

Modeling Guidelines for Northwest REM/Rate™

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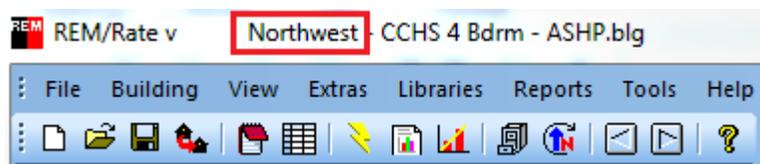
The Northwest ENERGY STAR® Homes program, in collaboration with NORESKO, has developed a Northwest version of the REM/Rate™ modeling software that has been adjusted for closer alignment with regionally accepted values. To qualify for Northwest ENERGY STAR certification, all single-family homes must be modeled in Northwest REM/Rate. While builders have some flexibility in constructing their homes to meet the program requirements, Raters must follow specific guidelines for data entry in addition to the standard REM/Rate protocol. This ensures that certified homes meet or exceed the minimum performance requirements of the Northwest ENERGY STAR Reference Home for your state.

How does the Northwest version of REM/Rate differ from the national version?

- The Northwest version compares the modeled home with state-specific reference homes
- Foundations have been restricted to the following four types:
 - Slab
 - Enclosed Crawlspace
 - Conditioned Basement
 - Unconditioned Basement
- Window areas locked with preset minimums
- Shading factor inputs for windows locked to preset values
- Ground contact, duct leakage, infiltration and heat pump behavior models adjusted for closer alignment with regionally accepted values based on calibrated software
- Tankless water heaters de-rated for consistency with DOE/RTF recommendations
- DHW gal./day consumption overridden to regionally accepted values
- HRV/ERV efficiency input set to align with regionally accepted values

What guidelines must Raters follow when modeling their homes?

- The Northwest version of REM/Rate must be used to determine compliance for Northwest ENERGY STAR Home certification. The version can be identified by checking for "Northwest" at the header of the software following the version of REM/Rate.



Contact your Provider to request the necessary files that modify the national version of REM/Rate to the Northwest version.

- Raters must use libraries approved by Northwest ENERGY STAR Homes (Exhibit 1). These libraries can be obtained from your Provider, along with detailed instructions for updating your copy of Northwest REM/Rate to include the library.

Exhibit 1: Approved Libraries

Effective Date 8/1/2013
Energy Trust of Oregon custom libraries
Washington State University Energy Program libraries

- Raters must run a Compliance Report to determine whether or not the home meets or exceeds performance of the Reference Home, based on annual energy consumption. Builders and Raters may generate and use other REM/*Rate* reports, but these reports will not suffice to demonstrate compliance for Northwest ENERGY STAR Home certification.
- When modeling homes in Northwest REM/*Rate*, the following protocols must be followed:
 - Slab insulation must meet or exceed the state-specific Reference Home prescriptive requirements, and must be modeled **at** the specified levels (see Exhibit 1 of the [Northwest ENERGY STAR Single-Family Homes Requirements](#)). No trade-offs are available for this measure.
 - Foundations are limited to four types (see below). Therefore, conditioned crawlspaces should be modeled as conditioned basements. Add the characteristics to the foundation wall, slab and house volume. For REM/*Rate* to assign the thermal boundary and provide an accurate model, a slab entry must be provided, even if not present in the home. If a mechanical exhaust ventilation strategy is used, this should be added to the whole-house ventilation rate, duration and fan wattage.
 - Enter window areas accurate to the rated home.
 - Duct tightness must meet or exceed Northwest ENERGY STAR Homes program standards (found in both the Single-Family Homes Requirements and Rater Field Checklist). No tradeoffs are available for duct leakage in excess of:
 - If testing at CFM25: .04 x floor area served by system or 40 CFM, whichever is greater.
 - If testing at CFM50: .06 x floor area served by system or 75 CFM, whichever is greater.

REM/*Rate* requires the Rater to enter a value for Leakage to Outside for energy calculations. Unless a ductless heat pump (or other ductless heating system) is installed, Leakage to Outside should never be set to zero. The "Exemption- No Test Required" box should not be checked. Use the following inputs depending on where the ducts are located:

- If ducts or portion of ducts are located outside of conditioned space, tested Leakage to Outside values should be entered. If only Total Leakage was tested, this number should be substituted for Leakage to Outside.
 - If ducts and equipment are located within conditioned space (max 5% of the lineal feet of the duct system located outside of pressure and thermal boundary), tested Leakage to Outside values should be entered. If no testing was done, enter .015 x floor area served at CFM50 as this matches the Reference Home assumed value.
- Air infiltration must be entered at the state-specific Reference Home value (see Exhibit 1 of the Northwest ENERGY STAR Single-Family Homes Requirements). Until further notice, no trade-offs are available for this measure.



- Unless an HRV or ERV is used, ventilation systems must be entered as program default type "Exhaust Only." Integrated supply air ventilation systems must also be modeled as an "Exhaust Only" system. For these systems, actual ventilation of the home should be set up to satisfy Northwest ENERGY STAR Homes (at minimum) requirements, but modeled according to the following:
 - Enter flow *Rate* as if the run time was constant or ASHRAE 62.2 2010 continuous design ventilation rate.
 - *Hours/Day* should be set to 24.
 - Multiply the air handler wattage by 0.146 to determine *Fan Watts*. This is based off the assumption of a 3.5 hour/day run time, spread out over a 24 hour period. Note this value accounts for run times outside of normal heating and cooling cycles.
- Balanced ventilation systems must be modeled with Apparent Sensible Effectiveness (ASE), Rate, Hours/Day and Fan watts accurate to the equipment being used.
- Air source heat pumps shall be modeled within the range of 8 to 10 HSPF.
- Ductless heat pumps shall be modeled according to the following:
 - If supplemental electric unit heaters or zone heaters exist in the home, the Rater should model an air-source heat pump and enter the minimum HSPF specified in the state-specific Reference Home (see Exhibit 1 of the [Northwest ENERGY STAR Single-Family Homes Requirements](#)). The Rater should not alter the "compressor capacities" listed in either of the approved libraries, or REM/*Rate's* default values for "electric resistance backup capacity" (strip heat). Ductwork shall be assigned to the system, but enter the ducts and system as inside the conditioned space and set "leakage to outside" to zero.
 - If **no** supplemental electric unit heaters or zone heaters exist in the home, the Rater should model an air-source heat pump and enter the HSPF of the system, which should be no greater than 10. The REM/*Rate* default value for "electric resistance backup capacity" (strip heat) should be set to "0". A duct system entry can be omitted. REM/*Rate* may indicate a warning that no ducts are present, but this will not affect Northwest ENERGY STAR Homes compliance.
- If a **ducted** mini-split is installed and no supplemental electric unit heaters or zone heaters exist in the home, the Rater should model an air-source heat pump and enter the HSPF of the system, which should be no greater than 10. The REM/*Rate* default value for "electric resistance backup capacity" (strip heat) should be set to "0". Ductwork shall be assigned to the system, following the protocol for duct tightness outlined above.
- REM/*Rate* default values shall be used for appliance consumption for clothes washers, dryers and refrigerators unless appliances are installed in the home at the final inspection that are more efficient than the default models. The actual consumption of the dishwasher should be entered as this appliance should be in place at the final inspection. Dishwashers must be ENERGY STAR qualified.

For questions, contact Northwest ENERGY STAR Homes by email at trevor.frick@clearesult.com or by phone at **1-503-548-1628**.