

**SUBJECT: DISCUSSION / DIRECTION – 2024 INTERNATIONAL CODE
SERIES ADOPTION**

DATE: AUGUST 26, 2025

**PREPARED BY: ROB ZUCCARO, COMMUNITY DEVELOPMENT DIRECTOR
CHAD ROOT, CHIEF BUILDING OFFICIAL**

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SUMMARY:

City staff are preparing an adoption package to update the City's building codes from the 2018 International Code Series and 2021 International Energy Code, with amendments, to the 2024 International Code Series (I-Codes), with amendments. The purpose of this review is to preview the 2024 I-Codes and potential local amendments to the codes, and to provide direction on key policy questions. A final draft version of the code will then be presented to City Council for adoption later in 2025. The following are the code versions being considered:

- 2024 International Building Code
- 2024 International Residential Code
- 2024 International Mechanical Code
- 2024 International Fuel Gas Code
- 2024 International Plumbing Code
- 2024 International Fire Code
- 2024 International Energy Conservation Code
- 2024 International Property Maintenance Code
- 2024 International Existing Building Code
- 2024 International Swimming Pool and Spa Code
- 1997 Uniform Housing Code (adds to the City's authority if needed to abate dangerous buildings).

The City would adopt each of these codes by reference and specify any desired amendments to these codes within the Municipal Code, Title 15, Building and Construction. Staff have worked with the Building Code Board of Appeals (BCBOA), which serves as the designated advisory board to City Council on building code adoptions, to develop initial drafts that outline potential amendments:

- Attachment No. 1: Draft ordinance adopting all codes except the International Energy Conservation Code, with amendments.
- Attachment No. 2: Draft ordinance adopting the International Energy Conservation Code, with amendments.

Staff anticipates combining the two drafts for final adoption.

Of particular note, the BCBOA recommends that the City Council adopt the 2024 International Energy Conservation Code with minimal local amendments (see Attachment Nos. 3 and 4 for BCBOA May 12, 2025 and June 11, 2025 minutes). This would diverge from the local amendments that are currently adopted with the 2021 International Energy Conservation Code, specifically removing requirements for all-electric heat pump systems for commercial space and water heating and minimum Energy Use Index (EUI) targets for certain commercial uses.

Another key policy consideration requested by the Louisville Fire Protection District (LFPD) is to require residential fire sprinklers (see Attachment No. 5 for LFPD letter). Residential fire sprinklers are required in the base code (both 2018 and 2024 I-Codes) and were included in the original version of the City's 2018 I-Codes. However, the City Council later removed the residential sprinkler requirement by Ordinance 1826, Series 2022 as part of other code amendments related to assisting with Marshall Fire recovery.

BACKGROUND / PRIOR DISCUSSIONS:

Adoption of 2018 I-Codes

The City adopted the 2018 I-Code series by Ordinance No. 1764, Series 2018. This adoption included the following code versions:

- 2018 International Building Code
- 2018 International Residential Code
- 2018 International Mechanical Code
- 2018 International Fuel Gas Code
- 2018 International Plumbing Code
- 2018 International Fire Code
- 2018 International Energy Conservation Code
- 2018 International Property Maintenance Code
- 2018 International Existing Building Code
- 1997 Uniform Code for the Abatement of Dangerous Buildings (adds to the City's authority if needed to abate dangerous buildings).

The adoption language and Louisville's amendments to the codes are located in [Municipal Code, Title 15, Building and Construction](#).

The I-Code series is updated every three years. The City has typically skipped an adoption cycle, and thus, adopted new codes every six years. It is common for municipalities not to adopt new codes during each three-year code cycle. This is a way to provide more predictability for businesses and the development community so that they are not having to adapt to new code requirements as frequently.

Adoption of 2021 International Energy Conservation Code and Follow-Up Amendments

While the City Council did not consider adoption of the entire 2021 I-Code series due to the City's practice of skipping a code adoption cycle, it made an exception for the 2021

International Energy Conservation Code. The following summary outlines the initial adoption and follow-up amendments:

- On October 19, 2021, City Council adopted the [2021 International Energy Conservation Code](#) with amendments by Ordinance 1816, Series 2021 ([Link to Council Packet](#)). Notably, the City Council incorporated Appendix RC – Zero Energy Residential Building Provisions (referred to as the Net-Zero Residential Code) by motion at the second reading adoption hearing. Appendix RC requires a minimum Energy Rating Index (ERI) score of 47 for Louisville’s climate zone, which is a calculation of the energy use and efficiency of the structure, plus a renewable energy offset to bring the ERI to a score of zero. Common renewable energy offsets allowed by Appendix RC include rooftop solar, onsite geothermal heating and cooling, and subscriptions to a local solar farm.
- On December 20, 2022, City Council added specific commercial strengthening amendments to the 2021 International Energy Conservation Code by Ordinance 1845, Series 2022 ([Link to Council Packet](#)). This followed the City hiring Group 14 Engineering and Lotus Engineering and Sustainability to conduct a study and gather community input on policy options. The final report was presented to City Council at its September 27, 2022 meeting for discussion and direction ([Link to Council Packet](#)). Council directed staff to draft a commercial code with minimum EUI standards and mandatory all-electric space and water heating standards.
- On January 21, 2025, City Council adopted several additional amendments to the 2021 International Energy Conservation Code by Ordinance 1876, Series 2024 ([Link to Council Packet](#)). These amendments were driven by feedback from residents, business owners, landowners, developers and their design consultants on specific issues of concern related to the cost and feasibility of meeting the code provisions. This resulted in the removal of the Appendix RC from the code and several amendments to the commercial code provisions, including the removal of post-construction documentation and one-year compliance checks on commercial EUI modeling, and allowing fuel-fired backup for commercial heat pump space and water heating equipment.

Regional Energy Code Cohort

City staff have been participating in a regional energy conservation code “Cohort” of 15 jurisdictions that are working on an adoption package with amendments for the 2024 International Energy Conservation Code and a roadmap for future code adoptions with increasing strengthening provisions over time. The Cohort’s versions of the residential and commercial codes are included as Attachment Nos. 6 and 7. The amendments are designed to avoid federal preemption issues related to regulating gas-fired appliances while still strengthening the base 2024 International Energy Conservation Code provisions. The Cohort is also now working with the Denver Regional Council of Governments (DRCOG) to promote adoption of the 2024 International Energy Conservation Code and associated code package across the 59 DRCOG member jurisdictions (see Attachment Nos. 8 and 9 for

Cohort code package fact sheet and Cohort Roadmap fact sheet). To date, the City of Golden is the only jurisdiction so far to adopt the Cohort code package.

DRCOG has received nearly \$200 million from the U.S. Environmental Protection Agency (EPA) through the Climate Pollution Reduction Grant (CPRG) program to advance building decarbonization efforts across the region. Within this award, about \$38.4 million has been dedicated to the Building Policy Collaborative (BPC), a program designed to help local governments adopt advanced energy codes, modernize permitting processes, support electrification, and strengthen other building-related policies that reduce greenhouse gas emissions.

Of that \$38.4 million, roughly \$34.8 million will be distributed directly to cities and counties through formula-based subawards, with each jurisdiction's allocation determined by factors such as population and growth trends. In addition to this guaranteed formula-based funding, jurisdictions will have opportunities to compete for additional funds in later rounds.

Louisville has been earmarked approximately \$600,000 in formula funding through this program. These funds can be used for a wide range of eligible activities, including hiring staff, engaging technical experts, improving permitting systems, conducting public outreach, or supporting implementation of updated building codes and related policies. All activities must align with the region's overarching goal of accelerating the transition to zero-emission buildings. For Louisville, staff is recommending using these funds to hire an Energy Code Specialist that would serve to enforce new code, train staff on the 2024 'Cohort' code and explore further building policy if the City were to adopt the "Cohort" code. The "Cohort" code includes complex energy modeling that this position would assist with implementing.

ANALYSIS:

2024 I-Code Series

The International Code Council updates the I-Codes on a three-year cycle to improve safety, address changes in building science and technology, resolve feasibility issues, ensure legal compliance of the codes, and reflect best practices in the building industry. The codes are meant to set a minimum standard to protect health, safety, and the environment. Development of the codes each cycle includes input and consensus from across the country and many industries. Each local jurisdiction may adopt the codes with local amendments. These amendments can address local preferences, ensure compliance with state-level regulations, and must comply with other legal standards and federal regulations. There are numerous changes between the City-adopted 2018 I-Codes and the 2024 I-Codes. Attachment No. 10 is a summary of some of the major changes between these code versions.

Staff have identified two specific policy items for more in-depth Council consideration at this meeting: potential amendment packages to the International Energy Conservation Code and residential fire sprinkler requirements. These two items are discussed in more detail below.

Options for International Energy Conservation Code Adoption

Staff is presenting three options for Council discussion. Based on feedback and direction from Council, staff would advance Council's preferred version of this Code for consideration through the formal adoption process. These three options include:

1. Maintain the City's current code version, which is the 2021 International Energy Conservation Code, with amendments. Major amendments include requirements for all-electric heat pump commercial space and water heating and EUI modeling for some commercial uses.
2. Adoption of the 2024 International Energy Conservation Code with amendments developed by the regional Cohort.
3. Adoption of the 2024 International Energy Conservation Code with minimal local amendments, supported by the City's BCBOA.

1. Maintain Current 2021 IECC with Amendment

Maintaining the current code would provide for a strengthened code when it comes to all-electric requirements for commercial development, which are not included in the Cohort code package or the BCBOA recommended code versions due to federal preemption concerns related to the Energy Policy and Conservation Act (EPCA). EPCA restricts local governments' ability to regulate fuel-fired appliances. Benefits of maintaining the current code include that the City has experience implementing the code, the City Council recently adopted several amendments to remove barriers to implementation, and the energy modeling options are simplified and more straightforward than the 2024 code versions being presented.

2. Cohort Code Amendment Package

The Cohort code version is developed with an electric-preferred approach but does not mandate all-electric buildings. The amendments are designed to provide an efficiency baseline using compliance modeling and minimum targets that measure energy use of the building, recognizing efficiencies and carbon reduction gained by all-electric construction. The code also addresses the federal preemptions on fuel-fired appliances through electric-preferred approach.

The Cohort code is currently being promoted by DRCOG for adoption by the 59 member jurisdictions. Potential benefits of regional cooperation on uniform code adoption include ensuring a level playing field and costs for development under the code within the Denver Metro area. The code would also promote the health and environmental benefits of energy efficiency and all-electric buildings regionally.

For commercial development the Cohort code allows Prescriptive Compliance, Simulated Building Performance, or All Electric paths.

- The Prescriptive Compliance path for mixed-fuel buildings requires compliance with certain "energy credits" based on occupancy type and total conditioned floor area. Buildings that don't use combustion equipment for space or water heating,

other than supplemental heating, require less credits and have preferential targets within this path.

- The Simulated Building Performance path measures site energy use and sets maximum compliance measurement targets based on building type. The total site energy is measured as an Energy Use Intensity (EUI) calculation based on energy use per building square footage for one year. Different factors are used in the calculation for all-electric buildings and buildings using combustion equipment, which provides incentives for all-electric construction.
- The All Electric path requires that commercial buildings do not include combustion equipment or plumbing for combustion equipment. The code provides an exception to allow gas or oil fuel when required by law for emergency or standby power systems. Electric heat pumps must be the primary systems with electric resistance limited in use.

For residential development, the code defines different compliance paths for homes that are less than 5,000 square feet and those that are 5,000 square feet or more. For homes less than 5,000 square feet, the code allows a Prescriptive Compliance, Energy Rating Index, Simulated Building Performance, and Passive House path options. For homes 5,000 square feet or more, the code does not allow the Prescriptive Compliance path, but allows Energy Rating Index, Simulated Building Performance, and Passive House path options, which require additional efficiency standards and incentivize all-electric construction.

3. BCBOA Recommended Code Amendment Package

The BCBOA recommendation is to adopt the 2024 International Energy Conservation Code with minimal amendments. The code would allow Prescriptive Compliance or Simulated Building Performance paths for commercial development and Prescriptive Compliance, Simulated Building Performance, or Energy Rating Index pathways for residential development. There are mandatory minimum performance standards for the thermal envelope of the building regardless of the pathway used, which are not included in the Cohort code version. This version of the code would not include mandatory all-electric heat pump space and water heating for commercial development or include mandatory energy modeling standards as exist in the City's current version of the 2021 International Energy Conservation Code.

The BCBOA was not supportive of the Cohort code due to the complexity and potential costs of meeting the more stringent code standards. Adoption of the BCBOA code version would be more straightforward to administer and could be considered more business-friendly and easier to use and implement for design professionals and builders working in Louisville. The base code has been vetted nationally and would still provide improved building efficiency and carbon reduction compared to previous base code versions.

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The following table provides a comparison of some of the major provisions between the City's existing code, the Cohort code, and the BCBOA-recommended code.

	2021 IECC Louisville Version	2024 IECC Cohort	2024 IECC BCBOA
Electric Ready	YES, complies with State Electric Ready Code	YES, adopting appendix with amendments to comply with State Electric Ready Code	YES, adopting State Electric Ready Code
Solar Ready	YES, complies with State Solar Ready Code	YES, adopting appendix with amendments to comply with State Solar Ready Code	YES, adopting State Solar Ready Code
High Efficiency above Code Gas Appliances Required	YES	NO	NO
Prohibit Gas Appliances in Commercial	YES, with exceptions	NO	NO
Minimum Prescriptive Insulation Values	YES	NO	YES
Solar Required	NO	NO	NO
Requires Energy Modeling	Yes, for certain commercial uses	YES, as one compliance pathway	NO
Energy Credits	NO	YES, as part of optional compliance pathway with all-electric preference	YES, as part of optional compliance pathway (less stringent and not based on fuel type)
Energy Credits Differential Based on Size of Home	NO	YES	NO
Residential HERS Required	YES, Max of 50 for all home sizes	YES Max of, 50, 46, 42 based on size of home, or 54, 50, 46 all electric based on size of home	YES, Max 50 for all home sizes
Building Size Credits for Smaller Homes	NO	YES	NO

Residential Sprinkler Requirements

LFPD has submitted a letter recommending that the City adopt the residential fire sprinkler requirements included in the 2024 International Residential Code. Residential fire sprinkler requirements differ from commercial fire sprinklers in that they are designed to control the fire long enough for occupants to escape whereas a commercial system is also designed to control and extinguish a fire to minimize damage to property. The limited scope of the system allows it to be more cost-effective than commercial systems and causes less property damage when they are triggered. The following neighboring jurisdictions have adopted residential fire sprinkler requirements:

- Boulder County
- Town of Superior
- City of Lafayette
- City and County of Broomfield
- Town of Erie
- City of Westminster
- City of Boulder

According to a 2024 publication from the National Fire Protection Association that studied residential fires from 2017 to 2021 (Attachment No. 11), residential fire sprinklers were shown to have the following benefits:

- They were effective in controlling the fire 98% of the time that they were activated, with a 95% activation rate when fires were large enough to trigger the sprinklers.
- Only one sprinkler activated in 85% of fires, limiting water damage from the activation.
- Civilian deaths and injuries were 89% and 31%, respectively, lower than in homes without sprinklers.
- Property loss per fire was 55% lower than in homes without sprinklers.
- Firefighter injury rate was 48% lower than in homes without sprinklers.

Based on staff outreach to a sprinkler contractor and cross-referencing available information from the NFPA, staff believes the average cost to install a new residential fire sprinkler system would be around \$1.65 per square foot. Based on a 2,500 sq. ft. home, the cost would be \$4,125. If the home costs \$250 per square foot to build, the sprinklers would equate to about 0.7% of the construction cost of the home.

2025 COUNCIL WORK PLAN:

This item is not on the 2025 City Council Workplan but has been an anticipated project this year.

FISCAL IMPACT:

Budgeted?: No

The amendment package of the International Energy Conservation Code could have a fiscal impact for staffing depending on the version of the code that Council adopts. Specifically, if Council adopts the Cohort version of the 2024 Energy Conservation Code, staff recommends hiring an Energy Code Specialist to administer the energy modeling options

provided in this code. This position could be covered by DRCOG formula funding in the amount of \$600,000. Staff anticipate that this could cover staffing costs for approximately two to three years, after which, there may be need to fund the position from the General Fund. Staff does not anticipate a fiscal impact from the adoption of the other 2024 I-Codes.

ALTERNATIVE(S):

The following are potential alternatives for consideration:

- 2024 I-Code Series (Excluding the International Energy Conservation Code and residential sprinkler policy):
 - Proceed with the 2024 I-Code package recommended by the BCBOA.
 - Direct any specific local amendments not included in BCBOA recommended code package.
 - Take no action and maintain current 2018 I-Codes and amendments.
- Alternatives for International Energy Conservation Code adoption:
 - Proceed with the BCBOA version of the 2024 International Energy Conservation Code with minimal amendments.
 - Proceed with the Cohort version of the 2024 International Energy Conservation Code.
 - Maintain the current 2021 International Energy Conservation Code with local amendments.
- Alternatives for Residential Fire Sprinklers:
 - Proceed with residential sprinkler requirements as part of the 2024 I-Code package.
 - Remove residential sprinkler requirements from the 2024 I-Code package.
- Provide other direction to staff on code adoption and potential local amendments to each code.

RECOMMENDATION:

Staff recommends that the 2024 I-Code versions reviewed and developed by the BCBOA be advanced for adoption at a public hearing later in 2025.

ATTACHMENT(S):

1. Draft Ordinance Adopting 2024 I-Code Series and 1997 Uniform Housing Code
2. Draft Ordinance Adopting the 2024 International Energy Conservation Code
3. May 12, 2025 BCBOA Minutes (Adopted)
4. June 11, 2025 BCBOA Minutes (Draft)
5. LFPD Letter Regarding Residential Fire Sprinkler Adoption
6. Regional Cohort Residential Code Amendments to the 2024 International Energy Conservation Code
7. Regional Cohort Commercial Code Amendments to the 2024 International Energy Conservation Code
8. Regional Cohort 2024 Amendments Fact Sheet
9. Regional Cohort Roadmap Fact Sheet
10. 2018 and 2024 I-Code Comparison Summary

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- 11. NFPA Fire Sprinkler Study
- 12. Presentation Slides

ORDINANCE NO. _____

AN ORDINANCE ADOPTING BY REFERENCE THE 2024 INTERNATIONAL BUILDING CODE, 2024 INTERNATIONAL RESIDENTIAL CODE, 2024 INTERNATIONAL MECHANICAL CODE, 2024 INTERNATIONAL FUEL GAS CODE, 2024 INTERNATIONAL FIRE CODE, 2024 INTERNATIONAL EXISTING BUILDING CODE, 2024 INTERNATIONAL PLUMBING CODE, 2024 INTERNATIONAL PROPERTY MAINTENANCE CODE, 2024 INTERNATIONAL SWIMMING POOL AND SPA CODE, AND THE 1997 UNIFORM HOUSING CODE

WHEREAS, the City Council has adopted from time to time certain building and construction standards; and

WHEREAS, it is deemed to be in the interest of the public health, safety and general welfare to adopt by reference thereto the updated editions of the above-referenced codes; and

WHEREAS, the City Council, after proper notice as required by law, has held a public hearing on this ordinance providing for the adoption of said codes; and

WHEREAS, the updated editions of the above-referenced codes have been submitted to the City Council in writing and the City Council has determined that such codes should be adopted as herein set forth.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF LOUISVILLE, COLORADO:

Section 1. Chapter 15.04 of the Louisville Municipal Code is hereby repealed and reenacted to read as follows:

Chapter 15.04

INTERNATIONAL BUILDING CODE

- Sec. 15.04.010. Adoption.
- Sec. 15.04.020. Amendments to the 2024 International Building Code.
- Sec. 15.04.030. Appendices adopted.
- Sec. 15.04.040. Section 101.1 amended—Title.
- Sec. 15.04.050. Section [A]104.1 amended—General.
- Sec. 15.04.060. Section [A]105.5 amended—Permit expiration.
- Sec. 15.04.070. Section 1010.1.9.4 amended— Locks and latches.
- Sec. 15.04.080. Section 1030.1 amended—General emergency escape and rescue.
- Sec. 15.04.190. Section 1604.8.3 amended—Decks.

Sec. 15.04.100. Section 1609.3.2 added—Wind loads.
Sec. 15.04.110. Section 1608.2 amended—Ground snow loads.
Sec. 15.04.120. Section 1809.5 amended—Frost protection.
Sec. 15.04.130. Section 2704 added-Lithium Energy Storage Systems (ESS)
Sec. 15.04.140. Section 3001.1 amended— Scope.
Sec. 15.04.150. Copies available.
Sec. 15.04.160. Violations and penalties.
Sec.15.04.170. Fireplace Installation
Sec.15.04.180. Design Handbook for Downtown Louisville to apply
Sec. 15.04.190. Industrial and Commercial Development Design Standards and Guidelines to apply

Sec. 15.04.010.- Adoption.

The International Building Code, 2024 Edition, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478, is hereby adopted by reference thereto and incorporated into and made a part of the Louisville Municipal Code. The purpose and subject matter of the International Building Code include regulating construction aspects of building through comprehensive provisions and standards regulating the erection, construction, enlargement, alteration, equipping, use, height, area, and maintenance of buildings and structures and providing greater safety to the public by uniformity in building laws. Except as otherwise provided in this chapter, the International Building Code, 2024 Edition, is adopted in full, including the table of contents, index, and appendices. Any reference to the International Building Code within this chapter shall be to the 2024 Edition of such code.

Sec. 15.04.020. – Amendments to the 2024 International Building Code.

The following amendments set forth in sections 15.04.040 through 15.04.140 are made to the 2024 International Building Code.

Sec. 15.04.030. - Appendices adopted.

The following appendices of the 2024 International Building Code are hereby specifically adopted; any appendices not listed are not adopted:

Appendix C, Group U – Agricultural Buildings; Appendix F, Rodent proofing; Appendix I, Patio Covers; Appendix J, Grading; Appendix K, Administrative Provisions; Appendix N, Replicable Buildings and Appendix P, Sleeping Lofts

Sec. 15.04.040. - Section [A]101.1 amended—Title.

Section [A]101.1 of the International Building Code is amended to insert "the City of Louisville" so the section will read:

[A]101.1 Title. These regulations shall be known as the Building Code of the City of Louisville, hereinafter referred to as "this code."

Sec.15.40.050.- Section [A]104.1 amended—General.

Section [A]104.1 of the International Building Code is amended to read as follows:

[A]104.1 General. The building official is hereby authorized and directed to enforce the provisions of this code. The building official shall have the authority to render interpretations of this code and other International Code Council codes and has the ability to adopt policies and procedures in order to clarify the application of their provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code but should give latitude for good science and engineering practices. Buildings shall meet the City of Louisville Fire Hardening Code.

Sec. 15.04.060. - Section [A]105.5 amended—Permit expiration.

The first paragraph of *Section [A]105.5* of the International Building Code is hereby amended to read as follows:

[A]105.5 Expiration. Except for permits for alterations involving only one discipline, every permit issued by the Building Official under the provisions of this code shall expire by limitation and become null and void if the building or work authorized by such permit is not commenced within 180 days from the date of such permit, or if the building or work authorized by such permit is suspended or abandoned at any time after the work is commenced for a period of 180 days. Every permit for alterations involving only one discipline which is issued by the Building Official under the provisions of this code shall expire by limitation and become null and void if the building or work authorized by such permit is not commenced within 90 days from the date of such permit, or if the building or work authorized by such permit is suspended or abandoned at any time after the work is commenced for a period of 90 days. Before such work can be recommenced, a new permit shall be first obtained. If a new Code has been

adopted the new permit will incorporate all new codes and fees. Permits are automatically extended 180 days from a passed Foundation Inspection and a Passed Framing Inspection.

Sec. 15.04.070.- Section 1010.2.4 Amended—Locks and latches.

Section 1010.2.4 of the International Building Code is amended to read as follows:

1010.2.4. Locks and Latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist. Except for Group A Occupancies shall only have Panic hardware no deadbolts or other locks are allowed on any doors in group A occupancies.

1.Places of detention or restraint.

2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keying to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.

3. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23m²) or less, serving a private office space.

4. In buildings in Occupancy Groups B, F, M and S, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:

4.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.

4.2. The locking device is readily distinguishable as locked.

4.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters one inch (25 mm) high on a contrasting background.

4.4. The use of the key-operated locking device is revocable by the Fire Code Official for due cause.

5. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4,

provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.

6. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual dwelling or sleeping units of Group R occupancies and equipped with a night latch, dead bolt or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.

7. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.

8. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.

9. Other than egress courts, where occupants must egress from an exterior space through the building for means of egress, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:

9.1. The maximum occupant load shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.

9.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.

9.3. The egress door locking device is readily distinguishable as locked and shall be key operated locking device.

9.4. A clear window or glazed door opening, not less than 5 square feet (0.46m²) in area, shall be provided at each exit access door to determine if there are occupants using the outside area.

9.5. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters one inch (25 mm) high on a contrasting background.

9.6. The occupant load of the occupied exterior area shall not exceed 49 occupants in accordance with Section 1004.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.

Sec.15.04.080.- Section 1031.1 Amended—General emergency escape and rescue.

Section 1030.1 of the International Building Code is amended to read as follows:

1030.1 General. In addition to the means of egress required by this chapter, emergency escape and rescue openings shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one exit or access to only one exit as permitted by Tables 1006.3.4(1) and 1006.3.4(2).

2. Group R-3 and R-4 occupancies. Basements and sleeping rooms below the fourth story above grade plane shall have not fewer than one exterior emergency escape and rescue opening in accordance with this section. Where basements contain one or more sleeping rooms, emergency escape and rescue openings shall be required in each sleeping room, but also be required in adjoining areas of the basement. Such openings shall open directly into a public way or to a yard or court that opens to a public way.

3. Exceptions: Basements with a ceiling height of less than 80 inches (2032 mm) shall not be required to have emergency escape and rescue openings. Emergency escape and rescue openings are not required from basements or sleeping rooms that have an exit door or exit access door that opens directly into a public way or to a yard, court or exterior exit balcony that opens to a public way. Basements without habitable spaces and having not more than 200 square feet (18.6 m²) in floor area shall not be required to have emergency escape and rescue openings.

Sec.15.04.090.- Section 1604.8.3 amended—Decks.

Section 1604.8.3 of the International Building Code is amended to read as follows:

1604.8.3 Decks. Decks that are structurally supported from an existing structure shall be engineered by a structural engineer that is

licensed with the State of Colorado and designed to meet the Louisville Fire Hardening Code. Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads as applicable. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting. This section shall govern over the IECC to ensure proper connection of deck top structure. Connections of decks with cantilevered framing members to exterior walls or other framing members shall be designed for both of the following:

1. The reactions resulting from the dead load and live load specified in Table 1607.1, or the snow load specified in Section 1608, in accordance with Section 1605, acting on all portions of the deck.

2. The reactions resulting from the dead load and live load specified in Table 1607.1, or the snow load specified in Section 1608, in accordance with Section 1605, acting on the cantilevered portion of the deck, and no live load or snow load on the remaining portion of the deck.

Sec. 15.04.100. - Section 1609.3.2 added—Wind loads.

The following *Section 1609.3.2* is added to the 2024 International Building Code:

1609.3.2. Wind Speeds. The minimum basic wind speed for determining wind pressure shall be in accordance with this Section 1609 and the Colorado Front Range Gust Map Study ASCE 7-10. Will be determined by the ASCE hazard tool at <https://ascehazardtool.org/>

Sec. 15.04.110. - Section 1608.2 amended—Ground snow loads.

Section 1608.2 of the International Building Code is amended by the addition of the following sentence inserted at the end of the section:

The ground and roof snow load shall be determined by the ASCE hazard tool at <https://ascehazardtool.org/>

Sec. 15.04.120. - Section 1809.5 amended—Frost protection.

