

Welcome

Improving the Consistency of Calculated HERS Scores

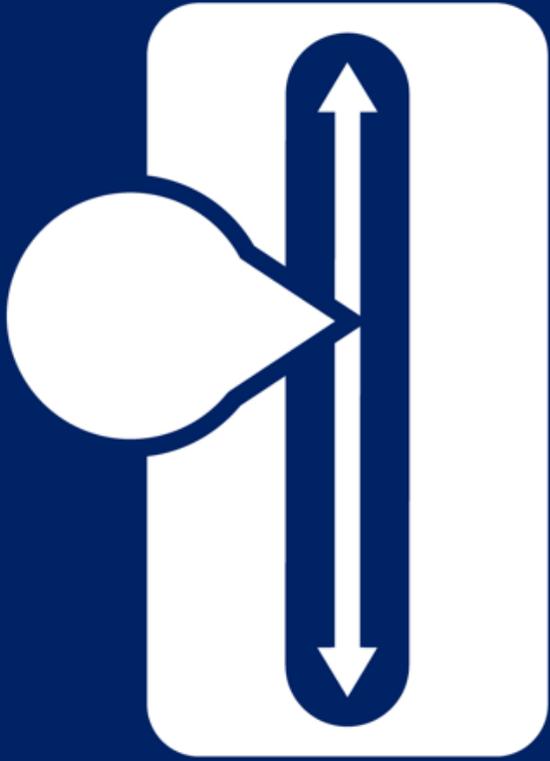


EEBATM



HIGH PERFORMANCE
HOME SUMMIT 2019

OCTOBER 1-3 \ DENVER, CO



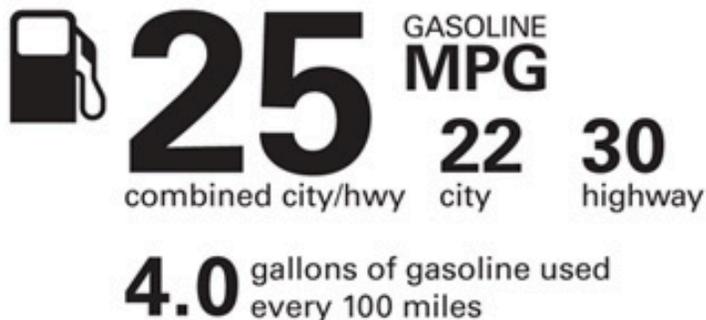
RESNET[®]

HERS

INDEX

EPA Fuel Economy and DOT Environmental Comparisons

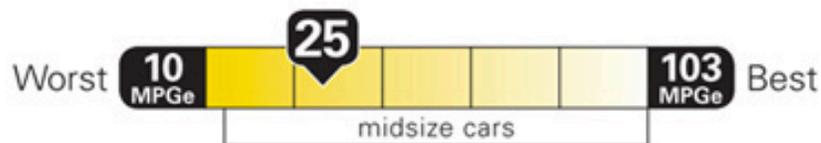
 Dual Fuel Vehicle:
Gasoline-Ethanol (E85)



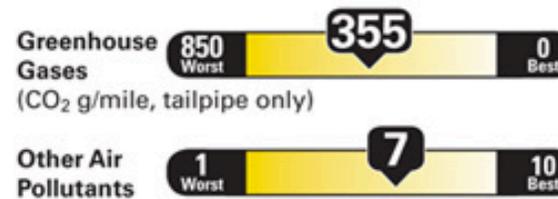
Annual Fuel Cost
\$1,680

How This Vehicle Compares

Among all vehicles and within midsize cars



Environment



Your actual mileage and costs will vary with fuel cost, driving conditions, and how you drive and maintain your vehicle. Cost estimates based on 15,000 miles per year at \$2.80 per gallon.

Ratings are based on gasoline and do not reflect performance and ratings using E-85.

See the Fuel Economy Guide for more information.

Visit www.fueleconomy.gov to calculate estimates personalized for your driving, and to download the Fuel Economy Guide (also available at dealers).



Smartphone Interactive

Scan code for more information about this vehicle or to compare it with others.





Credit: Argonne National Lab

RESNET accredited HERS rating software programs:

REM/RateTM

ekotrope 

EnergyGauge[®] 

Energy and Economic Analysis Software

“Someone with a watch knows what time it is.
Someone with two watches is never sure.”

- Segal's Law



“Someone with three rating software tools is never sure what the HERS index is.”

-Kruis's Law



RESNET FORMS HERS SOFTWARE CONSISTENCY TASK GROUP TO ENHANCE THE CONSISTENCY OF THE CALCULATION OF HERS INDEX SCORES

January 11th, 2018 - Posted by emma@resnet.us under [RESNET News](#)



A critical element in ensuring the consistency of HERS Ratings is enhancing the consistency which RESNET accredited HERS Software Programs calculate the HERS Index Score. There are currently situations where a home could have a different HERS Index Score based upon which software program is being used.

At the 2017 Fall RESNET Board of Directors Meeting, the RESNET Board adopted the following actions in terms of enhancing the consistency of how HERS software calculates HERS Index Scores:

» RESNET HOT TOPIC

[Conference](#)

[Rater Information](#)

[RESNET News](#)

[Technical](#)

[Training Opportunities](#)

[Upcoming Events](#)

» POST AN ENTRY

If you have an event, issue or story that you would like to share with the residential energy efficiency community, please use the link below to submit it to us!

[Post an Entry](#)

RESNET Software Consistency Committee

RESNET HERS Software Providers:



Brian Christensen



Philip Fairey



Cy Kilbourn



Subject Matter Experts:



Scott Horowitz



Martha Brook



Neal Krus



RESNET Software Consistency Committee

1. Oversee the continuous improvement in HERS rating consistency over time
2. Evaluate and resolve RESNET member inquiries about general inconsistencies
3. Propose changes to enhance publications, tests, and standards to better enforce consistency

Publications, Tests, and Standards

RESNET
RESIDENTIAL ENERGY SERVICES NETWORK

ICC INTERNATIONAL CODE COUNCIL

ANSI/RESNET/ICC 301-2019
Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index

 Approved American National Standard

December 18, 2018

Residential Energy Services Network, Inc.
P.O. Box 4561
Oceanside, CA 92052-4561
<http://resnet.us/>

International Code Council
500 New Jersey Avenue, NW, 6th Floor
Washington, D.C. 20001
www.iccsafe.org

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RESNET
RESIDENTIAL ENERGY SERVICES NETWORK

Procedures for Verification of RESNET Accredited HERS Software Tools

RESNET Publication No. 002-2017

(August 2017)

Published by:

Residential Energy Services Network, Inc.
P.O. Box 4561
Oceanside, CA 92052-4561
<http://resnet.us/>

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ANSI/ASHRAE Standard 140-2011
(Supersedes ANSI/ASHRAE Standard 140-2007)

 **ASHRAE STANDARD**

Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs

See Annex C for approval dates by the ASHRAE Standards Committee, the ASHRAE Board of Directors, and the American National Standards Institute.

