

New Buildings: Energy Efficiency and Building Codes

Colorado Resiliency Office's
Adaptations and Futures Webinar Series

April 07, 2021
12 P.M. - 1 P.M.



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Climate Adaptations & Futures Webinar Series

- First Wednesdays from 12pm - 1pm
- Recordings & upcoming webinars are available here:
www.coresiliency.com/webinars



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Welcome

Please use the **chat** to communicate any questions or comments to all attendees.

Please use the **Q&A** to ask any questions to the panelists only.

Your microphone is on mute.

This webinar is being recorded and will be posted on the Colorado Resiliency Office's website: coresiliency.com/webinars



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Agenda

- Introductions
- Connecting building codes to climate / resiliency plans
- Effective messaging to stakeholders to get buy-in
- Biggest challenge you had to overcome?
- Code adoption training and technical assistance
- Q&A with Panelists
- Quick tour of CEO's Energy Code Adoption Toolkit



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Jess Hoover
Climate Action Director
High Country Conservation
Center



Todd Carr
Building Official
Routt County



Christin Whitco
Energy Code
Coordinator
City of Boulder

Moderator: Kim Burke, Senior Program Manager, Colorado Energy Office

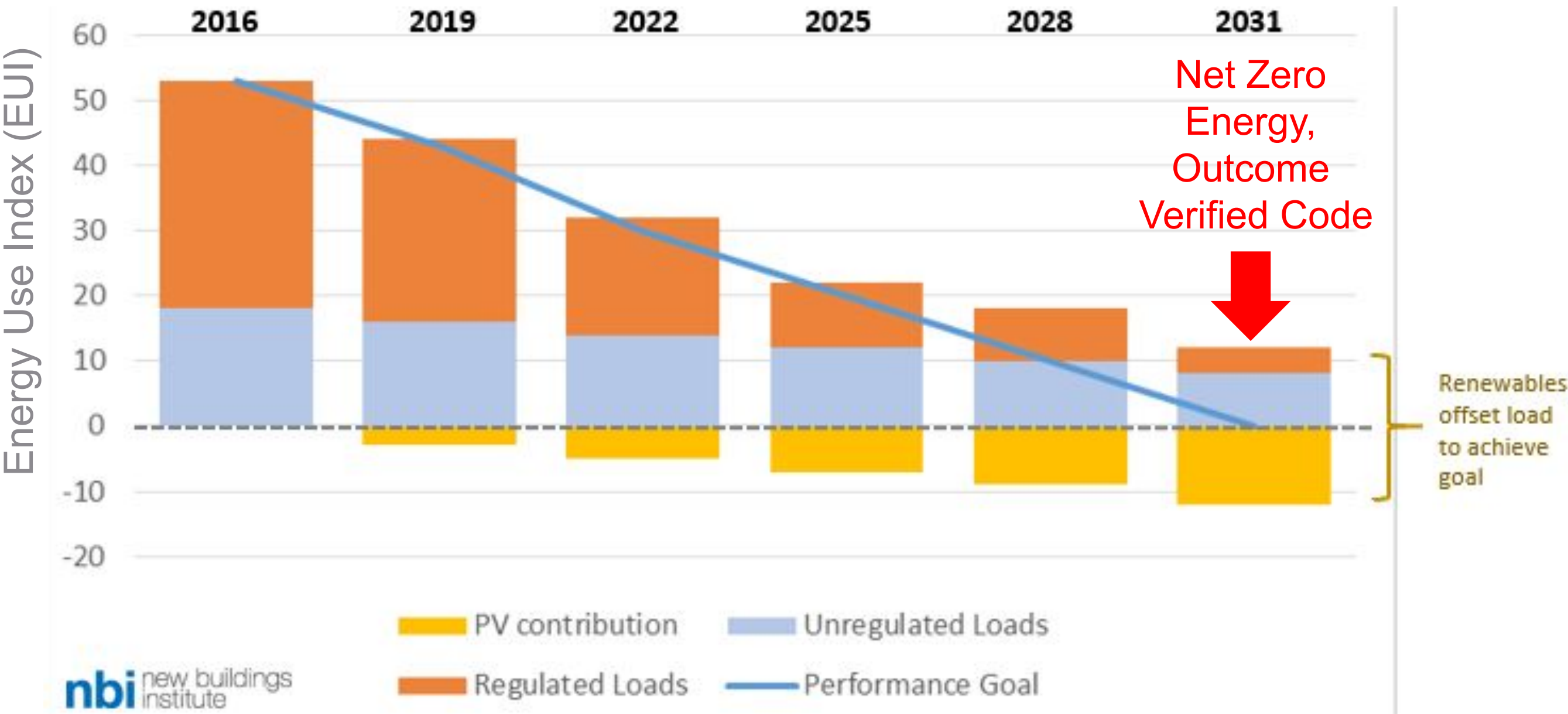


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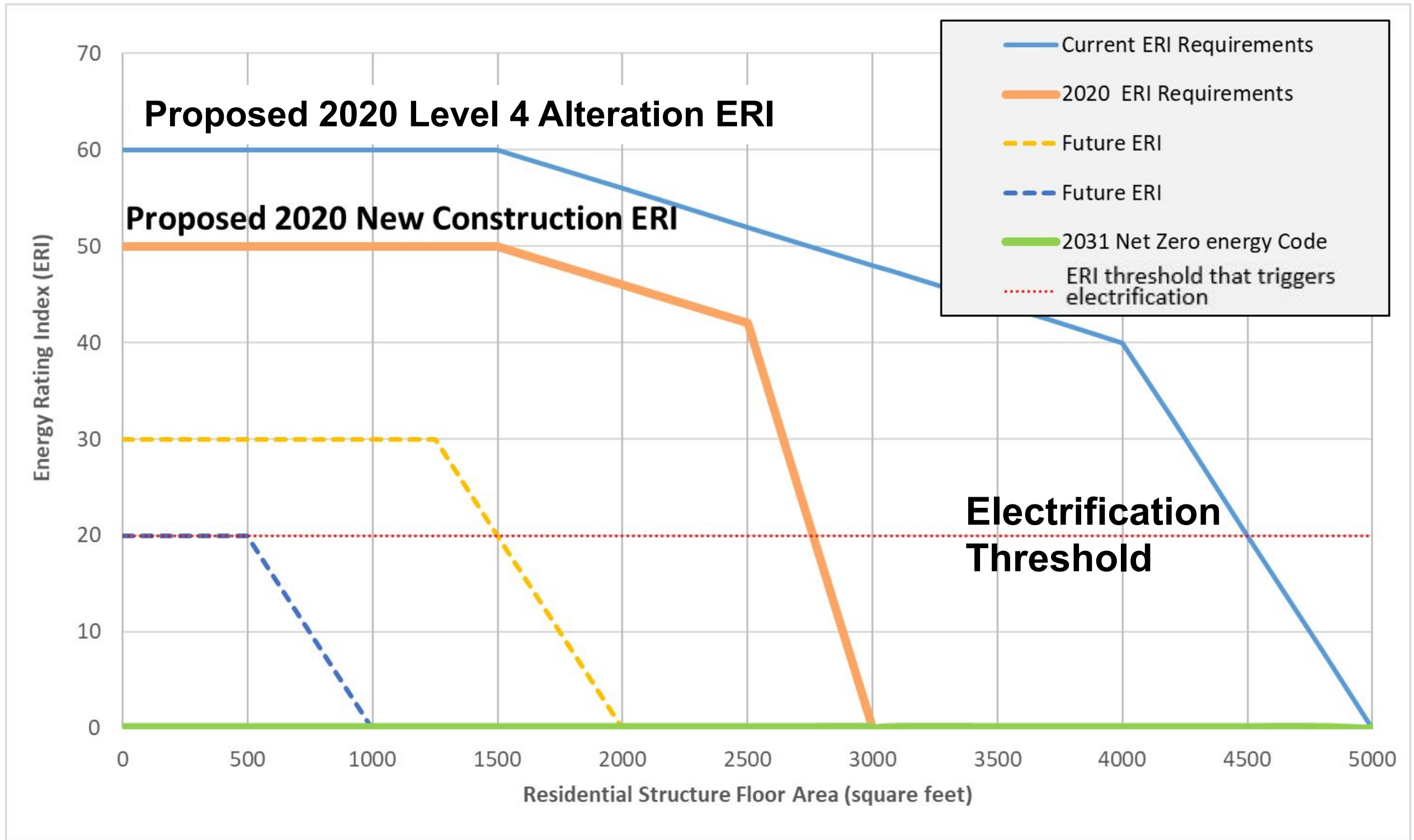
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BOULDER'S ENERGY CODE ROADMAP



