



Energy Rating Index Calculation Consistency

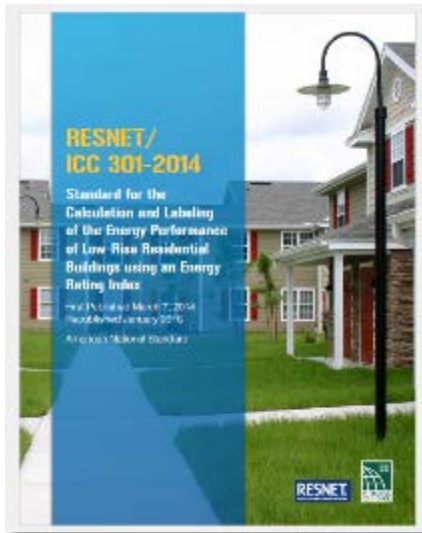
Dave Roberts, Manager
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National Renewable Energy Laboratory

DOE National Code Conference
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IECC Energy Rating Index, aka HERS Index

IECC Section 406 Energy Rating Index Compliance Alternative

406.3 Energy Rating Index. *The Energy Rating Index (ERI) shall be determined in accordance with RESNET/ICC 301.*




Climate Zone	Energy Rating Index
1	57
2	57
3	57
4	62
5	61
6	61
7	58
8	58



Anatomy of a Home Energy Assessment Tool

User Interface Typical residential assessment inputs

Example: Air Conditioner



SEER:	1 input
Capacity:	1 input
<u>SHR:</u>	<u>1 input</u>
Total:	3 inputs

Many, many lines of software code that translate simplified inputs into detailed inputs

Air Loop:	19 inputs
Coil:	28 inputs
Performance Curves:	50 inputs
<u>Fan:</u>	<u>13 inputs</u>
Total:	> 100 inputs

Estimated influence on variability**

40% observation and input

Keys to Improvement

Training and Interface Design

Input Translator Assumptions about building details not observed or input

50% input translation

Common Rules or Shared Software Code

Simulation Engine Detailed inputs needed to drive simulation*

10% simulation engine

Validation

*Similar inputs needed for any detailed simulation engine (e.g., EnergyPlus, DOE-2, ESP-r, etc.).

**Dave Roberts' generalized observational opinion.

RESNET Consistency Efforts

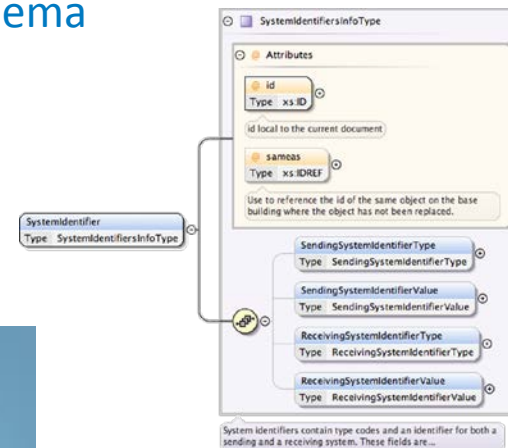
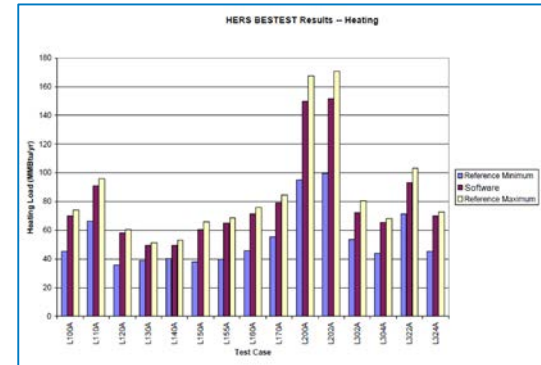
What Has RESNET Accomplished To Date

- Adoption of the RESNET Publication No. 002, "Procedures for Verification of RESNET Accredited HERS Software Tools"
- Established Limits on Input Variables for Whole-House Ventilation Systems
- Incorporated Bounds Checks into Software to Limit or Warn HERS Raters When Input Values are Beyond Reasonable Limits
- Established QAD Flags for Internal Inconsistencies that Should be Checked Prior to Entering a Building File into RESNET Registry



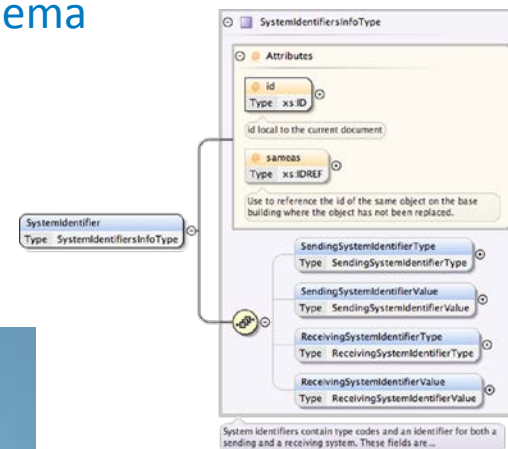
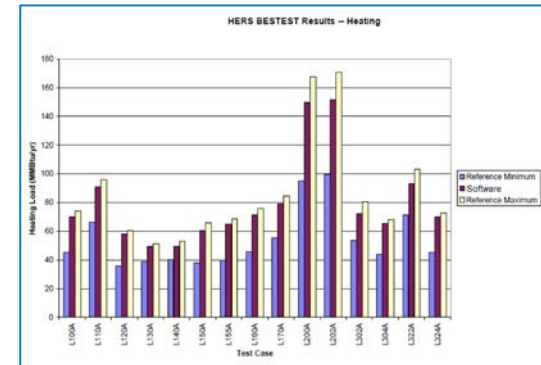
Improvements Planned for 2018

- Tightening of the Boundaries of the Suite of HERS Software Program Tests
- Development of a RESNET Building Input Common Schema
- Formation of a Software Consistency Committee
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Formation of a Software Consistency Committee

Purpose:

- Proactively promote consistency through group discussion, updates to the RESNET modeling guidelines, recommended updates to Publication 002 test boundaries, and requests for Standards interpretations.

Members:

- Representatives of RESNET Accredited Software Programs (REM/Rate, Ecotrope, EnergyGauge USA, Wrightsoft)
- Subject Matter Experts (NREL, California Energy Commission)



Hiring an Energy Modeling Director

To support the SCC, RESNET will recruit a technical consultant with extensive knowledge of building energy software modeling, who will serve as the RESNET Energy Modeling Director

RFP currently out. Deadline for responses is August 15, 2018



RESNET Consistency Efforts

Throughout all these processes, RESNET will conduct periodic evaluation of the progress toward consistency of index scores among all the software providers. If it becomes clear that all these efforts will not achieve an acceptable level of consistency, RESNET will proceed to moving to a ***single engine*** for calculation of the HERS index scores.

RESNET blast email 6/4/18

NREL/DOE Open Source Engine


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Benefits

- ✓ **Accelerates new technologies** into software tools
- ✓ **Increases consistency** across DOE/industry programs
- ✓ **Reduces developer effort** to use EnergyPlus
- ✓ **Lowers industry-wide costs** of maintaining multiple engines
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Summary & Key Takeaways

1. RESNET processes are improving accuracy and consistency
2. NREL is leading an effort to cooperatively develop open source infrastructure to support calculation of ERI based on OS/E+