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www.ashrae.org

 Accompanying CD includes electronic-format files for Standard 140.

HERS Index Consistency



Actual Home



User
(HERS Rater)



HERS Software



HERS Index

HERS Index Reality



Actual Home



User
(HERS Rater)



HERS Software



HERS Index

User Errors



Actual Home



User
(HERS Rater)



HERS Software

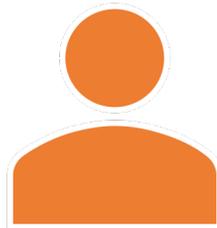


HERS Index

Software Inconsistencies and Errors



Actual Home



User
(HERS Rater)

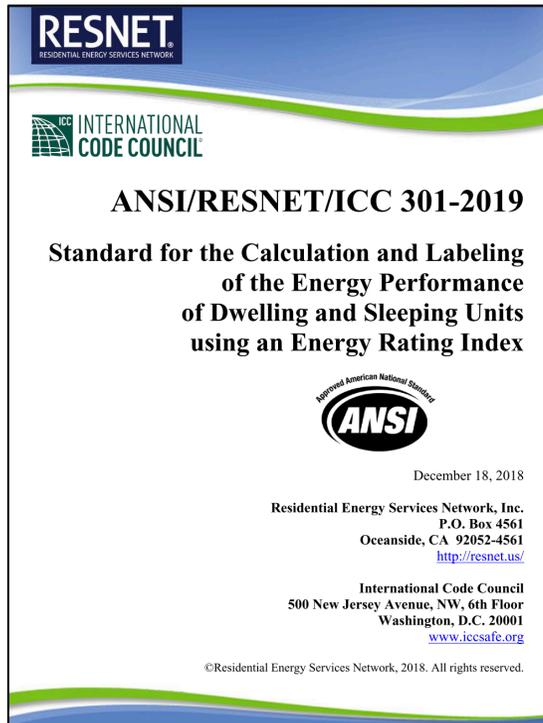


HERS Software



HERS Index

HERS Index Calculation Refresher...



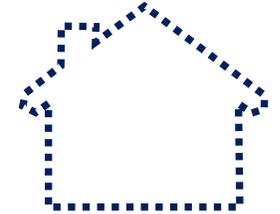
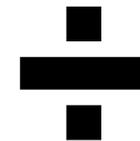
301 Standard



HERS
Index

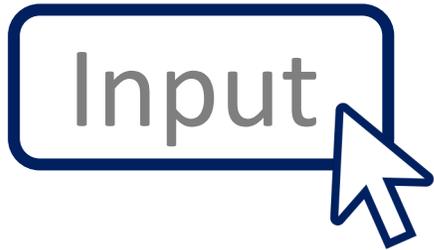


Rated
Home



Reference
Home

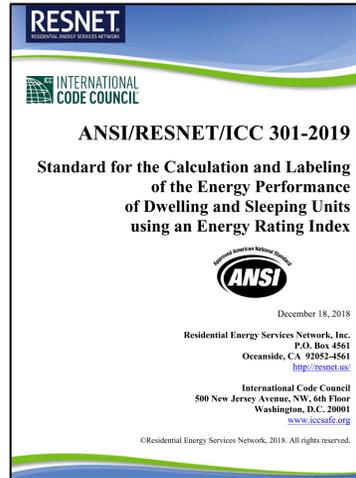
Software Consistency



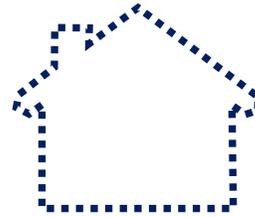
User Inputs



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Reference
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Calculations