BOULDER'S RESIDENTIAL ENERGY CODE



Q&A

Please leave your questions in the chat



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Energy Code Adoption Toolkit

energyoffice.colorado.gov



Search

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Home > Climate & Energy > Energy Policy > Building Energy Codes > Energy Code Adoption Toolkit

Energy Code Adoption Toolkit

- Climate & Energy
- GHG Pollution Reduction Roadmap
- Energy Policy
- Building Energy Codes
- Energy Code Adoption Toolkit**
- Building Benchmarking
- Colorado General Assembly
- Regulatory Information
- Colorado Energy Assurance Plan
- Electricity
- Renewable Energy
- Traditional Energy

The Colorado Energy Office (CEO) created this Energy Code Adoption Toolkit to assist Colorado jurisdictions through the process of energy code adoption. The toolkit provides information on the benefits of adopting a more current energy code and gives tips on how to navigate the typical adoption process. It also includes several resources that:

- Detail the costs of updating an energy code
- Describe changes made in the latest version of the International Energy Conservation Code (IECC)
- Provide example language for the adoption of stretch codes that go beyond the IECC
- Help jurisdictions verify code compliance

The resources in this Energy Code Adoption Toolkit are designed to put all of the necessary code adoption information in one place, while walking your jurisdiction through the process.



- Benefits of Current Energy Codes
- Navigating the Code Adoption Process

Go to: energyoffice.colorado.gov
Select Climate and Energy
Energy Policy
Building Energy Codes
Energy Code Adoption Toolkit

Designed for Building Officials and staff, Designers, Contractors, Engineers, Energy Consultant, Communities

Role of Energy Codes in Resilience



Source: ICC report, *The Important Role of Energy Codes in Achieving Resilience*



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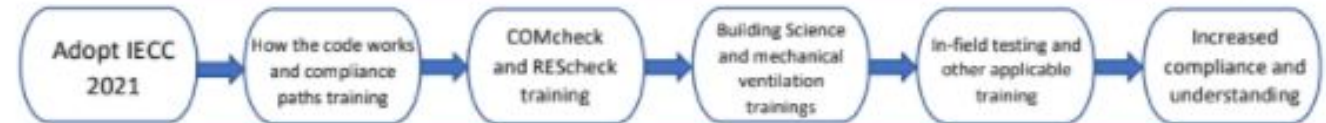
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Navigating the Code Adoption Process

- What does a typical code adoption process look like?
- Implementation plan
- Technical Assistance

IECC Code Adoption Implementation Plan

Use this guide to implement a new version of the energy code in phases within a jurisdiction and achieve improved building compliance and understanding. Implementation plans provide a reasonable schedule for this transition and set expectations between the building department and industry professionals.



Code Adoption through the City Council Process

- [Request Free Code Adoption Assistance](#)
 - A subject matter expert will be assigned to the jurisdiction and can help with code review, committee meetings, amendments, public comment, city council meetings, policy review and much more!
- Check out the [Code Adoption Toolkit](#) for benefits to changing code cycles, cost implications, code year comparisons, advanced amendments, how to troubleshoot and navigate compliance pathways and many other additional compliance resources.
- The Colorado Energy Office has a [library of previously recorded webinars](#) that covers some of the training listed below.

Year One: Training

- Either prior to final adoption or immediately after adoption
 - Focus on training for code officials, designers, contractors
 - Training 1: How the code works, what paths of compliance are available, documentation required and how to read it all.
 - Training 2: Tools used to verify compliance with the codes, such as COMcheck and REScheck.
 - Training 3: Building science basics, showing how the air and moisture get into the building and the details required to keep the building tight.
 - Training 4: Mechanical ventilation strategies to show options available and how to avoid common issues.
 - Training 5: In-field trainings on inspections while using an inspection checklist.