Item 1 of *Section 1809.5* of the International Building Code shall be amended to read as follows:

Extending 36 inches below finished grade;

Sec. 15.04.130.- Section 2704 added- Energy Storage Systems ESS

Chapter 27 of the International Building Code is amended by the addition of a new *Section 2704* to reads as follows:

2704. Lithium Energy Storage Systems (ESS).

2704.1 Lithium Energy Storage Systems (ESS). Energy storage systems shall not be installed inside the thermal building envelope of a commercial structure, primary residence, or Accessory Dwelling Unit (ADU). The ESS shall be installed on the outside of the thermal envelope or in an exterior insulated shed attached or detached to the building envelope to protect from extreme heat and cold . The ESS shall have electrical disconnects within 3 to 6 ft of the ESS. Installation of an ESS in garages that are attached to a residence or ADU must have One Hour Fire rated walls and ceiling and or an approved Fire Suppression system in the garage. The ESS shall be installed on the wall farthest away from the residence inside the garage the ESS shall have a Heat Detector that is tied into the Smoke Detectors and shall have a flashing light on the battery with the fault.

EXCEPTION:

1. Commercial Buildings with a 1 hour rated room where mechanical ventilation is separate from the rest of the building and shall have a Heat Detector at each battery with a flashing light on the battery with the fault.

Sec.15.04.140.- Section 3001.1 amended—Scope.

Section 3001.1 of the International Building Code is amended to read as follows:

3001.1 Scope. This chapter governs the design, construction, installation, alteration and repair of elevators and conveying systems and their components. All elevators that serve accessible residential units shall have secondary means of power such as a generator to maintain operation while primary power is down.

15.04.150. - Copies available.

At least one copy of the 2024 International Building Code and one copy of each secondary code pertaining thereto, as amended herein,

certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, between the hours of 9:00 a.m. and 4 p.m., Monday through Friday, except holidays and days City is closed. The city clerk shall at all times maintain a reasonable supply of copies of the code available for purchase by the public at a moderate price. Electronic copies are available, without amendment, at <https://codes.iccsafe.org/public/collections/I-Codes>.

Sec. 15.04.160. - Violations and penalties.

It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Sec. 15.04.170. - Fireplace installation.

A. Any new or remodeled fireplace to be installed or constructed in any dwelling in the city shall be one of the following:

1. A gas appliance;
2. An electric device; or
3. A fireplace or fireplace insert that meets the most stringent emissions standards for wood stoves established by C.R.S. Title 25, Article 7 and the Colorado Department of Public Health and Environment Air Quality Control Commission Regulations or any other clean burning device that is approved by the Air Quality Control Commission Regulations.

B. It is unlawful for any person to install or construct any new or remodeled fireplace which does not comply with this section. Any person convicted of a violation of this section shall be subject to the penalty provided in section 1.28.010.

Sec. 15.04.180. - Design Handbook for Downtown Louisville to apply.

Any addition, remodeling, relocation, construction, or other improvement within Downtown Louisville and requiring a building permit,

sign permit, or any other permit from the city shall comply with all requirements of the Design Handbook for Downtown Louisville, as adopted and amended from time to time.

Sec. 15.04.190. - Industrial and Commercial Development Design Standards and Guidelines to apply.

Any addition, remodeling, relocation, construction, or other improvement to an industrial property or project within the city and requiring a building permit, sign permit, or any other permit from the city shall comply with the requirements of City of Louisville Industrial Development Design Standards and Guidelines (IDDSG) and the Commercial Development Design Standards and Guidelines (CDDSG) as adopted and amended from time to time.

Section 2. Chapter 15.05 of the Louisville Municipal Code is hereby repealed and reenacted to read as follows:

Chapter 15.05

INTERNATIONAL RESIDENTIAL CODE

- Sec. 15.05.010. Adoption.
- Sec. 15.05.020. Appendices adopted.
- Sec. 15.05.030. Amendments to the 2024 International Residential Code.
- Sec. 15.05.040. Section R101.1 amended - Title.
- Sec. 15.05.050. Section R105.2 amended - Work exempt from permit.
- Sec. 15.05.060. Section R105.2.1 amended—Emergency repairs.
- Sec. 15.05.070. Section R108.2 amended- Schedule of permit fees.
- Sec. 15.05.080. Section 108.3 amended—Building permit valuations.
- Sec. 15.05.090. Section R110.1 amended—Use and occupancy.
- Sec. 15.05.100. Section R110.4 amended—Temporary certificate of occupancy.
- Sec. 15.05.110. Table R301.2(1) revised - Climate and Geography Design Table
- Sec.15.05.120. Section R309.2 amended- One and Two family Dwelling Automatic Sprinklers Systems
- Sec.15.05.130. Section 404.1.6 amended- Foundation Height above finished grade of non-combustible surface
- Sec.15.05.140. Section R507.1 amended- Decks.
- Sec. 15.05.150 Section R703.1 amended- Exterior Wall Covering
- Sec. 15.05.160 Section R806 amended-Roof Ventilation
- Sec. 15.05.170 Section R 902.1 amended-Roofing Material
- Sec. 15.05.180 Section R903.4 amended- Roof Drainage

Sec. 15.05.190. Section N 1101 deleted –Energy Efficiency
Sec. 15.05.200. Section M1503.3 amended--Exhaust Discharge
Sec. 15.05.210. Section G2427.4.1 amended—Plastic Piping
Sec. 15.05.220 Section M1905 added—Energy Storage Systems
Sec. 15.05.230. Reserved.
Sec. 15.05.240. Section P2503.5.1 amended—Rough plumbing.
Sec. 15.05.250. Section P2603.6.1 amended—Sewer depth.
Sec. 15.05.260. Section P3103.1 amended—Roof extension.
Sec. 15.05.270. Fireplace installation.
Sec. 15.05.280. Chapters 34-43 deleted.
Sec. 15.05.290. Copies available.
Sec. 15.05.300. Violations and penalties.

Sec. 15.05.010. - Adoption.

The International Residential Code for One-and-Two Family Dwellings, 2024 Edition, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478-5795, is hereby adopted by reference thereto and incorporated into and made a part of the Louisville Municipal Code. The subject matter of the International Residential Code is to regulate and govern the construction, alteration, movement, enlargement, replacement, repair, equipment, location, removal and demolition of detached one- and two-family dwellings and multiple single family dwellings (townhouses) not more than three stories in height with separate means of egress in the City of Louisville, and providing for the issuance of permits and collection of fees therefor. Except as otherwise provided in this chapter, the International Residential Code, 2024 Edition, is adopted in full, including the table of contents, index, and appendices. Any reference to the International Residential Code within this chapter shall be to the 2024 Edition of such code. Structures shall meet the City of Louisville's Fire Hardening Code.

Sec. 15.05.020.- Appendices adopted.

The following appendices of the International Residential Code are hereby specifically adopted; any appendices not listed are not adopted: BB Tiny Houses, BC-Accessory Dwelling Units, BE-Radon Control Methods, BG-Sound Transmission, BI-Light Straw-Clay Construction, BJ-Strawbale Construction, BK- Cob Construction (Monolithic Adobe), BL-Hemp-Lime Construction (Hempcrete), BM-3D-Printed Building Construction, BN-Extended Plate wall Construction, CC-Recommendation Procedure for Safety Inspections of an Existing Appliance Installation.

Sec. 15.05.030. - Amendments to the International Residential Code.

The following amendments set forth in sections 15.05.040 through 15.05.280 are made to the International Residential Code.

Sec. 15.05.040. - Section R101.1 amended—Title.

Section R101.1 of the International Residential Code is amended to insert "the City of Louisville" so the section will read:

R101.1 Title. These provisions shall be known as the Residential Code for One- and Two-Family Dwellings of the City of Louisville and shall be cited as such and will be referred to herein as this code.

Sec. 15.05.050.- Section R105.2 amended—Work exempt from permit.

The following paragraphs are added to the Building portion of *Section R105.2* of the International Residential Code:

11. PERMIT NOT REQUIRED. A Building Permit will NOT be required for the renovation, remodel and/or repair of an existing single-family residence only where:

- a) The work is to be done by the owner or occupant, and
- b) The size of the structure will not be increased, and
- c) The structural members (design) i.e., foundations, underpinning, bearing, or framing, will not be altered or changed, and
- d) The scope of the work will exclude any electrical, plumbing or heating, and
- e) The TOTAL COST of labor and materials will not exceed \$2,500.00, and
- f) All codes as adopted by the City of Louisville and the State of Colorado shall be adhered to. Failure to do so will result in a double fee required permit.

12. Windows that are being replaced in a like-for-like situation with no structural changes to the building do not need a building permit. This is for only those structures that fall under the International Residential Code and are owner occupied.

Sec. 15.05.060.- Section R105.2.1 amended—Emergency repairs.

Section R105.2.1 of the International Residential Code is hereby amended to read as follows:

R105.2.1 Emergency repairs. Where repairs to a structure, equipment replacements and other repairs must be performed in an emergency situation, a permit application shall be submitted within the next working business day to the building official. During a large-scale event such as a hail or wind storm event or tornado, requirements for roofing permits maybe deferred or suspended until such time as provided by the building official.

Sec. 15.05.070.- Section R108.2 amended—Schedule of permit fees.

Section R108.2 of the International Residential Code is amended to read as follows:

R108.2 Schedule of permit fees. For buildings, structures, electrical, gas, mechanical and plumbing systems or alterations requiring a permit, a fee for each permit shall be paid in accordance with a fee schedule adopted by resolution of the City Council from time to time.

Sec. 15.05.080.- Section 108.3 amended—Building permit valuations.

Section 108.3 of the International Residential Code is amended to read as follows:

108.3 Building permit valuations. The applicant for a permit shall provide an estimated permit value at time of application. Permit valuations shall include total value of work, including materials and labor, for which the permit is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. If, in the opinion of the building official, the valuation is underestimated on the application, the permit shall be denied, unless the applicant can show detailed estimates to meet the approval of the building official. Final building permit valuation shall be set by the building official.

Sec. 15.05.90.- Section R110.1 amended—Use and occupancy.

Section R110.1 of the International Residential Code is amended to read as follows:

R110.1 Use and occupancy.

A. No building or structure shall be used or occupied, and no change in the existing occupancy classification of a building or structure or portion thereof shall be made until the building official has issued a certificate of occupancy therefore as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other city ordinances. Certificates purporting to give authority to violate or cancel the provisions of this code or other city ordinances shall not be valid.

B. Exceptions:

1. Certificates of occupancy are not required for work exempt from permits under Section R105.2.

2. Cabins, agricultural and accessory buildings and miscellaneous permits shall not receive certificates of occupancy; a letter of completion will be given upon request.

Sec. 15.05.100. - Section R110.4 amended—Temporary certificate of occupancy.

Section R110.4 of the 2024 International Residential Code is amended to read as follows:

R110.4 Temporary Certificate of Occupancy. There will be a \$600 fee for a temporary certificate of occupancy if approved by the Chief Building Official. A Temporary Certificate of Occupancy shall be valid for 180 days. If a permanent Certificate of Occupancy is issued within the first 30 days, all but \$40 will be refunded. If a permanent Certificate of Occupancy is issued after the first 30 days but prior to the 180-day expiration, \$100 shall be refunded for each full 30-day period remaining out of the original 180-day validity period of the Temporary Certificate of Occupancy.

Sec. 15.05.110.- Table R301.2(1) revised - Climate and Geography Design Table

Table R301.2(1) of the 2024 International Residential Code is filled in as follows:

Based on ASCE Hazard Tool Website <https://ascehazardtool.org/>

TABLE R301.2 (1)
CLIMATE AND GEOGRAPHIC DESIGN CRITERIA for Wind Speed and Snow Load use ASCE Hazard Tool. <http://ascehazardtool.org/>

GROUND SNOW LOAD	WIND DESIGN				SEISMIC DESIGN CATEGORY	SUBJECT TO DAMAGE FROM			WINTER DESIGN TEMP	ICE BARRIER UNDERLAY MENT REQUIRED	FLOOD HAZARDS	AIR FREEZING INDEX	MEAN ANNUAL TEMP
	Speed (mph)	Topographic effects	Special wind region	Windborne debris zone		Weathering	Frost line depth	Termite					
ASCE Hazard	ASCE Hazard	Yes	YES	"C" Unless Proven	B	Severe -5B	36	Slight	1 Degree	Yes	2012	1000-2000	47 Degrees

MANUAL J DESIGN CRITERIA

Elevation	Latitude	Winter heating	Summer Cooling	Altitude correction factor	Indoor design temp.	Design temp. cooling	Heating temperature difference
5385	40 North	0	91	0.84	70	75	69
Cooling temperature difference	Wind velocity heating	Wind velocity cooling	Coincident wet bulb	Daily range	Winter humidity	Summer humidity	
16	15 MPH	7.5 MPH	59	High	50%	30%	

Sec.15.05.120. Section R309.2 amended- One and Two Family Dwelling Automatic Sprinkler Systems

Section R309.2 of the International Residential Code is amended to read as follows:

R309.2 One- and two-family dwellings automatic sprinkler systems.
An automatic sprinkler system shall be installed in one- and two-family *dwellings*.

Exceptions:

1. An automatic sprinkler system shall not be required for *additions or alterations to existing buildings* that are not already provided with a sprinkler system.
2. An automatic fire sprinkler system shall not be required when the dwelling is greater than 25 feet from the property line.

Sec. 15.05.130. Section 404.1.6 amended- Height above finished grade

Section 404.1.6 of the International Residential Code is hereby amended to read as follows:

R404.1.6 Height above finished grade.

Concrete and masonry foundation walls shall extend above the non-combustible finished *grade* adjacent to the foundation at all points not less than 4 inches (102 mm) where *masonry veneer* is used and not less than 6 inches (152 mm) elsewhere.

Sec.15.05.140.- Section R507.1 amended—Decks.

Section R507.1 of the International Residential Code is amended to read as follows:

R507.1 Decks. Wood-framed decks shall comply with the standards set forth in this section. All decks that are structurally supported from an existing residential home shall be engineered by a structural engineer that is licensed with the State of Colorado unless the deck is 30" or less above grade.

Sec. 15.05.150 Section R703.1 amended-Exterior Wall Covering

Section R703.1 of the International Residential Code is amended to read as follows:

R703.1 General. Exterior walls shall provide the *building* with a weather-resistant exterior wall envelope. Exterior siding shall meet the Fire Home Hardening Code.

Exception:

1. Log walls designed and constructed in accordance with the provisions of [ICC 400](#).
2. Historic Structures

Sec.15.05.160 section R806 amended- Roof Ventilation

Section R806 of the International Residential Code is amended to read as follows:

R806.1 Ventilation required. Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross *ventilation* for each separate space by ventilating openings protected against the entrance of rain or snow. Ventilation openings shall have a least dimension of inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum. Ventilation openings having a least dimension larger than 1/4 inch (6.4 mm) shall be provided with corrosion-resistant wire mesh with openings having a least dimension of 1/16 inch (1.6 mm) minimum and 1/8 inch maximum. Openings in roof framing members shall conform to the requirements of [Section R802.7](#). Required ventilation openings shall open directly to the outside air and shall be protected to prevent the entry of birds, rodents, snakes and other similar creatures.

Sec.15.05.170. Section R902.1 amended- Roofing Material

Section R902.1 of the International Residential Code is amended to read as follows:

R902.1 Roof Assemblies. Roof decks shall be covered with materials as set forth in [Section R904](#) or with roof coverings as set forth in [Section R905](#). Class A roof coverings shall be installed and shall be tested in accordance with ASTM E108 or [UL 790](#). The roof assembly shall be listed and identified as to class by an approved testing agency.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete *roof deck*.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible roof decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot (4.882 kg/m²) copper sheets installed over combustible roof decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible roof decks.

Sec. 15.05.180. section R903.4 amended-Roof Drainage

Section R903.4 of the International Residential Code is amended to read as follows:

R903.4 Roof drainage. Unless roofs are sloped to drain over roof edges, roof drains shall be installed at each low point of the roof. Gutters shall be metal and shall have gutter guards installed on all new and replaced gutters.

Sec. 15.05.190.- Section N1101 deleted--Energy Efficiency

Section N1101 of the International Residential Code is deleted and the City's Adopted Energy Code will be used for the Energy Efficiency for this section.

Sec. 15.05.200.- Section M1503.3 amended — Exhaust Discharge

Chapter 15 of the International Residential Code is amended by amending *Section M1503.3* to read as follows:

M1503.3 Exhaust discharge. Domestic cooking exhaust *equipment* shall discharge to the outdoors through a duct. The duct shall have a smooth interior surface, shall be airtight, shall be equipped with a backdraft damper and shall be independent of all other exhaust systems. Ducts serving domestic cooking exhaust *equipment* shall not terminate in an *attic* or *crawl space* or areas inside the *building*. Make up air is required for all domestic cooking exhaust equipment.

Sec. 15.05.210.-Section G2427.4.1 amended – Plastic Piping.

Section G2427.4.1 of the International Residential Code is amended to read as follows:

G2427.4.1 Plastic piping. Where plastic piping is used to vent an appliance, the appliance shall be listed for use with such venting materials, and the appliance manufacturer's installation instructions shall identify the specific plastic piping material. The plastic pipe venting materials shall be labeled in accordance with the product standards specific by the appliance manufacturer or shall be listed in accordance with UL 1738.

All exhaust plastic vent applications and applications that use positive pressure to push exhaust gasses through any type of a PVC, Plastic Pipe assembly shall be pressure tested at appliance and the termination on the roof to ensure the exhaust system does not leak using either of the following methods:

1. 10 ft water column above last glued fitting
2. 5 psi of air and must be inspected to ensure it holds the pressure for 15 minutes
3. -5 psi Vacuum test shall be evacuated of air by a vacuum-type pump to achieve a uniform gauge pressure of -5 pounds

per square inch of negative pressure and must hold a -5 psi for 15 minutes

Sec 15.05.220.- Section M1905 added – Energy Storage Systems

Chapter 15 of the International Residential Code is amended by adding a new *Section M1905* to read as follows:

M1905 Lithium Energy Storage Systems (ESS). Energy storage systems shall not be installed inside the thermal building envelope of a commercial structure, primary residence, or Accessory Dwelling Unit (ADU). The ESS shall be installed on the outside of the thermal envelope or in an exterior insulated shed attached or detached to the building envelope to protect from extreme heat and cold . The ESS shall have electrical disconnects within 3 to 6 ft of the ESS. Installation of an ESS in garages that are attached to a residence or ADU must have One Hour Fire rated walls and ceiling and or an approved Fire Suppression system in the garage. The ESS shall be installed on the wall farthest away from the residence inside the garage the ESS shall have a Heat Detector that is tied into the Smoke Detectors and shall have a flashing light on the battery with the fault.

Sec. 15.05.230.- Reserved

Sec. 15.05.240.- Section P2503.5.1 amended—Rough plumbing.

Section P2503.3.1 of the International Residential Code is amended to read as follows:

P2503.5.1 Rough plumbing. DWV systems shall be tested on completion of the rough piping installation by water or by five pounds per square inch (psi) of air, or a negative of a 5 psi vacuum and shall show no evidence of leakage for a minimum of 15 minutes.

Sec. 15.05.250.- Section P2603.6.1 amended—Sewer depth.

The number "36" is inserted in two locations of *Section P2603.6.1* of the International Residential Code so that the section will read as follows:

P2603.6.1. Sewer depth. Building sewers that connect to private sewage disposal systems shall be a minimum of 36 inches below finished grade at the point of septic tank connection. Building sewers shall be a minimum of 36 inches below grade.

Sec. 15.05.260.- Section P3103.1 amended—Roof extension.

The number "12" is inserted in two locations of *Section P3103.1* of the International Residential Code so that the section will read as follows:

P3103.1. Roof extension. All open vent pipes which extend through a roof shall be terminated at least 12 inches above the roof or 12 inches above the anticipated snow accumulation, except that where a roof is to be used for any purpose other than weather protection, the vent extensions shall be run at least 7 feet (2134 mm) above the roof.

Sec. 15.05.270.- Fireplace installation.

A. Any new or remodeled fireplace to be installed or constructed in any dwelling in the city shall be one of the following:

1. A gas appliance.
2. An electric device; or
3. A fireplace or fireplace insert that meets the most stringent emissions standards for wood stoves established by C.R.S. Title 25, Article 7 and the Colorado Department of Public Health and Environment Air Quality Control Commission Regulations or any other clean burning device that is approved by the Air Quality Control Commission Regulations.

B. It is unlawful for any person to install or construct any new or remodeled fireplace which does not comply with this section. Any person convicted of a violation of this section shall be subject to the penalty provided in section 1.28.010.

Sec. 15.05.280.- Chapters 34-43 deleted.

Chapters 34 through 43 of the International Residential Code are hereby deleted in their entirety, and replaced with the National Electrical Code, as adopted by the city.

Sec. 15.05.290.- Copies available.

At least one copy of the International Residential Code, 2024 edition, as amended herein, certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, between the

hours of 9:00 a.m. and 4 p.m., Monday through Friday, except holidays and days City is closed. The city clerk shall always maintain a reasonable supply of copies of the code available for purchase by the public at a moderate price. Electronic copies are available, without amendment, at <https://codes.iccsafe.org/public/collections/I-Codes>.

Sec. 15.05.300.- Violations and penalties.

It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Section 3. Chapter 15.08 of the Louisville Municipal Code is hereby repealed and reenacted to read as follows:

Chapter 15.08

2024 INTERNATIONAL MECHANICAL CODE

Sec. 15.08.010. Adoption.

Sec. 15.08.020. Amendments to the 2024 International Mechanical Code.

Sec. 15.08.030. Section 101.1 amended -Title.

Sec. 15.08.040. Section 505.4 amended-Make up air required

Sec. 15.08.050 Section 804.1.1 added- Vent Pipe Testing

Sec. 15.08.060. Section 901 amended—Solid fuel-burning equipment.

Sec. 15.08.070. Copies available.

Sec. 15.08.080. Violations and penalties.

Sec. 15.08.010. - Adoption.

The International Mechanical Code, 2024 Edition, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478-5795, is hereby adopted by reference thereto and incorporated into and made a part of the Louisville Municipal Code. The purpose and subject matter of the International Mechanical Code include minimum standards relating to the mechanical installations in or in connection with the construction, alteration and repair of new and existing structures including design, construction, installation, quality of materials, locations, operation, and maintenance or use of heating, ventilation, cooling

refrigeration systems, incinerators and other miscellaneous heat-producing appliances. The International Mechanical Code, 2024 Edition, is adopted in full, including the outline table of contents and index; but no appendices to such code are adopted.

Sec. 15.08.020. - Amendments to the 2024 International Mechanical Code.

The following amendments set forth in sections 15.08.030 through 15.08.060 are made to the 2024 International Mechanical Code.

Sec. 15.08.030. - Section 101.1 amended—Title.

Section 101.1 of the International Mechanical Code is amended to insert "the City of Louisville" so the section will read:

101.1 Title. These regulations shall be known as the Mechanical Code of the City of Louisville, hereinafter referred to as this code.

Sec. 15.08.040.- Section 505.4 amended- Make up air required

Section 504.4 of the International Mechanical Code is amended to read as follows:

Section 505.4. Exhaust hoods capable of exhausting air to the exterior of the building need make up air.

Sec. 15.08.050. - Section 804.1.1 added- Vent Pipe Testing

Section 804.1.1 of the International Mechanical Code is amended to read as follows:

Section 804.1.1 All exhaust plastic vent applications and applications that use positive pressure to push exhaust gasses thru any type of a PVC, Plastic Pipe assembly shall be pressure tested at appliance and the termination on the roof to ensure the exhaust system does not leak using either of the following:

4. 10 ft water column above last glued fitting
5. 5 psi of air and must be inspected to ensure it holds the pressure for 15 minutes
6. -5 psi of negative pressure and must hold a -5 psi for 15 minutes

Sec. 15.08.060. - Section 901 amended—Solid fuel-burning equipment.

Section 901 of the International Mechanical Code is amended to add the following new subsection:

Section 901.5. Solid Fuel-Burning Equipment. No permit shall be issued for the installation of a solid-fuel-burning fireplace stove, fireplace insert or wood stove appliance unless the appliance fully conforms with the requirements for emission testing, certification and labeling promulgated pursuant to C.R.S. Title 25, Article 7 and the Colorado Department of Public Health and Environment Air Quality Control Commission Regulations. All such appliances to be installed must be certified by the Air Quality Control Commission to meet the emissions standards set forth in Section IV of Regulation No. 4 of Volume 1 of the state air quality control commission as EPA Phase II or Colorado Phase III solid-fuel-burning devices.

Sec. 15.08.070. - Copies available.

At least one copy of the International Mechanical Code, 2024 Edition, as amended herein, certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, between the hours of 9:00 a.m. and 4 p.m., Monday through Friday, except holidays and days City is closed. The city clerk shall at all times maintain a reasonable supply of copies of the code available for purchase by the public at a moderate price. Electronic copies are available, without amendment, at <https://codes.iccsafe.org/public/collections/I-Codes>.

Sec. 15.08.080. - Violations and penalties.

It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Section 4. Chapter 15.10 of the Louisville Municipal Code is hereby repealed and reenacted to read as follows:

Chapter 15.10

2024 INTERNATIONAL FUEL GAS CODE

Sec. 15.10.010. Adoption.
Sec. 15.10.020. Amendments to the 2024 International Fuel Gas Code.
Sec. 15.10.030. Section 101.1 amended—Title.
Sec. 15.10.040. Copies available.
Sec. 15.10.050. Violations and penalties.

Sec. 15.10.010. - Adoption.

The International Fuel Gas Code, 2024 edition, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478-5795, is hereby adopted by reference thereto and incorporated into and made a part of the Louisville Municipal Code. The purpose and subject matter of the International Fuel Gas Code include minimum standards relating to the mechanical installations in or in connection with the construction, alteration and repair of new and existing structures including design, construction, installation, quality of materials, locations, operation, and maintenance or use of fuel-gas piping systems, fuel-gas utilization equipment and related accessories. The International Fuel Gas Code, 2024 Edition, is adopted in full, including the outline table of contents and index; but no appendices to such code are adopted.

Sec. 15.10.020. - Amendments to the 2024 International Fuel Gas Code.

The following amendments set forth in section 15.10.030 are made to the 2024 International Fuel Gas Code.

Sec. 15.10.030. - Section 101.1 amended—Title.

Section 101.1 of the International Fuel Gas Code is amended to insert "the City of Louisville" so the section will read:

101.1 Title. These regulations shall be known as the Fuel Gas Code of the City of Louisville, hereinafter referred to as this code.

Sec. 15.10.040. - Copies available.

At least one copy of the International Fuel Gas Code, 2024 Edition, as amended herein, certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, between the hours of 9:00 a.m. and 4 p.m., Monday through Friday, except holidays and days City is closed. The city clerk shall at all times maintain a reasonable supply of copies of the code available for purchase by the public at a

moderate price. Electronic copies are available, without amendment, at <https://codes.iccsafe.org/public/collections/I-Codes>.

Sec. 15.10.050. - Violations and penalties.

