combine the two heat pumps as System 1 and calculate the weighted average

efficiency (based the calculated efficiency of each heat pump and on the sq. ft. each unit serves). Enter the gas furnace as System 2.

If the home has two heating systems but only one cooling system serving the whole house, you need to make a choice as to how you want to enter the systems. If the heating systems are similar in type and fuel, you can perform a weighted average efficiency calculation for the two heating units and enter them as one system servicing 100% of the CFA (conditioned floor area). If the two heating systems are significantly different in type or fuel, you need to enter them as two separate systems. In this case, you will also need to enter two cooling systems as well (even though the house has only one cooling system). Enter identical information for the two cooling systems – do not enter “None” for one of the systems as this is not an accurate assessment and will produce erroneous results.

If wood heat is frequently used as a supplemental heat system, enter it as System 2 and attempt to characterize how much of the home’s total heating needs the wood heat provides, as a percentage. If the house has a cooling system you will need to enter two cooling systems as well (even though the house has only one cooling system). Enter identical information for two cooling systems – do not enter “None” for one of the systems as this is not an accurate assessment and will produce erroneous results.

If the home has a hybrid or dual fuel heat pump with a gas furnace back-up the system should be entered as two systems:

- **System 1:** services 80% of the CFA, select Electric Heat Pump for both the heating and cooling systems, and enter the duct configuration for the whole house.
- **System 2:** services 20% of the CFA, select Central Gas Furnace for the heating system, select Central Air Conditioner for the cooling system, and enter the same cooling efficiency and duct configuration as you did for System 1.

Heating – If there are multiple systems, characterize the two largest systems. When there are more than two systems, combine the systems that are using the same fuel and calculate a system size-weighted average efficiency (using one of the “Weighted Average Calculators” in the **Assessor Calculator**) for those systems in order to narrow down the total number of systems to two. If there are more than two dissimilar systems, enter the data for the largest systems.

Type of Heating System – If the home’s heating system is not represented in the selections, use your best judgement to choose a system that most closely resembles the home’s system. If heat pump or mini-split heat pump is selected for the Heating System it will automatically be selected for the Cooling System, although this can be overridden if necessary by selecting “None” for Cooling System type. If a stand-alone gas stove type heater is part of the heating system, it should be characterized as “Room (through-the-wall) gas furnace”, and efficiency value should be entered as .65 AFUE.

Heating System Efficiency – It is strongly recommended that the efficiency of the equipment is entered rather than the year installed. * Gather the information from the equipment labels or from the homeowner’s documentation and determine the efficiency using the “Equipment Efficiency Calculator” tab in the **Assessor Calculator**. The efficiency is entered as AFUE for combustion heat and electric furnace, HSPF for heat pump, and COP for ground coupled (aka ground source or geothermal) heat pump (gchp). If the installed year is entered (not allowed for mini-split or gchp), the efficiency value will default to a delivery weighted average efficiency for that year, and high efficiency equipment will incur a significant efficiency penalty. For gchp heating efficiency you must enter the ARI-330 32F COP rating number, which you can determine for the specific unit by looking it up at www.ahridirectory.org (you’ll need to enter the unit’s AHRI Certified Reference Number or the unit’s model number in the search field on the website). Do not de-rate the COP number. For wood heat and electric resistance heat the Tool provides default efficiencies, so the efficiency/install date fields will be hidden when one of these is chosen. Combustion Furnace/Boiler efficiency values (AFUE) should not be entered as less than .70 unless you actually measure it as such. Heat pump efficiency values (HSPF) should not be less than 6.5.

*Please note, for electric resistance heat (electric furnace and electric baseboard heater) and wood heat (wood stove and pellet stove) the Tool provides default efficiencies, so the efficiency and install date fields will be hidden when one of these types is selected. In all cases, heating equipment efficiency should be calculated and entered - Assessors should avoid using the “Year Installed” data entry field.

Cooling - If there are multiple systems, characterize the two largest systems. When there are more than two systems, combine the systems that are using the same fuel and calculate a system size-weighted average efficiency (using one of the “Weighted Average Calculators” in the **Assessor Calculator**) for those systems in order to narrow down the total number of systems to two. If there are more than two dissimilar systems, enter the data for the largest systems.

Type of Cooling System – If heat pump or mini-split was selected for the Heating System it will automatically be selected for the Cooling System, although this can be changed to “None” if there is no cooling provided by the system. Keep in mind, with a heat pump system you must enter the SEER value as the efficiency value for the cooling system – do not enter an HSPF value for cooling.