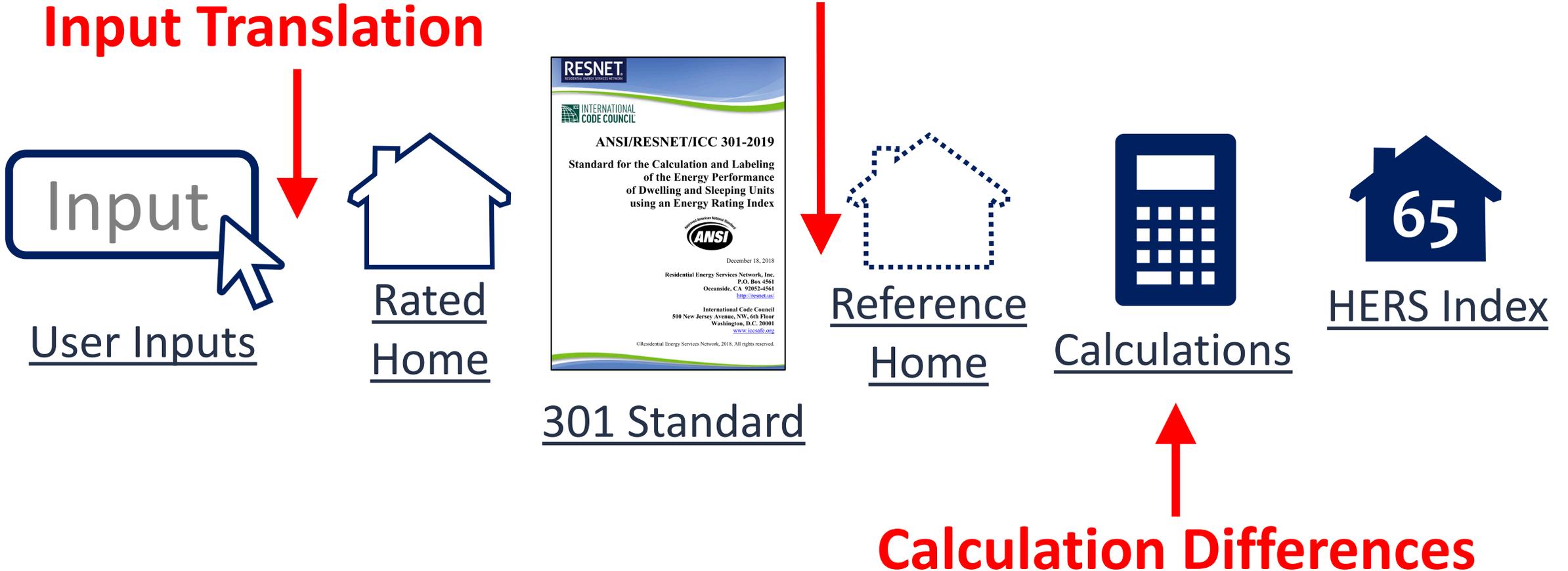


HERS Index

Software Consistency **Issues**

301 Standard Interpretation

Input Translation



Input Translation

ACH50



SLA

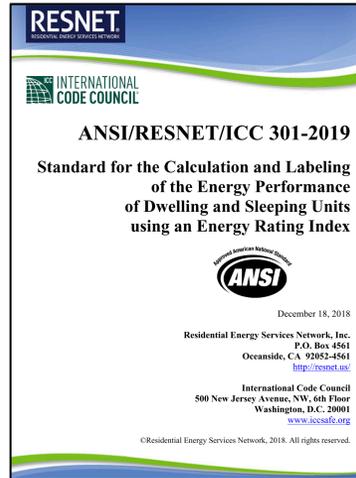


CFM50



User Inputs

Rated Home



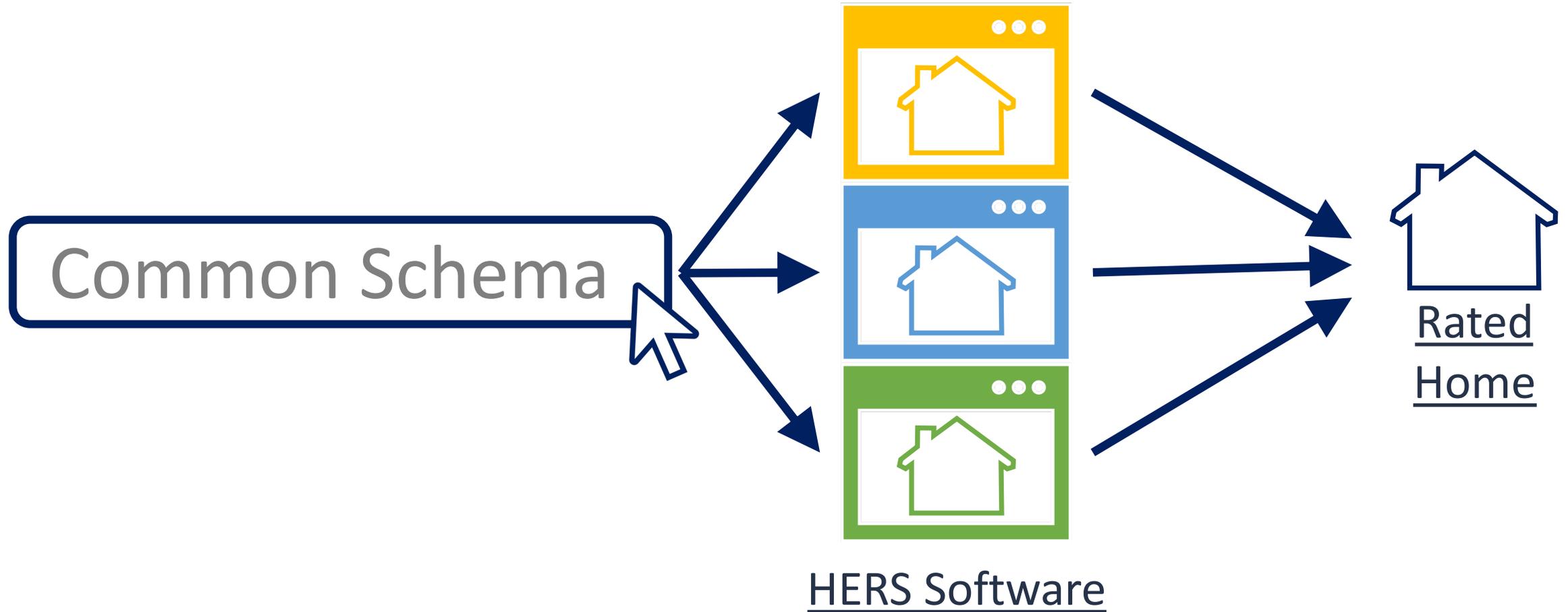
301 Standard

Reference Home

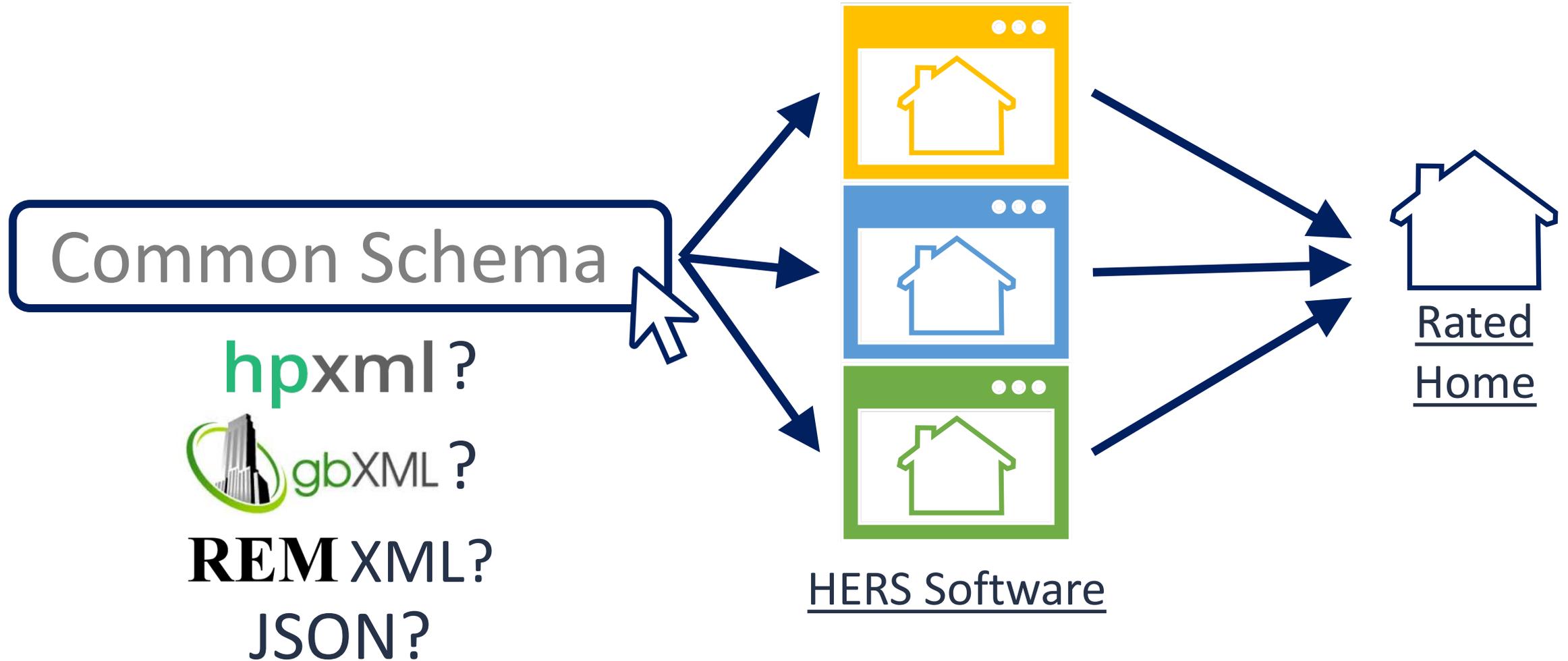
Calculations

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59