It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Section 5. Chapter 15.12 of the Louisville Municipal Code is hereby repealed and reenacted to read as follows:

Chapter 15.12

INTERNATIONAL FIRE CODE

- Sec. 15.12.010. Adoption.
- Sec. 15.12.020. Appendices adopted.
- Sec. 15.12.030. Amendments to the 2024 International Fire Code.
- Sec. 15.12.040. Section 101.1 amended— Title.
- Sec. 15.12.050. Section 103.1 amended- Creation of Agency
- Sec. 15.12.060. Section 104.1 amended- General
- Sec. 15.12.070. Section 105.5.58 added- Valet Trash
- Sec. 15.12.080. Section 105.6.26 added-Access Control or Delayed Systems
- Sec. 15.12.090. Section 113.4 amended— Violation Penalties
- Sec. 15.12.100. Section 304.1.1 amended - Valet Trash
- Sec. 15.12.110. Section 308.1.6.7 amended—Sky lanterns.
- Sec. 15.12.120. Section 315.3.1 amended— Ceiling clearance.
- Sec. 15.12.130. Section 401.3.2- Alarm Activations
- Sec. 15.12.140. Section 503.2.3 amended— Surface.
- Sec. 15.12.150. Section 506.1 amended-- Key boxes required.
- Sec. 15.12.160. Section 510.4.2.5.1 deleted- Single Supervisory Input
- Sec. 15.12.170. Section 510.5.1 amended- Mounting of doner antenna(s)
- Sec. 15.12.180. Section 807.5.2.2 amended- Artwork Corridors
- Sec. 15.12.190. Section 807.5.2.3 amended- Artwork in Classrooms
- Sec. 15.12.200. Section 807.5.5.2 amended- Art in Corridors
- Sec. 15.12.210. Section 807.5.5.3 amended- Artwork in Classrooms
- Sec. 15.12.220. Section 903.2.1 amended- Automatic fire Sprinklers

Sec. 15.12.230. Section 903.3.8 deleted- Limited Area Sprinkler systems
Sec. 15.12.240. Section 903.4.3 amended- Alarms
Sec. 15.12.250. Section 907.7.4 added- Graphic Map
Sec. 15.12.260. Section 1010.1.9.4 amended— Locks and latches.
Sec. 15.12.270. Section 1207.1.3 added- Lithium Energy Storage Systems (ESS)
Sec. 15.12.280. Fire lane requirements.
Sec. 15.12.290. Fire lane specifications.
Sec. 15.12.300. Placement of fire hydrants.
Sec. 15.12.310. Standards of reference.
Sec. 15.12.320. Copies available.
Sec. 15.12.330. Violations and penalties.

Sec. 15.12.010. - Adoption.

The International Fire Code, 2024 Edition, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478-5795, is hereby adopted by reference thereto and incorporated into and made a part of this Code. The purpose and subject matter of the International Fire Code include minimum standards relating to the storage, handling, and use of hazardous substances, materials and devices, and providing greater safety and protection to the public from conditions hazardous to life or property in the occupancy of buildings or premises.

Sec. 15.12.020.- Appendices adopted.

The following appendices of the 2024 International Fire Code are hereby specifically adopted; any appendices not listed are not adopted: Appendix B, Fire-Flow Requirements for Buildings; Appendix C, Fire Hydrant Locations and Distribution; Appendix D, Fire Apparatus Access Roads; Appendix E, Hazard Categories; Appendix I, Noncompliant Conditions; Appendix O Valet Trash and Recycling Collection in R-2 Occupancies.

Sec. 15.12.030. - Amendments to the 2024 International Fire Code.

The following amendments set forth in sections 15.12.040 through 15.12.270 are made to the 2024 International Fire Code.

Sec. 15.12.040. - Section 101.1 amended—Title.

Section 101.1 of the International Fire Code is amended to insert "the City of Louisville" so that the section will read:

101.1 Title. These regulations shall be known as the Fire Code of the City of Louisville, hereinafter referred to as this code.

Sec.15.12.050.-Section 103.1 amended- Creation of Agency.

Section 103.1 of the International Fire Code is amended to read as follows:

103.1 Creation of Agency. The Louisville Fire Protection District, Fire Prevention Division and the official in charge thereof shall be known as the *fire code official*. A function of this division shall be the implementation, administration and enforcement of the provisions of the code on behalf of the City of Louisville.

Sec. 15.12.060. - Section 104.1 amended—General.

Section 104.1 of the International Fire Code is amended to read as follows:

104.1 General. The Fire Marshal and Chief Building Official are hereby authorized to enforce the provisions of this code. The Fire Marshal and Chief Building Official shall each have the authority to render interpretations of this code as the Fire Code Official and to adopt policies, procedures, rules and regulations in order to clarify the application of its provisions. Such interpretations, policies, procedures, rules and regulations shall be in compliance with the intent and purpose of this code, and shall not have the effect of waiving requirements specifically provided for in this code. Structures shall meet the requirements of the City of Louisville Fire Hardening Code.

Sec. 15.12.070.- Section 105.5.58 added—Valet Trash.

Section 105.5.58 of the International Fire Code is added and reads as follows:

105.5.58 Valet Trash. An operational permit is required for the operation of a valet trash service in all buildings within the City of Louisville.

Sec.15.12.080.- Section 105.6.26 added—Access Control or Delayed Systems.

Section 105.6.26 Access Control or Delayed Systems of the International Fire Code is added and reads as follows:

105.6.26 Access Control or Delayed Systems. A construction permit is required to install or modify access control or delayed egress systems.

Sec. 15.12.090. - Section 113.4 amended— Violation Penalties.

Section 113.4 of the International Fire Code is deleted in its entirety and replaced with the following:

113.4 Violations Penalties. It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Sec.15 12.100.- Section 304.1.1 amended -Valet Trash.

Section 304.1.1 of the International Fire Code is amended to read as follows:

304.1.1- Valet Trash. Valet trash collection shall be permitted only in buildings equipped with automatic sprinkler systems where approved. The owner and valet trash collection service provider shall comply with the rules and limitations established by the jurisdiction.

Sec. 15.12.110.- Section 308.1.6.7 amended—Sky lanterns.

Section 308.1.6.7 of the International Fire Code is amended to read as follows:

308.1.6.7 Sky lanterns. Sky lanterns are prohibited because of climatic conditions.

Sec. 15.12.120. - Section 315.3.1 amended—Ceiling clearance.

Section 315.3.1 of the International Fire Code is amended to read as follows:

315.3.1 Ceiling clearance. Storage shall be maintained two feet (610 mm) or more below the ceiling in non-sprinklered areas of buildings or not less than 18 inches (457 mm) below sprinkler head deflectors in sprinklered areas of buildings. In areas with storage there shall be a red line added at 18 inches or 24 inches below the ceiling with language above the red line stating, "NO STORAGE ABOVE THIS LINE."

Sec.15.12.130.- Section 401.3.2 amended-Alarm Activations.

Section 401.3.2 of the International Fire Code is amended to read as follows:

401.3.2. Alarm activations. Upon activation of a fire alarm signal, employees or staff shall immediately notify the fire department. In settings other than prescribed maintenance, fire notification systems are not permitted to be silenced or reset by occupants prior to fire department arrival.

Sec. 15.12.140. - Section 503.2.3 amended—Surface.

Section 503.2.3 of the International Fire Code is amended to read as follows:

Section 503.2.3. Surface. Fire apparatus access roads shall be designed and constructed of hard surface, i.e. asphalt or concrete, to withstand the weight of fire apparatus and such surfaces must be able to support the weight of the heaviest fire apparatus of the fire district serving the property. The grade of a fire apparatus access road shall not exceed seven percent. A property owner or contractor may obtain a temporary waiver of the requirement to construct a hard surface fire apparatus access road during the construction of a land use development from the Fire Marshal. The waiver shall include an engineered plan for the alternative construction method of the access road and a plan for the continued maintenance of the access road during the period of project construction. Upon completion of the project and prior to the issuance of a certificate of occupancy, any fire apparatus access road shall be constructed of permanent hard surface.

Sec.15.12.150.- Section 506.1 amended—Key Boxes required.

Section 506.1 of the International Fire Code is amended to read as follows:

506.1. Key Boxes Required. All new commercial construction requires a key box to be installed. Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life-saving or fire fighting purposes, the fire code official is authorized to require a key box to be installed in an approved location. The key box shall be of an approved type listed in accordance with UL 1037, and shall contain keys to gain necessary access as required by the Fire Code Official.

Sec.15.12.160.- Section 510.4.2.5.1 deleted- Single Supervisory Input

Section 510.4.2.5.1- of the International Fire Code is deleted in its entirety

Sec. 15.12.170.- Section 510.5.1 amended – Mounting of the donor antenna(s)

Section 510.5.1 of the International Fire Code is amended to read as follows:

510.5.1. Mounting of donor antenna(s). To maintain proper alignment with the system design donor site, donor antennas shall be permanently affixed on the building. The antenna installation shall be in accordance with the applicable requirements in the *International Building Code* for weather protection of the building envelope.

Sec.15.12.180.- Section 807.5.2.2 amended – Artwork in Corridors.

Section 807.5.2.2 of the International Fire Code is amended to read as follows:

807.5.2.2. Artwork in Corridors. Artwork and teaching materials shall be limited on the walls of corridors to not more than 20 percent of the wall area. Three-dimensional artwork made of combustible materials and hanging decorations that impact the fire sprinkler system or create a hazard for first responders are prohibited.

Sec.15.12.190. – Section 807.5.2.3 amended—Artwork in Classrooms.

Section 807.5.2.3 of the International Fire Code is amended to read as follows:

807.5.2.3. Artwork and teaching materials shall be limited on the walls of classrooms to not more than 50 percent of the wall area. Three-dimensional artwork made of combustible materials and hanging decorations that impact the fire sprinkler system or create a hazard for first responders are prohibited.

Sec.15.12.200.-Section 807.5.5.2 amended-Art in Corridors

Section 807.5.5.3 of the International Fire Code is amended to read as follows:

807.5.5.3. *Artwork in Corridors.* Artwork and teaching materials shall be limited on the walls of corridors to not more than 20 percent of the wall area. Three-dimensional artwork made of combustible materials and hanging decorations that impact the fire sprinkler system or create a hazard for first responders are prohibited

Sec.15.12.210.- Section 807.5.5.3 amended- Artwork in Classrooms

Section 807.5.5.3 of the International Fire Code is amended to read as follows:

807.5.5.3. Art work in Classrooms. Artwork and teaching materials shall be limited on the walls of classrooms to not more than 50 percent of the wall area. Three-dimensional artwork made of combustible materials and hanging decorations that impact the fire sprinkler system or create a hazard for first responders are prohibited

Sec. 15.12.220. – Section 903.2.1 amended—Automatic fire sprinklers.

Section 903.2.1 of the International Fire Code is amended as follows:

A. Each new commercial and residential structure is required to have a fire suppression system designed for the Occupancy Group of that structure, unless the requirement is waived by both the Chief Building Official and Fire Marshal.

B. Exceptions: U Occupancies are not required to have fire suppression systems unless they exceed 5,000 square feet.

C. This section 903.2.1 shall only apply to new construction.

Sec. 15.12.230.- Section 903.3.8 deleted-Limited area sprinkler systems.

Section 903.3.8 of the International Fire Code is deleted in its entirety

Sec.15.12.240.- Section 903.4.3 amended-Alarms

Section 903.4.3 of the International Fire Code is amended to read as follows:

903.4.3. Alarms. Approved audible/visible notification appliances shall be provided for every building or structure with an automatic sprinkler system. Waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a waterflow switch is required by Section 903.4.1 to be electrically supervised, such sprinkler waterflow alarm devices shall be powered by a fire alarm control unit or, where provided, a fire alarm system. Alarm devices shall be provided in the interior of the building in accordance with NFPA 72 and on the exterior of the building in an approved location. Actuation of the automatic sprinkler system shall actuate occupant notification devices.

Exception: Automatic sprinkler systems protecting one-and two-family dwellings.

Sec.15.12.250.- section 907.7.4 added- Graphic Map

Section 907.7.4 of the International Fire Code is added to read as follows:

907.7.4. Graphic Map. A graphic map showing the locations of initiating devices with corresponding device identification information shall be provided at the fire alarm panel and annunciator panels. Modifications to system impacting the graphic map will require updating at final inspection.

Sec. 15.12.260. - Section 1010.1.9.4 amended—Locks and latches.

Section 1010.1.9.4 of the International Fire Code is amended to read as follows:

1010.1.9.4. Locks and latches shall be permitted to prevent operation of doors where any of the following exist. Except for Group A Occupancies that shall only have Panic hardware no deadbolts or other locks are allowed on any doors in group A occupancies.

1.Places of detention or restraint.

2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keying to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.

3. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23m²) or less, serving a private office space.

4. In buildings in Occupancy Groups B, F, M and S, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:

4.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.

4.2. The locking device is readily distinguishable as locked.

4.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters one inch (25 mm) high on a contrasting background.

4.4. The use of the key-operated locking device is revocable by the Fire Code Official for due cause.

5. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.

6. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual dwelling or sleeping units of Group R occupancies and equipped with a night latch, dead bolt or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.

7. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.

8. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.

9. Other than egress courts, where occupants must egress from an exterior space through the building for means of egress, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following

9.1. The maximum occupant load shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.

9.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.

9.3. The egress door locking device is readily distinguishable as locked and shall be key operated locking device.

9.4. A clear window or glazed door opening, not less than 5 square feet (0.46m²) in area, shall be provided at each exit access door to determine if there are occupants using the outside area.

9.5. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters one inch (25 mm) high on a contrasting background.

9.6. The occupant load of the occupied exterior area shall not exceed 49 occupants in accordance with Section 1004.

10. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.

Sec. 15.12.270.- Section 1207.1.3 added – Lithium Electrical Energy Storage Systems (ESS)

Section 1207.1.3 of the International Fire Code is added to read as follows:

Section 1207.1.3.- Lithium Energy Storage Systems (ESS). Energy storage systems shall not be installed inside the thermal building envelope of a commercial structure, primary residence, or Accessory Dwelling Unit (ADU). The ESS shall be installed on the outside of the thermal envelope or in an exterior insulated shed attached or detached to the building envelope to protect from extreme heat and cold . The ESS shall have electrical disconnects within 3 to 6 ft of the ESS. Installation of an ESS in garages that are attached to a residence or ADU must have One Hour Fire rated walls and ceiling and or an approved Fire Suppression system in the garage. The ESS shall be installed on the wall farthest away from the residence inside the garage the ESS shall have a Heat Detector that is tied into the Smoke Detectors and shall have a flashing light on the battery with the fault.

EXCEPTION:

1. Commercial Buildings with a 1 hour rated room where mechanical ventilation is separate from the rest of the building and shall have a heat detector at each battery with a flashing light on the battery with the fault.

Sec. 15.12.280. - Fire lane requirements.

A. Fire lanes are required in accordance with Appendix D of the 2024 International Fire Code.

B. In addition to the requirements of Appendix D, no platted street in a multifamily, industrial, business or commercial development ending in a cul-de-sac or some other design shall exceed 300 feet in length without providing secondary fire lane access.

C. In addition to the requirements of Appendix D, no platted street in a single-family area ending in a cul-de-sac or some other design shall exceed 500 feet in length without providing secondary fire lane access.

D. In addition to the requirements of Appendix D, single-family residences which are located more than 150 feet from the closest public street right-of-way shall provide a fire lane from the street to the residence.

Sec. 15.12.290. - Fire lane specifications.

Fire lanes shall comply with the specifications in Appendix D of the International Fire Code. In addition to the requirements of Appendix D, an emergency access fire lane which is required to be installed in an area as secondary access must be as remote as possible from the main access and provide access to all parts of the development. No emergency access fire lane shall exceed 300 feet in length.

Sec. 15.12.300. - Placement of fire hydrants.

A. Fire hydrants shall be placed at each street intersection and on each side of any divided highway, roadway or street, wherever possible.

B. In a residential area, there shall be no more than 500 feet of vehicle travel distance between hydrants. No residential unit shall be more than 250 feet of vehicle travel distance from the nearest hydrant.

C. In multifamily, industrial, business or commercial areas, there shall be no more than 300 feet of vehicle travel distance between hydrants. No building shall be more than 150 feet of travel distance from the nearest hydrant.

D. All water mains serving two or more fire hydrants or two or more fire service water lines shall have a looped water distribution system with approved sectional valves being provided.

E. The barrel of a fire hydrant shall be set perpendicular to the ground or the designed final grade with the lowest discharge outlet 18 inches above grade.

F. A minimum of three feet of clearance space shall be maintained around the circumference of a fire hydrant except as otherwise required or approved by the city.

G. The minimum required residual pressure for a water supply to any given area shall be 20 pounds per square inch (psi). In the event that a minimum water pressure of 20 psi cannot be obtained in any given area, large water mains shall be installed with closer than the required minimum spacing of fire hydrants to increase flow.

Sec. 15.12.310. - Standards of reference.

Standards of reference for the International Fire Code are:

The 2024 Edition of the International Wild Land-Urban Interface Code.

The most current edition of the NFPA Life Safety Code.

The most current edition of the NFPA Codes and Standards.

Sec. 15.12.320. - Copies available.

At least one copy of the International Fire Code, 2024 Edition, as amended herein, certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, between the hours of 9:00 a.m. and 4 p.m., Monday through Friday, except holidays and days City is closed. The city clerk shall always maintain a reasonable supply of copies of the code available for purchase by the public at a moderate price. Electronic copies are available, without amendment, at <https://codes.iccsafe.org/public/collections/I-Codes>.

Sec. 15.12.330. - Violations and penalties.

It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Section 6. Chapter 15.14 of the Louisville Municipal Code is hereby repealed and reenacted to read as follows:

Chapter 15.14

INTERNATIONAL EXISTING BUILDING CODE

Sec. 15.14.010. Adoption.

Sec. 15.14.020. Section 101.1 amended - Title.

Sec. 15.14.030. Copies available.

Sec. 15.14.040. Violations and penalties.

Sec. 15.14.010. - Adoption.

The International Existing Building Code, 2024 Edition, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478-5795, is hereby adopted by reference thereto and incorporated into and made a part of the Louisville Municipal Code. The subject matter of the International Existing Building Code is to regulate and govern existing buildings and installation of electrical, plumbing, mechanical, lighting, energy conservation systems and power systems in the City of Louisville and providing for the issuance of permits and collection of fees therefor. The International Existing Building Code, 2024 Edition, is adopted in full, including the outline table of contents and index; but no appendices to such code are adopted.

Sec. 15.14.020. - Section 101.1 amended—Title.

Section 101.1 of the 2024 International Existing Building Code is amended to insert "the City of Louisville" so the section will read:

101.1 Title. These regulations shall be known as the 2024 Existing Building Code of the City of Louisville, hereinafter referred to as "this code."

Sec. 15.14.030. - Copies available.

At least one copy of the International Existing Building Code, 2024 Edition, as amended herein, certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, between the hours of 9:00 a.m. and 4 p.m., Monday through Friday, except holidays and days City is closed. The city clerk shall always maintain a reasonable supply of copies of the code available for purchase by the public at a moderate price. Electronic copies are available, without amendment, at <https://codes.iccsafe.org/public/collections/I-Codes>.

Sec. 15.14.040. - Violations and penalties.

It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Section 7. Chapter 15.16 of the Louisville Municipal Code hereby repealed and reenacted to read as follows:

Chapter 15.16

2024 INTERNATIONAL PLUMBING CODE

- Sec. 15.16.010. Adoption.
- Sec. 15.16.020. Amendments to the 2024 International Plumbing Code.
- Sec. 15.16.030. Section 101.1 amended -Title.
- Sec. 15.16.060. Section 114.4 amended -Violations.
- Sec. 15.16.070. Section 115.5 added—Stop work orders.
- Sec. 15.16.080. Section 305.4.1 amended—Sewer depth.
- Sec. 15.16.090. Section 312.3 amended -Drainage and vent air test.
- Sec. 15.16.100. Section 608.14.10 added—Testing backflow prevention assemblies.
- Sec. 15.16.110. Section 903.1 amended—Roof extension.
- Sec. 15.16.120. Section 1003.3.2 amended—Food waste grinders.
- Sec. 15.16.130. Copies available.
- Sec. 15.16.140. Violations and penalties.

Sec. 15.16.010. - Adoption.

The International Plumbing Code, 2024 Edition, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478-5795, is adopted by reference thereto and incorporated into and made part of the Louisville Municipal Code. The purpose and subject matter of the International Plumbing Code include regulation of plumbing installations in or in connection with new and existing structures and provision of international plumbing standards for the purpose of protecting the public health, safety and general welfare. The International Plumbing Code, 2024 Edition, is adopted in full, including the outline table of contents and index; but no appendices to such code are adopted.

Sec. 15.16.020. - Amendments to the 2024 International Plumbing Code.

The following amendments set forth in sections 15.16.030 through 15.16.120 are made to the 2024 International Plumbing Code.

Sec. 15.16.030. - Section 101.1 amended—Title.

Section 101.1 of the 2024 International Plumbing Code is amended to insert "the City of Louisville" so the section will read:

101.1 Title. These regulations shall be known as the Plumbing Code of the City of Louisville, hereinafter referred to as "this code."

Sec. 15.16.060. - Section 114.4 amended—Violations.

Section 114.4 of the International Plumbing Code is deleted in its entirety and replaced with the following:

114.4 Violations. It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Sec. 15.16.070. - Section 115.5 added—Stop work orders.

Section 115.5 of the International Plumbing Code is added to read as follows:

Any person who shall continue any work in or about the structure after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be subject to the penalty provided in section 1.28.010.

Sec. 15.16.080. - Section 305.4.1 amended—Sewer depth.

The number "36" is inserted in two locations so that *Section 305.4.1* of the 2024 International Plumbing Code will read as follows:

305.4.1 Sewer depth. Building sewers that connect to private sewage disposal systems shall be a minimum of 36 inches below finished grade at the point of septic tank connection. Building sewers shall be a minimum of 36 inches below grade.

Sec. 15.16.090.- Section 312.3 amended—Drainage and vent air test.

Section 312.3 of the International Plumbing Code is amended to read as follows:

312.3 Drainage and vent air test. Plastic piping can be tested only to five pounds per square inch (psi) for DWV plastic piping if air testing in lieu of 10 foot water test above last glued fitting.

Sec. 15.16.100. – Section 608.14.10 added—Testing backflow prevention assemblies.

A new *Section 608.14.10* is added to the 2024 International Plumbing Code, to read as follows:

608.14.10 Testing backflow Prevention Assemblies. The premises owner or responsible person shall have the backflow prevention assembly tested by a certified backflow assembly tester at the time of installation, repair, or relocation.

Sec. 15.16.110. - Section 903.1.1 amended—Roof extension.

Section 903.1.1 of the International Plumbing Code is amended to read as follows:

903.1.1 Roof Extension. All open vent pipes that extend through a roof shall be terminated at least 12 inches above the roof, except that where a roof is to be used for any purpose other than weather protection, the vent extensions shall be run at least 7 feet above the roof. The anticipated snow depth is 6 inches.

Sec. 15.16.120. – Section 1003.3.2 amended—Food waste grinders.

Section 1003.3.2 of the International Plumbing Code is amended to read as follows:

1003.3.2 Food Waste Grinders.

A. Unless specifically required or permitted by the code official, no food waste grinder or dishwasher shall be connected to or discharge into any grease trap. Where food waste grinders connect to grease interceptors, the grease interceptor shall be sized and rated for the discharge of the food waste grinder.

B. Exception: Special regulations by the Public Works Department may supersede this requirement.

Sec. 15.16.130. - Copies available.

At least one copy of the 2024 International Plumbing Code, as amended herein, certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, between the hours of 9:00 a.m. and 4 p.m., Monday through Friday, except holidays and days City is closed. The city clerk shall at all times maintain a reasonable supply of copies of the code available for purchase by the public at a moderate price. Electronic copies are available, without amendment, at <https://codes.iccsafe.org/public/collections/I-Codes>.

Sec. 15.16.140. - Violations and penalties.

It is unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any plumbing or cause or permit such work to be done, in violation of the provisions of this chapter or the terms of the code adopted and incorporated in this chapter, or to otherwise violate or fail to comply with this chapter or such code. Any person convicted of a violation of any provision of this chapter or of the provisions of the code adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Section 8. Chapter 15.17 of the Louisville Municipal Code is hereby added and enacted to read as follows:

Chapter 15.17

INTERNATIONAL SWIMMING POOLAND SPA CODE (ISPSC)

Sec. 15.17.010. Adoption.

Sec. 15.17.020. Section 101.1 amended—Title.

Sec. 15.17.030. Copies available.

Sec. 15.17.040. Violations and penalties.

Sec. 15.17.010. - Adoption.

The International Swimming Pool and Spa Code, 2024 Edition, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478-5795, is hereby adopted by reference thereto and incorporated into and made a part of the Louisville Municipal Code. The subject matter of the International Swimming Pool and Spa Code is to regulate and govern the requirements for the design, construction, alteration, repair and maintenance of swimming pools, spas, hot tubs and aquatic facilities. This includes public swimming pools, public spas, public exercise spas, aquatic recreation facilities, on ground storable residential pools, permanent inground residential pools, permanent residential spas.

Permanent residential exercise spas, portable residential spas and portable residential exercise spas in the City of Louisville and providing for the issuance of permits and collection of fees therefor. The International Swimming Pool and Spa Code 2024 Edition, is adopted in full, including the outline table of contents and index; but no appendices to such code are adopted.

Sec. 15.17.020. - Section 101.1 amended—Title.

Section 101.1 of the 2024 International Swimming Pool and Spa Code is amended to insert "the City of Louisville" so the section will read:

101.1 Title. These regulations shall be known as the 2024 International Swimming Pool and Spa Code of the City of Louisville, hereinafter referred to as "this code."

Sec. 15.17.030. - Copies available.

At least one copy of the International Existing Building Code, 2024 Edition, as amended herein, certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, between the hours of 9:00 a.m. and 4 p.m., Monday through Friday, except holidays and days City is closed. The city clerk shall always maintain a reasonable supply of copies of the code available for purchase by the public at a moderate price. Electronic copies are available, without amendment, at <https://codes.iccsafe.org/public/collections/I-Codes>.

Sec. 15.17.040. - Violations and penalties.

It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Section 9. Chapter 15.21 of the Louisville Municipal Code hereby repealed and reenacted to read as follows:

Chapter 15.21

INTERNATIONAL PROPERTY MAINTENANCE CODE

Sec. 15.21.010. Adoption.

Sec. 15.21.020. Section 101.1 amended—Title.

Sec. 15.21.030. Copies available.

Sec. 15.21.040. Violations and penalties.

Sec. 15.21.010. - Adoption.

The International Property Maintenance Code, 2024 Edition, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478-5795, is hereby adopted by reference thereto and incorporated into and made a part of the Louisville Municipal Code. The subject matter of the International Existing Building Code is regulate and govern existing buildings and installation of electrical, plumbing, mechanical, lighting, energy conservation systems and power systems in the City of Louisville, and providing for the issuance of permits and collection of fees therefor. The International Property Maintenance Code, 2024 Edition, is adopted in full, including the outline table of contents and index; but no appendices to such code are adopted.

Sec. 15.21.020. - Section 101.1 amended—Title.

Section 101.1 of the 2024 International Property Maintenance Code is amended to insert "the City of Louisville" so that the section will read:

101.1 Title. These regulations shall be known as the 2024 Property Maintenance Code of the City of Louisville, hereinafter referred to as "this code."

Sec. 15.21.030. - Copies available.

At least one copy of the International Property Maintenance Code, 2024 Edition, as amended herein, certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, between the hours of 9:00 a.m. and 4 p.m., Monday through Friday, except holidays and days City is closed. The city clerk shall always maintain a reasonable supply of copies of the code available for purchase by the public at a moderate price. Electronic copies are available, without amendment, at <https://codes.iccsafe.org/public/collections/I-Codes>.

Sec. 15.21.040. - Violations and penalties.

It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Section 10. Chapter 15.23 of the Louisville Municipal Code is hereby added and enacted to read as follows:

Chapter 15.23

1997 UNIFORM HOUSING CODE

Sec. 15.23.010. Adoption.
Sec. 15.23.020. Section 101 amended- Title.
Sec. 15.23.030. Copies available.
Sec. 15.23.040. Violations and penalties.

