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**HYBRID (IN-PERSON/VIRTUAL)**  
**WISCONSIN ADVISORY COUNCIL ON BUILDING SUSTAINABILITY**  
**Room N208, 4822 Madison Yards Way, 2<sup>nd</sup> floor, Madison**  
**Contact: Brad Wojciechowski (608) 266-2112**  
**July 19, 2024**

*The following agenda describes the issues that the Council plans to consider at the meeting. At the time of the meeting, items may be removed from the agenda. Please consult the meeting minutes for a record of the actions of the Council. Be advised that board members may attend meetings designated as "Hybrid" in-person or virtually.*

**AGENDA**

**9:00 A.M.**

**OPEN SESSION – CALL TO ORDER – ROLL CALL**

- A. Adoption of Agenda (1-2)**
- B. Approval of Minutes of April 26, 2024 (3)**
- C. Reminders: Conflicts of Interest, Scheduling Concerns**
- D. Introductions, Announcements and Recognition**
- E. Administrative Matters – Discussion and Consideration**
  - 1. Department, Staff and Council Updates
  - 2. Council Members
    - a. Austin, Benjamin V.
    - b. Eber, Alan H.
    - c. Hackel, Scott P.
    - d. Herrmann, Monika S.
    - e. Lipari, Megan C.
    - f. Nergard, Missy A.
    - g. Nino Torres, Victor G.
    - h. O'Brien, Timothy M.
    - i. Sayu, Francisco J.
    - j. Swartz, Keith A.
    - k. Weber, Christina Louise
- F. Presentation: Background on Building Energy Codes, Darren Port – Building Code Advisor, Slipstream (4-32)**
- G. 2024 Council Recommended Priorities – Discussion and Consideration (33)**
- H. Administrative Rule Matters – Discussion and Consideration**

- I. Legislation and Policy Matters – Discussion and Consideration
- J. Discussion and Consideration of Items Added After Preparation of Agenda:
  - 1. Introductions, Announcements and Recognition
  - 2. Administrative Matters
  - 3. Election of Officers
  - 4. Education and Examination Matters
  - 5. Credentialing Matters
  - 6. Legislative and Policy Matters
  - 7. Administrative Rule Matters
  - 8. Council Liaison Training and Appointment of Mentors
  - 9. Informational Items

**K. Public Comments**

**L. ADJOURNMENT**

**NEXT MEETING: OCTOBER 25, 2024**

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MEETINGS AND HEARINGS ARE OPEN TO THE PUBLIC, AND MAY BE CANCELLED  
WITHOUT NOTICE.

Times listed for meeting items are approximate and depend on the length of discussion and voting. All meetings are held virtually unless otherwise indicated. In-person meetings are typically conducted at 4822 Madison Yards Way, Madison, Wisconsin, unless an alternative location is listed on the meeting notice. In order to confirm a meeting or to request a complete copy of the board's agenda, please visit the Department website at <https://dsps.wi.gov>. The board may also consider materials or items filed after the transmission of this notice. Times listed for the commencement of disciplinary hearings may be changed by the examiner for the convenience of the parties. Requests for interpreters for the hard of hearing, or other accommodations, are considered upon request by contacting the Affirmative Action Officer, or reach the Meeting Staff by calling 608-267-7213.

**VIRTUAL/TELECONFERENCE  
WISCONSIN ADVISORY COUNCIL ON  
BUILDING SUSTAINABILITY  
MEETING MINUTES  
APRIL 26, 2024**

**PRESENT:** Scott Hackel, Monika Hermann, Missy Nergard, Victor Nino Torres, Timothy O'Brien, Francisco Sayu, Keith Swartz, Christina Louise Weber

**EXCUSED:** Benjamin Austin, Alan Eber, Megan Lipari

**STAFF:** Brad Wojciechowski, Executive Director; Joseph Ricker, Legal Counsel; Tracy Drinkwater, Board Administration Specialist; and other DSPS Staff

**CALL TO ORDER**

Missy Nergard, Chairperson, called the meeting to order at 9:08 a.m. A quorum of eight (8) members was confirmed.

**ADOPTION OF AGENDA**

**MOTION:** Monika Hermann moved, seconded by Francisco Sayu, to adopt the Agenda as published. Motion carried unanimously.

**APPROVAL OF MINUTES OF OCTOBER 27, 2023**

**MOTION:** Keith Swartz moved, seconded by Timothy O'Brien, to adopt the Minutes of October 27, 2023, as published. Motion carried unanimously.