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HERS Index

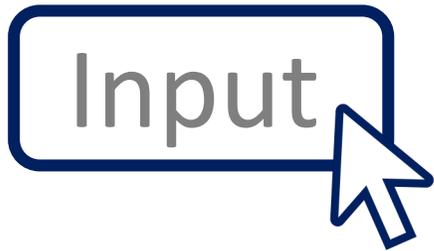
Input Consistency



Input Consistency



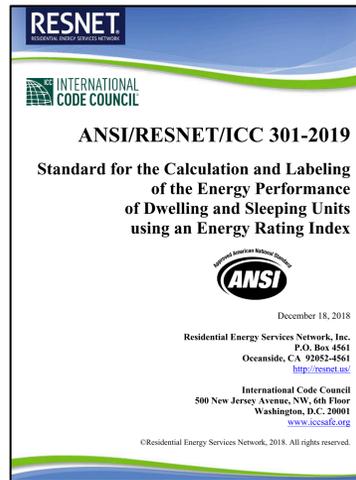
301 Standard Interpretation



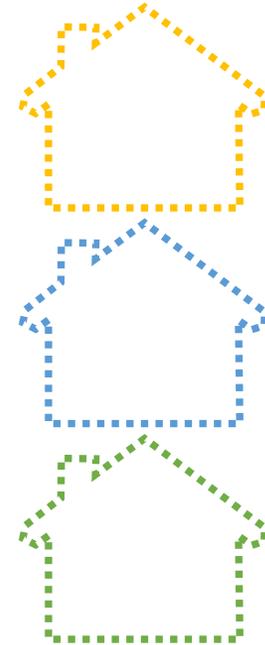
User Inputs



Rated
Home



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Reference
Home

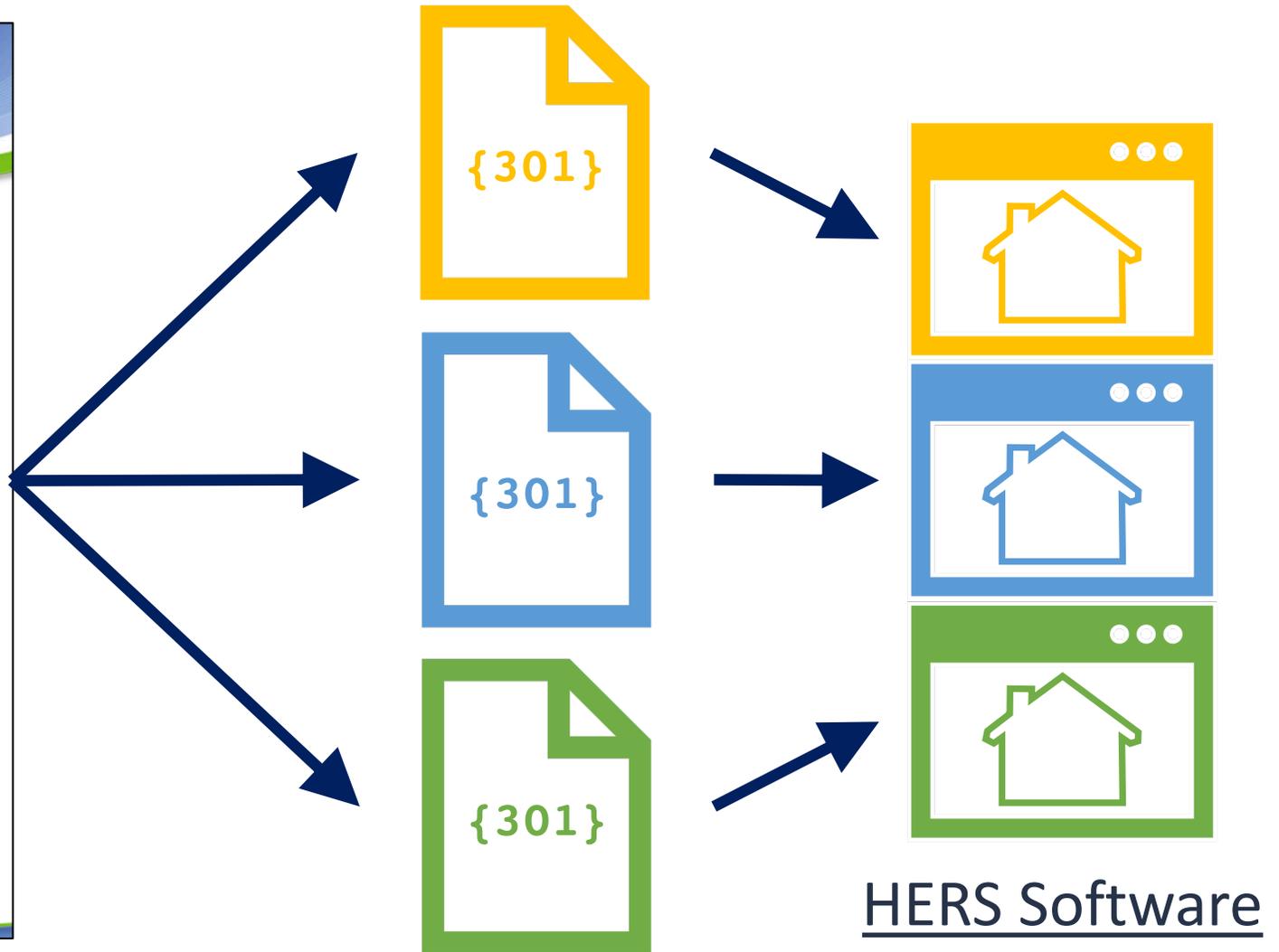
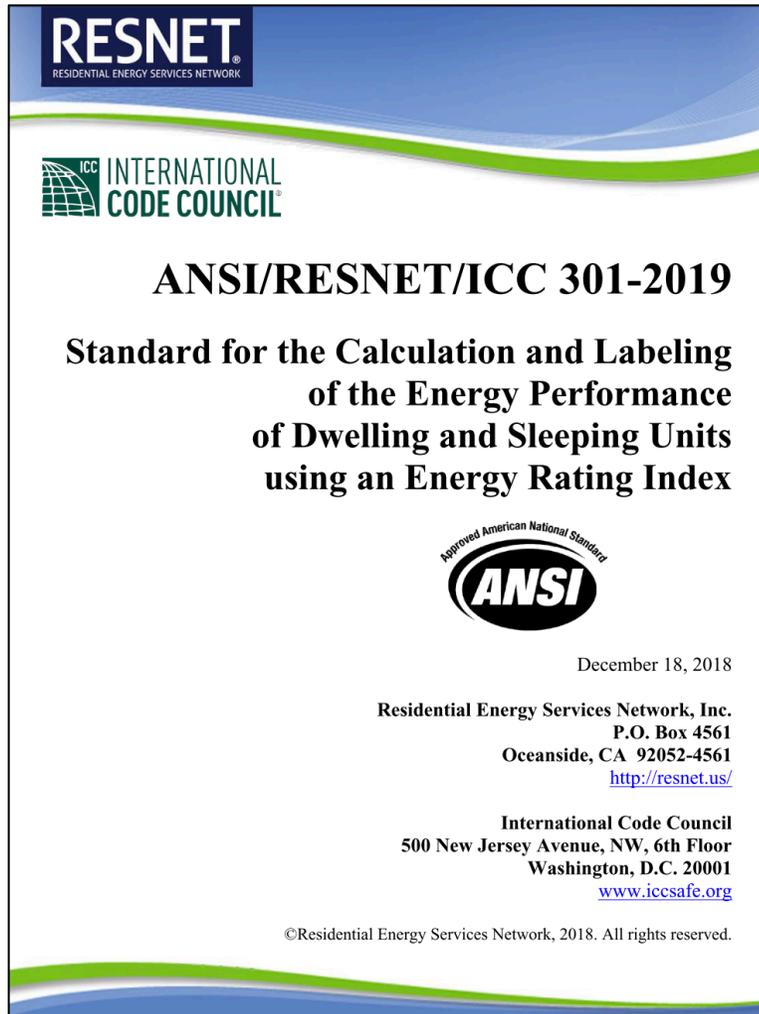