Cooling System Efficiency - It is always preferable to enter the efficiency rather than the year installed. Gather the information from the equipment labels or the homeowner’s documentation and determine the efficiency using the **Assessor Calculator**. The efficiency is entered as SEER for central air conditioning or heat pump, and EER for room/window air conditioning or gchp. If the installed year is entered (not allowed for mini-split or gchp), the Scoring Tool will default to a delivery weighted average efficiency for that year, and high efficiency equipment will incur a significant penalty. For gchp

cooling efficiency you must enter the ARI-330 77F EER rating number, which you can determine for the specific unit by looking it up at www.ahridirectory.org (you'll need to enter the unit's AHRI Certified Reference Number or the unit's model number in the search field on the website). Do not de-rate the EER number. Air conditioning/heat pump (cooling) efficiency values (SEER) should not be less than 9. If direct evaporative cooling is selected the Tool will use a default efficiency value, so the efficiency question and field will be hidden. If the home uses a heat pump for heating only and not for cooling, change the Cooling System type selection to "None".

Ducts – The duct fields will be hidden when a non-ducted system is chosen (i.e. electric baseboard, mini-split heat pump, boiler or wood heat) and there is no central air conditioning. For ducts located in a concrete slab choose "Unvented crawlspace" as the location; insulated: no; sealed: yes. If the system does not have ducts but the Tool requires duct entries, choose "Conditioned space" as the location; insulated - yes; sealed - yes.

Duct Location – choose the location (see above for exceptions).

Percent in that location – indicate the whole number percent of the duct length in that location with the same insulation and duct seal characteristics. There are up to 3 entries available - the sum of the location percentages must equal 100.

Are the ducts insulated/sealed – Answer yes or no based on those ducts referenced in the duct location entry. Ducts should only be considered sealed and/or insulated if the Assessor has visually verified as such, i.e. duct mastic/spray foam/UL-181 tape on joints and insulation on (or in) the ducts, particularly in unconditioned areas – otherwise select no. For ducts located in a concrete slab, choose insulated - no; sealed - yes.

Hot Water

Hot Water Type – If there are multiple systems using different fuels, enter the characteristics of the largest or most predominant one. If the water heater is an instantaneous/on-demand type, choose storage type and make every effort to determine the actual installed efficiency of the unit(s), as it is significantly higher than the default values. Electric on-demand water heaters have an energy factor of .98 or .99.

Water Heater Efficiency – It is always preferable to enter the efficiency rather than the year installed (entering year installed is not allowed for electric heat pump water heaters). The Tool will accept an energy factor (EF) as high as 3.00 (for a heat pump water heater). **Minimum** efficiency for a gas fired storage water heater is EF 0.50; for an oil fired storage water heater is EF 0.45; for an electric storage water heater is EF 0.86; and for an electric heat pump water heater is EF 2.0. If the energy factor is unknown, use the default values from the chart in the "Equipment Efficiency Calculator", in the

Assessor Calculator. The energy factor should be rounded to the second decimal. If the installed year is entered the efficiency value will default to a delivery weighted average efficiency for that year, and high efficiency equipment will incur a significant penalty – entering the “Year Installed” should be avoided. If there are multiple systems using the same fuel, calculate and enter a system size weighted average efficiency using the **Assessor Calculator**. If there are multiple systems using different fuels, enter the efficiency of the largest system.

If one of the home’s heating systems is a boiler and it provides the domestic hot water as well, select “Boiler with tankless coil” or “Boiler with indirect tank” appropriately – no efficiency value is required.

If the home’s water is heated by a gchp desuperheater, the system should be characterized as “Electric heat pump” (water heater) and the energy factor should be entered as 2.5.

Currently, solar thermal (water heating) systems cannot be accurately modeled by the Scoring Tool. If the home’s water is heated primarily by a solar thermal system with electric heating back-up, the system can be characterized as an “Electric heat pump” (water heater), in which case the energy factor should be entered as 2.5. If the solar thermal system utilizes a gas fueled heating back-up, the system cannot be modeled in the Scoring Tool.

Solar Photovoltaic (PV) System

“Year installed” and “Direction panels face” must both be entered. If you know the system’s DC capacity in kilowatts, select “Yes” and enter the value. The owner may have documentation with this information, which is preferred over the number of panels. Otherwise, select “No” (the entry box will change from “DC capacity” to “Number of panels”) and enter the number of PV panels. These entries must all be completed when entering a PV system. If there are multiple sets of panels facing different directions, choose the direction faced by the majority of the panels.