**PUBLIC AGENDA REQUEST**

**Introduction To Department Of Energy (Doe) Funding Project Addressing Building Codes**

**MOTION:** Francisco Sayu moved, seconded by Timothy O'Brien, to acknowledge and thank Jeanette Lezaks and Mike Turns for their appearance and presentation to the Council. Motion carried unanimously.


**ADJOURNMENT**

**MOTION:** Timothy O'Brien moved, seconded by Francisco Sayu, to adjourn the meeting. Motion carried unanimously.

The meeting adjourned at 10:27 a.m.

**State of Wisconsin  
Department of Safety & Professional Services**

**AGENDA REQUEST FORM**

1) Name and title of person submitting the request: Brad Wojciechowski, Executive Director		2) Date when request submitted: 7/10/2024 <small>Items will be considered late if submitted after 12:00 p.m. on the deadline date which is 8 business days before the meeting</small>	
3) Name of Board, Committee, Council, Sections: Choose an item.      Wisconsin Advisory Council on Building Sustainability			
4) Meeting Date: 7/19/2024	5) Attachments: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6) How should the item be titled on the agenda page? Presentation: Background on Building Energy Codes, Darren Port – Building Code Advisor, Slipstream	
7) Place Item in: <input checked="" type="checkbox"/> Open Session <input type="checkbox"/> Closed Session	8) Is an appearance before the Board being scheduled? <i>(If yes, please complete <a href="#">Appearance Request</a> for Non-DSPS Staff)</i> <input checked="" type="checkbox"/> Yes Darren Port <input type="checkbox"/> No	9) Name of Case Advisor(s), if applicable: <Click Here to Add Case Advisor Name or N/A>	
10) Describe the issue and action that should be addressed: <Click Here to Add Description>			
11) Authorization <div style="display: flex; justify-content: space-between; align-items: flex-end; margin-top: 20px;"> <div style="width: 60%;">  </div> <div style="width: 35%; text-align: right;">             7/10/2024           </div> </div> <hr/> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Signature of person making this request</div> <div style="width: 35%; text-align: right;">Date</div> </div> <hr/> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Supervisor (Only required for post agenda deadline items)</div> <div style="width: 35%; text-align: right;">Date</div> </div> <hr/> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Executive Director signature (Indicates approval for post agenda deadline items)</div> <div style="width: 35%; text-align: right;">Date</div> </div>			
Directions for including supporting documents: 1. This form should be saved with any other documents submitted to the <a href="#">Agenda Items</a> folders. 2. Post Agenda Deadline items must be authorized by a Supervisor and the Policy Development Executive Director. 3. If necessary, provide original documents needing Board Chairperson signature to the Bureau Assistant prior to the start of a meeting.			

# Background on Building Energy Codes

Wisconsin DSPS Advisory Council on Building Sustainability

June 19, 2024

**Darren Port – Building Code Advisor**

**Slipstream**

# Climate + Clean Energy Solutions for everyone.

The knowledge, people, and  
resources to solve our biggest  
energy challenges.





# Disclaimer:

The following presentation is intended for informational purposes only.

The information contained herein does not constitute a policy or program recommendation by the State of Wisconsin, the Department of Safety and Professional Services (DSPS), the Wisconsin Advisory Council on Building Sustainability (CBS), or any other Wisconsin State Department, Agency, or Authority.

Any opinions expressed are those of the author and Slipstream Inc.

# Agenda

**Introduction**

**Status of Energy Code Adoption National and Regional**

**Code Efficiency Improvement and Cost Savings**

**Energy Code Impact National and Wisconsin**

**Recent Key Residential Energy Code Changes**



# Darren Port



## Career

**Slipstream** - Building Code Policy Advisor

**Pacific Northwest National Laboratory (PNNL)** – Senior Buildings Advisor Energy Code Team

**Northeast Energy Efficiency Partnerships (NEEP)** – Senior Manager Codes and Standards

**State of New Jersey** – Code Specialist/ Green Building Administrator/ Director Green Homes



## Committee

ICC IECC 2024 Commercial Consensus Committee/E4C Sub Committee

2012 and 2015 IGCC Consensus Committee.

2012 and 2015 NAHB/ICC-700 Development Committee.

