SIGNIFICANT Changes to the 2021 IECC – Residential Provisions

Chapter R1 - Admin Provisions

R102.1 General: Energy Conservation is added. "The code official shall first find that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code for strength, effectiveness, fire resistance, durability , energy conservation and safety."

R102.1.1 Applies a minimum thermal envelope backstop for "above code buildings". This is like the ERI in 406. Uses 2009 IECC as reference

R103.2 Requires that the construction documents now specify somewhere which path of compliance was chosen for the project. (i.e. prescriptive, Total UA, Simulated Performance, ERI)

Chapter R2 Definitions

Added Definitions	Revised Definitions
Cavity Insulation	"Accessible" changed to "Access To"
Dimmer	Demand Recirculation Water System
Dwelling Unit Enclosure Area	Fenestration
Occupant Sensor Control	High-Efficacy Light Sources
On-Site Renewable Energy	"Readily Accessible" changed to "Ready Access to"
Renewable Energy Certificate (REC)	Roof Recover
Renewable Energy Resources	Skylights
Solar Fraction	
Thermal Distribution Efficiency (TDE)	

Chapter R3 General Requirements

R301 Climate Zones: Revises the Climate Zone Map and County Lists by State to match the new climate zones used in ASHRAE 90.1.

R303.1.2 Insulation mark installation: Requires insulation certificate left on site immediately after installation of a product not pre-labeled with R-Values.

Chapter R4 Energy Efficiency

Chapter 4 items listed as (Mandatory): The word mandatory was removed throughout the entire chapter. Mandatory always meant that that specific item could not be traded off if someone used a trade-off path of compliance. Instead of saying "mandatory", a table of "required" items has been placed in the Simulated Performance Approach and the Energy Rating Index Approach to list those items that cannot be traded off in those pathways. Otherwise, all items are required if using the prescriptive approach.

R401.2 Application: Compliance section is renamed Application and just cleans it up to clarify that you must choose a path of compliance by choosing the prescriptive, Total Building Performance, Energy Rating Index or Tropical Zone pathway. Gives exception to existing buildings and clearly send them to Chapter R5.

R401.2.5 Additional Energy Efficiency: New Section is added to bring in a requirement to pick a path of compliance and then also pick an additional efficiency package on top of that to meet the efficiency requirements of the building with options to choose. This is like the additional efficiency package options of C406 for commercial (prior to 2021 edition which is now points based for commercial). See Section R407 below for the full requirements.

R401.3 Certificate: Certificate requirements are revised to require code editions to be included as well as compliance path utilized for the project. Other items that must now be disclosed on the certificate include the ERI score if applicable, the array capacity plus inverter efficiency and panel tilt/orientation. If there is more than one value for any component of the building envelope, the certificate will require both the value covering largest area and the area weighted average value if available.

Table R402.1.3 Adds an additional option for basement walls so that there is a cavity plus continuous option instead of just cavity only or continuous only. Slab insulation requirements for climate zones 3-5 are revised to increase insulation around the perimeter of the slab for CZ3 and depth of insulation from 2 to 4 feet in CZ 4 &5. Removes footnote g that allowed you to drop down to an R-19 in the floors if the full amount would not fit. They say it is because you can use a trade-off path if you cannot get it to work prescriptively. Adds an option for cavity plus continuous insulation (R13+5) for basements and crawlspaces.

Table R402.1.2, R 402.1.3: Wall Insulation requirements are revised for all climate zones. All climate zones will have a cavity only option and a continuous only option and most climate zones will have at least one cavity plus continuous option. For Climate Zone 5, the PRESCRIPTIVE options will be R20+5, R13+10, R0+15. Ceiling insulation requirements for climate zones 2 & 3 are revised by making prescriptive values R49 instead of R38. Increases ceiling insulation in zones 4-8 from R-49 to R-60.

Fenestration: U-factor requirements in zones 3-4 are reduced to 0.30 from 0.32. Current 0.40 value in zone 2 would be restored to avoid conflict with Energy Star. Changes the Solar Heat Gain Coefficient (SHGC) in Climate Zone 5 from "not required (NR) to .40. Adds a footnote to the table that recognizes different U-Factors in high altitude climates or in windborne debris regions.

Table R402.2.6: Expands the list of wood-to-cold-formed steel equivalent R-Values.

R402.2.7 Walls with partial structural sheathing: Removed section and the allowance for less continuous insulation where structural sheathing covers 40% or less of the gross area of the exterior wall.

R402.2.7 Floors: Clarifies the intent behind the exception to the requirement that floor insulation be installed in permanent contact with the subfloor. Breaks it up into floor insulation options instead of an exception.

R402.2.9 Slab-on-grade floors: Slab-on-grade floor insulation installation is no longer a Mandatory section and allows this section to be tradeable.

R402.4.1.2 Testing: An exception is added to the air leakage testing section to address testing individual dwelling units to an optional metric of 0.30 cfm per square foot of dwelling unit enclosure area in accordance with RESNET/ICC380, ASTM E 779 or ASTM E 1827, instead of the 3 ACH/50 metric. The requirement is also changed to say that testing is mandatory, but the amount of leakage is prescriptive, meaning it can be traded off using one of the performance approaches. Finally, adds a .0 after the ACH requirement to clarify that anything over the 5.0 or 3.0 ACH/50 is non-compliant.

R402.5 Maximum fenestration U-factor and SHGC: Updates the limits put on SHGC and U-Factor that can be traded off. Also Adds an exception regarding U-Factor and SHGC for fenestration in storm shelters complying with ICC 500.

R403.3 Ducts: Section is revised to define ducts that are located within wall and floor cavities as either inside or outside the conditioned space based on how the air barrier and insulation is installed.

R403.3.1 Ducts located outside conditioned space: Section is revised to specify insulation requirements for ducts located outside conditioned space and how ducts located in floor cavities must be insulated and buried in order to be considered inside conditioned space. An additional change to this section talks to when insulating ducts buried beneath a building, how the code now allows an equivalent Thermal Distribution Efficiency (TDE) in lieu of R-Value.

R403.3.2 Ducts located in conditioned space: Criteria 3 & 4 are added to address duct work in floor cavities and duct work within exterior walls. This addresses what criteria is necessary based on how the air barrier and insulation is installed.

R403.3.6 Duct Leakage A requirement is added (by removing the exception) to mandate that all ducts be tested, including those inside the thermal envelope. Those inside the envelope can leak more than those outside of the envelope per the changes made to prescriptive section 403.3.4. Testing must be in accordance with ANSI/RESNET/ICC380 or ASTM E1554. Also, ducts serving ventilation systems are not required to be tested.

R403.5 Service hot water systems: A Water heating equipment section is added that lists allowed water heater types, as well as a table (Minimum uniform energy factor for storage gas water heaters).

R403.6.1 Heat or energy recovery ventilation: New section that will require homes in Climate Zones 6 and 7 to use an ERV or HRV unless they use a performance path for compliance.

R403.6.2 Whole-dwelling mechanical ventilation system fan efficacy: Revised to address compliance with Table T403.6.2 at rating points. Fans shall be tested with HVI Standard 916 and listed, as well as requiring the airflow be reported in the product listed or on the label.

Table R403.6.1 Ventilation Fan Efficacy Table is revised to update the efficacies of in-line and bathroom fans, Add the fan for an air handler that is integrated to the HVAC equipment (removing it from the exception), specifies how fans are rated for efficacy, and finally, changes the titles and combines some of the columns in the table to represent more of the intent.

R403.6.2 Testing: New section requiring the Testing for Mechanical Ventilation system flow rates is added as well as an Exception to address Kitchen range hoods.

R404.1 Lighting equipment: Changed from not less than 90 percent to All permanently installed lighting fixtures must be high efficacy. (see revised definition of high efficacy lamps).

R404.1.1 Exterior lighting: New section for exterior lighting of R2, R3 and R4 buildings that requires them to meet commercial exterior lighting provisions.

R404.2 Interior lighting controls: New section is brought in that will require either a dimmer, occupant sensor or other control that is built into the fixture to be installed in all lighting. But provides an exception for lighting controls in bathrooms, hallways, exterior lighting fixtures, lighting designed for safety or security. Also, a section that specifies exterior lighting controls must be automatic if over 30 watts of lighting is installed.

R405.2 Performance-based compliance: Mandatory Requirements of the simulated performance path section is revised to require that the building thermal envelope shall be greater than or equal to levels of efficiency and SHGC in Table R402.1.1 or R402.1.3 of the 2009 IECC.

R405.3.2 Compliance report: Removes the allowance for batch sampling under the simulated performance approach. This section also changed to make sure that a report based on the proposed design is submitted for permitting and a "confirmed" report is submitted prior to C.O. Clarifies the requirements that must be included in a compliance report that is submitted at plan review stage, prior to permit issuance.

R405.3.2.2 Compliance report for certificate of occupancy: clarifies the requirements that must be included in a compliance report that is submitted after final inspection and prior to C. of O.

Table R405.4.2(1) Air Exchange Rate: Table is revised to require the standard reference design and proposed design to be the same (as proposed). Also, for the Mechanical Ventilation component, the standard reference design efficacy of fans must be according to the prescriptive table in R403.6 based on the system type.

Service water heating: Revised in the performance table to give credit for a compact hot water distribution design. Additionally, the formula in the table that specifies the volume of domestic hot water usage is reduced by 15%.

Thermal Distribution System: specifies that the duct location is the same in the proposed and standard reference design. also clarifies the duct leakage to outside is the test that is used in modeling to assess the true energy penalty.

Dehumidistat (new): Establishes a method for accounting for the latent energy savings of ERVs if they are specified in the proposed design.

R406.2 ERI Compliance: Revises compliance with the ERI path to remove the backstop of the 2009 IECC and replaces it with a total UA that is within 15% of the current code edition requirement. Moved the thermal envelope backstop when using renewable energy into the code requirement instead of as a footnote in the Maximum Energy Rating Index Table. Also changed the backstop to be the 2018 thermal envelope instead of the 2015.

R406.3 Building thermal envelope (and subsections): Clarifies when on-site renewables are included in the ERI analysis that the building thermal envelope must be greater than or equal to the levels of efficiency and SHGC in the 2015 IECC.

R406.4 Energy Rating Index: Revised by adding a 5 percent cap on the trade-off credit allowed for on-site power.

Table R406.5 Table is revised to establish lower ERI target scores. CZ 1 & 2 change from 57 to 52, CZ 3 changes from 57 to 51, CZ 4 changes from 62 to 54, CZ 5 changes from 61 to 55, CZ 6 changes from 61 to 54, CZ 7 & 8 changes from 58 to 53.

R406.7.2 Compliance report: Revised to require ERI path declaration be listed on the title page of the compliance report.

R406.6.3 Renewable energy certificates (REC) documentation: Added to address who may claim the environmental attributes of an onsite-renewable energy system when using the ERI path.

R407 (and subsections) Tropical climate region compliance path: New Additional Efficiency Package Options section is added requiring you to do everything in the code that your path of compliance requires but then to also pick one of these options on top of that. It is mandatory, no matter which path you choose so it cannot be traded off. This is like the old C406 in the 2012-2018 code for commercial. Options include a 5% better Total UA

(commonly verified by REScheck), highly efficient mechanical equipment, more efficient water heating system, more efficient duct system or a more improved air sealing/ventilation combination.

Chapter R5 – Existing Buildings

Chapter 5 was reworked to remove redundant language, change sections so that they were more in order and to combine sections so that the entire chapter is more understandable and easier to navigate. It consolidates and clarifies all the provisions regarding changes from unconditioned to conditioned spaces. Significant technical changes are as follows:

- Removes requirement for additions to be air leakage tested.
- Removes requirement for duct leakage testing on duct extensions.
- Changes requirements in lighting alterations to kick in if more than 10% of the lighting is replaced instead of 50%.
- A change to 505.1 and 505.2 to require that changes of occupancy only must comply with the existing buildings chapter and not the entire code.

Appendix RB – Solar Ready Provisions

The Solar Ready Appendix in the IRC was updated in the 2018 code, but those changes did not make it into the IECC residential provisions, so the two appendices were made to match exactly. No technical changes otherwise.

Appendix RC – Zero Energy Buildings

An optional Appendix (only required if specifically adopted) to offer jurisdictions an appendix that would result in a residential building that has zero energy consumption over the course of a year by utilizing the ERI path to get to a score of zero.