

2024 Model Energy Code Key Changes



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2024 Model Energy Code Key Changes

This document provides an introductory overview of the key provisions of the **Residential 2024 International Energy Conservation Code (2024 IECC)**. For some components of the 2024 code, a comparison is made to the current Wisconsin Uniform Dwelling Code (UDC) based on the 2009 IECC with amendments, the model residential 2009 IECC, and the model residential 2021 IECC.

The International Code Council (ICC) published the 2024 International Energy Conservation Code (IECC) in August 2024. The IECC is a model code that sets minimum requirements for energy efficiency for residential and commercial buildings.

OVERVIEW MAJOR RESIDENTIAL CHANGES relevant to Wisconsin climate zones five and six (See Table 3 on page 4):

- Ceiling insulation requirements revert to less insulative 2018 IECC levels.
- Enhanced design flexibility is permitted for wall insulation in Climate Zone 5.
- The prescriptive compliance path requires additional efficiency practices from a table of measures with assigned credits (points) with a size of structure multiplier.
- The performance compliance path has been revised and expanded to allow equipment trade-offs and consider the location of ducts.
- The Energy Rating Index (ERI) compliance path updated. New ERI provisions address removing the additional efficiency options, averaging the ERI for larger buildings, backstop updates, insulation clarification, air leakage allowances, and other changes.
- Provisions for existing buildings are updated.
- The 2024 IECC includes several appendices that states and municipalities can elect to adopt. Example of new appendices address:
 - Electric Energy Storage Provisions
 - Electric Vehicle Charging Infrastructure
 - Appendix NG—2024 IECC Stretch Code
 - Operational Carbon Rating and Energy Reporting
 - On-site Renewable Energy
 - Electric-Ready and All-Electric Residential Building Provisions



2024 IECC NATIONAL SAVINGS

The Department of Energy issued a 2024 IECC Residential code determination, the results of which indicate that residential buildings meeting the 2024 IECC incur the following savings compared to the 2021 IECC on a weighted national average basis:

- **7.80 percent** annual reduction in site energy use intensity (EUI);
- **6.80 percent** annual reduction in source EUI;
- **6.60 percent** annual energy cost savings; and
- **6.51 percent** carbon emissions reduction.

https://www.energycodes.gov/sites/default/files/2024-12/2024_IECC_Determination_TSD.pdf

2024 Model Energy Code Key Changes—continued

WISCONSIN IECC RESIDENTIAL SAVINGS

2021 IECC Residential Savings for Homeowners Compared to Wisconsin UDC	
<ul style="list-style-type: none"> Average annual savings of 21% compared to the Wisconsin UDC Equating to \$817 of annual utility bill savings 	
Cash Flow Year One	Cash Flow 30 Year
<ul style="list-style-type: none"> Amortized costs and benefits over a typical 30-year mortgage First-time homebuyers positive cumulative cash flow in the first four years Average homebuyers positive cumulative cash flow in the first six years 	Over the course of 30 years, both a first-time homebuyer and an average-income homebuyer will net approximately \$10,600 in life-cycle cost savings
Wisconsin	
Year One	Over 30 Years
Wisconsin residents could expect to save over \$12,210,000 in energy costs and 56,100 metric tons in avoided CO ₂ emissions	Wisconsin homeowners would save 3.26 billion dollars in energy savings and reduce CO ₂ emissions by 25.8 MMT

2024 IECC Residential Savings for Homeowners Compared to Wisconsin UDC	
<ul style="list-style-type: none"> Average annual savings of 24% compared to the Wisconsin UDC Equating to \$993 of annual utility bill savings 	
Cash Flow Year One	Cash Flow 30 Year
<ul style="list-style-type: none"> Amortized costs and benefits over a typical 30-year mortgage First-time homebuyers positive cumulative cash flow in the first three years Average homebuyers positive cumulative cash flow in the first five years 	Over the course of 30 years, both a first-time homebuyer and an average-income homebuyer will net approximately \$11,800 in life-cycle cost savings
Wisconsin	
Year One	Over 30 Years
Wisconsin residents could expect to save over \$13,650,000 in energy costs and 62,700 metric tons in avoided CO ₂ emissions	Wisconsin homeowners would save 3.62 billion dollars in energy savings and reduce CO ₂ emissions by 28.8 MMT

2024 IECC RESIDENTIAL CHANGES

The following information is intended to overview the key 2024 IECC residential changes. The full 2024 IECC residential provisions can be viewed here: 2024 IECC. This document is not intended for code compliance. The technical content contained within this document is derived from the 2024 International Energy Conservation Code (IECC) published by the International Code Council, www.iccsafe.org.