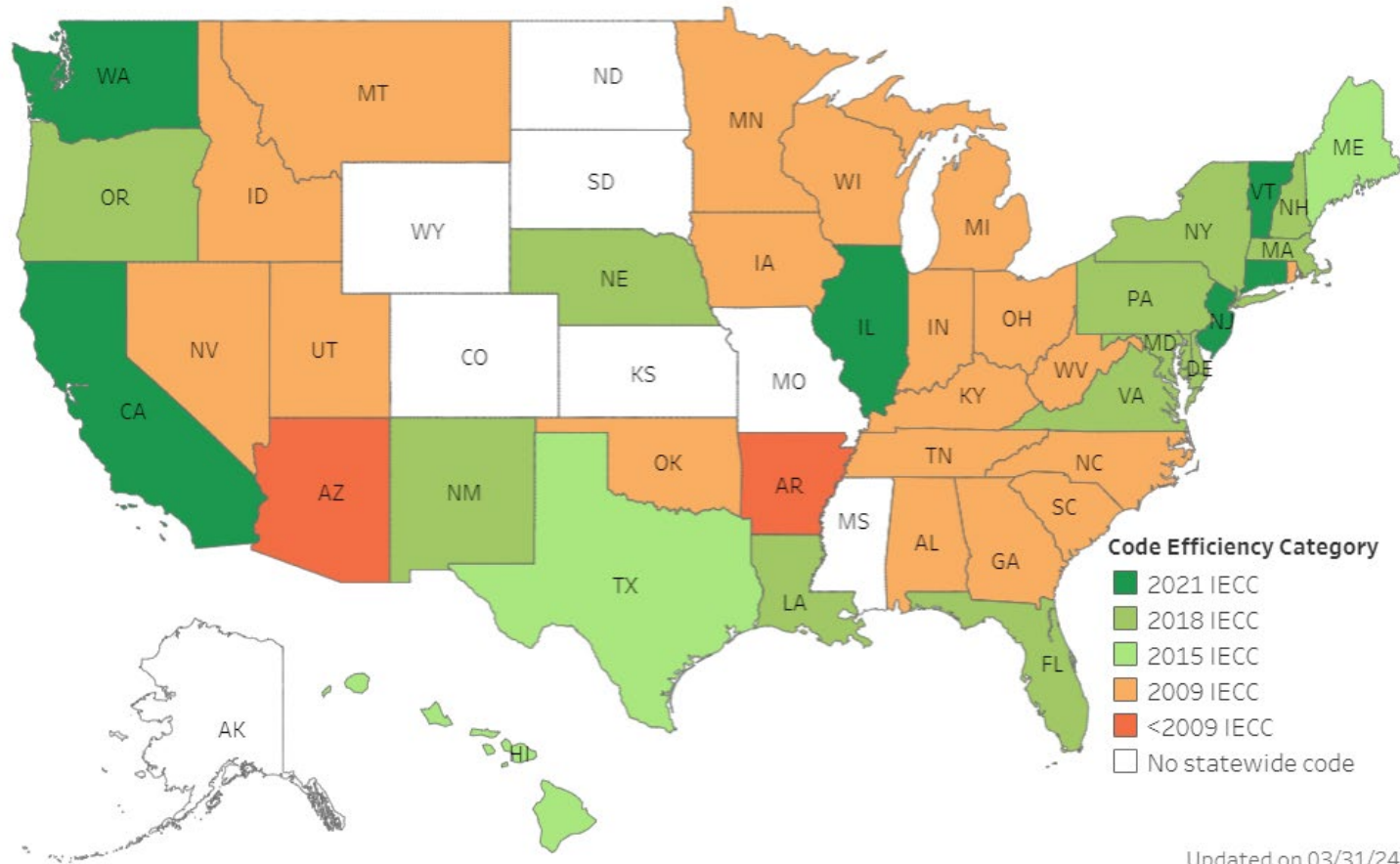
2011 and 2014 ASHRAE Standard 189.1 Development Committee.

2012-2013 ICC Evaluation Service Sustainability Committee.