Sec. 15.23.010.- Adoption.

The 1997 Uniform Housing Code, 1997 Edition, published by the International Code Council, 500 New Jersey Avenue, NW, 6th Floor, Washington, D.C. 20001, is hereby adopted by reference thereto and incorporated into and made a part of the Louisville Municipal Code. The subject matter of the 1997 Uniform Housing Code is to provide the building official with proper legal steps to provide minimum standards to safe-guard life limb, health, property and public welfare by regulating and controlling the use and occupancy, location, and maintenance of all residential buildings and structures within the City of Louisville, and to provide for the issuance of permits and collection of fees therefor. The 1997 Uniform Housing Code, 1997 Edition, is adopted in full, including the outline table of contents and index; but no appendices to such code are adopted.

Sec. 15.23.020.- Section 101 amended—Title.

Section 101 of the 1997 Uniform Housing Code is amended to read as follows:

101 Title. These regulations shall be known and may be cited as the 1997 Uniform Housing Code for the City of Louisville. The Code Official will be considered the health officer.

Sec. 15.23.030. - Copies available.

At least one copy of the 1997 Uniform Housing Code as amended herein, certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, between the hours of 9:00 a.m. and 4 p.m., days when the office is open to the public, holidays excepted. The Building Official shall at all times maintain a reasonable supply of copies of the code available for purchase by the public at a moderate price.

Sec. 15.23.040. - Violations and penalties.

It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Section 11. If any article, section, paragraph, sentence, clause, or phrase of this ordinance is held to be unconstitutional or invalid for any reason, such decision shall not affect the validity or constitutionality of the remaining portions of this ordinance. The City Council hereby declares that it would have passed this ordinance and each part or parts hereof irrespective of the fact that any one part or parts be declared unconstitutional or invalid.

Section 12. The repeal or modification of any provision of any prior ordinance by this ordinance shall not release, extinguish, alter, modify, or change in whole or in part any penalty, forfeiture or liability, either civil or criminal, which shall have been incurred under such provision, and each provision shall be treated and held as still remaining in force for the purpose of sustaining any judgment, decree, or order which can or may be rendered, entered, or made in such actions, suits, proceedings, or prosecutions.

Section 13. All other ordinances or portions thereof inconsistent or conflicting with this ordinance or any portion hereof are hereby repealed to the extent of such inconsistency or conflict.

**INTRODUCED, READ, PASSED ON FIRST READING, AND ORDERED
PUBLISHED** this _____ day of _____, 2025.

Chris Leh, Mayor

ATTEST:

Genny Kline, Interim City Clerk

APPROVED AS TO FORM:

Kelly PC, City Attorney

PASSED AND ADOPTED ON SECOND AND FINAL READING, this _____ day
of _____, 2025.

Chris Leh, , Mayor

ATTEST:

Genny Kline, Interim City Clerk

ORDINANCE NO. _____

**AN ORDINANCE ADOPTING BY REFERENCE THE 2024 INTERNATIONAL
ENERGY CONSERVATION CODE**

WHEREAS, the City Council has adopted from time-to-time certain building and construction standards; and

WHEREAS, it is deemed to be in the interest of the public health, safety and general welfare to adopt by reference thereto the updated editions of the above-referenced codes; and

WHEREAS, the City Council, after proper notice as required by law, has held a public hearing on this ordinance providing for the adoption of said codes; and

WHEREAS, the updated editions of the above-referenced codes have been submitted to the City Council in writing and the City Council has determined that such codes should be adopted as herein set forth.

**NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY
OF LOUISVILLE, COLORADO:**

Section 1. Chapter 15.18 of the Louisville Municipal Code is hereby repealed and reenacted to read as follows:

Chapter 15.18

2024 INTERNATIONAL ENERGY CONSERVATION CODE

Sec. 15.18.010. Adoption.

Sec. 15.18.020. Amendments to the 2024 International Energy Conservation Code.

Sec. 15.18.030. Appendices adopted.

Sec. 15.18.040. Section C101.1/R101.1 amended — Title.

Sec. 15.18.050. Section C104.1/R104.1 amended—Permit Expiration

Sec. 15.18.060. Section C401.2.1 amended—Energy Conservation Code.

Sec. 15.18.070. Section C401.4 added- Mandatory Requirements

Sec. 15.18.080. Section C402.1.4 Deleted- Component performance method

Sec. 15.18.090. Section C402.5 Deleted and Replaced Table Building Envelope Fenestration

Sec. 15.18.100. Section C405.1.2 added- Energy Storage Systems ESS

Sec. 15.18.110. Section R401.4 Added-Mandatory Requirements for Residential Buildings

Sec. 15.18.120. Section R402.1 Amended- General

Sec. 15.18.130. Section R402.1 Deleted and Replaced- Insulation and Fenestration

Sec. 15.18.140. Section R402.1.5 Deleted- Component performance alternative

Sec.15.18.150. Section R402.5.1. Deleted and Replaced- Building Thermal Envelope

Sec.15.18.160. Section R406.3 Deleted and Replaced- Thermal Envelope

Sec.15.18.170. Section R406.5 Deleted and Replaced- ERI based compliance

Sec.15.18.180. Section R502.1 Amended- General

Sec.15.18.190. Copies available

Sec.15.18.200. Violations and penalties.

Sec. 15.18.010.- Adoption.

The International Energy Conservation Code, 2024 Edition, published by the International Code Council, 4051 West Flossmoor Road, Country Club Hills, Illinois, 60478, is hereby adopted by reference thereto and incorporated into and made a part of the Louisville Municipal Code. The purpose and subject matter of the International Energy Code include regulating construction aspects of building through comprehensive provisions and standards regulating the erection, construction, enlargement, alteration, equipping, use, area, and maintenance of buildings and structures and providing minimum efficiency requirements for buildings that result in the maximum level of energy efficiency that is safe, technologically feasible, and life cycle cost effective, considering economic feasibility, including potential cost and savings for consumers and building owners with a return on investment. Optional requirements that lead to achievement of zero energy buildings, presently, and through glidepaths that achieve zero energy buildings by 2030 and achievements of additional policy goals as identified by the Energy and Carbon Advisory Council. Requirements contained in this code will include but not limited to, the minimum prescriptive insulation and U value requirements as adopted by the city as a foundation to the performance-based pathways. This code will include adopted appendices and non-adopted appendices incorporating additional energy efficiency and greenhouse gas reduction resources developed by the ICC and others. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this intent. The State of Colorado's Model Electric Ready Code, Solar Ready Code and Carbon Code will be adopted as adopted by the State of Colorado with the adoption of this Energy Code.

Sec. 15.18.020. – Amendments to the 2024 International Energy Conservation Code.

The following amendments set forth in sections 15.18.040 through 15.18.190 are made to the 2024 International Energy Code.

Sec. 15.18.030. - Appendices adopted.

The following appendices of the 2024 International Energy Conservation Code are hereby specifically adopted; any appendices not listed are not adopted:

Sec. 15.18.040. – C101.1 & R101.1 amended—Title.

Section C101.1 and R101.1 of the International Energy Conservation Code is amended to insert "the City of Louisville" so the section will read:

C101.1 and R101.1 Title. These regulations shall be known as the Building Code of the City of Louisville, hereinafter referred to as "this code."

Sec. 15.18.050. - Section C106.7 and R106.7 added—Permit expiration.

The last paragraph of *Section C106.7* and R106.7 of the International Energy Conservation Code is hereby added to read as follows:

C106.7 and R106.7 Expiration. Except for permits for alterations involving only one discipline, every permit issued by the Building Official under the provisions of this code shall expire by limitation and become null and void if the building or work authorized by such permit is not commenced within 180 days from the date of such permit, or if the building or work authorized by such permit is suspended or abandoned at any time after the work is commenced for a period of 180 days. Every permit for alterations involving only one discipline which is issued by the Building Official under the provisions of this code shall expire by limitation and become null and void if the building or work authorized by such permit is not commenced within 90 days from the date of such permit, or if the building or work authorized by such permit is suspended or abandoned at any time after the

work is commenced for a period of 90 days. Before such work can be recommenced, a new permit shall be first obtained. If a new Code has been adopted the new permit will incorporate all new codes and fees.

Sec. 15.18.060.- Section C401.2.1 Amended— International Energy Conservation Code.

Section C401.2.1 of the International Energy Conservation Code is amended to read as follows:

C401.2.1 International Energy Conservation Code. Commercial Buildings shall comply with the prescriptive compliance path for insulation and U values as listed in table C401.4, C402.1.3, C402.5 as a minimum for any simulated building performance options. **Simulated Building Performance.** The Simulated Building Performance option must incorporate the minimum prescriptive R Values and U-Factors before using the simulated building performance option that requires compliance with section C407.

Sec. 15.18.070.- Section C401.4 Added- Mandatory Requirements

Section C401.4 of the International Energy Conservation Code is added to read as follows:

C401.4 Mandatory Requirements for Commercial Buildings. Commercial buildings must comply with Table C401.4.

Table C401.4 (Mandatory)
Requirements for Commercial Buildings

Title	IECC Section
Air leakage	C402.6
Calculation of heating and cooling loads	C403.1.1
Data centers	C403.1.2
System Design	C403.2
Heating and cooling equipment efficiency	C403.3
Heating and cooling system controls	C403.4, except C403.4.3, C403.4.4, C403.4.5
Economizer fault detection and diagnostics	C403.5.5

Ventilation and exhaust systems	C403.7, except C403.7.4.1
Fan and fan controls	C403.8, except C403.8.6
Large diameter ceiling fans	C403.9
Refrigeration equipment performance	C403.12
Construction of HVAC system elements	C403.13
Mechanical systems located outside of the building thermal envelope	C403.14
Service water heating	C404
Electrical power and lighting systems	C405, except C405.3
Maintenance information and system commissioning	C408

Table C402.1.3 Opaque Thermal Envelope Insulation Component Minimum Requirements, R-Value Method, is hereby deleted and replaced with the following:

Table C402.1.3 (Mandatory)
Opaque Thermal Envelope Insulation Component of an Average Minimum Requirements, R-Value Method in following locations:

Roof C402.2.3	
Insulation entirely above roof deck	R-49/ R-49 ci
Metal buildings	R-21 + R-11 LS
Attic and other	R-49
Walls. Above grade C402.2.2	
Mass	R-21/ R-21 ci
Metal buildings	R-21 + R-10ci
Metal framed	R-21+ R-10ci
Wood framed and other	R-27/ R-20 + R-5 ci
Walls, Below grade C402.2.5	
Below-grade wall ^b	R-10 ci
Floors C402.2.3	
Mass	R-21
Joist/framing	R-38
Slab-on-grade floors C402.2.4	
Unheated	R-20 for 24" below
Heated	R-15 for 36" below + R-5 full slab

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m², 1 pound per cubic foot = 16 kg/m³.

NR = No Requirement, LS = Liner System.

a. Where using R-value compliance method, a thermal spacer block shall be provided,

b. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.

Sec. 15.18.080.- Section C402.1.4 Deleted-. Component performance method

Section C402.1.4 Component performance method, is hereby deleted in its entirety.

Sec. 15.18.90.- Table C402.5 Deleted and Replaced-

Table C402.5 Building Envelope Fenestration Maximum U-Factor and SHGC Requirements, is hereby deleted and replaced with the following:

Table C402.5 Building Thermal Envelope Fenestration Maximum	
Vertical Fenestration	
Maximum U-Factor Fixed/Operable	0.34/0.45
Maximum SHGC	0.33
Entrance Doors	0.63
Maximum air leakage rate for curtain walls and storefront glazing	.06 cfm/ft ²
Skylights	
Maximum U-Factor	0.50
Maximum SHGC	0.40
Maximum Air leakage rate	.20 cfm/ft ²

Sec. 15.18.100.- Section C405.1.2 added- Energy Storage Systems ESS

Section C405.1.2 of the International Energy Conservation Code is amended by the addition of a new *Section C405.1.2* to read as follows:

C405.1.2. Lithium Energy Storage Systems (ESS).

C405.1.2 Lithium Energy Storage Systems (ESS). Energy storage systems shall not be installed inside the thermal building envelope

of a commercial structure, primary residence, or Accessory Dwelling Unit (ADU). The ESS shall be installed on the outside of the thermal envelope or in an exterior insulated shed attached or detached to the building envelope to protect from extreme heat and cold. The ESS shall have electrical disconnects within 3 to 6 ft of the ESS. The installation of an ESS in garages that are attached to a residence or ADU must have One Hour Fire rated walls and ceiling and or an approved Fire Suppression system in the garage. The ESS shall be installed on the wall farthest away from the residence inside the garage the ESS shall have a Heat Detector that is tied into the Smoke Detectors and shall have a flashing light on the battery with the fault.

EXCEPTION:

1. Commercial Buildings with a 1 hour rated room where mechanical ventilation is separated from the rest of the building and shall have a Heat Detector at each battery with a flashing light on the battery with the fault.

Sec.15.18.110.- Section R401.4 Added- Mandatory Requirements for Residential Buildings

Section R401.4 of the International Energy Conservation Code is added to read as follows:

R401.4 Mandatory requirements for residential buildings. Residential building must comply with the following sections from the 2024 International Energy Conservation Code found in Table R401.4 and Section R401.2.

Table R401.4
Mandatory requirements for residential buildings

Title	IECC Section
Vapor retarder	R402.1.1
Eave baffle	R402.2.4
Access hatches and doors	R402.2.5
Maximum fenestration U-factor and SHGC	R402.5
Mechanical Controls	R403.1
Ducts	R403.3 except R403.3.2, R403.3.3, and R403.6

Mechanical system piping insulation	R403.4
Heated water circulation and temperature maintenance systems	R403.5.1
Drain Water heat recovery units	R403.5.3
Mechanical ventilation	R403.6 including E403.6.1
Equipment sizing and efficiency rating	R403.7
Systems serving multiple dwelling units	R403.8
Mechanical system located outside thermal envelope	R403.9
Energy consumption of pools and spas	R403.10
Portable spas	R403.11
Residential pools and permanent residential spas	R403.12
Lighting equipment	R404.1
Interior lighting controls	R404.2

Sec.15.18.120.- Section R402.1 Amended- General

Section R402.1 General, is hereby amended to read as follows:

R402.1 General. The minimum building thermal envelope standards shall comply with the requirements of Section R402.1.1 and Table R402.1.2 including when using the Energy Rating Index.

Sec.15.18.130.- Section R402.1 Deleted and Replaced- Insulation and Fenestration

Section R402.1.2 Insulation and fenestration, is hereby deleted and replaced with the following:

R402.1.2 Insulation and fenestration. New and replacement assemblies shall have R-values and U-factors of insulation materials equal to or greater than that specified in Table R402.1.2 including if using an alternative path is specified such as a ANSI/RESNET/ICC 301 or HERS energy rating index of 50 or less.

Table R402.1.2
Mandatory Requirements

Minimum Insulation and Max Fenestration Requirements by Component

Roof	R-60
Above grade walls	<u>R-30 or R-20 & R-5 ci</u>
Below grade walls	R-21/ R-19 ci
Floors	R-38

Non heated slab on grade	R-10 for 4ft
Heated slab on grade	R-15 for 4 ft + R-5 under full slab
Fenestration U-Factor	.30
Fenestration SHGC	.33
Skylight U-Factor	.50
Skylight SHGC	.40
<u>Hot Water Pipes</u>	<u>R-3</u>
<u>Warm Air Ducts</u>	<u>R-8</u>

Sec.15.18.140.- Section R402.1.5 Deleted- Component performance alternative

Section R402.1.5 Total UA alternative, is hereby deleted in its entirety.

Sec.15.18.150.- Section R402.5.1. Deleted and Replaced- Building thermal envelope

Section R402.5.1. Testing, is hereby deleted and replaced to read as follows:

Section R402.5.1 Building thermal envelope All new buildings or dwelling units that are heated or cooled, and additions over 500 square feet shall be tested for air leakage. The building thermal envelope shall comply with section R402.5.1.1 through R402.5.1.3. The sealing methods between dissimilar materials shall allow for differential expansion and contraction.

Sec.15.18.160.- Section R406.3 Deleted and Replaced- Thermal Envelope

Section R406.3 Building Thermal envelope, is hereby deleted and replaced to read as follows:

R406.3 Building thermal envelope. The building thermal envelope shall be greater or equal to the standards in Table R406.3.

Exception: The Building Official may grant an exception to the minimum standards of this table for remodels if demonstrated by the applicant that there are practical difficulties that cannot be reasonably overcome to meet the standards and that the highest standard possible is achieved.

Table R406.3

Mandatory Requirements
Minimum Insulation and Maximum Fenestration Requirements by Component

Roof	R-60
Above grade walls	<u>R-30 or R-20 & R-5 ci</u>
Below grade walls	R-21/ R-19 ci
Floors	R-38
Non heated slab on grade	R-10 for 4ft
Heated slab on grade	R-15 for 4 ft + R-5 under full slab
Fenestration U-Factor	.30
Fenestration SHGC	.33
Skylight U-Factor	.50
Skylight SHGC	.40
<u>Heated Water Pipes</u>	<u>R-3</u>
<u>Heated air Ducts</u>	<u>R-8</u>

Sec.15.18.170.- Section R406.5 Deleted and Replaced- ERI based compliance

Section R406.5 ERI- based compliance, is hereby deleted and replaced to read as follows:

R406.5 ERI-based compliance. Compliance based on the ERI analysis shall have a score of 50 or less without including OPP. ERI based compliance shall meet all of the minimum standards of table R406.3

Sec.15.18.180.- Section R502.1 Amended- General

Section R502.1. General, is hereby amended to read as follows:

Additions to an existing building, building system or portion thereof shall conform to the provisions of table R402.1.2 as those provisions relate to new construction without requiring the unaltered portion of the existing building or building system to comply with this code. Additions shall not create unsafe or hazardous conditions or overload existing building systems. An addition shall be deemed to comply with this code where the addition alone complies, where the existing building and addition comply with this code as a single building, or where the building with the addition does not use more energy than the existing building. Additions shall be in accordance with Section R502.2 or R502.3.

15.18.190. - Copies available.

At least one copy of the 2024 International Energy Conservation Code and one copy of each secondary code pertaining thereto, as amended herein, certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, between the hours of 9:00 a.m. and 4 p.m., Monday through Friday, except holidays and days City is closed. The city clerk shall at all times maintain a reasonable supply of copies of the code available for purchase by the public at a moderate price. Electronic copies are available, without amendment, at <https://codes.iccsafe.org/public/collections/I-Codes>.

Sec. 15.18.200. - Violations and penalties.

It shall be unlawful for any person, firm, or corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure or cause or permit the work to be done, in violation of the provisions of this chapter or the terms of the code or standards adopted and incorporated in this chapter. Any person convicted of a violation of any provision of this chapter or of the provisions of the code or standards adopted and incorporated in this chapter shall be subject to the penalty provided in section 1.28.010.

Section 11. If any article, section, paragraph, sentence, clause, or phrase of this ordinance is held to be unconstitutional or invalid for any reason, such decision shall not affect the validity or constitutionality of the remaining portions of this ordinance. The City Council hereby declares that it would have passed this ordinance and each part or parts hereof irrespective of the fact that any one part or parts be declared unconstitutional or invalid.

Section 12. The repeal or modification of any provision of any prior ordinance by this ordinance shall not release, extinguish, alter, modify, or change in whole or in part any penalty, forfeiture or liability, either civil or criminal, which shall have been incurred under such provision, and each provision shall be treated and held as still remaining in force for the purpose of sustaining any judgment, decree, or order which can or may be rendered, entered, or made in such actions, suits, proceedings, or prosecutions.

Section 13. All other ordinances or portions thereof inconsistent or conflicting with this ordinance or any portion hereof are hereby repealed to the extent of such inconsistency or conflict.

INTRODUCED, READ, PASSED ON FIRST READING, AND ORDERED PUBLISHED this _____ day of _____, 2025.

Chris Leh, Mayor

ATTEST:

Genny Kline, City Clerk

APPROVED AS TO FORM:

Kelly PC, City Attorney

PASSED AND ADOPTED ON SECOND AND FINAL READING, this _____ day of _____, 2025.

Chris Leh, Mayor

ATTEST:

Genny Kline, City Clerk

Building Code Board of Appeals

Meeting Minutes

May 12, 2025
City Hall, Council Chambers
749 Main Street
2:00pm

Call to Order – Vice Chair Mason Gatto called the meeting to order at 2:06pm.

Roll Call was taken and the following members were present:

Board Members Present:

Matt Berry
Steve Norwood
Mason Gatto
Peter Geise

Board Members Absent:

Steve Knapp

Staff Members Present:

Chad Root, Chief Building Official
Jenny Lane, Senior Permit Technician

Approval of Agenda –

Approved by all members.

Introduction of new member Steve Norwood.

Public Comments on Items Not on the Agenda

None.

Approval of Posting Locations –

Approved by all members.

Election of Officers –

Motion to elect Mason Gatto as Chair and Matt Berry as Vice Chair – approved by all members

Meeting Dates for 2025 –

Meetings quarterly unless otherwise requested by City Staff. Appeals/hearings would be held as needed.

Board recommendations for using the 2024 Cohort Energy Code for Residential and Commercial code or the 2024 IECC original version with possible amendments –

Municipalities will need to adopt the State WUI code (around the beginning of 2026) and State Carbon Code (June 2026 must adopt), and the State Electrification Code.

Staff plan is to bring an ordinance to City Council to adopt all 2024 Codes, except for the 2024 Energy Code, and bring the 2024 Energy Code as a separate ordinance afterwards pending a decision/recommendation by the BCBOA and staff.

Council would like to see electrification in part if not complete electrification.

\$600,000 grant from DRCOG for Louisville to use 2024 IECC; must adopt by October; City would use grant to hire staff to do energy reviews and inspections.

Staff would like Board recommendation for adoption of one of two Energy Code adoptions:

- 2024 IECC Code
 - 2024 IECC - can use gas appliances, similar to our existing code but must be high efficiency; Cohort cannot= more strict.
 - Could adopt as is and/or with minor modifications/amendments.
- Cohort proposal is to adopt entire 2024 IECC code with specific amendments/modifications.
 - decarbonization and point system (PT system)

- Cohort – took energy code and points to demonstrate efficiency and must have xx number of points to use gas appliances to hit the target.

Comments from the Board:

- None of the municipalities listed in the Cohort document have adopted this Cohort version yet.
- Denver is part of the cohort but has stated they will keep using the 2021 IECC; but will adopt all other 2024 codes. (see attached email from the City and County of Denver)
- Board would recommend following Denver, especially since they are NOT going to adopt the Cohort proposal, even though they are part of the Cohort.
- Board would support adopting the current energy code with as little amendments as possible and feel this would result in better energy performance overall.
- Mechanical systems are not available yet for a heat pump for a warehouse; how can the energy code have a requirement where the equipment to support it does not exist yet.
- Use Denver as an example; if they don't adopt, Louisville should not.
- Will miss inconsistencies of not adopting all as one
- ICC Code books are written together and are integrated with purpose
- The 2024 IECC Code was written and vetted on a national level and voted on by ICC members
- With concern regarding the \$600K grant, either the 2024 IECC adopted as is, or the cohort version would be acceptable.
- Cohort version's amendments/changes have not been successful to date.
- Board would like to spend time looking for conflicts/discrepancies between the 2024 IECC and 2024 IBC and IRC.
- Board is also concerned about the cohort version since the PT targets also include hospitals, which might deter Avista from building their new hospital in Louisville if they cannot meet the energy requirements, or if it would be cost prohibitive to do so.

Question from the Board is why is there not a liaison from City Council for this Board?

Board does not want to spend time working on amending the code if City Council will not use their suggestions.

Root: City Council would like to adopt a new Energy Code. 2024 IECC is less restrictive than our current 2021 version of the IECC.

Motion:

The BCBOA does not recommend passing the 2024 IECC without further research into conflict with IRC, IBC, and other 2024 ICC codes.

However if City Council does choose to pass it, the BCBOA recommends passing the 2024 IECC code as is, without adopting any amendments.

- Three members in favor, one opposed (Peter Geise)
- Motion passes

Motion:

The BCBOA does not recommend adoption of the Cohort version of the 2024 IECC energy code in any capacity. There has already been a lot of redlining and no other city has adopted it yet. From previous experience, without a consensus yet, it may cause conflicts with current code and has not had any real-world testing yet.

- All approved
- Motion passes

Discussion Items for Next Meeting

Discuss potential discrepancies between the 2024 IECC and the 2024 IBC/IRC.

Adjourn – The meeting was adjourned at 3:24pm.

Building Code Board of Appeals

Meeting Minutes

**June 11, 2025
City Hall, Council Chambers
749 Main Street
2:00pm**

Call to Order – Chair Mason Gatto called the meeting to order at 2:06pm.

Roll Call was taken and the following members were present:

Board Members Present:

Matt Berry
Mason Gatto
Peter Geise

Board Members Absent:

Steve Knapp
Steve Norwood

Staff Members Present:

Chad Root, Chief Building Official
Jenny Lane, Senior Permit Technician

Approval of Agenda –

Approved by all members.

Public Comments on Items Not on the Agenda

None.

Approval of Meeting Minutes from 5.12.25

Approved by all members.

Discuss potential discrepancies between the 2024 IECC and the 2024 IBC/IRC

This meeting was requested by the BCBOA to go over discrepancies between the 2024 ICC codes, before the Board is comfortable recommending the 2024 IECC code.

Root provided an update on the 2024 Codes. 2024 codes are one of the better code cycles since all the codes are cohesive and work together since there was a lot of scrutiny on these codes because of federal lawsuits where the code for the IRC and IECC had to postpone publication until after the lawsuit. Typically each committee works on their section (IBC, IRC, IECC, etc) which can create discrepancies, but with the extra scrutiny on these codes, it is more cohesive than in previous cycles. Root reiterated that Shauna Mazingo and Hope Medina did not see any large discrepancies.

City Council will have a study session on 8/26/25. The Board's concerns and recommendations are:

- Study session will be for all the codes, not just the energy code. Root believes the energy code will be the main focus, and maybe some focus on fire sprinklers.
- **Root** believes they may want to amend some items like all electrification and stricter greener means above the code, and they might push for the Cohort version.
- Consensus between Root and the Board is still that the 2024 IECC adopted as is, would be the best option as far as feasibility, compared to the cohort's version of the energy code.
- There is concern from the Board over discrepancies that could exist if there are a lot of amendments, since it could conflict with code straight from the 2024 code books.
- Only amendment Root would suggest to the 2024 IECC would be to have minimum R-values in a table to ensure that the overall performance will meet specific performance targets.
- Denver is staying with their 2021 IECC. Root confirmed that no other municipality has adopted the cohort version and some of the reasons are due to the cost of implementing the cohort version.
- One issue with staying with the 2021 IECC code as the City has adopted is that there are a few items that violate Federal standards (pre-emption).

- The **Board** discussed the State adopted code IECC Appendix CK Colorado Model Electric and Solar Ready Code-Commercial and Appendix RM Colorado Model Electric and Solar Ready Code-Residential which are two codes created and adopted by the State of Colorado. Root explained that the State codes are aligned with the 2024 ICC codes but would take precedence anyway.
- It will make a more positive environmental impact to work with the code rather than circumvent it.

The Board's concerns with the cohort version of the 2024 IECC, or more restrictive Energy Code amendments:

- Most mechanical contractors are working without a permit or on weekends to avoid having to pull a permit and comply with an all-electric requirement with residential and commercial jobs. Homeowners will use non-qualified people to move gas lines without a permit, or moving electrical outlets, which creates a dangerous situation, and then it is not inspected to ensure safety which comes with a building permit.
- The City of Boulder requires all electrification, so for example, if someone moves a gas stove with a kitchen remodel that they will have to switch to electric, along with potential costs to upgrade their electrical panel, but if they kept it in the same place, it could remain gas.
- With more restrictive code requirements for energy, the cost of implementation increases, which also eliminates the feasibility of affordable housing.
- All board members have spoken with contractors and property owners who have said they are not getting permits for the work and they would rather risk getting caught than try to meet the code, which is difficult or cost-prohibitive.