Following Years of Implementation

- An annual training plan is implemented to address more sections of the code on a stepped approach basis. This would allow the jurisdiction and contractors to focus on a few items at a time to gain understanding and compliance and then move onto the next items. A stepped approach is recommended and can be worked out with the assigned subject matter expert as to what fit each jurisdiction and contractor needs.
 - Manual J, S and D to ensure proper equipment and duct sizing
 - Building thermal envelope
 - Mechanical systems
 - Lighting and daylighting systems

SIGNIFICANT Changes to the 2021 IECC – COMMERCIAL Provisions

Chapter C1 - Admin Provisions

103.2 Information on Construction Documents: Added energy compliance path and the location of the air barrier to list of details that must be on the plans.

Chapter C2 Definitions

New Definitions	Revised Definitions
Bio Gas	Onsite Renewable Energy
Biomass Waste	Change "Accessible" to "Access to"
Data Center	Demand Recirculation Water System
Data Center Systems	General Lighting
Direct Digital Control (DDC)	Greenhouse
Electric Vehicle Supply Equipment (EVSE)	Network Guestroom Control System
Enthalpy Recovery Ratio	Skylights
EV-Capable Space	Wall, Above Grade
EV-Ready Space	
Fan Array	
Fan Energy Index FEI	
Fan Nameplate Electrical Input Power	
Fan System Electrical Input Power	
Fan, Embedded	
Fault Detection and Diagnostics (FDD) System	
Information Technology Equipment (ITE)	
Internal Curtain System	
Large-Diameter Ceiling Fan	
Renewable Energy Resources	
Testing Unit Enclosure Area	
Thermal Distribution Efficiency (TDE)	
Vegetative Roof	
Visible Transmittance, Annual (VT annual)	

Chapter C3 General Requirements

301.1 General: Revised Climate Zones in Figure C301.1 and Table C301.1 to update the climate zones to correspond with the release of ASHRAE Standard 169-2013".

303.1.2 Insulation Mark Installation: Revised language to require an insulation certificate on site if the R value label for insulation is not visible.

Chapter C4 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

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.

- Commercial and Residential Significant Changes Documents
- Code Comparison Documents from 2009 to 2021 IECC

SUMMARY OF IECC CODE CHANGES

Cost of Updating Energy Codes



Upfront costs

- Code books
- Training
- Construction costs
- More staff
- Publishing notices

What's the payback?

Residential Simple Payback Years¹

	Moving to This IECC Version			
	2009	2012	2015	2018
Moving from this IECC Version				
2006	7	6.2	6.1	7.6
2009		5.9	4.70	6.2
2012			Immediate	1.5
2015				1.5