2011-2014 Board Member ICC Sustainability Membership Committee

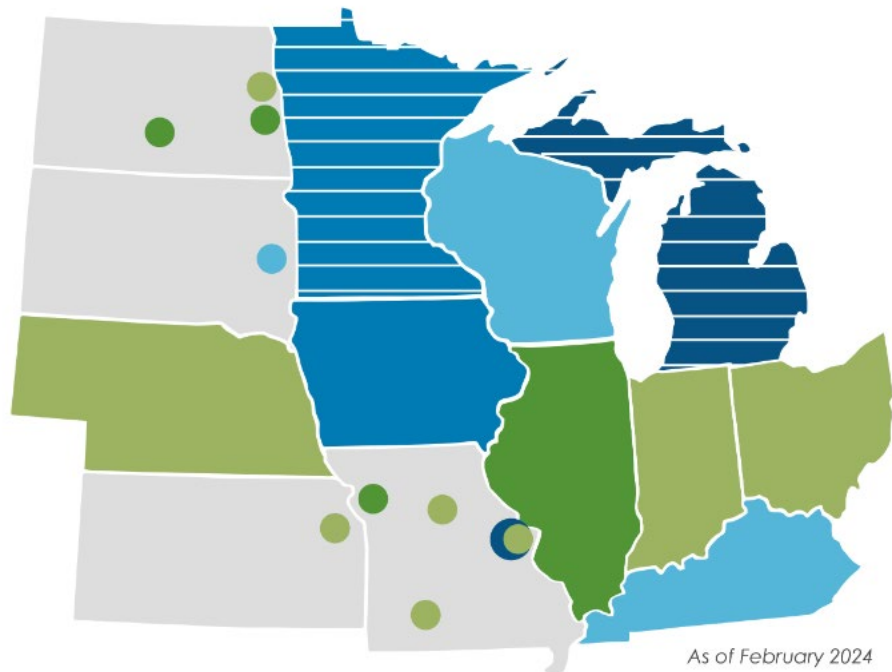


# Status of Residential Energy Code Adoption



# Regional Code Adoption Status

Residential Building Energy Code Adoption

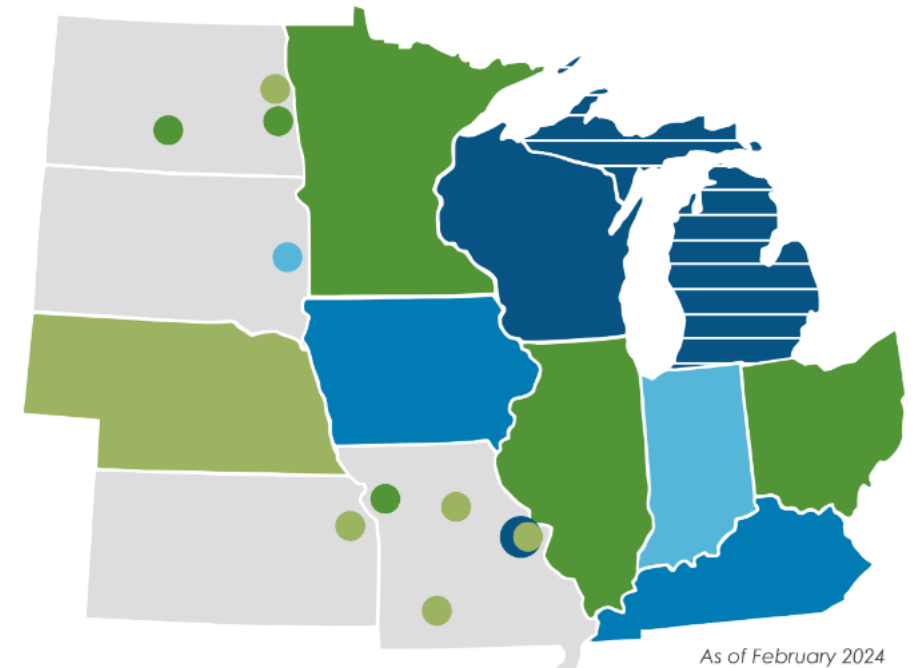


**Adopted Energy Code  
or IECC-equivalent Standard**

- No mandatory code
- 2009 IECC
- 2012 IECC
- 2015 IECC
- 2018 IECC
- 2021 IECC

\* Stripes indicate code update in progress

Commercial Building Energy Code Adoption





\*Net energy use includes the contribution of renewable energy generation

# Energy Code Improvement 2006 – 2021\*

IECC – Residential	Energy Savings over previous code
2006 IECC	1%
2009 IECC	10.5
2012 IECC	23.9
2015 IECC	.073
2018 IECC	1.97
2021 IECC	8.66
2024 IECC	6.41**

ASHRAE	Energy Savings over previous code/standard
90.1 – 2004	13.9
90.1 – 2007	4.4
90.1 - 2010	18.2
90.1 – 2013	8.7
90.1- 2016	8.3
90.1- 2019	4.3
90.1 - 2022	8.9

<https://www.thelocalstore.org/roadside-wisconsin-map-print.html>

[illegible]

- Life Cycle Savings: \$12,411 (average across both climate zones)
- Annual energy savings in year one: \$651 (state average)
- Net annual cash flow savings (year one): \$362 (average factoring downpayment, taxes, interest)
- Years to Positive Cash Flow: 2
- Simple Pay Back (years): 6.6 - 7.6 based on climate zone