Root asked for direction from the Board, three codes, which to recommend to City Council:

- A. 2024 IECC straight from the book.
- B. 2021 energy code as is already in place.
- C. Cohort 2024 version of energy code (Board and Root agree it is not the best to adopt; too difficult to enforce).

Root pointed out that the City's building department now requires the Energy Rater to fill out a checklist to ensure compliance with the energy code and that it

is being inspected by the energy rater to ensure all the documentation matches what is in the field.

Root talked about the different State codes with the Board and the requirements regarding energy code, EV charging, carbon, recycling, and green codes and how the State is developing these codes, that the City will need to adopt them when new codes are adopted by the City.

The **Board** spoke about the environmental impact of construction and the waste and material costs of it. Berry explained that it would be important to understand where the interest is for environmental concern:

- A. Immediate energy consumption (R value, efficiency of appliances, etc)
- B. Carbon impact of implementation; throwing away perfectly good appliances to meet new energy code even if the appliances are working and also truly looking at entire process from start to finish for construction materials – spray foam insulation, from the manufacturing of the chemicals, transporting the chemicals, the waste that must be cut at the end and thrown away.

Motion:

With no concern over discrepancies between the codes, the BCBOA would recommend the 2024 IECC code as written. Given evidence from the past, adopting the as-written 2024 IECC energy code will result in higher compliance than adopting a highly manipulated code, such as the cohort version.

- All approved
- Motion passes

Fire Hardening

No spray-on material allowed per the Fire Hardening Code, as written. Root explained that per the IBC, it is allowed, but with the City Council requirements, he cannot approve it. Root explained that there may be some contractors who might appeal to the Board to challenge the decision.

Discussion Items for Next Meeting

None.

Adjourn – The meeting was adjourned at 3:38pm.



LOUISVILLE FIRE
PROTECTION DISTRICT

"OUR FAMILY SERVING YOUR FAMILY"

895 VIA APPIA WAY LOUISVILLE, CO 80027
HEADQUARTERS: 303.666.6595 | FAX: 303.666.7659
LOUISVILLEFIRE.COM

Dear City Councilmembers,

We are reaching out to share our agreement with the City Staff's recommendation of adopting the International Residential Code to include the residential fire sprinkler provisions. One of our fundamental responsibilities is life safety and the inclusion of fire sprinklers in homes helps save lives. Residential fire sprinklers in new homes will help protect both residents and first responders. Home construction materials and what we store and use at home is changing and has become more combustible. Fire sprinklers give residents the time necessary to get out and help the firefighters going in. We want to highlight that the residential fire sprinkler provision was adopted by The City of Louisville in 2014 without complaint to our district but was removed. Many of our neighboring partners do have this requirement in place. Below is a list of the jurisdictions that are in our neighboring vicinity that require residential fire sprinklers.

Neighboring Agencies Requiring

- Unincorporated Boulder County
- Town of Superior
- City of Lafayette
- City and County of Broomfield
- Town of Erie
- City of Westminster
- City of Lafayette
- City of Boulder

The fire district supports the adoption of the new IRC without this removal. We support the protection of those who seek to make this City a future home.

Thank you for considering the safety of our citizens.

Sincerely,



John Willson
Fire Chief



Jennifer Henderson
Division Chief of Risk Reduction, Fire Marshal

DRAFT RESIDENTIAL AMENDMENTS FOR 2024 IECC ADOPTION

Version: Explanatory Version 1.2 DRAFT

Version Date: April 17, 2025

About This File: This document contains the regionally-aligned amendments to the 2024 International Energy Conservation Code – Residential Chapter. This is the “Explanatory” version which includes short notes and tags about each amendment as well as tracked changes (strikeouts and underlines) showing what changed from the base code.

Cohort Background and Goals: The 2024-2025 Metro Regional Building Policy Cohort (the “code cohort”) is an extension and expansion of a previous successful cohort effort. Goals of the cohort are to collaboratively review and adopt the most recent energy code – the 2024 International Energy Conservation Code (IECC) – along with regionally-aligned and consistent supporting amendments. Primary outcomes include reducing energy use and climate emissions in the built environment while balancing affordability and equity; improving region-wide consistency for builders, developers, and contractors; emphasizing flexibility without sacrificing performance; streamlining workload for budget-constrained building departments; and allowing for adjustments in each community while maintaining overall general alignment. Primary participating communities include Boulder County, City of Boulder, Brighton, Broomfield, Berthoud, Edgewater, Erie, Golden, Lafayette, Longmont, Louisville, Northglenn, Superior, Thornton, and Westminster. The code cohort is expanding to the remainder of the Denver metro area communities in 2025. The code cohort is jointly led and supported by participating local governments, with facilitation and code expertise from Lotus Engineering and Sustainability, the Southwest Energy Efficiency Project (with support from the U.S. Department of Energy), and Shums Coda (with support from Xcel Energy). Funding is provided by participating local governments and by the federal government through a Climate Pollution Reduction Grant (CPRG) to the Denver Regional Council of Governments (DRCOG) for the Decarbonize DRCOG project.

Source Materials and Terminology: These amendments are for the 2024 International Energy Conservation Code, first printing, as published by the International Code Council. Most of the amendments are from the Low Energy and Carbon Code developed by the Colorado Energy Code Board (in draft form as of April 2025, and unofficially denoted here as “LECC”), unless otherwise noted. It also incorporates agreed-upon principles and frameworks from each of the participating cohort communities (denoted here as “Cohort”), and pulls several additional amendments from the previous 2021 IECC code cohort. Minor amendments are from the Model Green Code developed by the Colorado Energy Office (in draft form as of Feb 2025, and denoted here as “Green”). Other resources consulted and considered include amendment packages from other states, other local governments in Colorado, and national stakeholder groups.

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ADOPTING LANGUAGE

Section xx. The International Energy Conservation Code, 2024 Edition, (the “IECC”), as published by the International Code Council, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001, a copy of which is on file and open for inspection in the office of the [city/town/county] clerk, is hereby adopted by reference subject to the additions, amendments, and appendices set forth herein. The subject matter of the

IECC includes the design of energy-efficient and high-performance buildings and related energy uses including mechanical, lighting, power systems, and electric vehicle infrastructure for the purpose of protecting the public health, safety, and welfare. The IECC-Residential includes appendices RB, RE, RJ, and RK as amended. The 2024 IECC, as amended in this Article, shall apply to all property within the [Community]. The IECC is amended as follows.

RESIDENTIAL AMENDMENTS

This adopts the solar-ready, EV-ready, and electric-ready appendices required by current state law. It also adds demand response control capability for water heaters, required by state law. (LECC)

[Simplification from LECC] [Required by law]

1. **Section R101.2.1 Appendices** is amended as follows:
R101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted. Appendices RB, RE, RJ, and RK as amended are hereby adopted.

This adds definitions necessary for the amendments below. (All-electric building, combustion equipment, future electric equipment, mixed fuel buildings, and off-grid homes are from Cohort; emergency power system and standby power system are from 2024 IBC)

[Clarification]

2. **Section R202 GENERAL DEFINITIONS** is amended to add the following definitions in alphabetical order:

ALL-ELECTRIC BUILDING. A new building that contains no permanently-installed combustion equipment or plumbing for combustion equipment, or an existing building that contains no permanently-installed combustion equipment.

COMBUSTION EQUIPMENT. Equipment or appliances that use fuel gas, fuel oil, or any other hydrocarbon-derived fuel or fuel blend to perform functions such as space heating, space cooling, service water heating (including pools and spas), cooking, clothes drying, humidification, or lighting. The scope of this definition may be limited to combustion-based space and water heating equipment where specifically indicated. Combustion equipment does not include emergency power systems or standby power systems.

EMERGENCY POWER SYSTEM. A source of automatic electric power of a required capacity and duration to operate required life safety, fire alarm, detection, and ventilation systems in the event of a failure of the primary power. Emergency power systems are those required for electrical loads where interruption of the primary power could result in loss of human life or serious injuries.

FUTURE ELECTRIC EQUIPMENT. Electrically-powered equipment that could be installed in the future to replace combustion equipment to meet a similar end use or load.

MIXED-FUEL BUILDING. A new building that contains combustion equipment or piping for combustion equipment, or an existing building that contains combustion equipment, in addition to electric loads.

OFF-GRID HOME. A residential building that does not receive any site energy from a publicly or privately owned utility, including for electricity, fuel gas, or fuel oil.

STANDBY POWER SYSTEM. A source of automatic electric power of a required capacity and duration to operate required *building* or ventilation systems in the event of a failure of the primary power. Standby power systems are those required for electrical loads where interruption of the primary power could create hazards or hamper rescue or fire-fighting operations.

These changes are part of adding the optional Passive House compliance pathway (Green), removing the Tropical Climate Region Option (LECC), requiring net zero-level efficiency for extra-large homes (modified from LECC), and exempting off-grid homes from demand response capability and EV-ready requirements (Cohort).

[Flexibility] [Simplification from LECC] [Strengthening from base and LECC] [Limited cost reduction]

3. **Section R401.2 Application** is amended as follows:

R401.2 Application. Residential *buildings* with less than an average of 5,000 square feet (465 m²) of *conditioned floor area per dwelling unit* shall comply with Section R401.2.1, R401.2.2, R401.2.3, ~~or R401.2.4,~~ or R401.2.5, as well as appendices RB, RE, RJ, and RK as amended. Residential *buildings* with an average of 5,000 square feet (465 m²) or more of *conditioned floor area per dwelling unit* shall comply with Section R401.2.3 or R401.2.5 as well as appendices RB, RE, RJ, and RK as amended.

Exceptions:

1. *Additions, alterations, repairs, and changes of occupancy to existing buildings* complying with Chapter 5.
 2. *Off-grid homes* need not comply with Appendix RE or Appendix RJ.
4. **Section R401.2.4 Tropical Climate Region Option** is deleted in its entirety.
 5. **Section R401.2.5 Passive House Option** is added as follows:

R401.2.5 Passive House Option. The Passive House option requires compliance with Section R409.

This clears up ambiguity by saying Tiny Homes need to meet the IRC appendix that specifically pertains to Tiny Homes, instead of the IECC.

[Clarification]

6. **Section R402.1 General** is amended by adding a new exception as follows:
 3. Tiny homes, as defined in the International Residential Code, designed in accordance with Appendix BB of the International Residential Code.

This amendment allows slab insulation to be omitted in sunrooms and heated garages if full compliance with other insulation requirements are met. In retrofits in particular, slab insulation requirements could necessitate complete demolition of the slab floor.

[Flexibility and cost reduction]

7. **Section R402.5.1.1 Sunroom and heated garage insulation** is amended by adding a new exception as follows:
 3. Slab insulation shall be permitted to be omitted where the minimum ceiling insulation *R-values* and minimum wall insulation *R-values* are installed.

This amendment requires insulation installation to meet a standard for high quality, while exempting performance-based pathways that already account for insulation effectiveness through modeling. (LECC)

[Clarification] [Minor strengthening from base] [Minor simplification from LECC]

8. **Section R402.5.1.1 Installation** is amended to read as follows:

R402.5.1.1 Installation. The components of the *building thermal envelope* as indicated in Table R402.5.1.1 shall be installed in accordance with the following:

1. The manufacturer's instructions.
2. The criteria indicated in Table R402.5.1.1, as applicable to the method of construction.
3. For *dwelling units* complying with Section R401.2.1, the requirements of a Grade 1 insulation installation in accordance with Appendix A of ANSI/RESNET/ICC 301.

This reduces costs by clarifying this air-sealing detail is only necessary between conditioned and unconditioned space. (LECC)

[Clarification] [Cost reduction]

9. **Table R402.5.1.1 Air Barrier, Air Sealing, and Insulation Installation** is amended by changing the text in the cell of the "Walls" row and the "Air Barrier, Air Sealing Criteria" column as follows:

The junction of the foundation and sill plate shall be sealed. The junction of the top plate and the top of *exterior walls* and interior walls that are adjacent to or abut unconditioned space shall be sealed. *Knee walls* shall be sealed.

This offers an alternative metric for measuring air leakage. The original metric, air changes per hour, is easier for large homes to meet and harder for smaller homes to meet. (Note: these rates are applicable to Climate Zone 5; see LECC for rates for other Climate Zones.) (LECC)

[Flexibility] [Cost reduction]

10. **Section R402.5.1.3 Maximum air leakage rate**, item #1, is amended to read as follows, with the rest of the section and exceptions to remain:

1. Where complying with Section R401.2.1, the *building* or the *dwelling units* or *sleeping units* in the *building* shall have an *air leakage* rate not greater than 3.0 air changes per hour, or 0.17 cubic feet per minute per square foot [0.86 L/(s × m²)] of the *building thermal envelope area* or the *dwelling testing unit enclosure area*.

The Department of Energy recommends setting the temperature for residential water heaters at 120 degrees, in order to be both low enough to save energy and high enough to kill bacteria and Legionella. The default setting for new residential water heaters is typically 140 degrees. That not only wastes energy but scalds human skin in less than a second, a safety risk especially for children, special needs adults, and seniors with dementia.

[Strengthening]

11. **Section R403.5.5 Water heater default temperature setting** is added as follows:

R403.5.5 Water heater default temperature setting. Storage water heaters with a rated water storage volume of 40 gallons (150 L) to 120 gallons (450 L) and installed in new detached one- and two-family dwellings and townhouses shall have the default temperature setting set to 120 degrees F.

This clarifies when and how much electric resistance is allowed. (LECC)

[Minor strengthening from base] [Possible cost reductions]

12. **Section R403.7.1 Electric-resistance space heating** is amended to read as follows:

R403.7.1 Electric-resistance space heating. Detached one- and two-family dwellings and townhouses ~~using~~ shall not use electric resistance space heating. ~~shall limit the total installed~~

~~heating capacity of total electric resistance space heating serving the dwelling unit to not more than 2.0 kW or shall install a heat pump in the largest space that is not used as a bedroom.~~

Exceptions:

1. Electric resistance heating used for supplemental heat in accordance with Section R403.1.2.
2. Electric resistance heating used for freeze protection.
3. Electric-resistance heating where the criteria in Section R408.2.2.2 for evaporative cooling are met.

This clarifies that air source heat pumps for new homes need to meet certain cold climate specifications.

[Clarification] [Strengthening from base and LECC]

13. A new **Section R403.7.2 Electric heating cold temperature performance** is added as follows:

Section R403.7.2 Electric heating cold temperature performance. Air source heat pumps installed in new detached one- and two-family dwellings and townhouses shall have a capability of maintaining no less than 70% of their rated heating capacity at 47°F (8.3°C) when tested at an outdoor temperature of 5°F (-15°C) per AHRI 210/240 or an equivalent testing standard, demonstrated by manufacturer documentation or third party certification.

Exception: Air source heat pumps installed as part of an *addition, alteration, or* replacement in an *existing residential building*.

These requirements are in state law. Gas fireplaces that do not meet these added requirements are not allowed to be sold or leased in the state. (Cohort)

[Clarification]

14. **Section R403.13. Gas fireplaces** is amended as follows:

Section R403.13. Gas fireplaces. Gas fireplaces must comply with all of the following requirements:

1. Gas fireplace systems shall not be equipped with a *continuous pilot* and shall be equipped with an *on-demand pilot, intermittent ignition or interrupted ignition*, as defined by ANSI Z21.20.
2. Gas fireplaces must be capable of *automatically* extinguishing any pilot flame when the main gas burner flame is extinguished or must prevent any ignition source for the main gas burner flame from operating continuously for more than seven days from the last use of the main gas burner.
3. Decorative gas fireplaces must have a direct vent or power vent configuration, unless the decorative gas fireplace is marked for replacement use only or outdoor use only or is a gas log set.

Exception: Gas-fired appliances using pilots within a listed combustion safety device.

This gives exterior lighting more flexibility by offering compliance with commercial lighting provisions, useful in particular for multifamily buildings. (LECC)

[Flexibility]

15. **Section R404.1.1 Exterior lighting** is amended by adding a new exception as follows:

7. Exterior lighting that meets the requirements of Section C405 of this code.

This disallows gas-powered lighting. Gas lighting is rarely used anymore, but this adds assurance that it can't be.

[Minor strengthening]

16. **Section R404.1.5 Fuel gas lighting** is amended to read as follows:

Section R404.1.5. Fuel gas lighting. Fuel gas lighting systems ~~shall not be equipped with a pilot and shall be equipped with an on-demand pilot, intermittent ignition, or interrupted ignition as defined by ANSI Z21.20~~ are prohibited.

This removes the renewable energy certification documentation since these are usually handled by other processes or departments, and since many of the RECs requirements are removed or amended later in this code amendment package. (LECC)

[Simplification]

17. **Section R404.4 Renewable energy certificate (REC) documentation** is deleted in its entirety.

This simplifies the application of the Simulated Building Performance pathway for R-2 buildings by not needing a separate commercial common areas reports from other areas in the building envelope. (LECC)

[Simplification] [Cost reduction]

18. **Section R405.1 Scope** is amended as follows:

R405.1 Scope. This section establishes criteria for compliance using *Simulated Building Performance* analysis. Such analysis shall include heating, cooling, mechanical *ventilation*, and *service water heating* energy only. ~~Such analysis shall be limited to dwelling units. Spaces other than dwelling units in Group R-2, R-3 or R-4 buildings shall comply with Sections R402 through R404.~~

This pathway in the base code allows builders to model and compare the efficiency of their proposed design to a standard reference design. This amendment uses site energy as the modeling metric instead of fuel-specific energy cost (LECC), which shifts the focus to the actual energy demand and consumption instead of highly variable utility costs. Consistent with the other sections, the amendment also adds a differential between mixed fuel homes and all-electric homes, and adds a differential between regular homes and large homes.

[Simplification from base and LECC] [Cost reduction]

19. **Section R405.2 Simulated building performance compliance**, item #3, is replaced as follows:

3. For each *dwelling unit*, the annual site energy use shall be less than or equal to the applicable percentage of the annual site energy use indicated in Table R405.2(1), as compared to the *standard reference design*.

TABLE R405.2(1) SIMULATED BUILDING PERFORMANCE COMPLIANCE TARGET

BUILDING SIZE	MIXED FUEL	ALL-ELECTRIC
<i>Dwelling units</i> with an average of <3,500 square feet (325 m ²) or less of <i>conditioned floor area</i>	80%	85%
<i>Dwelling units</i> with an average of 3,500 square feet (325 m ²) to 4,999 square feet (464 m ²) of <i>conditioned floor area</i>	70%	75%

- a. Informative note: Site energy use should be expressed in either kBtu/year or kBtu/ft²/year of *conditioned floor area*.
- b. *Dwelling units* with greater than 5,000 square feet (325 m²) of *conditioned floor area* must comply with the Energy Rating Index pathway in R401.2.3 or the Passive House pathway in R401.2.5.

20. **Table R405.2 Requirements for Simulated Building Performance** is renumbered as Table R405.2(2).

For the ERI pathway, this amendment removes the requirement that buildings choosing to install renewable energy must install a certain amount of that renewable energy.

[Simplification from base and LECC] [Cost reduction]

21. **Section R406.5 ERI-based compliance** is amended to read as follows:

R406.5 ERI-based compliance. Compliance based on an *ERI* analysis requires that the rated design and each confirmed as-built *dwelling unit* be shown to have an *ERI* less than or equal to the appropriate value indicated in Table R406.5 as compared to the *ERI* reference design as follows: The values in Table R406.5 shall be achieved prior to accounting for the installation of any on-site power production (OPP).

1. ~~Where on-site renewables are not installed, the values under ENERGY RATING INDEX NOT INCLUDING OPP apply.~~

2. ~~Where on-site renewables are installed, the values under ENERGY RATING INDEX WITH OPP apply.~~

Exception: For buildings with 20 or more *dwelling units*, where approved by the code official, compliance shall be permitted using the Average Dwelling Unit Energy Rating Index, as calculated in accordance with ANSI/RESNET/ICC 301.

1. ~~Where the *ERI* analysis excludes on-site power production (OPP), the values under ENERGY RATING INDEX NOT INCLUDING OPP shall be permitted to be applied.~~

2. ~~Where the *ERI* analysis excludes on-site power production (OPP), the values under ENERGY RATING INDEX NOT INCLUDING OPP shall be permitted to be applied.~~

This table adjusts the 2024 base code's ERI levels for our Climate Zone 5. It makes all-electric homes easier to meet than mixed fuel homes, and it makes regular sized homes easier to meet than large or extra-large homes.

[Simplification from base and LECC] [Strengthening from base and LECC]

22. **Table R406.5 Maximum Energy Rating Index** is replaced as follows:

TABLE R406.5 MAXIMUM ENERGY RATING INDEX

BUILDING SIZE	MIXED FUEL	ALL-ELECTRIC
<i>Dwelling units</i> with an average of <3,500 square feet (325 m ²) or less of <i>conditioned floor area</i>	50	54
<i>Dwelling units</i> with an average of 3,500 square feet (325 m ²) to 4,999 square feet (464 m ²) of <i>conditioned floor area</i>	46	50
<i>Dwelling units</i> with greater than 5,000 square feet (325 m ²) of <i>conditioned floor area</i>	42	46

Consistent with the themes in the other sections, this adds an electric-preferred differential (Cohort) and a home size differential (modified from LECC). It also removes the requirement to get credits for two or more categories if the full credits can be met from either a really good thermal envelope or a ground source heat pump. (LECC)

[Strengthening from base and LECC] [Flexibility]

23. **Section R408.2 Additional energy efficiency credit requirements** is amended to read as follows:

R408.2 Additional energy efficiency credit requirements. *Residential buildings* shall earn not less than ~~40~~ the appropriate number of credits indicated in Table R408.2.1, from not less than two measures specified in Table R408.2.2. ~~Five additional credits shall be earned for dwelling units with more than 5,000 square feet (465 m²) of living space located above grade plane.~~ To earn credit as specified in Table R408.2.2 for the applicable *climate zone*, each measure selected for compliance shall comply with the applicable subsections of Section R408. Each *dwelling unit* or *sleeping unit* shall comply with the selected measure to earn credit. Interpolation of credits between measures shall not be permitted.

Exception: *Residential buildings* shall not be required to achieve credits from two or more measures in Table R408.2.2 if sufficient credits can be achieved to meet the requirements of this section from one of the following single measures:

1. Achieving a 30% reduction in the total TC in accordance with Section R408.2.1.1.
2. Installation of a ground source heat pump in accordance with Section R408.2.2 item number 1.

TABLE R408.2.1 ADDITIONAL ENERGY EFFICIENCY CREDIT REQUIREMENTS

BUILDING SIZE	MIXED FUEL CREDIT REQUIREMENTS	ALL-ELECTRIC CREDIT REQUIREMENTS
<i>Dwelling units</i> with an average of <3,500 square feet (325 m ²) or less of <i>conditioned floor area</i>	15	10
<i>Dwelling units</i> with an average of 3,500 square feet (325 m ²) to 4,999 square feet (464 m ²) of <i>conditioned floor area</i>	25	20

- a. *Dwelling units* with greater than 5,000 square feet (325 m²) of *conditioned floor area* must comply with the Energy Rating Index pathway in R401.2.3 or the Passive House pathway in R401.2.5.

This adds new options for credits from better windows, evaporative cooling, multifamily duct testing, ERV or HRV preheating limits, and refrigerants, as well as fuel neutrality credits (LECC). It also adds an electric-preferred differential. Note: These credit values are applicable to Climate Zone 5.

[Strengthening from base and LECC] [Flexibility]

24. **Table R408.2 Credits for Additional Energy Efficiency** is renumbered R408.2.2, and the following items and footnotes are amended to read as follows, with the other items and footnotes to remain:

TABLE R408.2.2 CREDITS FOR ADDITIONAL ENERGY EFFICIENCY

MEASURE NUMBER	MEASURE DESCRIPTION	CREDIT VALUE: CZ 5
<u>R408.2.1.2(2)</u>	<u>Improved fenestration</u>	<u>3</u>
R408.2.2(4)	High performance gas furnace (Option 1)	<u>6</u> <u>4</u>

R408.2.2(5)	High performance gas furnace (Option 2)	5 <u>3</u>
R408.2.2(11)	High performance gas furnace and cooling (Option 3)	6 <u>4</u>
R408.2.2(12)	High performance gas furnace and cooling (Option 4)	7 <u>5</u>
R408.2.2(13)	High performance gas furnace and heat pump <u>for combined heating and cooling</u> (Option 2)	11 <u>8</u>
R408.2.2(14)	High performance heat pump <u>for combined heating and cooling</u> , with electric resistance backup (Option 2)	12
<u>R408.2.2(15)^b</u>	<u>Space heating fuel neutrality credit</u>	<u>2</u>
<u>R408.2.2.2^b</u>	<u>Evaporative cooling</u>	<u>2</u>
R408.2.3(1)(a) ^d	Gas-fired storage water heaters (Option 1)	4 <u>2</u>
R408.2.3(1)(b) ^d	Gas-fired storage water heaters (Option 2)	5 <u>3</u>
R408.2.3(2)(a) ^d	Gas-fired instantaneous water heaters (Option 1)	5 <u>3</u>
R408.2.3(2)(b) ^d	Gas-fired instantaneous water heaters (Option 2)	6 <u>4</u>
<u>R408.2.3(9)^d</u>	<u>Water heating fuel neutrality credit</u>	<u>1</u>
R408.2.4(2) ^c	100% of duct systems in conditioned space	9 <u>7</u>
R408.2.4(3) ^c	≥ 80% of ductwork inside conditioned space	7 <u>5</u>
R408.2.4.1 ^c	<u>Duct leakage testing in all multifamily units</u>	<u>2</u>
<u>R408.2.5.1</u>	<u>ERV or HRV preheating</u>	<u>1</u>
R408.2.7	Onsite renewable energy measures	9 <u>3</u>
R408.2.13	<u>Refrigerants</u>	<u>1</u>

This provides details on the new optional credits for better windows. (LECC)

[Simplification from LECC] [Flexibility]

25. Section **R408.2.1.2 Improved fenestration** is amended to read as follows:

R408.2.1.2 Improved fenestration. Improved fenestration shall achieve credits for one of the following:

1. The area weighted average *U-factor* and *SHGC* of all vertical fenestration shall be equal to or less than the values specified in Table R408.2.1.2.

2. The area weighted average *U-factor* and *SHGC* of all vertical fenestration shall be equal to or less than the values for the Northern Climate Zone in the latest version of the ENERGY STAR specification for residential windows, doors and skylights.

This provides details on the new optional credits for space heating fuel neutrality. (LECC)

[Simplification from LECC] [Flexibility]

26. **Section R408.2.2 More efficient HVAC equipment performance options** is amended to add a new item #15 as follows:

15. Space heating fuel neutrality credit: Heat pump with greater than or equal to the federal minimum efficiency rating for the location where the heat pump is installed, and a capacity ratio ≥ 70 percent of heating capacity at 5°F (−15°C) versus rated heating capacity at 47°F (8.3°C). For new *buildings*, the credit value for this item may be added to the credit value for R408.2.2(14) when the requirements of both measures are met. For *alterations*, the credit value for this item may be added to the credit value for R408.2.2(13) or R408.2.2(14) when the requirements of both measures are met.

This provides details on the new optional credits for evaporative cooling. (LECC)

[Flexibility]

27. A new **Section R408.2.2.2** Evaporative cooling is added as follows:

R408.2.2.2 Evaporative cooling. Evaporative cooling *equipment* used for space cooling shall achieve the credits allocated in Table R408.2 where it meets all of the following:

1. Not less than 80 percent of the total HVAC space cooling capacity of the *dwelling unit* is provided by evaporative cooling.
2. Evaporative cooling equipment is installed in accordance with Section 928.1 of the International Mechanical Code.