Key 2024 IECC Changes Addressed Include:

- 2024 IECC Format Changes
- 2024 IECC Climate Zones
- Compliance Paths
- U-Factors and Fenestration Requirements
- 2024 IECC R-Values
- Air Leakage
- Residential Ducts
- Simulated Building Performance
- Energy Rating Index
- 2024 IECC Additional Efficiency Requirements
- Residential System Changes
- Lighting and Controls
- Existing Buildings
- Alterations/Substantial Improvements
- Residential Appendixes

Table 1: 2021 IECC to 2024 IECC
Average Percent Saving for Wisconsin Climate Zones

Climate Zone	Energy Savings	Emissions
5	5.53	5.36
6	5.64	4.87

Table 2: 2021 IECC to 2024 IECC
Average Percent Saving for Wisconsin by Building Type

Building Type	Energy Savings	Emissions
Average for Single Family	6.54	6.43
Average for Multifamily	7.14	7.18

A complete analysis of the energy savings and emissions reductions for Wisconsin moving to the 2021 IECC and 2024 IECC, as well as the cost impacts on first-time and average homebuyers, is available on www.wienergycodes.org

2024 Model Energy Code Key Changes—continued

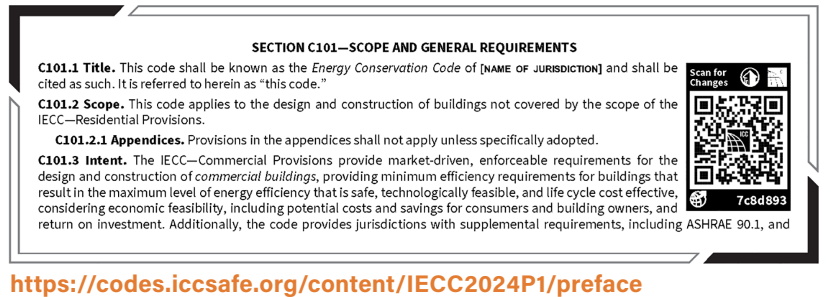
2024 IECC FORMAT CHANGES

The 2024 IECC includes format changes to the text and tables.

The text is in a single column instead of two columns, which is easier to read and consistent with ASHRAE standards.

QR codes identify code changes at the beginning of each section and provide links to additional details.

Figure 1: Example of the section QR codes



2024 IECC CLIMATE ZONES

Climate zones (CZ) are significant to the IECC as they prescribe many building envelope energy efficiency measures that a building must include. Climate zones are defined at the county level based on temperature, humidity, and rainfall.

In 2020, the climate zone map changed significantly. The 2021 IECC change, the first change in nearly 20 years, was based on research from weather data over 25 years. About 10 percent of counties nationally were assigned a new climate zone. In most cases, the shift was to a warmer (lower) climate zone.¹

82.68 percent of Wisconsin's floor area was reclassified, the highest percentage in the country, and Milwaukee and Dane Counties are among the top ten counties nationally reclassified. In the 2009 IECC, Wisconsin was CZ6/7; in the 2021 IECC, Wisconsin is in warmer CZ 5A/6A.²

The 2024 IECC climate zones remain unchanged from the 2021 IECC; Wisconsin is CZ 5A/6A. However, these climate zones differ from the current Wisconsin UDC climate zones of CZ 6/7.