# State of Wisconsin Impact

ENERGY and EMISSIONS		
Statewide Impact	First Year	30 Year Cumulative
Energy Cost Savings \$	\$1,831,000	\$592,300,00
CO2 emission reduction, Metric Tons	12,510	5,742,000

JOBS CREATED		
Statewide Impact	First Year	30 Year Cumulative
Jobs Created – EE Professionals	112	2906
Jobs Created – Construction Pros	260	6738



# 2021 IECC Restructured Repurposed

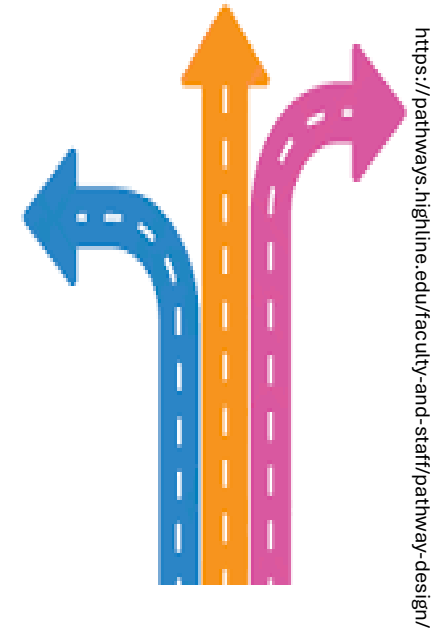
- Aligns DOE, ASHRAE, and ICC commitment to 2030 zero energy code
- Reformatting to lay the foundation for future improvements, stretch energy codes, building performance standards
- Begins to facilitate the path to electrification, net-zero, and decarbonization goals
- Increased resiliency and passive survivability
- Consumer savings, improved health and safety
- Requirement to adopt 2021 or equivalent to receive IRA funds





# 2021 IECC Compliance Pathways

- **Prescriptive**
  - R-Value (No Trade-Offs)
  - U-factor (tradeoffs within individual components)
  - UA (tradeoffs between envelope components)
- **Simulated Performance Alternative** R405 (keyed to Prescriptive requirements)
- **Energy Rating Index (ERI)** (largely independent of Prescriptive requirements)
- Each path has Trade-Off Backstops
- Terms “prescriptive” and “mandatory” removed
- All requirements to comply are included in user-friendly tables separate from prescriptive code requirements.



<https://pathways.highline.edu/faculty-and-staff/pathway-design/>

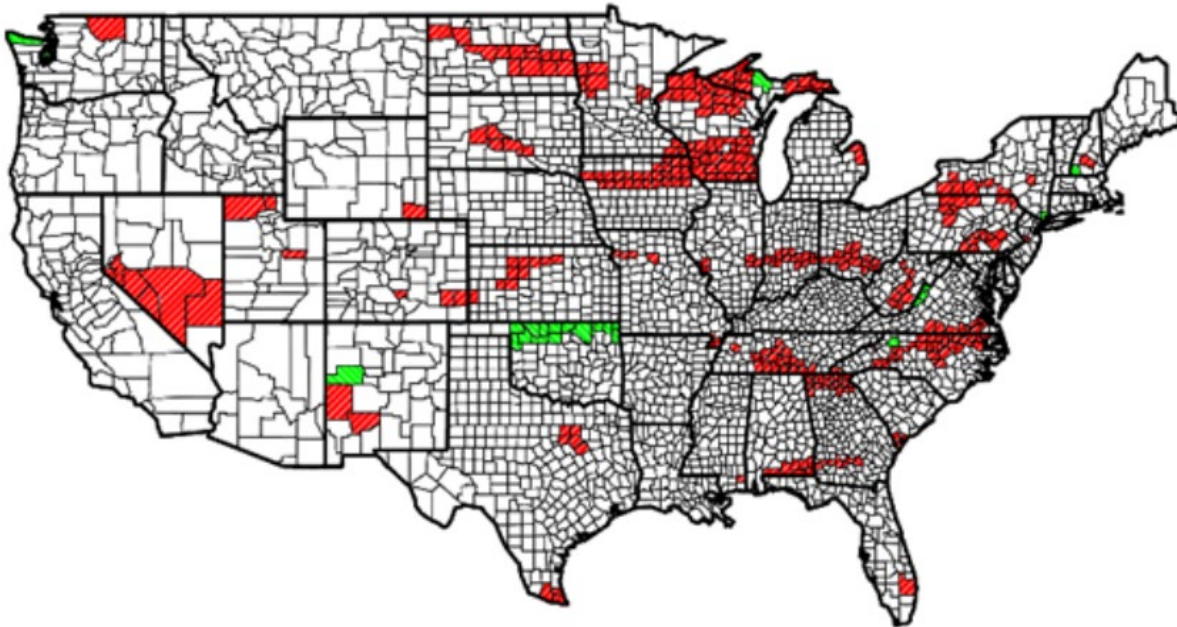
# 2021 IECC Climate Zone Changes

Climate zone provisions comprehensively updated

2009 IECC CZ6/7

2021 IECC CZ 5A/6A

RED: Counties moving to warmer zones (requirements generally get less stringent)  
GREEN: Counties moving to colder zones (requirements generally get more stringent)