This and the next item provide details on the new optional credits for water heating fuel neutrality. (LECC)

[Simplification from LECC] [Strengthening from base] [Flexibility]

28. **Section R408.2.3 Reduced energy use in service water-heating options** is amended to read as follows:

R408.2.3 Reduced energy use in service water-heating options. For measure numbers R408.2.3(1) through R408.2.3(7) and R408.2.3(9), the installed hot water system shall meet one of the Uniform Energy Factors (UEF) or Solar Uniform Energy Factors (SUEF) in Table R408.2.3. For measure number R408.2.3(8), the hot water distribution system shall comply with Section R408.2.3.1. The credit value for R408.2.3(9) may be added to the credit value for other electric water heater options when the requirements of both measures are met.

29. **Table R408.2.3 Service Water Heating Efficiencies** is amended to add the following row:

TABLE R408.2.3 SERVICE WATER HEATING EFFICIENCIES

MEASURE NUMBER	WATER HEATER	SIZE AND DRAW PATTERN	TYPE	EFFICIENCY
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<u>R408.2.3(9)</u>	<u>Federal minimum efficiency HPWH</u>	<u>All storage volumes, all draw patterns</u>	<u>HPWH with or without hybrid electric resistance element</u>	<u>Equal to or greater than federal minimum efficiency standard</u>
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This provides details on the new optional credits for duct testing in all multifamily units, instead of just a sampling of them. (LECC)

[Flexibility]

30. A new **Section R408.2.4.1** is added as follows:

R408.2.4.1 Testing duct leakage in all multifamily dwelling units. *Buildings with eight or more dwelling units or sleeping units shall test every dwelling unit or sleeping unit in accordance with the requirements of Section R403.3.7.*

This provides details on the new optional credits for ERV and HRV preheating limits. (LECC)

[Flexibility]

31. A new **Section R408.2.5.1** is added as follows:

R408.2.5.1 ERV and HRV preheating limits. All systems that utilize energy recovery ventilation and utilize electric resistance to preheat outdoor air to defrost or temper air entering the energy recovery device shall comply with one of the following:

1. Where the space is mechanically humidified when the outdoor temperature is not greater than 25°F (-4°C) and the system recovers latent energy, the outdoor air shall not be preheated to greater than 25°F (-4°C).
2. For sensible-only heat recovery exchangers, outdoor air shall not be preheated to greater than 25°F (-4°C).
3. For all other systems, outdoor air shall not be preheated to greater than 5°F (-15°C).

This changes the optional credits for efficient appliances from a federal statute reference to the ENERGY STAR specification.

[Clarification]

32. **Table R408.2.6 Minimum Efficiency Requirements: Appliances** is replaced with the following:

TABLE R408.2.3 SERVICE WATER HEATING EFFICIENCIES

APPLIANCE TYPES	EFFICIENCY IMPROVEMENT	TEST PROCEDURE
Refrigerator	Meets the energy performance metrics in the most recent version of the applicable consumer ENERGY STAR specification	Test procedure contained in the most recent version of the applicable consumer ENERGY STAR specification
Dishwasher		
Clothes washer and clothes dryer		

This removes reference to a deleted section.

[Simplification from base]

33. **Section R408.2.7 Renewable energy** is amended as follows:

R408.2.7 Renewable energy. Renewable energy resources shall be permanently installed and have the rated capacity to produce not less than 1.0 watt of on-site renewable energy per square

foot of *conditioned floor area*. To qualify for this option, renewable energy certificate (REC) documentation shall meet the requirements of Section R404.4.

This removes an efficiency-weakening tradeoff added to the base 2024. (RECA)

[Strengthening from base and LECC]

34. Section R408.2.9 Opaque walls is deleted.

This provides details on the new optional credits for low-GWP refrigerants. (LECC)

[Flexibility]

35. A new Section R408.2.12 Refrigerants and Table R408.2.12 Credit Adjustment for Refrigerant GWP Level are added as follows:

R408.2.12 Refrigerants. Projects that select equipment for space heating and *service water heating* that utilize low global warming potential (GWP) or ultra-low GWP refrigerants shall utilize Equation 4-4 to determine available credits:

Equation 4-4

$$EC_{ach} = EC_{base} \times EC_{adj}$$

where:

EC_{ach} = Refrigerant credit achieved for the project.

EC_{base} = Base credit from Table R408.2.

EC_{adj} = Credit adjustment factor from Table R408.2.14.

TABLE R408.2.12 CREDIT ADJUSTMENT FOR REFRIGERANT GWP LEVEL

REFRIGERANT CATEGORY	GWP LIMIT (K _g CO ₂ E)	EC_{adj}
Ultra-low GWP	<10	100%
Low GWP	10 to 150	50%
Other	>150	0%

Along with the amendments above in R401, this adds the optional Passive House compliance path.

[Flexibility]

36. Section R409 Passive House Compliance Option is added as follows:

R409.1 Scope. This section establishes criteria for new *residential buildings* to comply using Passive House certification.

R409.2 Passive House compliance. Compliance based on the Passive House option requires certification in accordance with Section R409.3 or R409.4.

409.3 Passive House Institute US (PHIUS) certification. Achieve certification with the most recent PHIUS+ Passive Building Standard and provide documentation in accordance with Section 409.3.1.

409.3.1 Documentation. Documentation shall be provided to the *code official* demonstrating the following:

1. Prior to the issuance of a *building* permit, a PHIUS+ Design Certification Letter from PHIUS and a list of compliance features.

2. Prior to the issuance of a certificate of occupancy, a copy of the final certification submitted on a form that is *approved* by PHIUS to document compliance with the most recent PHIUS+ Standard.

409.4 Passive House Institute (PHI) certification. Achieve certification with the PHI Passive House Standard and provide documentation in accordance with Section 409.4.1.

409.4.1 Documentation. Documentation shall be provided to the *code official* demonstrating the following:

1. Prior to the issuance of a *building* permit, a signed Design Stage Conditional Assurance Letter from a PHI-accredited Passive House Certifier of intent to certify the *building* and list of compliance features.
2. Prior to the issuance of a certificate of occupancy, a copy of the final report submitted in a Certifiers Assurance Letter that is *approved* by PHI to document compliance with the Passive House Standard.

RESIDENTIAL EXISTING BUILDINGS

This adds a programmable thermostat anytime an HVAC system is replaced or expanded.
(Mountain Cohort)

[Minor strengthening]

37. **Section R501.7 Programmable thermostat** is added as follows:

Section R501.7 Programmable thermostat. *Alterations, additions, and changes of occupancy that involve replacing or expanding a heating or cooling system shall comply with section R403.1.1 Programmable thermostat.*

This amendment allows existing slabs under new additions to remain as-in without insulation if full compliance with other insulation requirements is met. Otherwise, slab insulation requirements could necessitate complete demolition of the slab floor.

[Flexibility] [Cost reductions]

38. **Section R502.2.1 Building thermal envelope** is amended by adding a second exception as follows:

2. For additions where there is an existing slab, slab insulation shall be permitted to be omitted when the minimum ceiling insulation *R-values* and minimum wall insulation *R-values* of Table R402.1.3 are installed.

This exempts small additions from the requirement for efficiency improvements, and on the other hand also adds additional efficiency requirements for very large additions. (LECC)

[Strengthening from base and LECC] [Possible cost reductions]

39. **Section R502.2.5 Additional energy efficiency credit requirements for additions** is amended to read as follows, with exception #1 deleted and the other exceptions to remain:

R502.2.5 Additional energy efficiency credit requirements for additions. *Additions that increase the existing building's total conditioned floor area by 1,000 square feet (93 m²) to 3,500 square feet (325 m²) or by more than 25 percent within any three-year period shall comply with sufficient measures from Table R408.2 to achieve not less than 5 credits. Additions that increase the existing building's total conditioned floor area by greater than 3,500 square feet (325 m²) within any three-year period shall comply with sufficient measures from Table R408.2 to achieve*

not less than 10 credits. *Alterations* to existing buildings that are not part of the *addition* but are permitted with an *addition* shall be permitted to be used to achieve this requirement.

This adds an exception to where improvements to the thermal envelope would otherwise be required. (LECC)

[Flexibility] [Cost reductions]

40. **Section R503.1.1 Building thermal envelope** is amended by adding a new exception as follows:

5. Existing windows or doors that are removed and filled in with a wall assembly.

This amendment allows existing slabs to remain as-in without insulation if full compliance with other insulation requirements is met. Otherwise, slab insulation requirements could necessitate complete demolition of the slab floor.

[Flexibility] [Cost reductions]

41. **Section R503.1.1.2 Roof, ceiling, and attic alterations** is amended by adding a new exception as follows:

5. For alterations where there is an existing slab, slab insulation may be omitted when the minimum ceiling insulation *R-values* and minimum wall insulation *R-values* of Table R402.1.3 are installed.

This clarifies when a “substantial improvement” is substantial enough to warrant additional efficiency, by changing the terminology to “Alterations” and adding a threshold of 50% of the gross floor area affected. (LECC)

[Clarification]

42. **Section R503.1.3 Additional efficiency credit requirements for substantial improvements** is amended to read as follows:

R503.1.5 Additional efficiency credit requirements for substantial improvements.

~~Substantial improvements~~ Alterations where the work area is 50 percent or more of the gross floor area of the *dwelling unit* shall comply with sufficient measures from Table R408.2 to achieve not less than three credits.

Exceptions:

1. *Alterations* that are permitted with an *addition* complying with Section R502.2.5.
2. *Alterations* that comply with Section R405 or R406.
3. ~~Substantial improvements~~ Alterations that do not include the addition or replacement of equipment covered in either Section R403.5 or R403.7.

RESIDENTIAL APPENDICES

The following provisions add the solar-ready code, required by state law.

[Simplification from LECC]

43. **Appendix RB Solar-Ready Provisions–Detached One- and Two-Family Dwellings and Townhouses** is renamed to **Appendix RB Solar-Ready Provisions–Residential Buildings**.

44. **Section RB103.1 General** is amended as follows:

RB103.1 General. New ~~detached one- and two-family dwellings and townhouses~~ residential buildings with not less than 600 square feet (55.7 m²) of roof area oriented between 110 degrees

and 270 degrees of true north or that have a low-slope roof shall comply with Sections RB103.2 through RB103.8.

Exceptions:

1. New residential *buildings* with a permanently installed on-site renewable energy system that provides electricity to the dwelling unit's electrical system.
2. A *building* where all areas of the roof that would otherwise meet the requirements of RB103 are in full or partial shade for more than 70 percent of daylight hours annually.
3. Group R-2, R-3, or R-4 buildings shall meet the requirements of Appendix CB, as amended, instead of this Appendix RB.

45. **Section RB103.2 Construction document requirements for solar-ready zone** is amended as follows:

RB103.2 Construction document requirements for solar-ready zone.

Construction documents shall indicate the location and size of the solar-ready zone, structural design loads for roof dead load and roof live load, and pathways for routing of conduit from the solar-ready zone to the electrical service panel.

The following provisions add the EV-ready code, required by state law.

[Simplification from LECC] [Required by state law]

46. In **Section RE101.1 Definitions**, the following definition is amended:

ELECTRIC VEHICLE (EV). An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles and electric motorcycles, primarily powered by an electric motor that draws current from a *building* electrical service, electric vehicle supply equipment (EVSE), a rechargeable storage battery, a fuel cell, a photovoltaic array, or another source of electric current. Off-road, self-propelled electric mobile equipment, including but not limited to, industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, and boats are not considered electric vehicles.

47. **Section RE101.2 Electric vehicle power transfer infrastructure** is amended as follows:

RE101.2 Electric vehicle power transfer infrastructure. New residential *automobile parking spaces* for ~~residential buildings~~ new one- and two-family dwellings and townhouses shall be provided with *electric vehicle* power transfer infrastructure in accordance with Sections RE101.2.1 through ~~RE101.2.5~~ RE101.2.6. Group R-2, R-3, or R-4 buildings shall meet the requirements of Appendix CG instead of this Appendix RE.

48. **Section RE101.2.1 Quantity** is amended as follows, and both exceptions are deleted:

RE101.2.1 Quantity. New one- and two-family dwellings and townhouses with a designated attached or detached garage or other on-site private parking provided adjacent to the *dwelling unit* shall be provided with one ~~EV-capable, EV ready or EVSE~~ space per *dwelling unit*. ~~R-2 occupancies or allocated parking for R-2 occupancies in mixed-use buildings shall be provided with an EV-capable space, EV ready space or EVSE space for 40 percent of the dwelling units or automobile parking spaces, whichever is less.~~

49. **Section RE101.2.2 EV capable spaces** is deleted.

50. **Section RE101.2.3 EV ready spaces**, item #1, is amended as follows with the other items to remain:

RE101.2.3 EV ready spaces. Each branch circuit serving *EV ready spaces* shall comply with all of the following:

1. Termination at an outlet or enclosure located within ~~6 feet (1828 mm)~~ 3 feet of each *EV ready space* it serves and marked “For electric vehicle supply equipment (EVSE).”.

Exception: An outlet or enclosure shall not be required if a hard-wired EVSE is installed.

51. **Section RE101.2.4 EVSE spaces** is deleted.

52. **Section RE101.2.5 Electrical distribution system capacity** is amended as follows, and item #2 is deleted:

RE101.2.5 Electrical distribution system capacity. The branch circuits and electrical distribution system serving each ~~*EV capable space*, *EV ready space* and *EVSE space*~~ used to comply with Section RE101.2.1 shall ~~comply with one of the following:~~ be sized for a calculated *EV* charging load of not less than ~~6.2~~ 8.3 kVA per ~~*EVSE*, *EV ready space*~~. Where a circuit is shared or managed, it shall be in accordance with NFPA 70.

53. **Section RE101.2.6 Identification** is added as follows:

RE101.2.6 Identification. Construction documents shall designate all *EV ready spaces* and indicate the locations of raceway and/or conduit and termination points serving them.

This adds technical clarity to the demand response section. (LECC)

[Clarification] [Simplification from LECC]

54. **Section RJ10.1 Demand responsive water heating**, exception #1, is amended as follows:

1. Water heaters that are required to provide a constant hot water delivery temperature of 180°F (82°C) or greater.

This adds demand response controls for heating and cooling systems. (Cohort)

[Strengthening]

55. **Section RJ103.1 Demand responsive controls for heating and cooling systems** is added as follows:

RJ103.1.1 Demand responsive controls for heating and cooling systems. Electric heating and cooling systems for *residential buildings* shall be provided with *demand responsive controls* that meet the requirements of Appendix CI Section 101.

The following appendix is the electric-ready code, required by state law (LECC). Note: the base code electric-ready appendix differs too substantially from the required state code to be referenced and amended. Note also: The addition of the last item is to ensure sufficient physical space and air volume for a future heat pump water heater (Cohort).

[Required by law] [Strengthening] [Electric-preferred]

56. **Appendix RK Electric Readiness** is adopted and replaced with the following:

RK101.1 General. The provisions of this section shall be applicable for all new *buildings*, and major renovations and *additions*.

RK102.1 Additional electric infrastructure. *Combustion equipment* in *residential buildings* must meet the requirements of this Appendix RK.

Exceptions:

1. Interior fireplaces that do not serve as a primary source of heating.
2. Exterior fireplaces and firepits.

RK103.1 Combustion equipment. *Combustion equipment* shall be provided with all of the following:

1. A dedicated, appropriately phased branch circuit sized to accommodate *future electric equipment* or appliances to serve a comparable capacity to meet the heating load.
 - 1.1. The branch circuits serving future electric clothes drying equipment and water heaters shall be sized with a rating not less than 240 volts and not less than 30 amperes.

Exception: Water heaters serving multiple *dwelling units* in a R-2 occupancy.
 - 1.2. The branch circuits serving future cooking equipment shall be sized with a rating not less than 240 volts and not less than 40 amperes.
2. An electric receptacle or junction box that meets the requirements of Section RK106.1, and is connected to the electrical panel through the branch circuit. Each electrical receptacle or junction box shall have reasonable access to the *combustion equipment* or dedicated physical space for *future electric equipment* with no obstructions other than the current *combustion equipment*.
3. Where *combustion equipment* is used for space or water heating, dedicated physical space shall be provided for *future electric equipment*, including an electric resistance backup coil for ducted systems, if applicable. Physical space occupied by existing *combustion equipment* or other equipment serving the same load shall be permitted to count towards satisfying the physical space requirement, subject to approval by the *code official*.

RK104.1 Electrical panel space. The electrical panel shall have a reserved space for a minimum two-pole circuit breaker for each branch circuit provided for *future electric equipment* or appliances. The electrical panel shall be sized for the electrical load necessary to meet an equivalent electrical load for any *combustion equipment*. Electrical loads shall be calculated in accordance with the National Electrical Code.

RF105.1 Labeling. The junction box or receptacle and the dedicated circuit breaker space serving *future electric equipment* or appliances in the electrical panel shall be labeled for their intended use.

RK106.1 Adjacency. The electrical receptacle or junction box must be provided within 3 feet of the *combustion equipment* or appliances, or within 3 feet of the dedicated physical space for *future electric equipment* or appliances.

Exception: For *combustion equipment* dedicated to space or water heating, the electrical receptacle or junction box shall be located not more than 6 feet from the *combustion equipment* or the dedicated physical space for *future electric equipment*.

RK107.1 Condensate drain. Where *combustion equipment* for space heating and water heating is installed, a location shall be provided for condensate drainage and shall be noted on the construction drawings.

RK108.1 Water heating equipment space and airflow access requirements. Water heaters with *combustion equipment* shall be located in a space with the following characteristics:

1. Combustion air provided and sized in accordance with Section 2407 of the International Residential Code.
2. Minimum dimensions of 3 feet by 3 feet by 7 feet high.
3. Sufficient airflow access meeting one of the following options:
 - 3.1. Minimum volume of 700 cubic feet (19.8 m³). Volume may include adjacent spaces if air can freely circulate (e.g. without solid barriers or doors).
 - 3.2. Louvered door(s) with a total minimum net free area of 100 square inches, split between high and low placement.
 - 3.3. **Transfer grille(s) or duct(s) to an adjacent space, sized to provide $\geq$ 100 CFM of airflow. Ducts and grills shall be sized to limit pressure drop and avoid excessive fan cycling.**
 - 3.4. Direct ducting to the exterior, sized in accordance with heat pump water heater manufacturers' requirements for intake and exhaust air for a similar-capacity system.

Exception: Water heaters with an input capacity of greater than or equal to 300,000 Btu/h that serve multiple *dwelling units* or *sleeping units*.

DRAFT COMMERCIAL AMENDMENTS FOR 2024 IECC ADOPTION

Version: Explanatory Version 1.2 DRAFT

Version Date: April 27, 2025

About This File: This document contains the regionally-aligned amendments to the 2024 International Energy Conservation Code – Commercial Chapter. This is the “Explanatory” version which includes short notes about each amendment as well as tracked changes (strikeouts and underlines) showing what changed from the base code.

Cohort Background and Goals: The 2024-2025 Metro Regional Building Policy Cohort (the “code cohort”) is an extension and expansion of a previous successful cohort effort. Goals of the cohort are to collaboratively review and adopt the most recent energy code – the 2024 International Energy Conservation Code (IECC) – along with regionally-aligned and consistent supporting amendments. Primary outcomes include reducing energy use and climate emissions in the built environment while balancing affordability and equity; improving region-wide consistency for builders, developers, and contractors; emphasizing flexibility without sacrificing performance; streamlining workload for budget-constrained building departments; and allowing for adjustments in each community while maintaining overall general alignment. Primary participating communities include Boulder County, City of Boulder, Brighton, Broomfield, Berthoud, Denver, Edgewater, Erie, Golden, Lafayette, Longmont, Louisville, Northglenn, Superior, Thornton, and Westminster. The code cohort is expanding to the remainder of the Denver metro area communities in 2025. The code cohort is jointly led and supported by participating local governments, with facilitation and code expertise from Lotus Engineering and Sustainability, the Southwest Energy Efficiency Project, and Shums Coda (with support from Xcel Energy). Funding is provided by participating local governments and by the federal government through a Climate Pollution Reduction Grant (CPRG) to the Denver Regional Council of Governments (DRCOG) for the Decarbonize DRCOG project.

Source Materials and Terminology: These amendments are for the 2024 International Energy Conservation Code, first printing, as published by the International Code Council. Most of the amendments are from the Low Energy and Carbon Code developed by the Colorado Energy Code Board (in draft form as of April 2025, and unofficially denoted here as “LECC”). It also incorporates agreed-upon principles and frameworks from each of the participating cohort communities (denoted here as “Cohort”), and pulls several additional amendments from the previous 2021 IECC code cohort. Minor amendments are from the Model Green Code developed by the Colorado Energy Office (in draft form as of April 2025, and denoted here as “Green”).

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ADOPTING LANGUAGE

Section xx. The International Energy Conservation Code, 2024 Edition, (the "IECC"), as published by the International Code Council, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001, a copy of which is on file and open for inspection in the office of the [city/town/county] clerk, is hereby adopted by reference subject to the additions, amendments, and appendices set forth herein. The subject matter of the IECC includes the design of energy-efficient and high-performance buildings and related energy uses

including mechanical, lighting, power systems, and electric vehicle infrastructure for the purpose of protecting the public health, safety, and welfare. The IECC-Commercial includes appendices CB, CG, CH, and CI. The 2024 IECC, as amended in this Article, shall apply to all property within the [Community]. The IECC is amended as follows.

COMMERCIAL AMENDMENTS

This adopts the solar-ready, EV-ready, electric-ready, and demand response appendices to align with state law and best practices. (LECC but different format)

[Simplification from LECC] [Minor strengthening]

1. **Section C101.2.1 Appendices** is amended as follows:
C101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted. Appendices CB, CG, CH, and CI are hereby adopted.

This requires notification of intent to hire third-party air leakage testing agency and confirmation that third party understands the proper inspection sequence. (LECC)

[Better enforcement]

2. **Section C107.2.2 Building thermal envelope** is amended to read as follows:

C107.2.2 Building thermal envelope. Inspections shall verify the type of insulation, *R-values*, location of insulation, *thermal bridge* mitigation, *fenestration*, *U-factor*, *SHGC* and *VT*, and that *air leakage* controls are installed, as required by the code, *approved* plans and specifications. At the request of the *code official*, a letter or proof of intent to contract with an *approved* third-party testing agency describing the *air barrier* inspection sequencing shall be provided to the *code official* prior to completion of rough framing or insulation inspections, and shall be signed by the *building owner* or the *building owner's* representative.

This adds or modifies definitions necessary for these amendments. (LECC, Cohort)

[Clarification]

3. **Section C202 GENERAL DEFINITIONS** is amended to change or add the following definitions in alphabetical order:

ALL-ELECTRIC BUILDING. A new *building* that contains no permanently-installed *combustion equipment* or plumbing for *combustion equipment*, or an existing *building* that contains no permanently-installed *combustion equipment*.

COMBUSTION EQUIPMENT. Equipment or appliances that use *fuel gas*, *fuel oil*, or any other hydrocarbon-derived fuel or fuel blend to perform functions such as space heating, space cooling, *service water heating* (including pools and spas), cooking, clothes drying, humidification, or lighting. The scope of this definition may be limited to combustion-based space and water heating equipment where specifically indicated. Combustion equipment does not include *emergency power systems* or *standby power systems*.

CORE AND SHELL. The first phase of a commercial project that has the outer *building envelope* constructed and may contain interior lighting and heating and has not received a permanent Certificate of Occupancy.

EMERGENCY POWER SYSTEM. A source of automatic electric power of a required capacity and duration to operate required life safety, fire alarm, detection, and ventilation systems in the event of a failure of the primary power. Emergency power systems are those required for

electrical loads where interruption of the primary power could result in loss of human life or serious injuries.

ENERGY USE INTENSITY (EUI). The metric indicating the total amount of site energy consumed by a *building* in 1 year divided by the gross floor area of the *building*, and reported in kBtu per square foot.

FIRST TENANT FINISH. The first tenant finish(es) in a new structure or *core and shell building* that is credited towards meeting the requirements of the commercial provisions of the energy code.

FUEL GAS. A natural gas, manufactured gas, liquefied petroleum gas, or mixtures of these gases that is burned to produce heat or energy.

FUEL OIL. Kerosene or any hydrocarbon oil having a flash point of not less than 100°F (38°C).

FUTURE ELECTRIC EQUIPMENT. Electrically-powered equipment that could be installed in the future to replace *combustion equipment* to meet a similar end use or load.

MIXED-FUEL BUILDING. A new *building* that contains *combustion equipment* or piping for *combustion equipment*, or an existing *building* that contains *combustion equipment*, in addition to electric loads.

STANDBY POWER SYSTEM. A source of automatic electric power of a required capacity and duration to operate required *building*, hazardous materials, or ventilation systems in the event of a failure of the primary power. Standby power systems are those required for electrical loads where interruption of the primary power could create hazards or hamper rescue or fire-fighting operations.

This specifies which appendices apply.

[Simplification from LECC] [Minor strengthening]

4. **Section C401.2 Application** is amended to read as follows:

C401.2 Application. *Commercial buildings* shall comply with Section C401.2.1 ~~or C401.2.2~~ and Appendix CB, CG, CH, and CI as amended.

This section lists the compliance pathway options. This amendment adds the optional All-Electric and Passive House pathways, and adds an appendix reference. (Cohort)

[Strengthening from base and LECC] [Flexibility]

5. **Section C401.2.1 International Energy Conservation Code** is amended to read as follows, with exception to remain:

C401.2.1 International Energy Conservation Code. *Commercial buildings* shall comply with one of the following:

1. **Prescriptive Compliance.** The Prescriptive Compliance option requires compliance with Sections C402 through C406 and Section C408. *Dwelling units* and *sleeping units* in Group R-2 buildings shall be deemed to be in compliance with this chapter, provided they comply with Sections R406 and Appendix RK as amended.
2. **Simulated Building Performance.** The *Simulated Building Performance* option requires compliance with Section C407.
3. **All-Electric.** The *All-Electric* option requires compliance with Section C411.

4. **Passive House.** The Passive House option requires compliance with Section C412.

This flags that ASHRAE 90.1 is no longer a standalone pathway in this code, and is instead included within Section C407 with some further modifications there.

[Clarification from LECC]

6. **Section C401.2.2 ASHRAE 90.1** is rewritten to read as follows:

C401.2.2 ASHRAE 90.1. ANSI/ASHRAE/IES 90.1 shall not be used as a compliance path under this code except where specifically referenced in Section C407 for performance-based compliance. Where referenced in Section C407, the standard shall be applied as modified by that section.

This deletes a redundant provision already covered in the mechanical code. (LECC)

[Clarification]

7. **Section C402.1.2.1.8 Mechanical equipment penetrations** is deleted in its entirety.

This fixes a construction and maintenance challenge for ceilings above semi-heated spaces. (LECC)

[Upfront cost reduction]

8. **Section C402.1.3.3 Suspended ceilings** is amended to add exceptions as follows:

C402.1.3.3 Suspended ceilings. Insulation installed on suspended ceilings having removable ceiling tiles shall not be considered part of the minimum thermal resistance (R-value) of roof insulation in roof/ceiling construction.

Exceptions: Suspended ceilings with heated plenums over parking garages where access to mechanical systems is required and that meet the following criteria:

1. Insulation is a minimum of R-19 and is supported in a permanent manner by a support no greater than 24 inches on center.
2. The plenum above the parking garage is heated by a heating system whose output capacity does not exceed 12 Btu/H x ft².