Commercial Simple Payback in Years¹

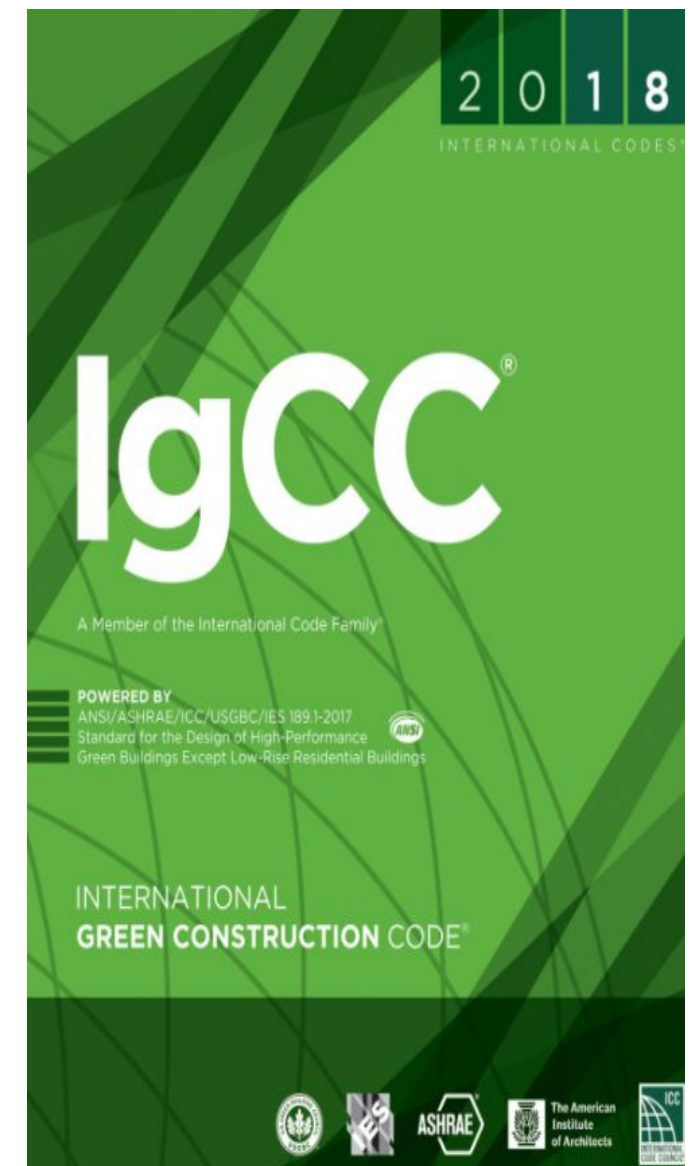
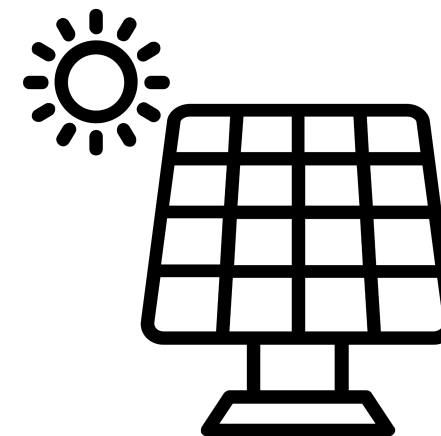
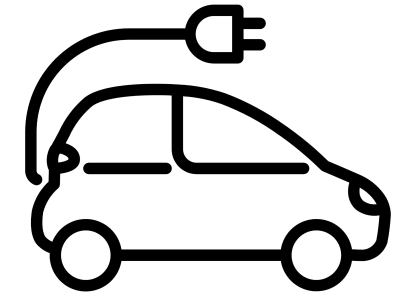
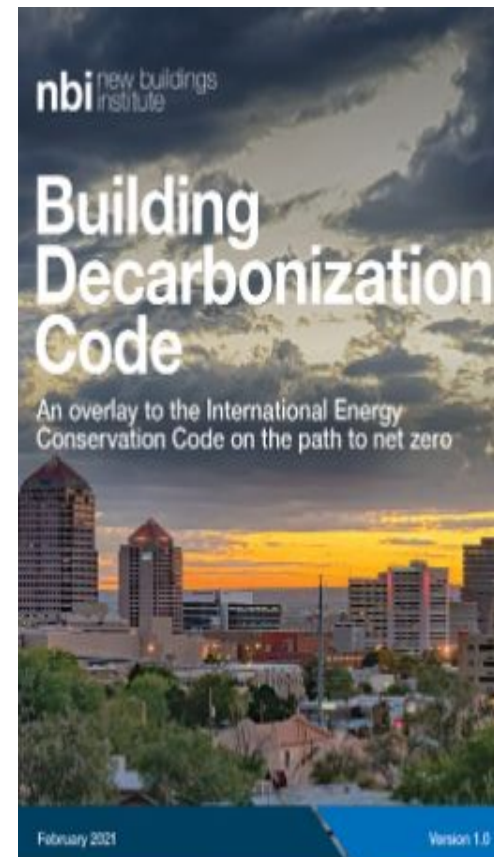
	Moving to This IECC Version		
	2012	2015	2018
Moving from this IECC Version			
2009	8.1	6.2	4.5
2012		2.7	1.25
2015			Immediate

Free codes access:

<https://codes.iccsafe.org/codes/i-codes>

Advanced Building Codes and Amendments

- Building Decarbonization Code
- Electric Vehicle (EV) Ready
- Solar Ready
- Zero Energy Appendix
- ZERH (Zero Energy Ready Homes)
- All-Electric New Construction
- International Green Construction Code (IgCC)
- High Performance Energy Codes around the Country
- Building Benchmarking



