

# Pathway to Energy Efficiency (2351)

IECC: APPENDIX RN (New), RN101.1 (New), RN101.2 (New), RN101.3 (New), RN101.4 (New), RN101.4.1 (New), RN101.5 (New), RN101.6 (New), RN101.7 (New), RN101.8 (New), RN101.9 (New), RN101.10 (New), RN101.10.1 (New), RN101.10.2 (New), RN101.10.2.1 (New), RN101.10.2.2 (New), RN101.10.3 (New), RN101.10.4 (New), RN101.10.5 (New)

Proponents: Ryan Meres, RESNET, RESNET (ryan.meres@gmail.com)

## 2024 International Energy Conservation Code [RE Project]

Add new text as follows:

**APPENDIX RN Pathway to Energy Efficiency.** *The purpose of this appendix is to provide an alternative long-term compliance option using the Energy Rating Index. Where adopted, this appendix will provide certainty of future energy efficiency target scores and allow builders to plan well in advance of the effective date to comply with the adopted energy code*

**RN101.1 Scope.** *This appendix applies to new residential buildings. This appendix establishes criteria for compliance using an Energy Rating Index (ERI) analysis. Such analysis shall be limited to dwelling units. Spaces other than dwelling units in Group R-2, R-3 or R-4 buildings shall not use this appendix for compliance.*

**RN101.2 Application and effective dates.** *Residential buildings may comply with this appendix, effective <month, date, year> through <month, date, year>. (Adopting entity shall input the initial effective date and end date as included in Table RN101.4 (a-c)).*

**RN101.3 Energy Rating Index.** *The Energy Rating Index (ERI) not including renewable energy resources shall be determined in accordance with ANSI/RESNET/ICC 301.*

**RN101.4 Determining the ERI target score and effective dates.** *The adopting entity shall determine the Energy Rating Index target scores and effective dates in accordance with RN101.4.1.*

**RN101.4.1 N/A.** *Select the ERI target scores from Table RN101.4 (a-c), based on the efficiency level of the adopted code. Input the effective dates for each set of ERI target scores in the appropriate table.*

Table RN101.4 (a)—Maximum Energy Rating Index				
Starting with 2009 IECC Efficiency Levels				
	Effective Dates: <month, date, year> through <month, date, year>	Effective Dates: <month, date, year> through <month, date, year>	Effective Dates: <month, date, year> through <month, date, year>	Effective Dates: <month, date, year> through <month, date, year>
CLIMATE ZONE	ENERGY RATING INDEX NOT INCLUDING OPP*	ENERGY RATING INDEX NOT INCLUDING OPP*	ENERGY RATING INDEX NOT INCLUDING OPP*	ENERGY RATING INDEX NOT INCLUDING OPP*
0-1	69	64	60	56
2	71	67	63	59
3	68	64	60	56
4	73	69	65	61
5	73	69	65	64
6	74	70	66	62
7	73	69	65	61
8	73	69	65	61

Table RN101.4 (b)—Maximum Energy Rating Index
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<b>Starting with 2012-2018 IECC Efficiency Levels</b>				
	Effective Dates: <month, date, year> through <month, date, year>	Effective Dates: <month, date, year> through <month, date, year>	Effective Dates: <month, date, year> through <month, date, year>	Effective Dates: <month, date, year> through <month, date, year>
<b>CLIMATE ZONE</b>	<b>ENERGY RATING INDEX NOT INCLUDING OPP*</b>	<b>ENERGY RATING INDEX NOT INCLUDING OPP*</b>	<b>ENERGY RATING INDEX NOT INCLUDING OPP*</b>	<b>ENERGY RATING INDEX NOT INCLUDING OPP*</b>
0-1	60	57	54	51
2	63	60	57	54
3	57	54	51	48
4	63	60	57	54
5	65	62	59	56
6	62	59	56	53
7	61	58	55	52
8	61	58	55	52