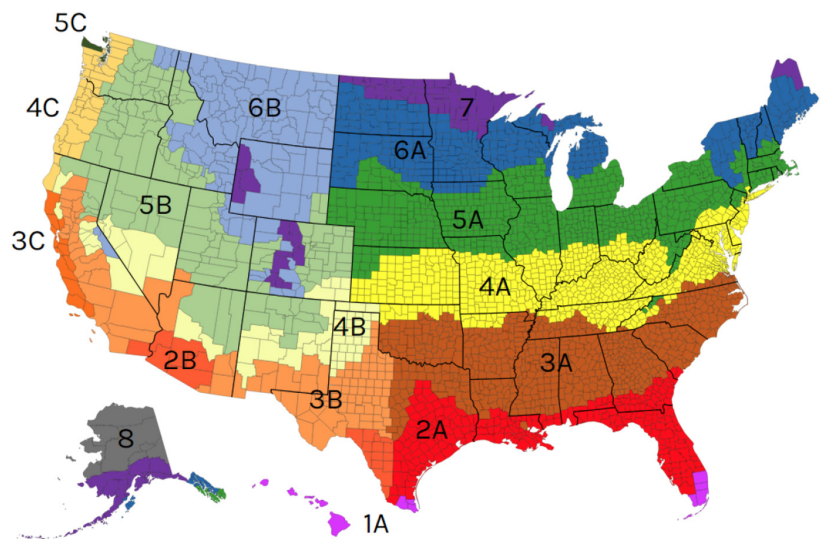


Table 3: Wisconsin Climate Zones by Code Compared

The table compares the 2009 IECC, WI UDC, 2021 IECC, and 2024 IECC climate zones. The current code 2021 and 2024 IECC climate zones differ from and are updated compared to the 2009 and the current WI UDC.

Code	Climate Zone	
2009	6A	7
WI UDC*	6A	7
2021	5A	6A
2024	5A	6A

*Based on 2009 IECC with amendments

¹2021 IECC Climate Zones and Implications for ENERGY STAR Updates. June 29, 2022 <https://theber.com/iecc-climate-zone-updates/>

²IMPACT OF ASHRAE STANDARD 169-2013 ON BUILDING ENERGY CODES AND ENERGY EFFICIENCY Rahul Athalye¹, Todd Taylor¹, and Bing Liu¹ Pacific Northwest National Laboratory, Richland, WA, August 2016 https://publications.ibpsa.org/proceedings/simbuild/2016/papers/simbuild2016_C057.pdf 5 <https://codes.iccsafe.org/co>

2024 Model Energy Code Key Changes—continued

COMPLIANCE PATHS

The 2024 IECC contains the following compliance paths (see *Table 4* below):

Prescriptive Compliance Option—Required for compliance with various efficiency practices. The prescriptive compliance path will require additional efficiency practices from dozens of measures with assigned credits.

Simulated Performance Option—Uses energy modeling to compare the proposed dwelling's energy costs to a reference home.

Energy Rating Index Option—Uses energy modeling to calculate an ERI for the proposed dwelling, which must be less than the maximum allowed for the climate zone.

Total UA Alternative was renamed Component Performance Alternative to accompany the F-factor change. "Total UA Alternative Compliance" refers to a method where a building can demonstrate compliance with energy efficiency requirements by calculating the total "U-value times area" (UA) of its thermal envelope, allowing for tradeoffs between different building components, as long as the overall UA is less than or equal to a specified limit. This essentially lets builders use higher performing components in some areas to offset lower performing ones in others; this calculation is typically done using software like REScheck and is considered an optional compliance pathway within the code.

Table 4: Compliance Paths

This table compares the compliance paths of the model 2009 IECC, WI UDC, 2021 IECC and 2024 IECC. The ERRI pathway was not a part of the model 2009 IECC or the WI UDC.

CODE	Prescriptive	Performance	UA	ERI	WI Efficient Equipment
2009	X	X	X		
WI UDC*	X	X	X		X
2021	X	X	X	X	
2024	X	X	X	X	

*Based on 2009 IECC with amendments

Prescriptive Path

The 2024 International Energy Conservation Code (IECC) prescriptive path is a set of minimum requirements for building features that must be met to comply with the code.

As part of the Prescriptive Path, **Additional Efficiency Requirements:** Builders must meet a minimum of 10 credits from at least two of over 50 optional measures.