This expands the cool roof requirement to Climate Zone 5 to mitigate the urban heat island effect. Note: This doesn't impact solar panels, skylights, mechanical equipment, rooftop amenities, vegetative roofs, etc. and it doesn't apply to roof repairs, recovering, or replacement. (Cohort 1)

[Minor strengthening]

9. **Section C402.4 Roof solar reflectance and thermal emittance**, first sentence, is amended as follows, with the exceptions and other parts of the section to remain:

C402.4 Roof solar reflectance and thermal emittance. Low-slope roofs directly above cooled *conditioned spaces* ~~in Climate Zones 0 through 3~~ shall comply with one or more of the options in Table C402.4.

This clarifies that air barrier details need to be clearly marked on construction drawings for enforceability. (LECC)

[Better enforcement]

10. **Section C402.6.1.1 Air barrier design and documentation requirements** is amended to add a new item #6 to read as follows:

6. The *air barrier* boundary limits and size of the surface area of the *air barrier* (floor, wall, and ceiling or roof), and of the zone or zones to be tested for maximum *building* air infiltration or exfiltration, shall be clearly identified on the *approved construction drawings*.

This fixes a typo in the 2024 IECC. (LECC)

[Clarification]

11. **Section C402.6.1.2 Air barrier construction** item #1 is amended to read as follows:

1. The *air barrier* shall be continuous for all assemblies that comprise the *building thermal envelope* and across the joints and assemblies.

This makes sure that the results of air barrier testing are delivered to the building owner and the code official at a point when corrections could still be made if necessary. (LECC)

[Better enforcement]

12. **Section C402.6.2.3 Building thermal envelope design and construction verification criteria** item #2 is amended to read as follows:

2. Inspection of continuous *air barrier* components and assemblies shall be conducted during construction to verify compliance with the requirements of Section C402.6.2.3.1 and C402.6.2.3.2. If conducted by an *approved* third-party, the inspection shall comply with the protocols established in Section C402.6.1.1, and the *air barrier* and air sealing inspection report shall be provided to the *building owner* or owner's authorized agent and the *code official* at the time of rough framing or insulation inspection. The *air barrier* shall be provided with access for inspection and repair.

This clarifies that heat pumps need controls that limit the supplemental heat to just the times and situations when the heat pump can't meet the heating need. (LECC)

[Clarification] [Minor simplification from LECC]

13. **Section C403.4.1.1 Heat pump supplementary heat** is amended as follows:

C403.4.1.1 Heat pump supplementary heat.

Heat pumps having supplementary ~~electric resistance~~ heat shall have controls that limit supplemental heat operation to only those times when one of the following applies:

1. The vapor compression cycle cannot provide the necessary heating energy to satisfy the thermostat setting.
2. The heat pump is operating in defrost mode.
3. The vapor compression cycle malfunctions.
4. The thermostat malfunctions.

This more clearly defines which type of equipment is exempted. (LECC)

[Clarification]

14. **Section C403.5 Economizers** exception #7 is amended to read as follows:

1. ~~Direct expansion~~ Fan coils or unitary equipment with a capacity less than 54,000 Btu/h (15.8 kW) and ~~multiple stages of compressor capacity~~ installed with a dedicated outdoor air system.

This disallows piping insulation protection that can easily degrade over time. (LECC)

[Technical functionality]

15. **Section C403.13.3.1 Protection of piping insulation** is amended to read as follows:

C403.13.3.1 Protection of piping insulation. Piping insulation exposed to the weather shall be protected from physical damage, including that caused by sunlight, moisture, equipment maintenance, and wind. The protection shall provide shielding from solar radiation that can cause degradation of the material. The protection shall be removable and reusable for not less than 6 inches (150 mm) from the connection to the equipment piping for maintenance. Adhesive tape and paint products applied to HVAC system insulating materials, and similar applications that require maintenance shall not be permitted as a means of insulation protection, although such products and applications may still be used for other purposes where allowed or required by other codes.

This eases the requirements for daylight-responsive lighting controls, reducing upfront costs. (LECC)

[Upfront cost reduction]

16. **Section C405.2.4 Daylight responsive controls** is amended to read as follows, with exceptions to remain:

C405.2.4 Daylight responsive controls. *Daylight responsive controls* complying with Section C405.2.4.1 shall be provided to control the *general lighting* within *daylight zones* in the following spaces:

1. Spaces with a total of more than ~~75~~ 150 watts of *general lighting* within primary sidelit *daylight zones* complying with Section C405.2.4.2.
2. Spaces with a total of more than ~~150~~ 300 watts of *general lighting* within sidelit *daylight zones* complying with Section C405.2.4.2.
3. Spaces with a total of more than ~~75~~ 150 watts of *general lighting* within toplit *daylight zones* complying with Section C405.2.4.3.

This corrects an oversight by saying demand-responsive lighting controls have to be able to communicate with the utility. (LECC)

[Clarification]

17. **Section C405.2.8.1 Demand responsive lighting controls function** is amended to add a new item #5 as follows:

5. Receiving and responding to a utility demand response signal from the specific utility providing electric power to the building.

This disallows gas-powered lighting. Gas lighting is rarely used anymore, but this adds assurance that it can't be. (Cohort 2021)

[Minor strengthening]

18. **Section C405.5.3 Gas lighting** is amended to read as follows:

C405.5.3. Gas lighting. Gas fired lighting appliances ~~shall not be equipped with continuously burning pilot ignition systems.~~ are prohibited.

This removes the requirement for automatic receptacle controls (e.g. occupancy sensors), since their energy savings aren't high enough to justify their expense and complexity. (LECC)

[Upfront cost reductions]

19. **Sections C405.12 Automatic receptacle control** and **C405.12.1 Automatic receptacle control function** are deleted in their entirety.

This raises the building size threshold for energy monitoring capability from 10,000 to 25,000 sq ft, to reduce costs for new small businesses while improving alignment with benchmarking policies. (LECC)

[Upfront cost reductions]

20. **Section C405.13 Energy monitoring** is amended to read as follows, with the exceptions to remain:

C405.13 Energy monitoring. New *buildings* with a gross *conditioned floor area* of not less than ~~10,000~~ 25,000 square feet (2,323.6 m²) shall be equipped to measure, monitor, record, and report energy consumption in accordance with Sections C405.13.1 through C405.13.6 for load categories indicated in Table C405.13.2 and Sections C405.13.7 through C405.13.11 for end-use categories indicated in Table C405.13.8.

This specifies separate submetering for EV charging, to help building owners more easily understand building loads and comply with benchmarking policies. (Cohort 2021)

[Technical functionality]

21. **Table C405.13.2 ENERGY USE CATEGORIES** is amended to add a new line at the end:

<u><i>Electric vehicle charging</i></u>	<u><i>Electric vehicle charging loads.</i></u>
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This removes mandatory on-site renewable energy requirements which, given our highly renewable grid, are high-cost and low-benefit. It's more appropriate in Colorado to leave solar as an option for meeting the additional credits rather than a straight requirement. (LECC)

[Cost reduction] [Simplification from base]

22. **Section C405.15 Renewable energy systems** and all of **Sections C405.15.1** through **C405.15.4** are deleted in their entirety.

This combines the efficiency, renewable, and load management credits into one “bucket” and adds electric-preferred differentials. (LECC)

[Simplification from base and LECC]

23. **Section C406.1 Compliance** is amended as follows:

Section C406.1 Compliance. *Buildings* shall comply as follows:

1. *Buildings* with greater than 2,000 square feet (186 m²) of *conditioned floor area* shall comply with Section C406.1.1.
~~*Buildings with greater than 5,000 square feet (465 m²) of conditioned floor area shall comply with Sections C406.1.1 and C406.1.2.*~~
2. Build-out construction greater than 1,000 square feet (93 m²) of *conditioned floor area* that does not have final lighting or final HVAC systems installed under a prior building permit shall comply with Section ~~C406.1.1.2~~ C406.1.1.3.

Exceptions: Core and shell *buildings* where not less than 20 percent of the net floor area is without final lighting or final HVAC that comply with the following:

1. *Buildings* with greater than 5,000 square feet (465 m²) of *conditioned floor area* shall comply with Section ~~C406.1.2~~ C406.1.1.
2. Portions of the *building* where the net floor area is without final lighting or final HVAC shall comply with Section ~~C406.1.1.2~~ C406.1.1.3.
3. Portions of the *building* where the net floor area has final lighting and final HVAC systems shall comply with Section C406.1.1.

24. **Section C406.1.1 Additional energy efficiency credit requirements** is renamed **Additional energy credit requirements** and replaced as follows:

C406.1.1 Additional energy credit requirements. *Buildings* shall comply with measures from Sections C406.2 and C406.3 to achieve not less than the number of required ~~efficiency energy~~ credits in accordance with Sections C406.1.1.1 or C406.1.1.2 as applicable. Where a project contains multiple occupancies, the total required energy credits from each building occupancy shall be weighted by the gross *conditioned floor area* to determine the weighted-average project energy credits required. Accessory occupancies shall be included with the primary occupancy group for the purposes of Section C406.

Exceptions:

1. Portions of *buildings* devoted to manufacturing or industrial use.
2. ~~Where a *building* achieves more renewable and load management credits in Section C406.3 than are required in Section C406.1.2, surplus credits shall be permitted to reduce the required energy efficiency credits as follows:~~

$$EEC_{red} = EEC_{tbl} - \{ \text{the lesser of: } [SRLM_{lim}, SRLM_{adj} \times (RLM_{ach} - RLM_{req})] \}$$

(Equation 4-12)

where:

~~EEC_{red} = Reduced required energy efficiency credits.~~

~~EEC_{tbl} = Required energy efficiency credits from Table C406.1.1(1).~~

~~$SRLM_{lim}$ = Surplus renewable and load management credit limit from Table C406.1.1(2).~~

~~$SRLM_{adj}$ = 1.0 for all electric or all renewable buildings (excluding emergency generation); 0.7 for buildings with fossil fuel equipment (excluding emergency generation).~~

~~RLM_{ach} = Achieved renewable and load management credits from Section C406.3.~~

~~RLM_{req} = Required renewable and load management credits from Section C406.1.2.~~

C406.1.1.1 Mixed fuel buildings. *Buildings* that use *combustion equipment* for space heating or *service water heating*, other than for supplemental heating in accordance with Section C403.4.1.1, shall achieve the number of required energy credits in Table C406.1.1.1, based on building occupancy group and *conditioned floor area*. Credit ID R01 shall receive no more than the maximum credit value indicated in column #4 of the table.

Exceptions: *Buildings* that meet any of the following criteria shall achieve the number of required energy credits in accordance with Section C406.1.1.2:

1. *Buildings* that use *combustion equipment* only for specialized *service water heating* uses where determined by and approved by the *code official*, including but not limited to water heating for pools or spas.
2. Low-energy *buildings* complying with Section C402.1.1.1.
3. Portions of *buildings* in Group U, Group S, Group F, or Group H occupancies.

TABLE C406.1.1.1 CREDIT REQUIREMENTS FOR MIXED FUEL BUILDINGS

BUILDING OCCUPANCY GROUP	CONDITIONED FLOOR AREA 2,000-4,999 FT ²	CONDITIONED FLOOR AREA ≥ 5,000 FT ²	MAXIMUM CREDITS FROM ID R01
R-2, R-4, and I-1	113	146	5
I-2	54	82	26
R-1	108	141	37

B	91	138	35
A-2	90	100	5
M	78	126	5
E	84	132	32
S-1 and S-2	82	172	35
All Other	45	89	6

C406.1.1.2 All other buildings. *Buildings that do not use combustion equipment for space heating or service water heating, other than for supplemental heating in accordance with Section C403.4.1.1, shall achieve the number of required energy credits in Table C406.1.1.2, based on building occupancy group and conditioned floor area. Credit ID R01 shall receive no more than the maximum credit value indicated in column #4 of the table.*

TABLE C406.1.1.2 CREDIT REQUIREMENTS FOR ALL OTHER BUILDINGS

BUILDING OCCUPANCY GROUP	CONDITIONED FLOOR AREA 2,000-4,999 FT ²	CONDITIONED FLOOR AREA ≥ 5,000 FT ²	MAXIMUM CREDITS FROM ID R01
R-2, R-4, and I-1	90	123	5
I-2	43	71	26
R-1	86	119	37
B	73	120	35
A-2	72	82	5
M	62	110	5
E	67	115	32
S-1 and S-2	82	172	35
All Other	36	80	6

25. **Section C406.1.1.2** is renumbered as **Section C406.1.1.3** and items #1 and #3 are amended as follows, with item #2 remaining unchanged:

C406.1.1.3 Building core/shell and build-out construction. Where separate permits are issued for *core and shell buildings* and build-out construction, compliance shall be ~~in accordance with the following requirements as follows and summarized in Table C406.1.1.3:~~

1. *Core and shell buildings* or portions of *buildings* shall comply with one of the following:
 - 1.1. Where the permit includes a ~~central HVAC system or service water heating system with chillers, heat pumps, boilers, service water heating equipment, or loop pumping systems with heat rejection;~~ space heating or service water heating system that uses combustion equipment, the project shall achieve not less than 50 percent of the energy credits required by Section C406.1.1.1 ~~in accordance with using measure in~~ Sections C406.2 and C406.3.
 - 1.2. Where the permit includes a space heating or service water heating system that does not use combustion equipment, or meets one of the exceptions in C406.1.1.1, the project shall achieve not less than 50 percent of the energy credits required by Section C406.1.1.2 using measures in Section C406.2 and C406.3.
 - 1.3. ~~Alternatively,~~ Where neither a space heating nor a service water heating system is included in the permit, the project shall achieve not less than 33 percent of the energy credits required by Section C406.1.1.1.
2. For *core and shell buildings* or portions of *buildings*, the energy credits achieved shall be subject to the following adjustments:

- 2.1. Lighting measure credits shall be determined only for areas with final lighting installed.
- 2.2. Where HVAC or service water heating systems are designed to serve the entire building, full HVAC or service water heating measure credits shall be achieved.
- 2.3. Where HVAC or service water heating systems are designed to serve individual areas, HVAC or service water heating measure credits achieved shall be reduced in proportion to the floor area with final HVAC systems or final service water heating systems installed.
3. Build-out construction shall be deemed to comply with Section C406.1 where one of the following applies:
 - 3.1. Where ~~heating and cooling generation~~ space heating or *service water heating* is provided by a previously installed central system that uses *combustion equipment*, the energy credits achieved in accordance with Section C406.2 and C406.3 under the build-out project are not less than 33 percent of the credits required by Section C406.1.1.1.
 - 3.2. Where space heating or *service water heating* is provided by a previously installed system that does not use *combustion equipment* or that meets one or more exceptions in C406.1.1.1, the energy credits achieved in accordance with Section C406.2 under the build-out project are not less than 33 percent of the credits required by Section C406.1.1.2.
 - 3.3. ~~Where heating and cooling generation is provided by an HVAC system installed in the build-out,~~ space heating or *service water heating* is provided in the build-out by a system that uses *combustion equipment*, the build-out project shall achieve not less than 66 percent of the credits required by Section C406.1.1.1 in accordance with Section C406.2 and C406.3.
 - 3.4. Where space heating or *service water heating* is provided in the build-out by a system that does not use *combustion equipment* or that meets one or more exceptions in C406.1.1.1, the energy credits achieved in accordance with Section C406.2 and C406.3 under the build-out project are not less than 66 percent of the credits required by Section C406.1.1.2.
 - 3.5. Where the *core and shell building* is was *approved* in accordance with Section C407 under the 2021 IECC ~~or later~~.
4. Where a *core and shell* or build-out project is required to achieve less than 100 percent of the energy credits required by Section C406.1.1.1 or C406.1.1.2, the maximum allowable credit value from Credit ID R01 shall be reduced in proportion to the percentage of total required energy credits.

**TABLE C406.1.1.3 BUILDING CORE/SHELL AND BUILD-OUT
CONSTRUCTION SUMMARY**

CATEGORY	CONDITION FOR SPACE AND WATER HEATING	ENERGY CREDIT REQUIREMENTS
Core and shell buildings	With combustion equipment	≥ 50% of required credits (C406.1.1.1)
	Without combustion equipment or meeting exceptions	≥ 50% of required credits (C406.1.1.2)
	No space heating or service water heating in permit	≥ 33% of required credits (C406.1.1.1)

Build-out construction	Using a previously installed central system with combustion	≥ 33% of required credits (C406.1.1.1)
	Using a previously installed system without combustion	≥ 33% of required credits (C406.1.1.2)
	Build-out system uses combustion equipment	≥ 66% of required credits (C406.1.1.1)
	Build-out system does not use combustion or meets exceptions	≥ 66% of required credits (C406.1.1.2)
	Core and shell building previously <i>approved</i>	Must comply with C407

This was integrated into the other credits section, to reduce the number of tables and calculations. (LECC)

[Simplification from base]

26. **Section C406.1.2 Additional renewable and load management credit requirements** and Table C406.1.2 are deleted in their entirety.

This disallows extra credit for efficient commercial kitchen equipment since it is already required by Colorado's appliance standards law. (Cohort)

[Clarification]

27. **Section C406.2.6.2 Q02 Efficient commercial kitchen equipment** is deleted in its entirety, along with its references in Tables C406.2(1) through C406.2(9).

This changes the focus of the renewable energy credit to only onsite resources. (Cohort)

[Simplification from base and LECC] [Minor strengthening]

28. **Section C406.3.1 R01 Renewable energy** is amended as follows:

C406.3.1 R01 Renewable Energy. Projects installing on-site renewable energy systems with a capacity of at least 0.1 watts per gross square foot (1.08 W/m²) of building area ~~or securing off-site renewable energy~~ shall achieve energy credits for this measure calculated as follows:

$$EC_R = EC_{0.1} \times (R_t + R_{eff} - R_{ex}) / (0.1 \times PGFA) \quad \text{Equation 4-28}$$

where:

EC_R = Section C406.3.1 R01 energy credits achieved for this project.

$EC_{0.1}$ = Section C406.3.1 R01 base credits from Tables C406.2(1) through C406.2(9).

R_t = Actual total rating of on-site renewable energy systems (W).

~~R_{eff} = Actual total equivalent rating of off-site renewable energy contracts (W), calculated as follows:~~

~~$$R_{eff} = TRE / (REN \times 20)$$~~

~~Where:~~

~~TRE = Total off-site renewable electric energy in kilowatt-hours (kWh) that is procured in accordance with Section C406.2.8.1.~~

~~REN = Annual off-site renewable electrical energy from Table C406.2.8.1.1, in units of kilowatt-hours per watt of array capacity.~~

R_{ex} = Rating (W) of renewable energy resources capacity excluded from credit calculated as follows:

$$R_{ex} = RR_x + RR_c$$

where:

RR_x = Rating of on-site renewable energy resources used to meet any exceptions of this code (W).

RR_c = Rating of on-site renewable energy resources used to achieve other energy credits in Section C406 (W).

PGFA = Project gross floor area (ft²). Where renewable requirements, exceptions, or credits are expressed in annual kWh or Btu rather than W of output capacity, they shall be converted as 3,413 Btu = 1 kWh and converted to W equivalent capacity.

This changes the Simulated Building Performance Path to use ASHRAE Appendix G. (LECC)

[Simplification from LECC] [Partial strengthening from base and LECC]

29. **Section C407 Simulated Building Performance** is replaced with the following:

Section C407 SIMULATED BUILDING PERFORMANCE

C407.1 Scope. This section establishes criteria for demonstrating compliance using simulated building performance in accordance with Section 4.2.1.1 of ANSI/ASHRAE/IES Standard 90.1, Normative Appendix G, as modified by Informative Appendix I for Site Energy and as further modified by this code.

This maintains the IECC table of mandatory items. (LECC)

[Simplification from LECC]

Section C407.2 Mandatory requirements is replaced with the following:

C407.2 Mandatory requirements. Compliance under the simulated building performance path of Section C407 requires compliance with the sections of this code identified in Table C407.2 as amended, superseding Section G1.2.1 of ANSI/ASHRAE/IES Standard 90.1, Normative Appendix G.

This syncs two items in the table with the LECC's version.

[Simplification from LECC]

Table C407.2 Requirements for Simulated Building Performance is amended to add a new line as follows, and to delete C406.1.2 Additional renewable and load management credit requirements:

<u>C403.4.6</u>	<u>Demand Response</u>
C406.1.2	Additional renewable and load management credit requirements

This changes the metric for the Simulated Building Performance path to site energy since it is fuel-neutral and less variable over geographies and time. (LECC)

[Simplification from LECC]

C407.3 Compliance based on site energy. Buildings shall comply with either Section C407.3.1 Site energy reduction or C407.3.2 Fixed site *energy use intensity* target.

C407.3.1 Site energy reduction. Buildings shall comply with Section 4.2.1.1 of ANSI/ASHRAE/IES Standard 90.1, Normative Appendix G, as modified by Informative Appendix I for Site Energy and as further modified by this code.

C407.3.1.1 Building performance factors. Table 4.2.1.1 Building Performance Factor (BPF) of ANSI/ASHRAE/IES Standard 90.1 is replaced with Table C407.3.1.1. *Mixed fuel buildings* that use *combustion equipment* for space heating or *service water heating*, other than for supplemental heating in accordance with Section C403.4.1.1, shall use the appropriate building performance factor under BPF – Mixed Fuel. All other buildings shall use the appropriate building performance factor under BPF – All Others.

Exceptions: *Buildings* that meet any of the following criteria may use the building performance factors under BPF – All Others:

1. *Buildings* that use *combustion equipment* only for specialized *service water heating* uses where determined by and approved by the *code official*, including but not limited to water heating for pools or spas.
2. Low-energy *buildings* complying with Section C402.1.1.1.
3. Portions of *buildings* in Group U, Group S, Group F, or Group H occupancies.

TABLE C407.3.1.1 BUILDING PERFORMANCE FACTOR (BPF), SITE ENERGY

BUILDING TYPE	BPF – MIXED FUEL	BPF – ALL OTHERS
Multifamily (R-2, R-4)	0.47	0.63
Healthcare/hospital	0.47	0.63
Hotel/motel	0.50	0.66
Office	0.39	0.52
Restaurant	0.52	0.69
Retail	0.35	0.47
School	0.38	0.50
Warehouse	0.28	0.37
All others	0.43	0.57

C407.3.1.2 Energy conversion factors. Table G2.1 of ANSI/ASHRAE/IES Standard 90.1 is replaced with Table C407.3.1.1.

C407.2.1.2 ENERGY CONVERSION FACTORS

UNITS	SITE ENERGY, BTU/UNIT	BUILDING PROJECT ENERGY SOURCE
kWh	3,412	Electricity
Therm (GJ)	100,000	Natural Gas
Therm (GJ)	100,000	Propane
Gallon (L)	137,600	Distillate fuel oil

This adds an option for certain common building types to hit one fixed number instead of a certain percentage reduced from a baseline. The EUI targets are based on cohort members with similar language, but adjusted to have an electric-preferred differential. (LECC)

[Simplified from LECC] [Strengthened from base and LECC]

C407.3.2 Fixed performance target modeling procedure. Eligible *building* types listed in Table C407.3.2 may demonstrate compliance by achieving the site EUI target identified in Table C407.3.2. The proposed design performance shall be demonstrated using the energy modeling procedures, schedules, and loads for the proposed design in ANSI/ASHRAE/IES Standard 90.1 Normative Appendix G as modified by Informative Appendix I for Site Energy and as further modified by this code. *Buildings* with multiple occupancy types listed in Table C407.3.2 shall develop a site EUI performance target based on an area-weighted average EUI calculated by the floor area of each occupancy type. *Mixed fuel buildings* that use *combustion equipment* for space heating or *service water heating*, other than for supplemental heating in accordance with Section C403.4.1.1, shall use the appropriate target in Mixed Fuel – Site EUI Target. All other buildings shall use the appropriate target in All Others – Site EUI Target.

Exceptions: *Buildings* that meet any of the following criteria may use the building performance factors under BPF – All Others:

1. *Buildings* that use *combustion equipment* only for specialized *service water heating* uses where determined by and approved by the *code official*, including but not limited to water heating for pools or spas.
2. Low-energy *buildings* complying with Section C402.1.1.1.
3. Portions of *buildings* in Group U, Group S, Group F, or Group H occupancies.

C407.3.2.1 Excluded energy use. Energy used for data centers, EV charging, swimming pools, or parking areas is permitted to be excluded from the total site EUI calculation of the building, provided that those sources of energy use are separately metered.

C407.3.2.2 On-site renewable energy limit. On-site renewable energy is permitted to offset not more than 5 percent of the building’s site EUI.

TABLE C407.3.2 FIXED EUI PERFORMANCE TARGETS

BUILDING AREA TYPE	MIXED FUEL – SITE EUI TARGET (KBTU/FT ² ×YR)	ALL OTHERS – SITE EUI TARGET (KBTU/FT ² ×YR)
Multifamily	24	32
Healthcare/hospital (General Medical & Surgical)	116	155
Healthcare (other)	44	59
Hotel/motel	26	35
Office	30	40
Restaurant	150	200
Retail	30	40
School	25	34
Non-refrigerated Warehouse	8	11

This adds a backstop to the Simulated Building Performance pathway. (Cohort)

[Potential strengthening from base and LECC]

C407.4 Performance backstop. All elements of the *building* envelope and HVAC system must at a minimum meet the mandatory requirements of ASHRAE Standard 90.1-2016, Sections 5.5 and 6.8. No individual component tradeoffs below these prescriptive requirements will be allowed in the proposed *building* performance model. Exceptions to the 40 percent window-to-wall area in Section 5.5.4.2 of ASHRAE 90.1 2022 Appendix G may be approved by the *code official* provided that the project can still meet the required building energy performance requirements.

This adds a “reserved” (blank) section so that the numbering aligns with the LECC.

[Clarification]

30. **Section C410 Reserved** is added as follows:

C410 Reserved. This section is reserved for future use.

This adds an optional All-Electric compliance pathway. (Green)

[Flexibility]

31. **Section C411 All-electric compliance pathway** is added as follows:

C411 ALL-ELECTRIC COMPLIANCE PATHWAY

C411.1 Application. New *commercial buildings* shall be *all-electric buildings* and comply with Sections C402 through C405, Section C408, and Sections C411.2 through C411.6.

Exceptions:

1. *Fuel gas* or *fuel oil* shall be permitted where it has been demonstrated to the code official that use of *fuel gas* or *fuel oil* is required by an applicable law or regulation.
2. *Fuel gas* or *fuel oil* shall be permitted for an *emergency power system* or a *standby power system*.

C411.2 Electric resistance heating equipment. The sole use of electric resistance equipment and appliances for space and water heating shall be prohibited other than for *buildings* or portions of *buildings* that comply with one or more of Sections C411.2.1 through C411.2.8.

C411.2.1 Low space heating capacity. Electric resistance appliances or equipment shall be permitted in *buildings* or areas of *buildings* not served by a mechanical cooling system and with a total space heating capacity not greater than 4.0 Btu/h (1.2 watts) per square foot of *conditioned space*.

C411.2.2 Small systems. *Buildings* in which electric resistance appliances or equipment comprise less than 5 percent of the total system heating capacity or serve less than 5 percent of the *conditioned floor area*.

C411.2.3 Kitchen makeup air. Makeup air for commercial kitchen exhaust systems required to be tempered by Section 508.1.1 of the International Mechanical Code is permitted to be heated by electric resistance.

C411.2.4 Freeze protection. The use of electric resistance heat for freeze protection shall comply with the following:

1. Space heating systems sized for spaces with indoor design conditions of not greater than 40°F and intended for freeze protection, including temporary systems in unfinished spaces, shall be permitted to use electric resistance. The *building thermal envelope* of any such space shall be insulated in accordance with Section C402.1 of the International Energy Conservation Code.
2. Freeze protection systems shall comply with Section C403.13.3 of the International Energy Conservation Code.