2018 Energy Code Plan Review Checklist - Residential	
Project Information Sheet	
Plan Review/Permit # _____	Date _____
Project Address _____	
Project Contact Info	Name _____ Phone _____ email _____
Building Type	Single Family Detached _____ Duplex _____ Townhome _____ Multi-Family Apartment _____ Condominium _____ New Construction _____ Addition _____ Renovation _____
Compliance Approach	Prescriptive _____ UA Trade Off _____ Performance _____
Compliance Software Used _____	
Plan Review Contact Info	Name _____ Phone _____ email _____
Jurisdiction Name/Address _____	
County _____	Climate Zone _____
Substantiating Data	<input type="checkbox"/> Mechanical Load Calculations <input type="checkbox"/> Duct design <input type="checkbox"/> Compliance Path documentation <input type="checkbox"/> UA Trade Off - need REScheck <input type="checkbox"/> Performance - need From Plans Rating Analysis <input type="checkbox"/> Energy Rating Index (ERI) need report with score <input type="checkbox"/> Prescriptive - Show R values and U values on plan <input type="checkbox"/> Other: Please describe _____
Plan Review and Project Comments: _____	

Troubleshooting Code Interpretation Guide

IECC 2018 for Commercial & Residential Buildings



- Troubleshooting Interpretation Guide
- Plans Examiner Checklists
- Commissioning Checklists
- REScheck and COMcheck Guides
- Manual J, S and D Guides

Compliance Resources

Training Recordings

^ Recorded Webinars

IECC 2021 General Training

- [Electric Vehicles and Electrification](#) (10/28/2020)
- [Should We Adopt the 2021?](#) (10/7/2020)

IECC 2021 Residential Trainings

- [Residential Ventilation](#) (3/17/2021) + [slides](#)
- [Residential Testing](#) (3/10/2021)
- [Significant Residential Changes - Part 1](#) (2/17/2021) + [slides](#)
- [Deep Dive into Compliance Pathways - Part 2](#) (2/24/2021) + [slides](#)
- [Infiltration vs. Ventilation vs. Manual J](#) (1/13/2021)

IECC 2021 Commercial Trainings

- [Advanced Amendments](#) (2/10/2021)
- [Commercial Lighting / Daylighting](#) (2/3/2021)
- [Commercial Architectural](#) (1/27/2021)
- [Commercial Mechanical and Plumbing](#) (1/20/2021)

Zero Energy Ready Home (ZERH) Training Series

The Colorado Energy Office sponsored a Department of Energy ZERH Program Webinar Training Series in Spring 2020.

1. [ZERH Intro to Building Science](#) + [slides](#)
2. [ZERH Program Overview](#) + [slides](#)
3. [ENERGY STAR, the Foundation of the ZERH Program](#) + [slides](#)
4. [Indoor airPLUS and the ZERH Program](#) + [slides](#)
5. [Additional ZERH Program Requirements](#) + [slides](#)
6. [Cold Climate Building Science and Assemblies](#) + [slides](#)

General Topics (applicable to IECC 2015 or later versions)

- [Manual D](#) (12/16/2020) + [slides](#)
- [Manual S](#) (12/9/2020) + [slides](#)
- [Manual J](#) (12/2/2020) + [slides](#)
- [Building Science 101](#) (for Mechanical Contractors, 11/18/2020)
- [How Should Architects Implement and Specify New Regulations?](#) (11/4/2020)
- [Administration of the Energy Efficiency Provisions of the Codes](#) (10/14/2020)
- [COMcheck Overview](#) (5/1/2020)
- [REScheck Overview](#) (4/24/2020)

2024 IECC Call for Committees

The International Code Council (ICC) has announced its call for committees for the development of its **2024 International Energy Conservation Code (IECC)**, which will replace the governmental consensus voting process from prior code adoption cycles.

All interested parties are encouraged to apply to participate on the Residential Energy Code Consensus Committee or Commercial Energy Code Consensus Committee. Apply here:

<https://www.iccsafe.org/products-and-services/energy-application/>

The deadline for submissions is **Friday, April 23, 2021**. Additional information about committee participation is available in ICC's FAQs.



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Upcoming Webinars

Energy Resiliency through Microgrids

May 05, 2021

12 P.M. - 1 P.M.

Sign up at: www.coresiliency.com/webinars



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THANK YOU!



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