U-FACTORS AND FENESTRATION REQUIREMENTS

The U-factor measures how well a window insulates. U-factor values generally range from 0.20 to 1.20. The lower the U-factor, the more insulative the window. The SHGC measures how much the sun's heat comes through the window can range in value from 0 to 1.

The table formats in the 2024 IECC, U-Factors, and Fenestration differ from those in prior codes, and several numerical values have changed compared to the 2021 IECC. In most cases, the values have become more stringent or energy efficient.

New to the 2024 IECC is the term F-Factors. (see page 6 for an explanation of F-Factors).

2024 Model Energy Code Key Changes—continued

Prescriptive Path—continued

Table 5: 2024 IECC U-Factors and Fenestration Requirements

Table 5—This table shows the U-factors and Fenestration requirements. These factors are required for the prescriptive path by the 2024 IECC. The changes increase the requirements for window U-factors in Wisconsin climate zones 5 and 6.

Note: NR (Not Required)	Climate Zone	
	5	6
Vertical fenestration U-factor	0.28d	0.28d
Skylight U-factor	0.50	0.50
Glazed vertical fenestration SHGC	NR	NR
Skylight SHGC	NR	NR
Ceiling U-factor	0.026	0.026
Insulation entirely above roof deck	0.032	0.032
Wood-framed wall U-factor	0.045	0.045
Mass wall U-factor b	0.082	0.060
Floor U-factor	0.033	0.033
Basement wall U-factor	0.050	0.050
Unheated slab F-factor e	0.51	0.48
Heated slab F-factor e	0.66	0.66
Crawl space wall U-factor	0.055	0.055

Table 6: Residential U-Factor

This table compares residential U-Factors between the model 2009 IECC, WI UDC, 2021 IECC and 2024 IECC.

CODE	Climate Zone	Fenestration	Basement Wall	Crawl Space Wall	Slab
2009	6A	0.35	0.050	0.065	0.033
	7	0.35	0.050	0.065	0.028
WI UDC*	6A	0.30	0.045	0.045	0.033
	7	0.30	0.045	0.045	0.033
2021	5A	0.30	0.050	0.055	0.033
	6A	0.30	0.050	0.055	0.033
2024	5A	0.28	0.050	0.055	See 2024 Slab
	6A	0.28	0.050	0.055	

*Based on 2009 IECC with amendments

Table 7: 2024 Slab

This table shows the F-factor for heated and unheated slabs. Prior versions of the energy code used a U-factor, but the 2024 IECC uses an F-factor for the slab building component.

	Climate Zone	F-Factor
Unheated Slab	5A	0.51
	6A	0.48
Heated Slab	5A	0.66
	6A	0.66



F-FACTOR EXPLAINED

F-factor is a calculation that estimates the amount of heat lost through a slab-on-grade floor. It's used to determine the U-factor for slab-on-grade floors.

How is the F-factor used?

- The F-factor approximates the total heat lost through a slab's perimeter.
- It's expressed per unit length of the slab's perimeter.
- The F-factor is similar to the U-factor used for above-grade walls, roofs, and fenestrations.
- The C-factor is used for below-grade walls.

How is the F-factor determined?

- The F-factor can be found in Appendix RF of the 2024 IECC.
- It can also be determined using a method consistent with the ASHRAE Handbook of Fundamentals.

Note: Total UA Alternative was renamed Component Performance Alternative to accompany the F-factor change.

2024 Model Energy Code Key Changes—continued

Prescriptive Path—continued

2024 IECC R-VALUES

The 2024 International Energy Conservation Code (IECC) specifies R-Values for insulating ducts, walls, and other areas.

The 2024 IECC addresses changes to the building's components below as compared to the 2021 IECC and WI UDC:

- Reductions in ceiling R-values,
- Expanded cavity and Continuous Insulation (CI) options,
- Separate skylight SHGC values.