Troubleshooting

- **Problems logging on:** Assessors must enter their Assessor ID in the username field and their password at <http://hescore.labworks.org> in order to access the Home Energy Score. If you do not know your Assessor ID please click on the “Request new password” tab on the login screen and enter the email address you originally provided to your Partner. An email with your Assessor ID (username) in the salutation and a temporary link will be sent to you at that email address. Go to your email program, open the email from hes.helpdesk@pnnl.gov, and click on the temporary link in the email message. Follow the password instructions. Once

you've created a new password, be sure to record your username and password for future reference.

- If you no longer have access to the email account you provided to your Partner please contact us at assessor@ee.doe.gov to have your new email address registered to your account.
- If you're typing in your Assessor ID / password and it's not working, check to make sure that your caps lock is not on.
- Do not share your login, or allow others to score homes through your login; doing so will compromise your status as an Assessor and your access to the Scoring Tool may be blocked indefinitely.
- Session "Lock-ups": If you enter data into a session, then exit the Home Energy Score before creating the label, and then re-access the session a few minutes later it may cause the session to lock-up, in which case you'll need to wait at least an hour before the session is unlocked. If you find that the session is permanently locked you will need to start over by creating a new session. In this case the permanently locked session can be deleted from your Dashboard. If you seem to be locked out of the Scoring Tool, please notify us at assessor@ee.doe.gov.
- Reporting Problems: If you run into an error or need to report a problem with the Home Energy Score software please provide as much information about the issue as possible in your email, including screen pics (aka screen shots or prints), to assessor@ee.doe.gov. If it is about a particular session, provide the Session ID number and whether you generated a score or were entering data at the time of the failure. If you are using a third party software to access the Scoring Tool, identify the software in your email to us and Cc the software vendor in your message.

Other

- As an Assessor, you have access to other resources through the Assessor/Partner Portal, such as Home Energy Score logos and word blocks that you can add to your business card or website. You can get to the Portal by clicking on the "Admin Tool" link in the Assessor Tools menu on your Scoring Tool Dashboard page.
- Check out the Department of Energy's Home Energy Score website, here: www.homeenergyscore.gov
- Also, Building America Solutions Center website at <http://basc.energy.gov>
 - DOE's free resource on building science & energy efficient construction

- Lots of diagrams, renderings, and photos
- Step-by-step “how to” instructions
- Mostly focused on new construction but existing construction is being added
- Users can “gather” the information that is most helpful to them
- Users can provide feedback to the site, including content

Home Energy Score Technical Team

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Home Energy Score Definitions

Absorptance – a measure of how much heat from the sun is absorbed by the roof. The number falls between zero and one. The closer the number is to 1.0, the more energy is absorbed. In climates that use more air conditioning than heating, it can be beneficial to have a roof with a number less than 0.5.

Air Barrier – the building components that reduce or stop conditioned air from moving between inside and outside. This is typically the top floor ceiling, the lowest floor, and the walls. To be effective the air barrier must be continuous and must be in contact with the thermal boundary.

AFUE (Annual Fuel Utilization Efficiency) – the estimated energy efficiency of heating systems that use fossil fuels. It accounts for all losses related to the actual heating unit.

Base Load – the energy used by the appliances and fixtures in your home other than the heating, cooling, and hot water systems. Base load includes lighting, entertainment systems, computers, kitchen appliances, washer & dryer, etc.

Batt – a blanket of insulation that is provided in standard widths and thicknesses.

Blower Door – a large fan, removable door panel and gauges used to measure the degree of air leakage in a building’s envelope, and also used to locate the leaks in the air barrier.

Btu (British thermal unit) – an international standard unit of measuring energy content or power; one Btu is the amount of heat needed to raise one pound of water one degree Fahrenheit. 1,000 Btu equals 1 kBtu, and one million Btu (or 1,000 kBtu) equals 1 Mbtu.

Cathedral Ceiling – a sloped ceiling which is either part of or directly attached to the roof rafters, and is therefore part of the roof assembly. Cathedral ceilings can either be open, with exposed rafters, or have enclosed rafter cavities. Cathedral ceilings have no attic space. Cathedral ceilings are not the same as vaulted ceilings (see definition below).

Cellulose Insulation – insulation made from recycled newspapers, cardboard and/or wood waste that is treated with a fire retardant.

CO (Carbon Monoxide) – a colorless, odorless, deadly gas that can be produced by any equipment that burns fossil fuels.

