



VT Residential Building Energy Standards (RBES) Update

Vermont law requires that the residential energy code (RBES) be updated promptly upon the revision of the latest version of the International Energy Conservation Code (IECC); this process is expected to be completed late 2014. On June 17, 2013, the Vermont legislature adopted Act 89, which clarifies the applicability of Vermont's residential (and commercial) building energy codes to mixed-use buildings and includes various amendments to promote compliance with those codes, such as using existing State and local permit processes to encourage compliance.

Vermont's First Stretch Residential Energy Code

Act 89 also amended the RBES statute to authorize the Vermont Public Service Department (PSD) to adopt a "stretch" code for residential buildings to achieve greater energy savings than the baseline RBES. Once a stretch code is adopted, residential buildings will gain a presumption of compliance with the energy conservation criterion of Act 250 by complying with the stretch code. Municipalities will also have the option to adopt the stretch code as part of their land use bylaws.

Three Ways to Comply

2015 RBES has three compliance paths for both base and stretch codes, including: 1) Multiple Prescriptive Packages; 2) HERS Energy Rating; and 3) REScheckTM modeling software.

Economic Analysis for Single-Family Homes

An economic analysis comparing the proposed minimum base requirements for the 2015 RBES to the current 2011 RBES for typical single-family new construction has been completed (see other side for details). A similar analysis was conducted comparing the 2011 RBES and the proposed minimum stretch energy code requirements.

For more information go to: http://publicservice.vermont.gov/topics/energy_efficiency/code_update

Single-Family New Construction – Economic Analysis Summary Results

2015 RBES Base and Stretch Code energy savings were calculated from REM/Rate modeled annual consumption estimates and converted into fuel specific units for propane, natural gas, fuel oil and electricity (heat pump). Annual energy costs were calculated for each fuel using the VT PSD 2014 Fuel Report, with a conservative assumption of constant fuel prices into the future.

For each Prescriptive Package analyzed to establish the minimum requirements for the 2015 Base and Stretch Codes, energy savings were determined and compared to the minimum requirements in the prescriptive “Fast-Track Package 1” listed in the 2011 RBES Handbook. For each comparison scenario, energy savings were determined for four heating system fuel types: fuel oil, propane, natural gas, and electricity (heat pump). Weighted average annual energy savings were calculated by weighting the annual savings for each fuel type by the incidence rate of each fuel as reported in the 2013 Vermont Residential New Construction Baseline Study. Also determined were incremental costs for each Prescriptive Package compared to minimum requirements in the primary 2011 RBES Fast-Track Package 1, which was then reviewed by Vermont production builders.

Below are weighted energy savings across all 2015 Base and Stretch Code Prescriptive Packages, along with high and low energy cost savings scenarios based on a specific fuel type assumed for a particular Prescriptive Package. Across the four benefit-cost perspectives, incremental costs associated with Base Code and Stretch Code, as compared to 2011 RBES requirements, are offset through the significant energy savings that accrue.

Simple Payback (SPB) – Scenarios Results

- $SPB = \text{Incremental cost} \div \text{annual energy savings}$
- 5.3 years for Base Code (individual fuel-specific scenarios range from 4.3 to 12.4 years)
- 7.4 years for Stretch Code (individual fuel-specific scenarios range from 6.6 to 15.8 years)

Return on Investment (ROI) – Scenarios Results

- $ROI = \text{Annual energy savings} \div \text{incremental cost}$
- 19% for Base Code (individual fuel-specific scenarios range from 8% to 23%)
- 13% for Stretch Code (individual fuel-specific scenarios range from 6% to 15%)

Savings to Investment Ratio (SIR) – Scenarios Results

- $SIR = \text{Annual energy savings} \div \text{incremental cost} \times \text{lifetime of the energy measures}$
- 4.7 for Base Code (individual fuel-specific scenarios range from 2 to 5.8)
- 3.3 for Stretch Code (individual fuel-specific scenarios range from 1.6 to 3.8)

Cash Flow (CF) – Scenarios Results

- $CF = \text{Annual energy savings} - \text{incremental mortgage cost of the energy measures}$
- \$440 Annual Net Positive Savings for Base Code (individual fuel-specific scenarios range from \$68 to \$590)
- \$591 for Stretch Code (individual fuel-specific scenarios range from \$15 to \$730)