Table 8: 2024 IECC Insulation minimum R-Values and Fenestration requirements by building component

Note: NR (Not Required)	Climate Zone 5	Climate Zone 6
Vertical fenestration U-factor	0.28	0.28
Skylight U-factor	0.50	0.50
Glazed vertical fenestration SHGC	NR	NR
Skylight SHGC	NR	NR
Ceiling R-value	49	49
Insulation entirely above roof deck	30	30
Wood-framed wall R-value	30 or 20&5ci or 13&10ci or 0&20ci	30 or 20&5ci or 13&10ci or 0&20ci
Mass wall R-value	13/17	15/20
Floor R-value	30 or 19+7.5ci or 20ci	30 or 19+7.5ci or 20ci
Basement wall R-value	15ci or 19 or 13&5ci	15ci or 19 or 13&5ci
Unheated slab R-value and depth	10ci, 3 ft	10ci, 4 ft
Heated slab R-value and depth	R-10ci, 3 ft and R-5 full slab	R-10ci, 4 ft and R-5 full slab
Crawl space wall R-value	15ci or 19 or 13&5ci	15ci or 19 or 13&5ci

Table 10: 2024 IECC Heated and Unheated Slab R-Values and Depth by climate zone

	Climate Zone	R-Value & Depth
Unheated Slab	5A	10, 3ft
	6A	10, 4ft
Heated Slab	5A	10, 3ft & R-5 full slab
	6A	10, 4ft & R-5 full slab

Table 9: Residential R-Values and Fenestration

Building components' R-values (insulation values). It compares the WI UDC to the model 2009 IECC, 2021 IECC, and 2024 IECC. The 2021 IECC R-Values are generally more stringent or equivalent to the UDC and model 2009 IECC, with a few exceptions. The 2024 IECC ceiling R-value has been lowered to 49 from 60.

CODE	Climate Zone	Glazed Fenestration SHGC	Ceiling	Wood Frame Wall	Floor	Basement Wall	Slab R-Value & depth	Crawl Space
2009	6A	NR	49	20 or 13+5	30	15/19	10, 4ft	10/13
	7		49	21	38	15/19	10, 4ft	10/13
WI UDC*	6A	NR	49	21	30	15/19	10/20	15/19
	7		49	19+5	38	15/19	10/20	15/19
2021	5A	0.4	60	30 or 20+5	30	15 or 19	10, 4ft	15/19
	6A	NR	60	or 0+20	30	or 13.5	10, 4ft	or 13&5
2024	5A	NR	49	30 or 20+5	30 or 19+7.5	15 or 19	See 2024 Slab	15 or 19
	6A		49	or 0+20	or 20	or 13.5		or 13&5

Note: NR (Not Required)

*Based on 2009 IECC with amendments



2024 Model Energy Code Key Changes—*continued*

Prescriptive Path—*continued*

AIR LEAKAGE

The 2024 IECC requires more stringent air leakage limits and expanded verification testing.

The maximum air leakage allowed for each compliance path and residential building type has undergone technical and organizational changes and clarifications.

2024 IECC Prescriptive compliance

- Climate Zone 5: 3.0 ACH50
- Climate Zone 6: 2.5 ACH50
- 2021 IECC maximum air leakage under any compliance path is 5 ACH50
- 2009 IECC maximum air leakage under any compliance path is 7 ACH50

2024 IECC Performance and ERI Compliance

- 5ACH50 drops to 4.0 ACH50
- 2024 IECC Multifamily increased stringency from 0.30cfm/ft² to 0.27
- 2024 IECC added sampling protocol for buildings with eight or more units
 - Seven units or 20%, whichever is greater
 - If the tested unit fails, corrective action is to retest the unit until it passes
 - For each fail, test three more units, including the corrected unit

2024 IECC Exceptions:

- Buildings ≤1500ft otherwise 0.03cfm/sq drops to 0.27

2024 IECC RESIDENTIAL DUCTS

The 2024 International Energy Conservation Code (IECC) requires that duct leakage be limited to specific levels during rough-in and post-construction testing.