Calculations

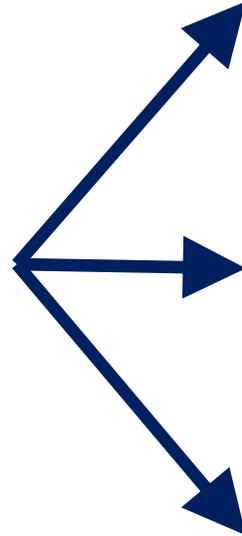
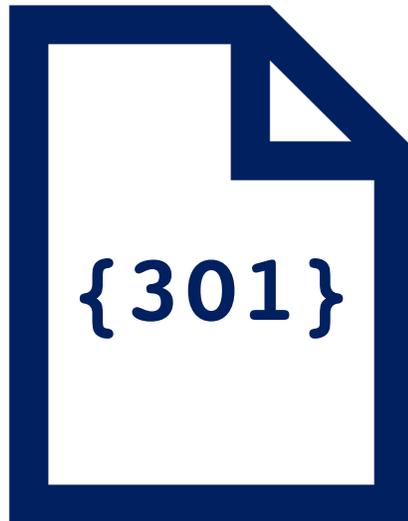
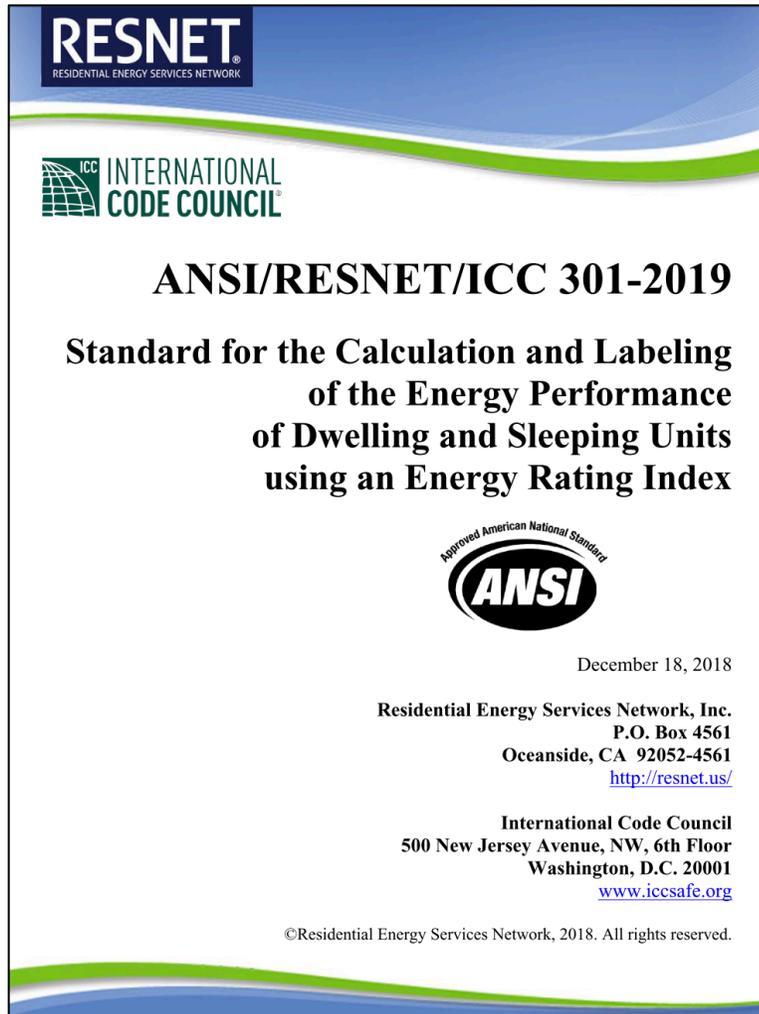