State	Fraction of New Floor Area in State Reclassified to a New Climate Zone (percent)
Wisconsin	82.68
North Carolina	42.35
North Dakota	
Tennessee	
Indiana	
Ohio	
Texas	
Wyoming	
Pennsylvania	
Virginia	

Table 2 Top ten counties with the most floor space (ft<sup>2</sup>)  
reclassified into new climate zones

County, State	Shift in Climate Zone	Floor Area, ft <sup>2</sup> (‘000s)	Fraction of Floor Space in State from County (percent)
Dallas, TX	Down (3A to 2A)	109769	14.12
Palm Beach, FL	Down (2A to 1A)	69206	7.77
Tarrant, TX	Down (3A to 2A)	65159	8.38
Franklin, OH	Down (5A to 4A)	47549	18.01
Marion, IN	Down (5A to 4A)	34518	17.51
Wake, NC	Down (4A to 3A)	33504	14.03
Davidson, TN	Down (4A to 3A)	28054	15.93
Milwaukee, WI	Down (6A to 5A)	27292	21.26
Dane, WI	Down (6A to 5A)	24081	18.76
Hidalgo, TX	Down (2A to 1A)	19596	2.52

# 2021 IECC Building Envelope

## Air leakage requirements

- **All new homes are required to be blower door tested.**
- **Baseline for envelope leakage  $\leq 3.0$  ACH50 (2009 IECC  $\leq 7$ ACH)**
- Performance path and ERI, envelope leakage traded up to  $\leq 5.0$  ACH50 as long as losses are accounted for. (Backstop)
- Small units (<1500 sq. ft.) may be tested to  $\leq 0.30$  cfm/sq. ft.
- No sampling allowed.
- Additional Efficiency Options (AOE) measured air leakage rate  $\leq 3.0$  ACH50 plus HRV/ERV.

**ACH50** an abbreviation for air changes per hour at 50 pascals (Pa) pressure differential and is one of the most important metrics we use to determine the energy efficiency of a house. It is the number of times the air volume in a building changes per hour at 50 Pa of pressure

# 2021 IECC Building Envelope



## Duct testing requirements

- **All new homes required to have ducts tested.**
  - No exception for homes with ducts/air handler inside conditioned space.
- Maximum leakage allowable for systems located inside conditioned space AND maximum trade-off for duct leakage is  $\leq 8.0$  cfm/100 sq.ft.
- Prescriptive requirement and baseline for performance path trade-offs is  $\leq 4.0$  cfm/100 sq.ft. or  $\leq 3.0$  cfm/100 sq.ft. if air handler is not installed.
- Additional Efficiency Options (AOE) 100% of ducts and air handlers inside the envelope/inside conditioned space.
- No sampling allowed.

# 2021 Insulation R-Values

## INSULATION MINIMUM R-VALUE AND FENESTRATION REQUIREMENT BY COMPONENT

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE	FLOOR R-VALUE	BASEMENT WALL R-VALUE	SLAB R-VALUE & DEPTH	CRAWL SPACE WALL R-VALUE
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2009 IECC Table 402.1.1

6	0.35	0.60	NR	49	20 or 13+5	15/19	30	15/19	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19/21	38	15/19	10, 4 ft	10/13

2021 IECC Table 402.1.3

5 and Marine 4	0.30 <sup>i</sup>	0.55	0.40	60	20 + 5 or 13 + 10ci or 0 + 15	13/17	30	15ci or 19 or 13 + 5ci	10ci, 4 ft	15ci or 19 or 13 + 5ci
6	0.30 <sup>i</sup>	0.55	NR	60	20 + 5ci or 13 + 10ci or 0 + 20	15/20	30	15ci or 19 or 13 + 5ci	10ci, 4 ft	15ci or 19 or 13 + 5ci

