



Setting the Standards for
Home Energy Efficiency

RESNET Proposed Amendments to the 2021 IECC ERI Path

What states and municipalities should know today

December 6, 2018

Background

Every three years, the International Code Council (ICC) invites vested stakeholders and members of the public to participate in proposing amendments to International Codes (I-Codes), including the International Energy Conservation Code (IECC). For the 2015 and 2018 IECC code cycles, RESNET was active in the amendment proposal process, with successful adoption of the following:

- 2015 IECC: Energy Rating Index (ERI) adopted – a compliance method modeled off of the national RESNET Home Energy Rating System (HERS) Index.
- 2018 IECC: Modification of ERI scores to better researched and achievable targets.
- 2018 IECC: Adoption of ANSI/RESNET/ICC 301-2014 as the ERI calculation reference standard.

While the 2018 IECC was just recently published in late 2017 and is being considered for adoption in several states and municipalities, RESNET is already looking ahead to the 2021 IECC development cycle which will begin with code change proposals submitted in January 2019. While great strides were made in the 2018 IECC, RESNET believes there are significant improvements that can be made in the 2021 IECC to strengthen the functional use of the ERI compliance path.

What does RESNET propose for the 2021 IECC?

1. RESNET asserts that the specification of Section R406.3 related to the *Reference Design* ventilation rate creates unintended consequences for the ERI score that were not contemplated at the time. (see below for further discussion)
2. RESNET has adopted addenda to the ANSI/RESNET/ICC 301-2014 Standard that improve the ERI calculation.
 - a. ANSI/RESNET/ICC 301-2014 Addendum A-2015 improves hot water energy use calculations making them more accurate and providing for proven energy saving hot water system design.

- b. ANSI/RESNET/ICC 301-2014 Addendum E-2018 creates the house size Index Adjustment Factor (IAF) to better equalize the ERI scores between larger and smaller dwellings with similar efficiency
- c. ANSI/RESNET/ICC 301-2014 Addendum G-2018 creates a second tier of qualified efficient lighting systems to capture the enhanced efficiency of LED lighting

These Addenda were not included in the ERI calculation Standard adopted by 2018 IECC. Thus, they technically are not incorporated by the 2018 IECC. All three have significant and technically beneficial impacts on how the ERI is calculated and should be incorporated in the 2021 IECC.

RESNET intends to propose the following amendments to the 2021 IECC Section R406 ERI compliance path:

Modification of R406.3

RESNET will propose the following:

R406.3 Energy Rating Index.

The Energy Rating Index (ERI) shall be determined in accordance with RESNET/ICC 301 ~~except for buildings covered by the International Residential Code, the ERI Reference Design Ventilation rate shall be in accordance with Equation 4-1.~~

~~Ventilation rate, CFM = (0.01 × total square foot area of house) + [7.5 × (number of bedrooms + 1)]~~ (Equation 4-1)

Energy used to recharge or refuel a vehicle used for transportation on roads that are not on the building site shall not be included in the *ERI reference design* or the *rated design*.

ERI Calculation Standard

By the time the 2021 IECC is published, RESNET will have finalized publication of the 2019 version of the ANSI/RESNET/ICC 301 ERI calculation standard. The 2019 version will incorporate all adopted addenda of the 2014 version, as well as improve the consistency and clarity of the standard. Therefore, RESNET will also propose that the updated version of the ANSI/RESNET/ICC 301 Standard be referenced as the ERI calculation standard in Section R406.3.

Further discussion of R406.3 and Ventilation

The specification in Section R406.3 related to the *Reference Design* ventilation rate was proposed as a modification at the final hearing on the 2018 IECC just prior to voting. This modification did not go through the standard public comment and committee

process that most amendments go through to be incorporated for publication. The modification to Section R406.3 changed the ventilation rate for the ERI *Reference Design*, resulting in a *Reference Design* ventilation rate that is lower than that prescribed in the ERI calculation standard - ANSI/RESNET/ICC 301-2014. The issue with this change is as follows:

1. The modification altered the ERI calculation Standard. ANSI/RESNET/ICC 301-2014 is a published American National Standard, under continuous maintenance, and proposals to amend the standard should go through RESNET's Standard Development Committee 300.

Therefore, the change to section R406.3 relating to the *Reference Design* ventilation rate results in a non-conforming ERI calculation and cannot be appropriately referred to as an ERI. Rather, it is more appropriately referred to as a "2018 IECC R406 compliance score".

While this may seem like semantics, this change is quite impactful. It unintentionally undermined the intent of using the ANSI/RESNET/ICC 301-2014 standard as the reference standard for calculating the ERI. Additionally, it results in a substantial change in the 2018 IECC R406 compliance scores as compared with the HERS Index.

2. The modification changes only the ERI *Reference Design* ventilation rate; it does not modify the specification of ANSI/RESNET/ICC 301-2014 for the *Rated Design* ventilation rate.

The *Rated Design* is required by ANSI/RESNET/ICC 301-2014 to comply with the ASHRAE 62.2-2013 ventilation rate for indoor air quality, which with tight homes is often greater than the rate prescribed by R406.3. The result of this discrepancy in ventilation rates for the *Reference Design* and *Rated Design* is that the calculated 2018 IECC R406 compliance scores will almost always be 3-10 points larger than the scores calculated in accordance with ANSI/RESNET/ICC 301-2014.

The reason for the resulting larger scores is because the ERI calculation is an efficiency calculation that compares the *Rated Design* to a *Reference Design* case for all of the minimum rated features that impact the energy use of a home.

Section R406.3 requires that the *Reference Design* have less ventilation airflow than the *Rated Design*. This means that the *Rated Design* is forced by the calculation to use more energy for mechanical ventilation than the *Reference*

Design, resulting in reduced performance as compared with the *Reference Design* and thus larger 2018 IECC R406 compliance scores.

The amendment to R406.3 related to the *Reference Design* ventilation rate was the only modification to ANSI/RESNET/ICC 301-2014 related to the calculation of the ERI. Unfortunately, by only changing the ventilation rate for the *Reference Design* and not the *Rated Design*, a significant discrepancy was created between the two, resulting in significant changes to the Index score calculation.

RESNET acknowledges that the scientific and political discussions regarding the “correct” ventilation rate for residential homes is contentious. Neither RESNET nor standard ANSI/RESNET/ICC 301-2014 seek to determine the correct ventilation rate for homes.

At the time ANSI/RESNET/ICC 301-2014 was published, the published American National Standard for *Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings* was ASHRAE 62.2-2013. To align with published American National Standards for indoor air quality, RESNET chose to adopt the ventilation rates prescribed by ASHRAE 62.2-2013. RESNET considers this decision to be procedural. RESNET as an organization acknowledges ventilation is important for homes that are built to modern building energy code standards, which require fairly tight envelopes. However, RESNET is neutral regarding the “correct” ventilation rate. To facilitate this neutrality, RESNET Standards do not penalize homes with ventilation rates that are less than ASHRAE 62.2-2013 Standard minimum ventilation rates but RESNET also does not provide energy credit for such homes.

Regardless of which rate may be best, the ERI calculation procedure does not establish requirements for home ventilation rates. Rather such requirements are established by building code authorities and model codes such as set forth in Section R403.6 of the 2018 IECC. The ventilation rates used in the ANSI/RESNET/ICC 301-2014 procedure do not change or modify any requirements of building codes or standards.