COP (Coefficient of Performance) – a measure of the efficiency of a heating or cooling system that uses electricity as its fuel. The number typically falls between 1 and 10 with 10 being the most efficient. This is typically used only for ground source heat pumps.

Cooling Load – the maximum amount of heat removal required from the air conditioner when the outside temperature and humidity are at design conditions.

Dense Pack Insulation – a method of using loose fill insulation (cellulose or fiberglass) to completely fill a wall, floor, or ceiling cavity enough to significantly reduce air movement. Fibrous insulation (e.g. fiberglass or cellulose) will not stop air flow, but can reduce it when applied under pressure in an enclosed cavity.

Design Conditions – the temperature and humidity measurements used to calculate the amount of heating or cooling capacity needed by the house to maintain comfort. The temperature values are dependent on how severe the weather typically is in that location.

Desuperheater – A secondary heat exchanger that transfers heat from a gchp heating/cooling system to the domestic hot water system.

EER (Energy Efficiency Ratio) – a measurement of the energy efficiency of air conditioners. Typically it is only applied to window or through the wall air conditioners. The number typically falls between 5 and 10 - the higher the number, the better.

Energy Factor – a measure of the efficiency of a water heater. The value typically falls between 0.5 and 1, although the most efficient systems can have an energy factor greater than 2.

Envelope – the part of the house that separates inside from outside. Typically the envelope is comprised of the walls and windows, the lowest floor, and the ceiling.

Exfiltration – uncontrolled air flow out of the house. This is caused by pressure differences (stack effect, temperature gradients, and wind) or be mechanically driven (duct leakage). Exfiltration is a direct cause of infiltration.

Fiberglass – an insulation material made by spinning molten glass.

Heating Load – the maximum amount of heat needed by the house during design conditions.

HSPF (Heating Seasonal Performance Factor) – a measure of the efficiency of an air source heat pump during the heating season. HSPF is typically between 6 and 12 - the higher the number, the more efficient the equipment.

HVAC – Heating, Ventilation and Air Conditioning.

Infiltration – the uncontrolled flow of air into the house as a direct result of exfiltration.

Insulation – any material with a relatively high thermal resistance or R-value.

kWh (kilowatt hour) – a unit of electric energy equal to one thousand watt-hours or 3412 Btu-hrs.

kBtu – equals one thousand Btu.

Mastic – a thick, gooey paste used to seal duct joints.

MBtu – equals one million Btu, or one thousand kBtu.

MWh (megawatt hour) – equals one thousand kWh, or one million watt-hours.

Mechanical Ventilation – the use of a fan to control the amount of air that moves into and out of a building.

Photovoltaic (PV) – the conversion of electromagnetic radiation (visible light) emitted by the sun into electricity, using semiconducting materials incorporated into manufactured cells, typically referred to as solar cells. Solar cells are combined into groupings called solar panels, and groupings of solar panels are referred to as PV systems.

R-value – a measure of a material's resistance to heat flow - the higher the number, the more resistant to heat flow and thus the higher the insulation value. R-value is the inverse of U-factor.

Radiant Barrier – typically a shiny material that reflects radiant heat waves (e.g. heat from the sun) away from the house. This can be beneficial in climates where air conditioning requires more energy than heating on an annual basis. Radiant barriers have very low R-value.

SEER (Seasonal Energy Efficiency Ratio) – a measurement of the efficiency of a central air conditioner or the cooling efficiency of a heat pump. The number usually falls between 8 and 20, but can be higher. The higher the number, the more efficient the equipment.

SHGC (Solar Heat Gain Coefficient) – a measure of how effective a window is at preventing radiant heat from passing through the glass. The number falls between 0.0 and 1.0 - the lower the number the more effective the window is.

Solar Thermal – technology that captures heat energy from the sun for either generating thermal energy or electrical energy. In the residential sector it is most often used for transferring heat to domestic hot water systems, and is often referred to as solar water heating.

Thermal boundary – the surfaces of a house that reduce heat movement between the inside and the outside by the application of insulation. The thermal boundary should be continuous and be in direct contact with (or be part of) the air barrier.

U-factor – a measure of the ability of a material or combination of materials to transfer heat, often used to express window efficiency. U-factor is the inverse of the R-value. The U-factor for windows is usually a decimal less than 1 - the smaller the number, the better the efficiency performance of the window.

Vaulted Ceiling – a sloped ceiling which is not directly part of or attached to the roof rafters and so is not part of the roof assembly. Vaulted ceilings have some degree of attic space above them. Vaulted ceilings are not the same as cathedral ceilings (see definition above).