# 2021 IECC U-Factor Values

Climate Zone 2009/2021	Fenestration U-factor		Basement Wall Insulation		Crawl Space Wall Insulation		Slab U-factor	
	2009	2021	2009	2021	2009	2021	2009	2021
6 / 5A	.35	.30	0.050	0.050	0.065	0.055	0.033	0.033
7 / 6A	.35	.30	0.050	0.050	0.065	0.055	0.033	0.028

## Wisconsin 2009 Prescriptive U-factor

Window U-factor (.30) matches 2021(.30)

Basement Wall (.045) exceeds 2021(.050)

Crawl Space (.045) exceeds 2021 (.055)

Slab equivalent CZ 5 (.033/.033), less efficient in CZ 6 (.033/.028)

# 2021 IECC Mechanical Systems

- Clarification on duct location and insulation requirements.
- New mechanical ventilation system testing requirements.
- Mechanical ventilation in climate zones 7 & 8 provided by an HRV or ERV is required for prescriptive compliance path



Photos: <https://www.prettygoodhouse.org/mechanical-equipment>

<https://totalmechanicalsystems.com/>

[https://www.jlconline.com/how-to/electrical/organizing-the-mechanicals\\_o](https://www.jlconline.com/how-to/electrical/organizing-the-mechanicals_o)

<https://artofqualityplumbingsolutions.medium.com/efficient-and-eco-friendly-a-guide-to-heat-pump-water-heater-installation-db5c4a759fdb>



# Additional Efficiency Package Options (Pick one)\*

## 5% improved envelope UA and SHGC

### Ducts inside conditioned space

- 100% ducts/air handler entirely within the thermal envelope
- 100% ductless system or hydronic system entirely within thermal envelope
- 100% thermal distribution system inside conditioned space (per R403.3.7)

### Improved heating and cooling equipment

- $\geq 95$  AFUE nat. gas + 16 SEER air conditioner
- $\geq 10$  HSPF/16 SEER air source heat pump
- $\geq 3.5$  COP ground source heat pump

### Improved water heating equipment

- $\geq .82$  EF fossil fuel water heater
- $\geq 2.0$  EF electric water heater
- $\geq 0.4$  SF solar water heater

### Air leakage $\leq 3$ ACH50 + ERV/HRV



**\*Builder, Designer, Homeowner Picks**



# 2021 Trade-Off Prescriptive Backstop

<b>Envelope Air Leakage</b>	<b><math>\geq 3.0</math> ACH50 <math>\geq 5.0</math> ACH5 in CZ 1-2 Or for small units (&lt;1500 sq.ft.) <math>\geq 0.30</math> cfm/sq.ft. enclosure area</b>
<b>Duct Tightness</b>	<b>Maximum leakage limit for all systems: <math>\geq 8.0</math> cfm/sq.ft.</b>

**Backstops protect consumers and ensure efficient envelopes and systems.**

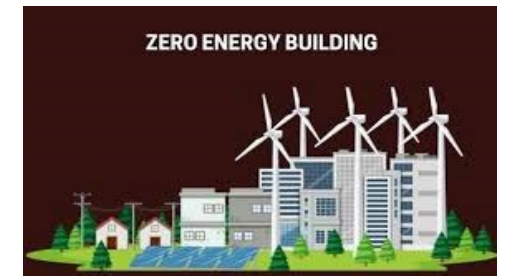
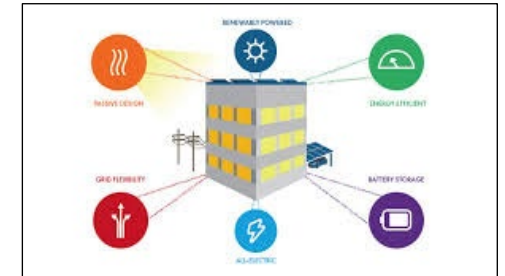
# Electrical Power and Lighting Systems

- $\geq 70$  lumens/watt (100 percent of permeant lighting)
- New exterior lighting requirements for limited residential buildings.
- New interior lighting controls requirements.