HERS Index

301 Standard Interpretation

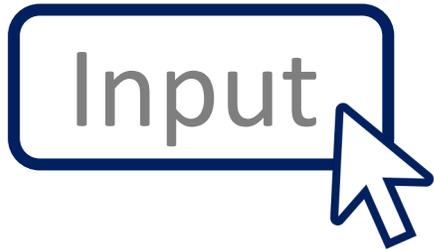


301 Standard Interpretation



HERS Software

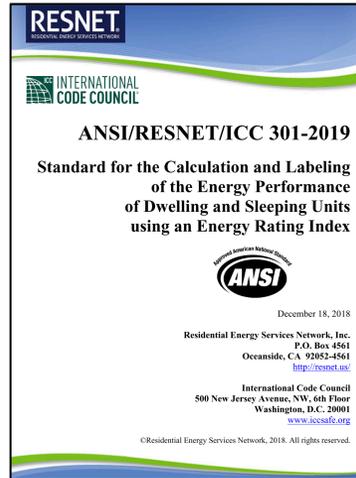
Calculation Differences and Errors



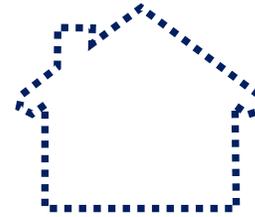
User Inputs



Rated
Home



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Reference
Home



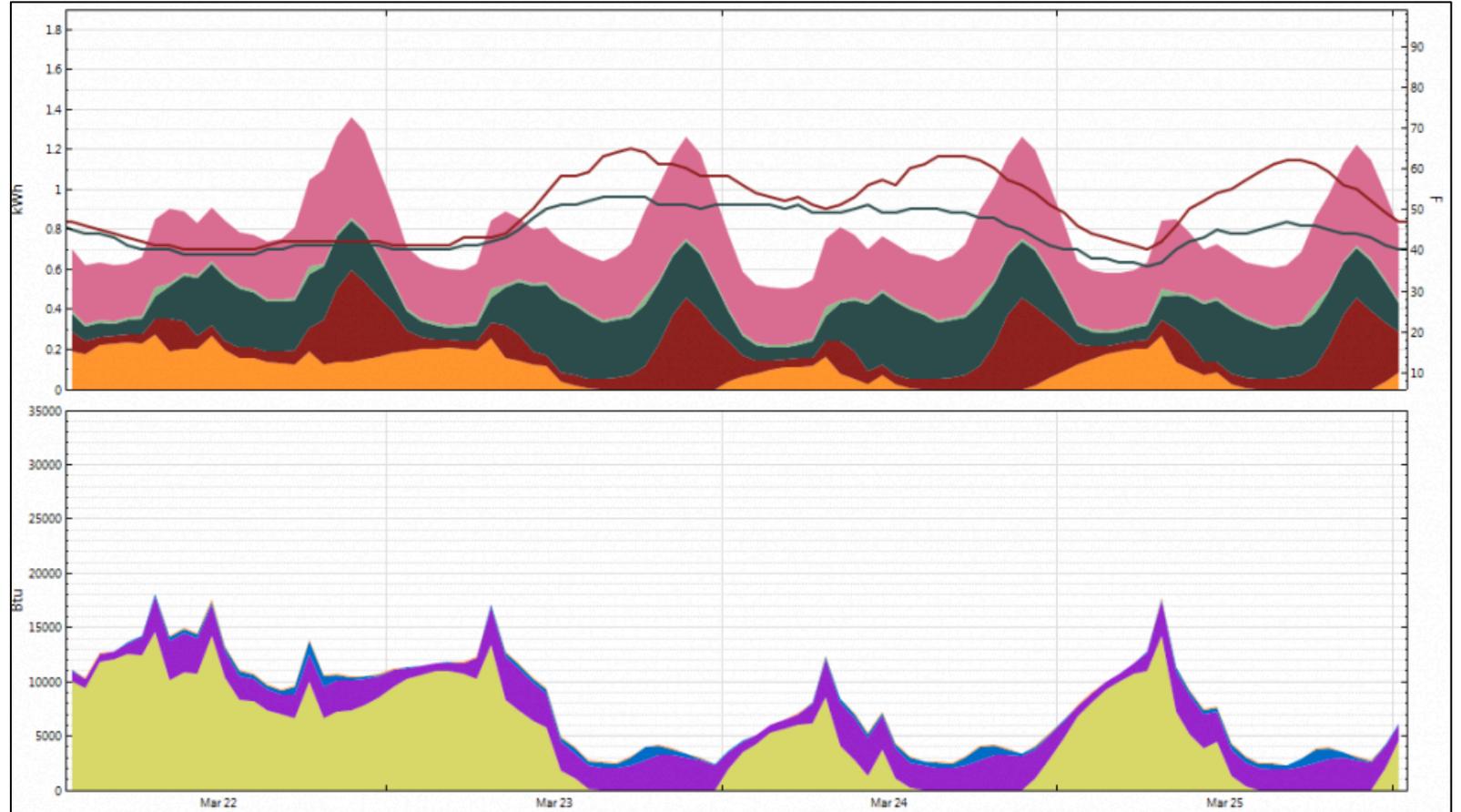
Calculations



HERS Index

Calculation Consistency

All HERS Index software must be based on hourly simulation by **Jan. 1, 2020**



Credit: NREL

Calculation Consistency

ANSI/ASHRAE Standard 140-2011
(Supersedes ANSI/ASHRAE Standard 140-2007)