The 2024 IECC contains technical, editorial, and organizational changes:

- Revised and added definitions
- Added duct system design requirements
- Ducts serving one or two dwelling units: ACCA Manual D required

- More than two units: ASHRAE Handbook of Fundamentals, ACCA Man D, or equivalent
- Added test exemption for ductless systems (< 10 ft of ductwork)
- Sampling protocol added



Ducts Prescriptive Path

DUCT SYSTEM LEAKAGE

Changes to the duct leakage requirements provide more flexible measures based on conditioned floor area, number of ducted returns, location of ductwork, and space conditioning equipment. The changes are particularly relevant in homes with more significant amounts of ductwork and smaller homes (1000 sq ft or less) that may have difficulties complying with the CFM/100 requirements.

DUCTWORK IN CONDITIONED SPACE

Additional Efficiency Requirement Credits (*see page 10 for more information on Additional Efficiency Requirements*) to reduce duct leakage rates for ductwork and space conditioning equipment in conditioned space. 1–14 credits based on climate zone. Credits vary based on the amount of ductwork installed in the conditioned space (80% vs. 100%).

Ducts Simulated Building Performance Path

DUCT LOCATION MODELING AND TRADEOFFS

Changes increase the modeling possibilities, including the location of ductwork (e.g., conditioned attic, crawlspace, or conditioned space) and the number of floors in the residential building.

2024 Model Energy Code Key Changes—continued

Simulated Building Performance

This section establishes criteria for compliance using simulated building performance analysis.

The analysis includes only heating, cooling, mechanical ventilation, and service water-heating energy. It is limited to dwelling units. Spaces other than dwelling units in Group R-2, R-3, or R-4 buildings comply with other code sections.

The Simulated Building Performance path (Section R405) underwent a significant revision for the 2024 code, expanding the scope of measures used in the modeling to evaluate trade-offs.

KEY CHANGES:

- Envelope Backstop
- Energy Cost Compliance
- Equipment In Reference Home
- Ductwork in Reference Home
- Requirements in Table R405.2
- Annual energy cost requirements

BACKSTOP

"Backstop" refers to the "envelope backstop," provision that sets a minimum level of performance for a building's envelope (walls, roof, windows) regardless of how efficient the internal systems like HVAC or lighting are, essentially preventing designers from trading off too much envelope efficiency to meet energy targets with high-performing internal systems alone; it ensures a building maintains a certain level of thermal performance across its exterior elements.

2021 IECC Backstop

- The efficiency levels of the 2009 IECC

2024 IECC Backstop

- Sets an envelope backstop based on total building thermal envelope thermal conductance.
- Allows flexibility while ensuring envelope items that impact the long-term performance of the home are not missed.
- Utilizes equations below:

***For Climate Zone 3-8 TC Proposed design
≤1.15 x TC Prescriptive reference design***

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 Table R402.1.2 multiplied by 1.08 in Climate Zones 0, 1, and 2, and 1.15 in Climate Zones 3 through 8, in accordance with Equation 4-2 and Section R402.1.5. The area-weighted maximum fenestration SHGC permitted in Climate Zones 0 through 3 shall be 0.30.

REQUIREMENTS FOR THE SIMULATED BUILDING PERFORMANCE

Table R405.2 contains requirements for the Simulated Building Performance compliance pathway. The table indicates the section of the code from which the requirement is drawn. The requirements include General, building Thermal Envelope, Mechanical, and Electrical Power and Lighting.

Equipment Efficiency Modeling and Tradeoffs

Changes set efficiency requirements for heating, cooling, and water heating equipment to federal minimum efficiencies for the reference home. This update effectively expands the modeling scope to allow tradeoffs to include using higher-efficiency equipment, a previously unallowed design strategy.

Removal of Additional Efficiency Requirement

This change removes the requirement to include one of the additional efficiency measures or achieve a 5% improvement over the reference home required under the 2021 IECC.

Ductwork in Reference Home

- Sets standard duct locations based on the home foundation and number of stories.
- Allows for additional credit for all ducts in conditioned space

2024 Model Energy Code Key Changes—continued

Energy Rating Index (ERI) Performance

The Energy Rating Index (ERI) is a numerical score that compares a building's energy performance to a baseline.

- The ERI scale ranges from 0 to 100.
- A score of 0 is a net-zero home.
- A score of 100 is equivalent to the 2006 IECC.
- Each point on the scale represents a one percent change in the building's energy efficiency.