# 2021 IECC Performance Compliance Path

- New Table of Mandatory Measures
- Includes improved prescriptive tables, lighting efficiency, etc.
- Requires compliance with Additional Efficiency Options or 5% improvement over Standard Reference
- Trade-offs and Backstops
  - Flexibility in air tightness (up to 5.0 ACH50) –
  - New backstop on duct tightness (8.0 cfm/100sq.ft.)
  - New thermal envelope backstop (2009 IECC) – No equipment trade-offs
  - No onsite power trade-offs



# 2021 IECC: Energy Rating Index (ERI)

Climate Zone	2009 / 2021 Baseline	Baseline + 5% Efficiency
5	82 / 55	52
6	83 / 54	51

Trade-Off	2021 IECC
Envelope Air leakage	Mandatory trade-off maximum: $\geq 5.0$ ACH50 for all CZ
Duct Tightness	Max leakage limit for all systems: $\geq 8.0$ cfm/sq. ft.
	Max leakage limit for duct leakage: $\geq 8.0$ cfm/sq. ft.
Envelope Efficiency (No onsite power production)	Total UA of 2021 IECC X 1.15
Envelope Efficiency (w/onsite power production)	2018 IECC Prescriptive table
Onsite power production	Limited to 5% credit for onsite power production

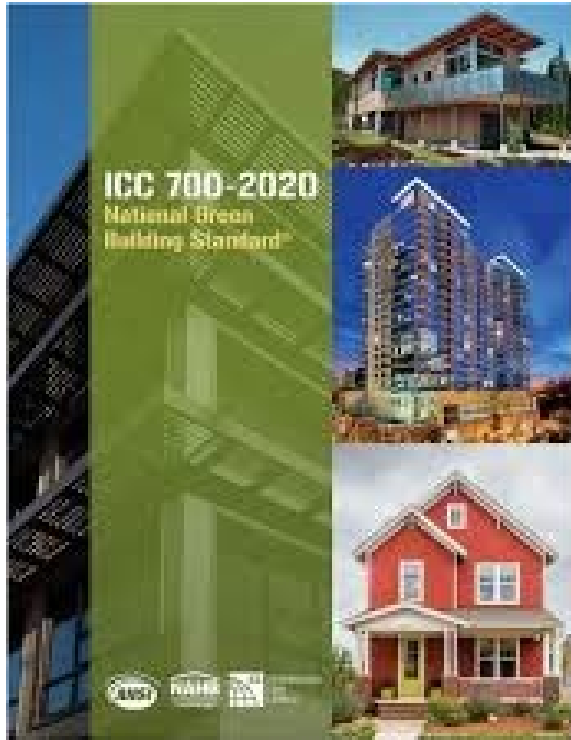
# 2021 IECC Zero Energy Appendix

Zero Energy Residential Building Provisions appendix.

- Available for adoption by jurisdictions with net-zero goals
- Minimum envelope: 2015 IECC

CZ	2021 Baseline	Baseline + 5% Efficiency	Net Zero Appx w/o OPP	Net Zero Appx w/ OPP
5	55	52	47	0
6	54	51	46	0

# Above Code Programs

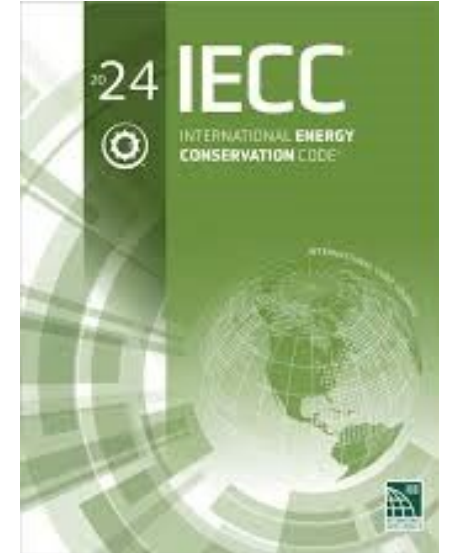


**Must comply with all mandatory measures and the 2009 IECC prescriptive table**

# Overview of 2024 IECC Residential Changes

**Improved/More Efficient:** Windows and Doors, Skylights, Air Tightness, Insulation, Air Sealing, Insulation Installation Requirements

- **Electric Vehicle (EV) Charging:** All SF 40 Amp 240 V receptacle required
- **Solar Ready:** All SF homes roofs “solar ready,”
- **Electric Ready:** Gas water heaters, dryers, and stoves must have electric wiring back to the electric panel suitable for potential electric replacements.
- **Efficiency Credits:** Additional efficiency credits. + 5% increase in efficiency.
- **Equipment Trade-Off:** Limited trade-offs have been reinstated for heating and cooling equipment with efficiencies above the Federal minimum against other requirements for code compliance.
- **Adoptable Appendices:** New jurisdictional appendices: Electric Energy Storage Provisions, All-Electric Residential Buildings, Alternative Building Thermal Envelope R-values.





# Thank you!

Darren Port

Building Code Policy Advisor


[dport@slipstreaminc.org](mailto:dport@slipstreaminc.org)

608.210.7145



**State of Wisconsin  
Department of Safety & Professional Services**

**AGENDA REQUEST FORM**

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