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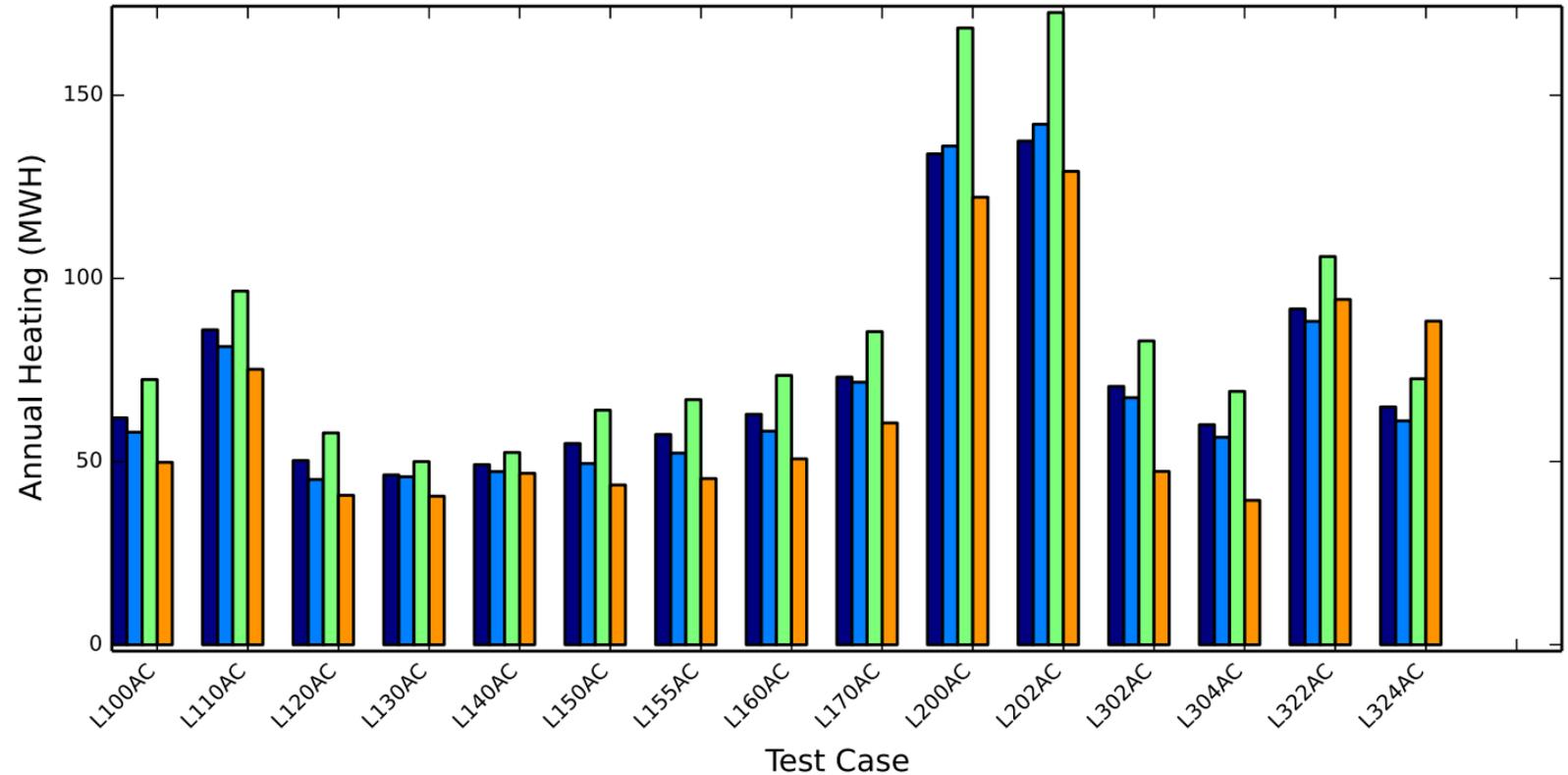
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Standard 140-2011 Comparison
Home Energy Rating System (HERS)
Tier-1 Heating Tests - Colorado Springs



Calculation Consistency

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Accompanying CD includes electronic-format files for Standard 140.

- *Class I test cases*: **detailed diagnostic tests** intended for simulation software capable of hourly or sub-hourly simulation time steps.
- *Class II test cases*: used for all types of building load calculation methods, **regardless of time-step granularity**, and are often favored by those needing to test **simplified software for residential buildings**.

Calculation Consistency



ANSI/ASHRAE Standard 140-2011
(Supersedes ANSI/ASHRAE Standard 140-2007)

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Class I Software Participants

- EnergyPlus
- TRNSYS
- ESP-r
- CSE

**Last updated:
2019**

Class II Software Participants

- BLAST
- DOE-2.1E
- SERIRES

**Last updated:
1995**

Calculation Consistency

ANSI/ASHRAE Standard 140-2011
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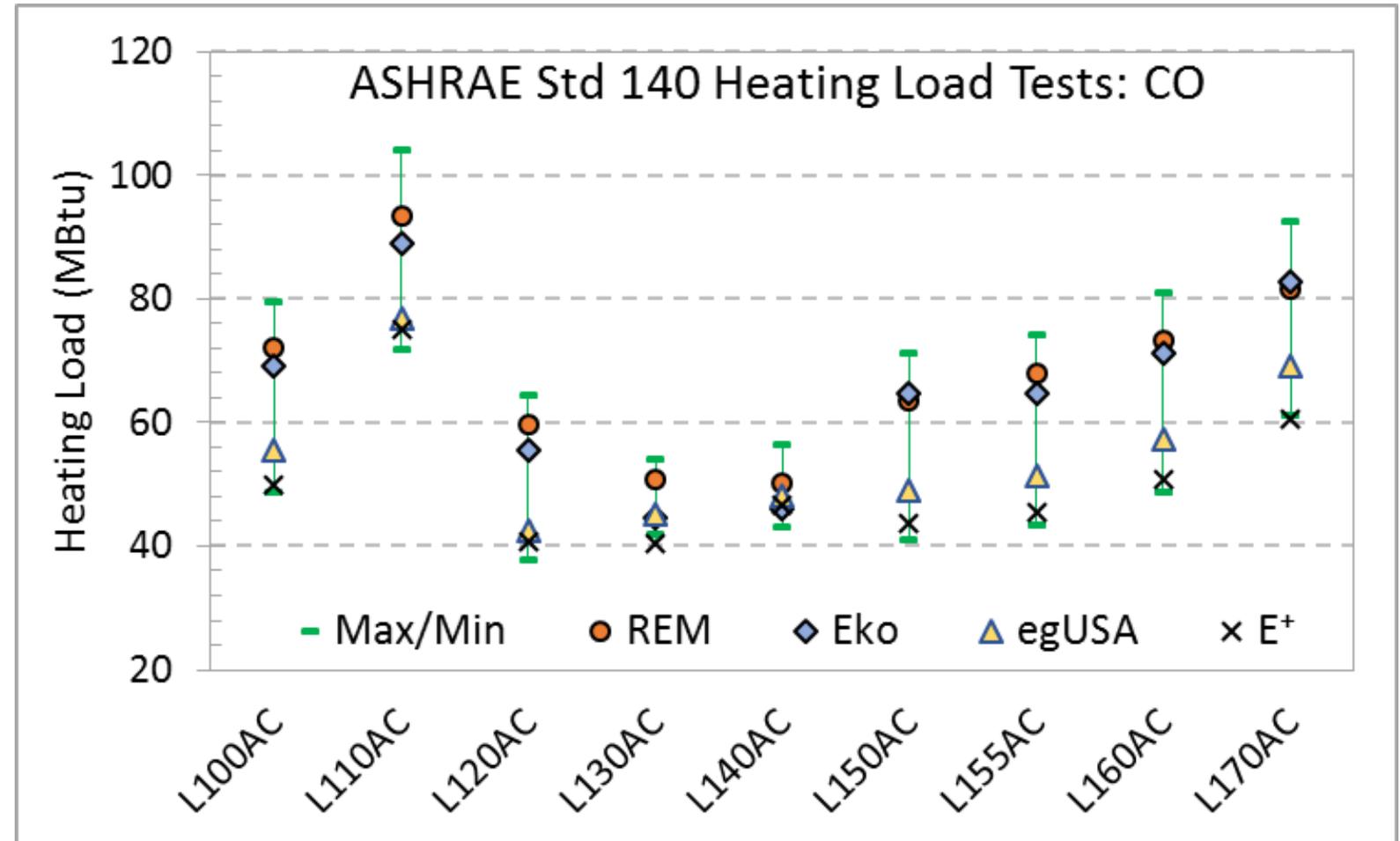