<b>Table RN101.4(c)—Maximum Energy Rating Index</b>				
<b>Starting with 2021/2024 IECC Efficiency</b>				
	Effective Dates: <month, date, year> through <month, date, year>	Effective Dates: <month, date, year> through <month, date, year>	Effective Dates: <month, date, year> through <month, date, year>	Effective Dates: <month, date, year> through <month, date, year>
<b>CLIMATE ZONE</b>	<b>ENERGY RATING INDEX NOT INCLUDING OPP*</b>	<b>ENERGY RATING INDEX NOT INCLUDING OPP*</b>	<b>ENERGY RATING INDEX NOT INCLUDING OPP*</b>	<b>ENERGY RATING INDEX NOT INCLUDING OPP*</b>
0-1	52	50	48	46
2	52	50	48	46
3	51	49	47	45
4	54	52	50	48
5	55	53	51	49
6	54	52	50	48
7	53	51	49	47
8	53	51	49	47

\*OPP = on-site power production (i.e., solar)

**RN101.5 ERI compliance.** Compliance based on the ERI requires the rated design and as-built dwelling unit meet all of the following: 1. The mandatory requirements as established by <insert name of state/jurisdiction energy code>. 2. Maximum ERI values as established by Section RN101.4.1.

**RN101.6 Building thermal envelope.** The proposed total building thermal envelope thermal conductance (TC) shall be less than or equal to the required total building thermal envelope TC using the prescriptive *U*-factors and *F*-factors from <insert table reference and name of state/jurisdiction energy code>. The area-weighted maximum fenestration SHGC permitted in Climate Zones 0 through 3 shall be 0.30.

**RN101.7 Determining ERI.** The Energy Rating Index (ERI) shall be determined in accordance with ANSI/RESNET/ICC 301. The mechanical ventilation rates used for the purpose of determining the ERI shall not be construed to establish minimum ventilation requirements for compliance with this code. 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.

**RN101.8 ERI-based compliance.** Compliance based on an ERI analysis requires that the rated design and each confirmed as-built dwelling unit be shown to have an ERI less than or equal to the appropriate value indicated in the table adopted in Section RN101.4.1, where compared to the ERI reference design. The ERI analysis shall not include the impact of on-site power production (OPP).

**RN101.9 Verification by approved agency.** Verification of compliance with this appendix as outlined in Sections RN101.8 and RN101.10 shall be completed by an *approved* third party. Verification of compliance with Section RN101.5 shall be completed by the authority having jurisdiction or an approved third-party inspection agency.

**RN101.10 Documentation.** Documentation of the software used to determine the ERI and the parameters for the ERI reference design shall be in accordance with Sections RN101.10.1 through RN101.10.5.

**RN101.10.1 Compliance software tools.** Software tools used for determining ERI shall be approved software rating tools as defined by ANSI/RESNET/ICC 301. Software vendors shall publish, on a publicly available website, documentation that the software tool has been validated using the Class II, Tier 1 test procedure in ANSI/ASHRAE 140.

**RN101.10.2 Compliance report.** Compliance software tools shall generate a report that documents that the ERI of the rated design and as-built dwelling unit complies with Sections RN101.10.1 through RN101.10.5. Compliance documentation shall be created for the proposed design and shall be submitted with the application for the building permit. Confirmed compliance documents of the as-built dwelling units submitted to the code official for review before a certificate of occupancy is issued. Compliance reports shall include information in accordance with Sections RN101.10.2.1 and RN101.10.2.2.

**RN101.10.2.1 Proposed compliance report for permit application.** Compliance reports submitted with the application for a building permit shall include the following: 1. Building street address, or other building site identification. 2. Declare ERI on title page and building plans. 3. The name of the individual performing the analysis and generating the compliance report. 4. The name and version of the compliance software tool. 5. Documentation of all inputs entered into the software used to produce the results for the ERI reference design and the rated design. 6. A certificate indicating that the proposed design has an ERI less than or equal to the appropriate score indicated in the Table adopted in Section RN101.4.1 when compared to the ERI reference design. The certificate shall document the building component energy specifications that are included in the calculation, including: component level insulation *R-values* or *U-factors*; assumed duct system and building thermal envelope air leakage testing results; and the type and rated efficiencies of proposed heating, cooling, mechanical ventilation and service water-heating equipment to be installed. 7. When a site-specific report is not generated, the proposed design shall be based on the worst-case orientation and configuration of the rated dwelling unit.

