

Improving Building Energy Simulation Programs Through Diagnostic Testing

New test procedure evaluates quality and accuracy of energy analysis tools for the residential building retrofit market.

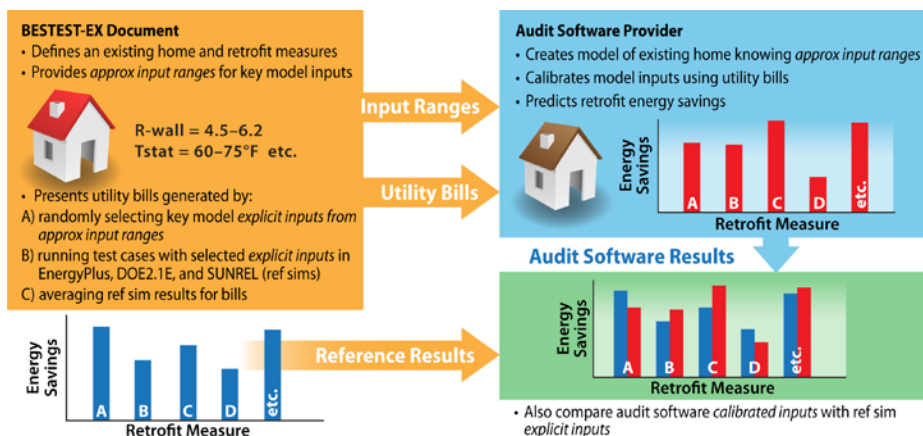
Reducing the energy use of existing homes in the United States offers significant energy-saving opportunities, which can be identified through building simulation software tools that calculate optimal packages of efficiency measures. To improve the accuracy of energy analysis for residential buildings, the National Renewable Energy Laboratory's (NREL) Buildings Research team developed the Building Energy Simulation Test for Existing Homes (BESTEST-EX), a method for diagnosing and correcting errors in building energy audit software and calibration procedures.

BESTEST-EX consists of building physics and utility bill calibration test cases, which software developers can use to compare their tools' simulation findings to reference results generated with state-of-the-art simulation tools. Overall, the BESTEST-EX methodology:

- Tests software predictions of retrofit energy savings in existing homes
- Ensures building physics calculations and utility bill calibration procedures perform to a minimum standard
- Quantifies impacts of uncertainties in input audit data and occupant behavior.

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Reference: BESTEST-EX website, www.nrel.gov/buildings/bestest_ex.html



Utility bill calibration cases. Illustration by AI Hicks, NREL

Key Research Results

Achievement

NREL developed a Building Energy Simulation Test for Existing Homes (BESTEST-EX), which allows software developers to evaluate their audit tools' performance in modeling energy use and savings in existing homes when utility bills are available for model calibration.

Key Result

BESTEST-EX is helping software developers identify and correct bugs in their software, as well as develop and test utility bill calibration procedures.

Potential Impact

Improvements to audit tools will reduce risks associated with purchasing, selling, and financing home energy upgrades based on predicted energy savings.