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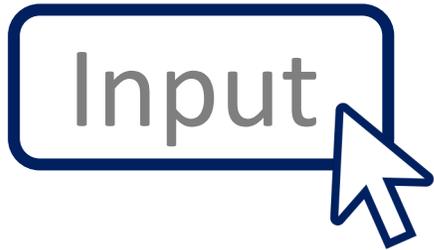
Accompanying CD includes electronic-format files for Standard 140.



Credit: Philip Fairey

Software Consistency

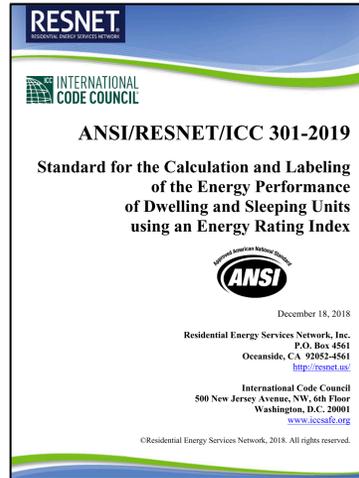
Common Schema



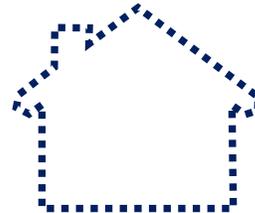
User Inputs



Rated
Home



301 Standard



Reference
Home

Hourly Engine Update Acceptance Criteria Class I 140 Tests



Calculations



HERS Index

Where possible, leverage existing efforts

1. IBPSA-USA Standard Input/Output Committee
2. ASHRAE Standard 140 Committee
3. ASHRAE Standard 140/90.1 Working Group on Acceptance Criteria
4. New ASHRAE Ruleset Certification Standard Committee?



Strategic Improvements

Enforce Hourly Calculations (1/2020)



Update Acceptance Criteria (~6/2020)



Establish Common Schema (~6/2021)



Software Implementation of Standard 301 (~6/2021)



Utilize Class I ASHRAE Standard 140 Tests (~1/2023)

RESNET Member Inquiries

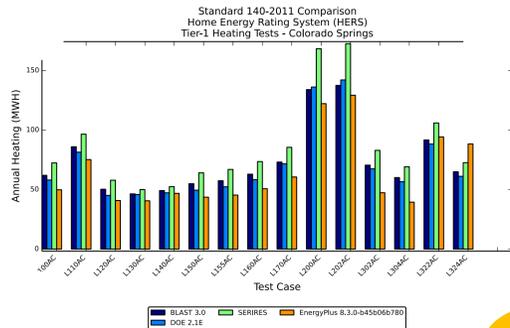


What does the SCC investigate?

- Ratings of specific homes (investigations are lengthy)
- Non-equivalent inputs (do your homework)
- General modeling/calculation methods
- General building components (e.g., windows, air conditioning)

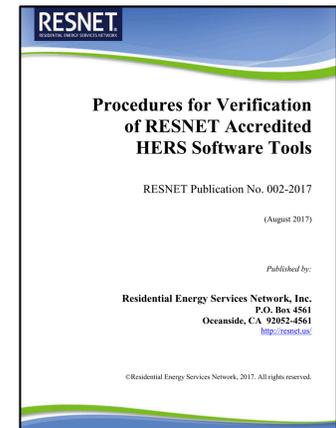
Continuous Improvements

Resolve RESNET
Member Inquiry



Enhance ASHRAE
Standard 140
Test Suites

Update
Accreditation
Procedures



Alternatives?



Actual Home



User
(HERS Rater)



HERS Software



HERS Index

or...



Actual Home



User
(HERS Rater)

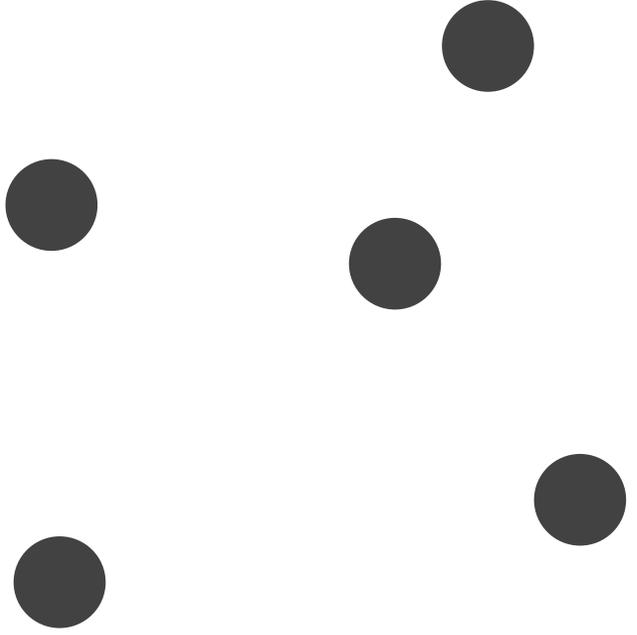


THE HERS
Software



HERS Index







Questions and Discussion

Neal Kruis, PhD
neal.kruis@bigladdersoftware.com

Vice President



Energy Modeling Director



Thank you!

Join the conversation - #EEBASummit2019

Save the dates for next year:

