



Key Changes in the 2021 IECC for the Northeast and Mid-Atlantic

Overview

The 2021 International Energy Conservation Code (IECC) is regarded by many as a significant achievement in building energy efficiency compared to the prior two code cycles (IECC 2015 and IECC 2018). Based on early industry estimates, residential construction would gain an 8-14 percent increase in efficiency (depending on climate zone). For commercial construction, estimates suggest improvements in energy efficiency of around 10 percent. Since buildings account for approximately [40 percent of greenhouse gas emissions](#) in the United States, an energy code that provides significant energy efficiency improvement is a substantial advancement for the building sector, especially as states aim for higher levels of energy efficiency and a reduction in emissions. This resource is an overview of the major changes in IECC 2021 and is not intended to cover all changes within the code. For official code resources, please visit: <https://codes.iccsafe.org/content/IECC2021P1>

Residential Code

		IECC 2018	IECC 2021
Envelope	Wall/ Ceiling/Slab Insulation	Wall: R-30 or 20+5 or 13+10 Ceiling: R-49 Slab: R-10, 4 ft	Wall: R-30 or 20+5 or 13+10 or 0+20/U-0.045 Ceiling: R-60/U-0.024 Slab: R-10, 4 ft (CZ 4-5)
	Fenestration	U 0.3	U 0.3
	Air Leakage	3 ACH50 (CZ 3-8)	3.0 ACH50 (CZ 3-8) *Sets 5.0 ACH50 max tradeoff limit for all CZs
Service Hot Water		EF Fossil Fuel Water Heater: 0.615 EF Electric Water Heater: 0.948	EF Fossil Fuel Water Heater: >0.82 EF Electric Water Heater: >2.0

HVAC Changes

Annual fuel utilization efficiency (AFUE) for natural gas increased from 80 percent to greater than >95 percent from IECC 2018 to 2021. Heating seasonal performance factor (HSPF) for heat pumps increased from 8.2 to >10/16 SEER. Mechanical ventilation in climate zones 7 & 8 provided by an HRV or ERV is required for prescriptive compliance path.

Lighting Changes

Increased efficacy value of high-efficacy lamps from IECC 2018 to 2021. 70 lumens/watt

Climate Zone	ERI
4	54
5	55
6	54
7	53
8	53

(100 percent of lighting), a 10 percent increase in high-efficacy from 2018.

Compliance Pathways

There are three compliance pathways in the 2021 IECC: Prescriptive (**R402 – R404**), Performance (**R405**), and Energy Rating Index or ERI (**R406**) which reverted to IECC 2015 levels. The prescriptive paths can follow the R-value minimum table, the U-Factor equivalent table, or the UA equivalent alternative. All compliance pathways now have required Additional Efficiency Options or AEOs (**R408**) to achieve five percent greater energy efficiency than base levels.

Electrification Opportunities

ICC opted not to include certain electrification provisions in the final version of the code.



However, provisions are still available for adoption by states as amendments to the 2021 IECC: [RE147-19 \(Electrification-Ready\)](#), [RE126-19 \(Energy Efficient Water Heating\)](#), [RE107-19 \(Eliminate Continuous Burning Pilot Light\)](#)

Appendix RC Zero Energy Residential Building Provisions

Use Energy Rating Index (ERI) zero energy score table in accordance with RESNET/ICC 301 and **Equation RC-1** to determine annual renewable energy needed.

Commercial Code

		IECC 2018	IECC 2021
Envelope	Fenestration	Skylight: U 0.50 (CZ 4-8) Vertical (fixed): U 0.38- 0.29 (CZ 4-8)	Skylight: U 0.50- 0.41 (CZ 4-8) Vertical (fixed): U 0.36- 0.26 (CZ 4-8)
	Opaque Surfaces	N/A	Updated to align with ASHRAE 90.1 2016 & 2019 for all surfaces
Refrigeration Efficiency		N/A	Updated to match federal requirements
Lighting		Office: 0.79 School: 0.81 Hospital: 1.05	Office: 0.64 School: 0.72 Hospital: 0.96

HVAC Changes

HVAC equipment efficiency updated to match ASHRAE 90.1 Tables directly, replacing Tables **C403.3.2(1)** through **C403.3.2(10)**. Additional tables added with efficiencies based on Federal appliance manufacturing requirements.

Service Hot Water

Large ($\geq 1,000,000$ Btu/h) service hot water system efficiency increases from 90 percent to 92 percent.

Energy Recovery Changes

Adds residential (multifamily) exhaust energy recovery requirements. Defines Enthalpy Recovery Ratio (ERR) to match ASHRAE. Now requires 50 percent cooling/60 percent heating ERR for CZ 4A, 5A, 5C, 6A, 6B, 7, 8. Also, requires chiller heat recovery for reheat in hospitals.

Air Infiltration Changes

Air leakage testing requirements: Air leakage target of 0.3cfm/sq.ft. at 50PA for Class R and I. Testing target is 0.4cfm/sq.ft at 75PA for non-Class R and I (aligns with ASHRAE 90.1-2019). Continuous air barrier required throughout thermal envelope.

Appendix CC Zero Energy Commercial Building Provisions

Use **Equation CC-1 and CC-2** and ASHRAE 90.1 Appendix G tables to calculate the building energy use and the onsite renewables and offsets. The building reaches zero energy by generating and/or offsetting energy consumption with renewable energy that meets the buildings annual energy use, effectively

Climate Zone	ERI (without onsite power)	ERI (with onsite power)
4	47	0
5	47	0
6	46	0
7	46	0
8	45	0



eliminating energy consumption from fossil fuels for the building's operations.

Compliance Pathways

There are two compliance pathways in the 2021 IECC for commercial buildings: Prescriptive and Total Building Performance. The prescriptive pathway (**section C401-406 and C408**) has opaque envelope improvements due to more stringent insulation requirements using the R-Value minimum approach for climate zones 4-8. The performance pathway (**section C405**) requires new mandatory measures, such as air leakage testing and installation of a continuous

air barrier for the whole building with required commissioning. The same improvements are in the prescriptive path tables for the standard reference baseline regarding wall and ceiling insulation, fenestration, slabs, etc. Overall, they demonstrate an ≤80 percent annual energy cost savings.

Electrification Opportunities

ICC opted to not include EV provisions in the final version of the code. However, these provisions are still available for adoption by states as amendments to the 2021 IECC: [CE217 Part II \(EV Parking Spaces\)](#).

2021 IECC Video Modules

1. [ICC and IECC Background and Development](#)
2. [2021 IECC Residential Overview](#)
3. [2021 IECC Commercial Overview](#)
4. [2021 IECC Electrification Overview](#)
5. [2021 IECC Residential Prescriptive Compliance Pathway](#)
6. [2021 IECC Residential Performance Compliance Pathway](#)
7. [2021 IECC Residential Energy Rating Index \(ERI Compliance Pathway](#)
8. [2021 IECC Residential Additional Efficiency Options \(AEOs\)](#)
9. [2021 IECC Residential Zero Energy Overview](#)
10. [2021 IECC Commercial Prescriptive Compliance Pathway](#)
11. [2021 IECC Commercial Total Building Performance Compliance Pathway](#)
12. [2021 IECC Commercial Zero Energy Overview](#)