**RN101.10.2.2 Confirmed compliance report for a certificate of occupancy.** A confirmed compliance report submitted for obtaining the certificate of occupancy shall be made site and address specific and include the following: 1. Building street address or other building site identification. 2. Declaration of ERI on title page and on building plans. 3. The name of the individual performing the analysis and generating the report. 4. The name and version of the compliance software tool. 5. Documentation of all inputs entered into the software used to produce the results for the ERI reference design and the as-built dwelling unit. A final confirmed certificate indicating that the as-built building complies with Sections RN101.3, RN101.5 and RN101.6. The certificate shall report the energy features that were confirmed to be in the building, including: component-level insulation *R-values* or *U-factors*; results from any required duct system and building thermal envelope air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical ventilation, and service water-heating equipment installed.

**Add new text as follows:**

**RN101.10.3 Additional documentation.** The code official shall be permitted to require the following documents: 1. Documentation of the building component characteristics of the ERI reference design. 2. A certification signed by the builder providing the building component characteristics of the rated design. 3. Documentation of the actual values used in the software calculations for the rated design.

**RN101.10.4 Specific approval.** Performance analysis tools meeting the applicable subsections of the appendix shall be approved. Documentation demonstrating the approval of performance analysis tools in accordance with Section RN101.10.1 shall be provided.

**RN101.10.5 Input values.** Where calculations require input values not specified by this code, those inputs shall be taken from ANSI/RESNET/ICC 301.

**Reason:** It has been 15 years since the 2009 IECC was published and still nearly half of the states are still at energy code efficiency levels equivalent to that code. A pathway that provides flexibility for cost-effective energy code compliance is needed to advance residential energy efficiency. The purpose of this proposal is to provide such a pathway by meeting states where they are and setting Energy Rating Index (ERI) target scores that steadily decrease over time. The benefits of this proposal include:

- States can choose a starting point, based on their current code efficiency level
- States can choose the frequency by which the target scores decrease (get more efficient) (3 years is recommended)
- States adopting this pathway give builders plenty of time to prepare to meet each stage of decreased target scores
- Building thermal envelope backstops are determined by the state's adopted code
- This compliance path requires compliance verification by a third party
- Builder's working with third party energy consultants have the benefit of expert advice on reducing energy consumption in a cost-effective manner, often exceeding code requirements
- Using an ERI-based approach gives builders an entryway into incentive programs, like Energy Star, Zero Energy Ready Home and the tax credits associated with those programs as well as local utility incentives.

Builders doing HERS Ratings will often improve their energy efficiency, even in the absence of improved state energy codes. For example, RESNET data shows that in the 21 states that are still under 2009 IECC efficiency levels, builders have improved their HERS scores by 8 points on average since 2013.

Important note about energy modeling to determine target scores: The energy models used to determine the target scores closely followed the methodology found here: [Cost-Effective Energy-Efficiency and Florida's](#) for both the 2009 and 2012 IECC, with a few exceptions:

- Only a 2,000 square foot one-story home was used
- All homes were modeled as slab-on-grade
- A 95 AFUE furnace was used for all homes (based on NAECA rule, set to take effect in 2028)
- A 0.62 efficiency gas storage water heater was used for all homes
- Target scores for the 2021/2024 IECC efficiency table, start with the 2021 IECC ERI target scores (these codes were not modeled).

**Cost Impact:** The code change proposal will neither increase nor decrease the cost of construction. As an optional appendix for an optional compliance pathway, this proposal will neither increase nor decrease the cost of construction because builders have the option to choose a compliance pathway that is most cost effective for their construction practices.

**Cost Impact (Detailed):** The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

**Justification:**

The code change proposal will neither increase nor decrease the cost of construction. As an optional appendix for an optional compliance pathway, this proposal will neither increase nor decrease the cost of construction because builders have the option to choose a compliance pathway that is most cost effective for their construction practices.