The 2024 International Energy Conservation Code (IECC) Energy Rating Index (ERI) requirements have been adjusted to lower the maximum ERI value compared to the 2021 IECC. This provides a stricter standard while also offering more flexibility for builders to achieve compliance through a point-based credit system for additional efficiency measures (see below) across various building components.

Maximum Energy Rating Index (ERI)			
Climate Zone	2021 IECC	2024 IECC	
	ERI	ERI without Onsite Power Production	ERI with Onsite Power Production
5	55	54	43
6	54	53	43

The 2024 IECC uses the same envelope backstop as the Stimulated Performance Path.

1.08 or 1.15 x TC2024 IECC

TC refers to Total Building Thermal Envelope Thermal Conductance, which measures how much heat can pass through the building's thermal envelope (walls, roof, windows, etc.).

No limit exists on how much on-site solar PV can contribute to code compliance. However, with Onsite Power Production (OPP), the ERI is lower.

ERI Air Leakage—This allows air leakage to be as high as 4ACH50 for buildings or dwelling units in any climate zone utilizing the ERI path.

Ventilation and Additional Efficiency Measures Removed from 2024 IECC

2024 IECC ERI removes previous code versions for ventilation requirements, better aligning ERI and HERS Index. Also removed from the 2024 IECC is the requirement to achieve 5% improvement (additional efficiency measures) required under the 2021 IECC.

ERI Average for Larger Multifamily Buildings—This change allows the code official to allow the average ERI for buildings with 20 dwelling units or larger.

2024 IECC ADDITIONAL EFFICIENCY REQUIREMENTS

In the 2024 IECC, "additional efficiency requirements" refer to a section within the code that requires builders to achieve a certain number of points by selecting from a list of energy efficiency measures, such as improved insulation, high-performance windows, advanced HVAC systems, and renewable energy options, required when using the prescriptive compliance path.

Unlike the 2021 IECC, the Additional Efficiency Requirements do not apply to Simulated Performance or ERI Pathways. In the 2021 IECC, users pick one option from five.

2024 IECC Additional Efficiency Requirements

- Use for the prescriptive compliance only
- New 2024 format using a system of measures/credits.
 - A minimum of two measures must be implemented.
 - A minimum of 10 credits must be achieved in addition to meeting all mandatory requirements.

Each credit equals approximately a one percent improvement in the home's efficiency. Performance and ERI compliance values were adjusted accordingly to allow maximum flexibility.

Credit value based on climate zone.

2024 Model Energy Code Key Changes—continued

Flexibility

Over 50 measures are available in these categories:

- Heating Equipment
- Cooling Equipment
- Water Heating Equipment
- Ducts in Conditioned Space
- Reduced Air Leakage
- ERV/HRV
- Appliances
- On-Site Renewable
- Insulation
- Fenestration

Larger Homes

- Five additional credits must be earned for dwelling units more than 5000 sq ft

**2024 IECC ADDITIONAL MEASURES
(PARTIAL TABLE)**

Measure Number	Measure Description	Credit Value	
		Climate Zone 5	Climate Zone 6
R408.2.1.1(1)	≥ 2.5% Reduction in total TC	1	1
R408.2.1.1(2)	≥ 5% Reduction in total TC	2	2
R408.2.1.1(3)	≥ 7.5% Reduction in total TC	2	3
R408.2.1.1(4)	≥ 10% Reduction in total TC	4	4
R408.2.1.1(5)	≥ 15% Reduction in total TC	5	6
R408.2.1.1(6)	≥ 20% Reduction in total TC	7	8
R408.2.1.1(7)	≥ 30% Reduction in total T	11	12

LIGHTING AND CONTROLS

The lighting sections were revised editorially and provisionally for both interior and exterior. New definitions were added. A new lighting power allowance table was added to match the equivalent requirements in IECC-C. Additional exceptions were added that may apply to Group R occupancies.

100% of permanently installed lighting must be high-efficacy

- Luminaires > 45 lumens per watts
- Lamps > 65 lumens per watt

Control requirements expanded:

- Habitable spaces require manual dimmer or occupancy control {20 minutes) and manual control
- Specific locations such as Garages, unfinished basements, laundry rooms, utility rooms require occupancy control (20 minutes) and manual control

OTHER 2024 IECC RESIDENTIAL SYSTEM CHANGES

The information below outlines residential system requirements for various building components.

Heat or Energy Recovery Ventilation

- Required in CZ 6

Electric Resistance Space Heating

- Limits CZ 4-8 to 2kW maximum unless at least one heat pump is installed

Controls

Additional controls required for exhaust fans in bathrooms:

- Timer
- Occupant Sensor Control
- Humidity Control
- Contaminant Control

Gas Fireplaces

- No continuous pilot
- On-demand pilot, intermittent ignition, or interrupted ignition,
- Efficiency requirements

Systems Outside Building Thermal Envelope (Applicable to Wisconsin Climate)

- Heating outside a building must be radiant and have occupant sensors or a time switch.
- Snow melt and ice systems require automatic controls.
- Roof and gutter deicing systems are required to have automatic controls.
- Freeze protection system controls must include heat tracing of outdoor piping, heat exchanger, and automatic controls.

2024 Model Energy Code Key Changes—continued

EXISTING BUILDINGS

2024 IECC, existing building provisions focus on implementing efficiency upgrades when significant renovations or alterations occur to the building envelope, HVAC, and other building systems. In most renovations, new equipment must meet current energy standards when replaced.

Five credits or points as outlined may be required contingent on the project scope. Exceptions apply when an addition or addition and existing building meets with Simulated building Performance or ERI.

When significant HVAC work is performed, testing and sealing of existing duct systems will be required.

Depending on the project scale, energy modeling may be used to demonstrate compliance with the code.

ALTERATIONS/SUBSTANTIAL IMPROVEMENTS

Alterations may require a minimum of three credits contingent on the project scope.

The 2024 IECC contains a new definition and trigger for Substantial Improvement:

Any repair, reconstruction, rehabilitation, alteration, addition, or other improvement of a building or structure, the cost of which equals or is more than 50 percent of the market value of the structure before the improvement.



2024 Model Energy Code Key Changes—continued

RESIDENTIAL APPENDIXES

The 2024 IECC retains and updates the Solar Ready (Appendix NB) and Zero Net Energy Provisions (Appendix NC) appendices and adds ten new appendices and a resource chapter for All-Electric Residential Buildings. Resources are code-related information but are not part of the code. However, the provisions of the Resource may be adopted by a jurisdiction. **Underlined entries are new to the residential 2024 IECC.**



Appendix RA—Reserved

Board of Appeals provisions

Appendix RB—Solar-Ready Provisions

Requires space for installing solar PV systems, but does not require the PV panels. Also, it requires wiring pathways and the structural capacity of roofs to support systems.

Appendix RC—Zero Net Energy Residential Building Provisions

Requirements for residential buildings to be zero net energy over a year.

Appendix RD—Electric Energy Storage Provisions

Reserves space for energy storage systems, wiring, and switching

Appendix RE—Electric Vehicle Charging Infrastructure

Single-family and multifamily EV charging requirements

Appendix RF—Alternate Building Thermal Envelope Insulation R-values

Expanded R-value options for determining compliance with the U-factor criteria and supplements the limited selection of common insulation conditions addressed in the R-value table.

Appendix RG—2024 IECC Stretch Code

Three stretch code compliance pathways with additional measures beyond the 2024 IECC base code.

Appendix RH—Operational Carbon Rating And Energy Reporting

Maximum CO₂e Index and reporting criteria.

Appendix RI—On-site Renewable Energy

Applies where renewables are installed.

Appendix RJ—Demand Responsive Controls

Applies to electric water heaters.

Appendix RK—Electric-Ready Residential Building Provisions

Provide electric infrastructure where non-electric cooktops, ovens, clothes dryers, or water heaters are installed.

Appendix RL—Renewable Energy Infrastructure

Requirements for the solar-ready zone. Space is reserved in the electric service panel.

Resource A—All-Electric Residential Buildings

Provisions for all-electric buildings. Federal law may preempt these provisions.