C411.2.5 Preheating of outdoor air. Hydronic systems without energy recovery *ventilation* and that do not use freeze protection fluids shall be permitted to utilize electric resistance to temper air to not more than 40°F. All systems with energy recovery *ventilation* shall be permitted to utilize electric resistance to preheat outdoor air to defrost or temper air entering the energy recovery device and shall comply with one of the following:

1. Where the space is mechanically humidified or has a process application that will maintain the space above 30 percent relative humidity when the outside temperature is not greater than 25°F and the system recovers latent energy, the outdoor air shall not be preheated to greater than 25°F.
2. For sensible-only heat recovery exchangers, outdoor air shall not be preheated to greater than 25°F.
3. For all other systems, outdoor air shall not be preheated to greater than 5°F.

C411.2.6 Small buildings. *Buildings* with a *conditioned floor area* of not more than 250 square feet and not served by a mechanical space cooling system shall be permitted to use electric resistance appliances or equipment for space heating.

C411.2.7 Supplemental heat. Electric resistance heat shall be permitted as supplemental heat where installed with heat pumps sized in accordance with Section C411.3 and provided with controls in accordance with Section C403.4.1.1.

C411.2.8 Specific conditions. Portions of *buildings* or specific equipment and appliances, subject to approval by the *code official*, that require electric resistance heating and cannot practicably be served by electric heat pumps.

C411.3 Heat pump sizing for space heating. Heat pump space heating systems shall be sized to meet the *building* heating load at the greater of 0°F or the 99 percent annual heating dry-bulb for the nearest weather station provided in the latest edition of the ASHRAE Handbook of Fundamentals. The heat pump space heating system shall not require the use of supplemental electric heat at or above this temperature other than for defrosting.

C411.4 Heat pump sizing for water heating. Heat pump *service water heating* systems shall be sized to meet not less than the *building service water heating* load at the greater of 15°F or the 99 percent annual heating dry-bulb for the nearest weather station provided in the latest edition of the ASHRAE Handbook of Fundamentals. Supplemental electric heat shall not be required at or above this temperature other than for temperature maintenance in recirculating systems and defrosting.

C411.5 Heating outside a building. Systems for heating outside a *building* shall comply with Section C403.13.1.

C411.6 Low-capacity cooling equipment. Air conditioners with capacities less than 240,000 Btu/h (70 kW) shall be electric heat pump equipment sized and configured to provide both space cooling and space heating.

This adds an optional Passive House compliance pathway. (Green)

[Flexibility] [Possible strengthening from base and LECC]

32. Section C412 Passive House compliance pathway is added as follows:

C412 PASSIVE HOUSE COMPLIANCE PATHWAY

C412.1 Scope. This section establishes criteria for compliance using Passive House Certification. New *commercial buildings* shall achieve Passive House certification in accordance with Sections C412.2 or C412.3.

C412.2 Passive House Institute US (PHIUS) Certification. New *commercial buildings* shall achieve certification with the PHIUS CORE COMM Passive Building Standard and provide documentation in accordance with Section C412.2.1.

C412.2.1 Documentation. Documentation shall be provided to the *code official* demonstrating the following:

1. Prior to the issuance of a *building* permit, documentation of a PHIUS CORE COMM Certification Contract from PHIUS and a list of compliance features.

2. Prior to the issuance of a certificate of occupancy, a copy of the final report submitted on a form that is *approved* by PHIUS to document compliance with the PHIUS CORE COMM Standard.

C412.3 Passive House Institute (PHI) Certification. New *commercial buildings* shall achieve certification with the PHI Passive House Standard and provide documentation in accordance with Section 412.3.1.

C412.3.1 Documentation. Documentation shall be provided to the *code official* demonstrating the following:

1. Prior to the issuance of a *building* permit, signed documentation from a PHI accredited Passive House Certifier of intent to certify the *building* and a list of compliance features.
2. Prior to the issuance of a certificate of occupancy, a copy of the final report submitted on a form that is *approved* by PHI to document compliance with the Passive House Standard.

This makes conforming amendments to this section so it aligns with the changes in C407.
(Cohort)

[Clarification]

33. **Section C502.2 Change in space conditioning**, exception #2, is amended as follows:

2. Where the simulated building performance option in Section C407 is used to comply with this section, the annual ~~energy cost~~ site energy use of the *proposed design* shall be not greater than 110 percent of the annual ~~energy cost~~ site energy use otherwise permitted by Section ~~C407.2~~ C407.3

This clarifies that programmable thermostat controls are required anytime an HVAC system is replaced or expanded. (Mountain Cohort 1)

[Clarification]

34. **Section C502.3.3.1 Thermostatic controls** is added as follows:

C502.3.3.1 Thermostatic controls. *Additions* that involve replacing or expanding a heating or cooling system shall comply with section C403.4.1 Thermostatic controls.

This makes conforming amendments to this section so it aligns with the changes in C407.
(Cohort)

[Clarification]

35. **Section C502.3.7 Additional energy efficiency credit requirements** is amended as follows, with the exceptions to remain:

C502.3.7 Additional energy efficiency credit requirements. *Additions* shall comply with sufficient measures from Sections C406.2 and C406.3 to achieve not less than 50 percent of the number of required efficiency credits from Table ~~C406.1.1(1)~~ C406.1.1.1 or Table C406.1.1.2 as applicable based on building occupancy group and ~~climate zone~~ combustion equipment. Where a project contains multiple occupancies, credits from Table ~~C406.1.1(1)~~ C406.1.1.1 or Table C406.1.1.2 as applicable for each building occupancy shall be weighted by the gross floor area to determine the project weighted average energy credits required. Accessory occupancies shall be included with the primary occupancy group for purposes of this section. *Alterations* to the existing building that are not part of the *addition*, but are permitted with an *addition*, shall be permitted to be used to achieve the required credits.

These makes conforming amendments to this section so it aligns with the changes in C407.

(Cohort)

[Clarification]

36. **Section C503.2.2 Vertical fenestration** is amended as follows:

C503.2.2 Vertical fenestration. The addition of *vertical fenestration* that results in a total building *fenestration* area less than or equal to that specified in Section C402.5.1 shall comply with Section C402.1.4, C402.5.3 or C407. The addition of *vertical fenestration* that results in a total building *fenestration* area greater than Section C402.5.1 shall comply with Section C402.5.1.1 for the space adjacent to the new fenestration only. *Alterations* that result in a total building *vertical fenestration* area exceeding that specified in Section C402.5.1.1 shall comply with Section C402.1.4 or C407. Provided that the vertical fenestration area is not changed, using the same vertical fenestration area in the *standard reference design* as the *building* prior to *alteration* shall be an alternative to using: ~~the vertical fenestration area specified in Table C407.4.1(1).~~

1. The proposed vertical fenestration area, where the proposed vertical fenestration area is less than 40 percent of the above-grade wall area; or
2. Forty percent of the above-grade wall area, where the proposed vertical fenestration area is 40 percent or more of the above-grade wall area.

37. **Section C503.2.3 Skylight area** is amended as follows:

C503.2.3 Skylight area. New *skylight* area that results in a total building *skylight* area less than or equal to that specified in Section C402.5.1 shall comply with Section C402.1.4, C402.5 or C407. The addition of *skylight* area that results in a total building skylight area greater than Section C402.5.1 shall comply with Section C402.5.1.2 for the space adjacent to the new skylights. *Alterations* that result in a total building skylight area exceeding that specified in Section C402.5.1.2 shall comply with Section C402.1.4 or C407. Provided that the skylight area is not changed, using the same skylight area in the *standard reference design* as the *building* prior to *alteration* shall be an alternative to using: ~~the skylight area specified in Table C407.4.1(1).~~

1. The proposed skylight area, where the proposed skylight area is less than that permitted by Section C402.1; or
2. The area permitted by Section C402.1; where the proposed skylight area exceeds that permitted by Section C402.1.

38. **Section C503.6 Additional energy efficiency credit requirements for alterations** is amended as follows with the exceptions to remain:

C503.6 Additional energy efficiency credit requirements for alterations. *Alterations* that are *substantial improvements* shall comply with measures from Sections C406.2, C406.3 or both to earn the number of required credits specified in Table ~~C406.1.1(1)~~ C406.1.1.1 or Table C406.1.1.2 as applicable based on building occupancy group and ~~climate zone~~ combustion equipment.. Where a project contains multiple occupancies, credits specified in Table ~~C406.1.1(1)~~ C406.1.1.1 or Table C406.1.1.2 as applicable for each building occupancy shall be weighted by the gross *conditioned floor area* to determine the weighted average credits required. Accessory occupancies, other than Group F or H, shall be included with the primary occupancy group for the purposes of this section.

This clarifies that programmable thermostat controls are required anytime an HVAC system is replaced or expanded. (Mountain Cohort 1)

[Clarification]

39. **Section C503.7 Thermostatic controls** is added as follows:

C503.7 Thermostatic controls. *Alterations* that involve replacing or expanding a heating or cooling system shall comply with section C403.4.1 Thermostatic controls.

These makes conforming amendments to this section so it aligns with the changes in C407. (Cohort)

[Clarification]

40. **Section C505.1 General**, exception, is amended as follows:

Where the simulated building performance option in Section C407 is used to comply with this section, the annual ~~energy cost~~ site energy use of the proposed design shall be not greater than 110 percent of the annual ~~energy cost~~ site energy use otherwise permitted by Section C407.3.

41. **Section C502.2 Change in space conditioning**, exception #2, is amended as follows:

2. Where the simulated building performance option in Section C407 is used to comply with this section, the annual ~~energy cost~~ site energy use of the *proposed design* shall be not greater than 110 percent of the annual ~~energy cost~~ site energy use otherwise permitted by Section ~~C407.2~~ C407.3.

SOLAR-READY CODE AMENDMENTS (Required by state law)

[Simplification from LECC] [Required by state law]

This amends the appendix to apply to all commercial buildings instead of just those with five or fewer stories. It also adds specificity to the exceptions for buildings with existing onsite solar.

[Specificity] [Required by state law]

42. **Section CB101.1 General** and exception #1 is amended as follows, with the other exceptions to remain:

CB103.1 General. A solar-ready zone shall be located on the roof of ~~buildings that are five stories or less in height above grade plane, and all new commercial buildings that~~ are oriented between 110 degrees and 270 degrees of true north or have *low slope* roofs. Solar-ready zones shall comply with Sections CB103.2 through CB103.8.

Exceptions:

1. A *building* with a permanently installed, on-site renewable energy system that meets the following criteria:
 - a. The system produces the energy output equivalent to covering 40 percent of the net roof area with solar photovoltaic calculated as the horizontally projected gross roof area less that area covered by skylights, occupied roof decks, vegetative roof areas, and mandatory access or setback areas as required by the International Fire Code.
 - b. The system is located on the roof or overhang of the building or the roof or overhang of another structure located within 250 feet of the building, on the building site, on covered parking, or another approved location installed

with the *building* project and under the same property ownership.

This adds specificity to what's required to be shown on construction documents.

[Specificity] [Simplification from LECC] [Required by state law]

43. **Section CB103.2 Construction document requirements for solar-ready zone** is amended as follows:

CB103.2 Construction document requirements for solar-ready zone. *Construction documents* shall indicate the location and size of the solar-ready zone, structural design loads for roof dead load and roof live load, and pathways for routing of raceways from the solar-ready zone to the electrical service panel, with each raceway labeled on the construction documents as "Potential Pathway".

This adds specificity to where the solar-ready zone can be located and the minimum sizes of sub-zones.

[Simplification from LECC] [Required by state law] [Specificity]

44. **Section CB103.3 Solar-ready zone area** is amended as follows, with the other exceptions to remain:

CB103.3 Solar-ready zone area. The total *solar-ready zone* area shall not be less than 40 percent of the roof area calculated as the horizontally projected gross roof area less the area covered by skylights, occupied roof decks, *vegetative roof* areas, and mandatory access or set back areas as required by the International Fire Code. The *solar-ready zone* shall be a single area or smaller, separated sub-zone areas. ~~Each sub-zone area shall be not less than 5 feet (1524 mm) in width in the narrowest dimension.~~ For sloped roofs, each sub-zone area shall be not less than 200 square feet (18.6 m²) and no side of any rectangular area shall be less than 11 feet in length. For low-sloped or flat roofs, each sub-zone area shall be not less than 330 square feet (30.7 m²), with a minimum length running generally north to south of 15 feet and a minimum length running generally east to west of 22 feet and no side of any rectangular area shall be less than 11 feet in length. The solar-ready zone shall be located on the roof or overhang of the building or on the roof or overhang of another structure located within 250 feet of the building, on the building site, on covered parking, or another approved location installed with the building project and under the same property ownership.

This specifies that the main electrical panel needs a minimum amperage of 200 amps.

[Specificity][Required by state law]

45. **Section CB103.7 Electrical service reserved space** is amended as follows:

CB103.7 Electrical service reserved space. The main electrical service panel shall have a minimum bus bar rating of not less than 200 amps, and shall have a reserved space to allow installation of a dual-pole circuit breaker for future solar electric labeled "For Future Solar Electric." The reserved space shall be positioned at the end of the panel that is opposite from the panel supply conductor connection.

EV-READY CODE AMENDMENTS (Required by state law)

This adjusts the IECC EV-ready Appendix CG to sync with the state model code. Due to the LECC addition of EV Capable Light and Level 1 EVSE, it is shorter to replace than amend. This version is in a more logical order puts the

[Simplification from LECC]

46. **Appendix CG** is replaced with the following:

Section CG101.1 Definitions.

DIRECT CURRENT FAST CHARGER (DCFC) EVSE. Equipment capable of fast charging on a 100A or higher 480VAC three-phase branch circuit. AC power is converted into a controlled DC voltage and current within the *EVSE* that will then directly charge an *EV*.

ELECTRIC VEHICLE (EV). An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles and electric motorcycles, primarily powered by an electric motor that draws current from a building electrical service, *EVSE*, a rechargeable storage battery, a fuel cell, a photovoltaic array, or another source of electric current. Off-road, self-propelled electric mobile equipment, including but not limited to, industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, and boats are not considered *EVs*.

ELECTRIC VEHICLE CAPABLE SPACE (EV CAPABLE SPACE). A designated *parking space* that is provided with electrical infrastructure such as, but not limited to, raceways, cables, electrical capacity, a panelboard, or other electrical distribution equipment space necessary for the future installation of an *EVSE*.

ELECTRIC VEHICLE CAPABLE LIGHT SPACE (EV CAPABLE LIGHT SPACE). A designated *parking space* that has a raceway and/or conduit installed to support future implementation of *EV* charging installation, and has sufficient physical space adjacent to existing electrical equipment for future electrical upgrades.

ELECTRIC VEHICLE READY SPACE (EV READY SPACE). A *parking space* that is provided with a branch circuit and an outlet, junction box, or receptacle that will support an installed *EVSE*.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). Equipment for plug-in power transfer, including ungrounded, grounded, and equipment grounding conductors; *EV* connectors; attached plugs; any personal protection system; and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the *EV*.

ELECTRIC VEHICLE SUPPLY EQUIPMENT INSTALLED SPACE (EVSE SPACE). A *parking space* that is provided with a dedicated *EVSE* connection.

LEVEL 1 EVSE. An *EV* charging system that uses a standard alternating current (AC) 120-volt outlet to deliver a low charging rate suitable for overnight or extended-duration charging.

LEVEL 2 EVSE. An *EV* charging system that uses a 208- or 240-volt alternating current (AC) power source to deliver a medium charging rate, typically used in residential, commercial, and public settings for faster charging than *Level 1 EVSE* systems.

PARKING SPACE. A space within a building or private or public parking lot, excluding driveways, ramps, columns, and work areas, for the parking of an automobile.

PLUG-IN HYBRID ELECTRIC VEHICLE. An electric vehicle having a second source of motive power.

CG101.2 Electric vehicle power transfer infrastructure.

Parking facilities for *commercial buildings*, major renovations, and *additions* shall be provided with *EV* power transfer infrastructure in accordance with Sections CG101.2.1 through CG101.2.8.

CG101.2.1 Quantity. The number of required *Level 2 EVSE installed spaces*, *EV ready spaces*, *EV capable spaces*, and *EV capable light spaces* shall be determined in accordance with this section and Table CG101.2.1 based on the total number of *parking spaces*, including all covered parking under carports or detached garages, and shall be rounded up to the nearest whole number. This includes all covered parking under carports or detached garages.

1. *Group R-2* occupancies shall use the total parking for the entire development to determine the *EV* power transfer infrastructure requirements of Table CG101.2.
2. For *Group R-2 buildings*, the requirements shall be based on the total number of *dwelling units* or the total number of *parking spaces*, whichever is more.
3. All attached garages with direct connection to a *dwelling unit* will be required to have one *EV ready space*.
4. Where more than one parking facility is provided on a *building site*, the number of required *parking spaces* required to have *EV* power transfer infrastructure shall be calculated separately for each parking facility.
5. Where one shared parking facility serves multiple building occupancies, the required number of spaces shall be determined proportionally based on the floor area of each *building* occupancy.
6. Requirements for a *Group S-2* parking garage shall be determined by the occupancies served by that parking garage. Where new *parking spaces* do not serve specific occupancies, the values for *Group S-2* parking garage in Table CG101.2.1 shall be used.

TABLE CG101.2.1 REQUIRED EV POWER TRANSFER INFRASTRUCTURE

BUILDING TYPE/SPACE TYPE	LEVEL 2 EVSE SPACES	EV READY SPACES	EV CAPABLE SPACES	EV CAPABLE LIGHT SPACES
Group R-2 with ≤10 parking spaces	0	15% of spaces	10% of spaces	10% of spaces
Group R-2 with >10 parking spaces	5% of spaces	15% of spaces	10% of spaces	30% of spaces
All other commercial occupancies with ≤15 parking spaces	0	20% of spaces but ≥2 spaces	0	0
All other commercial occupancies with >15 parking spaces	2% of spaces	8% of spaces	10% of spaces	10% of spaces

CG101.2.2 Substitutions. *EV* power transfer infrastructure types may be substituted in accordance with the following criteria, as summarized in Table CG101.2.2:

1. Each *DCFC EVSE* installed shall be permitted to be substituted for other space types as follows:
 1. *Group R-2* occupancies may substitute up to 5 spaces when the *building* provides a minimum of 60 percent of *parking spaces* as a combination of *Level 2 EVSE spaces*, *EV ready spaces*, *EV capable spaces*, or *EV capable light spaces*.

2. *Commercial buildings* other than *Group R-2* occupancies may substitute up to 10 spaces when the *building* provides a minimum of 20 percent of *parking spaces* as a combination of *Level 2 EVSE spaces*, *EV ready spaces*, or *EV capable spaces*.
2. *Group R-2* occupancies with greater than 10 vehicle *parking spaces* shall be permitted to substitute three *Level 1 EVSE spaces* for every one *Level 2 EVSE space* or every one *EV ready space*, for up to 50 percent of required *Level 2 EVSE spaces* and *EV ready spaces*.
3. *Level 2 EVSE spaces* that exceed the minimum requirements of this section may be used to meet the minimum requirements for *EV ready spaces*, *EV capable spaces*, and *EV capable spaces*.
4. *EV ready spaces* that exceed the minimum requirements of this section may be used to meet the minimum requirements for *EV capable spaces* and *EV capable light spaces*.
5. *EV capable spaces* that exceed the minimum requirements of this section may be used to meet the minimum requirements for *EV capable light spaces*.

TABLE CG101.2.2 EV POWER TRANSFER INFRASTRUCTURE SUBSTITUTIONS

EV INFRASTRUCTURE TYPE	ELIGIBLE SUBSTITUTIONS
DCFC for R-2 occupancies	Can replace up to 5 spaces of other types if building has at least 60% parking spaces of other types
DCFC for other commercial occupancies	Can replace up to 10 spaces of other types if building has at least 20% parking spaces of other types
Level 1 EVSE Spaces for R-2 occupancies	Every three Level 1 EVSE spaces can replace one Level 2 EVSE space or one Level 2 EV ready space, for up to 50% of EVSE space requirements
Level 1 EVSE spaces for other commercial occupancies	Not permitted for substitutions
Excess Level 2 EVSE spaces	Can count toward EV ready, EV capable, or EV capable light space requirements
Excess EV ready spaces	Can count toward EV capable and EV capable light space requirements
Excess EV capable spaces	Can count toward EV capable light space requirements

CG101.2.3 EV capable light spaces. Each *EV capable light space* shall comply with the following:

1. A continuous raceway and/or conduit, sized and rated to supply a minimum of 208 volts and a minimum of 40-ampere rated circuits, shall be installed between an enclosure or outlet located within 3 feet (914 mm) of the space and electrical distribution panel, and shall be capped.
Exception: Conduit installed with a pull string from the termination locations at parking spaces to a location of a future transformer or future electrical panel with electrical service size determined at the time of future permit.
2. Dedicated physical space shall be provided to accommodate all equipment necessary for electrical service to future *EVSE*.
3. The raceway and/or conduit shall be permanently and visibly marked “For electric vehicle supply equipment (EVSE)” at the load center and termination point locations.
4. *EV capable light* includes directly adjacent *parking spaces* if the raceway and/or conduit terminates next to and between both *parking spaces*.

CG101.2.4 EV capable spaces. Each *EV capable space* shall comply with the following:

1. A continuous raceway or cable assembly, sized and rated to supply a minimum of 208 volts and a minimum of 40-ampere rated circuits, shall be installed between an enclosure or outlet located within 3 feet (914 mm) of the space and electrical distribution panel, and shall be capped.

Exception: Conduit installed with a pull string from the termination locations at *parking spaces* to a location of a future transformer or future electrical panel with electrical service size determined at the time of future permit.

2. The electrical distribution equipment to which the raceway or cable assembly connects shall have dedicated overcurrent protection device space and spare capacity to support at least 8.3 kVA (40A 208/240V) for each space.
3. The enclosure or outlet and panel directory shall be marked: "For electric vehicle supply equipment (EVSE)."
4. *EV capable* includes directly adjacent *parking spaces* if the raceway terminates next to and between both *parking spaces*.

CG101.2.5 EV ready spaces. Each *EV ready space* shall comply with the following:

1. A branch circuit shall have a minimum circuit capacity of 8.3 kVA (40A 208/240V) and shall terminate at a receptacle or junction box located within 3 feet of each space.
2. The electrical panel, electrical distribution equipment directory, and all outlets or enclosures shall be marked "For future electric vehicle supply equipment (EVS)."
3. *EV ready* includes directly adjacent *parking spaces* if the receptacle or junction box is adjacent to and between both *parking spaces*.

CG101.2.6 Level 1 EVSE spaces. Each *Level 1 EVSE space* shall comply with the following:

1. A branch circuit shall have a minimum circuit capacity of 1.8 kVA (15A 120V) and shall terminate at a receptacle located within 3 feet of each space.
2. The *EVSE*, electrical panel directory, and all receptacles or enclosures shall be marked "Level 1 Electric vehicle supply equipment (EVSE)."
3. The *EVSE* shall be installed in accordance with NFPA 70 and shall be listed and labeled in accordance with UL 2202 or UL 2594.

CG101.2.7 Level 2 EVSE spaces.

An installed *EVSE* with multiple output connections shall be permitted to serve multiple *Level 2 EVSE installed spaces*. An *EVSE* serving one or more *Level 2 EVSE spaces* shall comply with the following:

1. A branch circuit shall have a minimum circuit capacity of 8.3 kVA (40A 208/240V) and shall terminate at a receptacle located within 3 feet of the space.
2. The *EVSE* shall provide a minimum charging rate of 6.2 kVA (30A at 208/240V) or shall be an ENERGY STAR-certified inductive charging system for battery powered *EVs*.

Exception: If serving three or more spaces and controlled by an energy management system, the minimum charging rate shall be 3.3 kVA per space.

3. The *EVSE* may be wall-mounted or pedestal style and may provide multiple cords to connect with *EVs*.
4. The *EVSE* must be capable of connecting to the internet.
5. The *EVSE*, electrical panel directory, and all receptacles or enclosures shall be marked "Level 2 Electric vehicle supply equipment (EVSE)."
6. The *EVSE* shall be installed in accordance with NFPA 70, including Article 625, and shall be listed and labeled in accordance with UL 2202 or UL 2594

CG101.2.6 EVSE installation. *EVSE* shall be installed in accordance with NFPA 70 and shall be *listed* and *labeled* in accordance with UL 2202 or UL 2594.

CG101.2.7 Accessible EV Parking Spaces. For Level 2 *EVSE installed spaces* required by Table CG101.2.1, a minimum of 5 percent (not less than one space) shall be van accessible spaces in accordance with Section 1107.2.2 of the International Building Code. In addition, another 5 percent (not less than one space) of the total *EV ready*, *EV capable*, or *EV capable light spaces* required by Table CG101.2.1 shall meet one of the following:

1. Be van accessible parking spaces in accordance with Section 1107.2.2 of the International Building Code.
2. Have the electrical infrastructure for *EV capable light*, *EV capable*, or *EV ready spaces* configured so that future *EVSE* shall be capable of serving van accessible *parking spaces*.

CG101.2.8 Identification. *Construction documents* shall designate all *DCFC*, *Level 2 EVSE spaces*, *Level 1 EVSE spaces*, *EV ready spaces*, *EV capable spaces*, and *EV capable light spaces*, and indicate the locations of raceway and/or conduit and termination points serving them. The circuits or spaces reserved for *DCFC*, *Level 2 EVSE spaces*, *EV ready spaces*, and *EV capable spaces* shall be clearly identified in the panel or subpanel directory. The raceway and/or conduit for *EV ready spaces*, *EV capable spaces* and *EV capable light spaces* shall be clearly identified at both the panel or subpanel and the termination point at the *parking space*.

ELECTRIC READY AMENDMENTS (Required by state law)

[Simplification from LECC] [Required by state law]

This ensures that “core and shell” buildings (unfinished interiors) align with energy standards once the first tenant completes their build-out. (LECC)

[Clarification] [Required by state law]

47. **Section CH101.2 Scope** is amended and section CH101.2.1 is added as follows:

CH101.2 Scope. The provisions in this appendix are applicable to new commercial buildings, additions, and first tenant finish permits. ~~New construction shall comply with Section CH103.~~

CH101.2.1 First tenant finishes. In the case that a first tenant finish to a commercial core and shell building or unfinished space is credited towards meeting the requirements of Appendix CH, the code official shall not issue a Certificate of Occupancy to the tenant until the requirements of Section CH103.1 are met.

This exempts interior/exterior fireplaces and additions without new heating equipment from electric-ready mandates. (LECC)

[Clarification] [Upfront cost reduction] [Simplification from LECC] [Required by state law]

48. **Section CH103.1 General** is amended to add the following exceptions:

Exceptions:

1. Interior fireplaces that do not serve as a primary source of heating.
2. Exterior fireplaces and fire pits.
3. Additions to buildings that do not provide new space heating equipment.

This adds condensate drainage to the list of items shown on construction documents. (LECC)

[Minor strengthening from base]

49. **CH103.3 Construction documentation** is amended as follows:

CH103.3 Construction documentation. The *construction documents* shall provide details for additional electric infrastructure, including branch circuits, conduit, rewiring, panel capacity, ~~and~~ electrical service capacity, and condensate drainage, as well as interior and exterior spaces designated for future electric equipment.

This makes minor wording changes for technical clarity. (LECC)

[Clarification] [Required by state law]

50. **Section CI102.1 Demand responsive water heating**, exception #1, is amended as follows:

1. Water heaters that are required to provide a constant hot water delivery temperature of 180°F (82°C) or greater.

This adds flexibility if needed for unique circumstances. (LECC)

[Clarification] [Required by state law]

51. **Section CI103.1 Demand responsive lighting controls** is amended to include a new item #7 as follows:

7. Spaces where the health, safety, or productivity of occupants would be compromised by light level reductions, as *approved by the code official*.

2025 METRO REGIONAL CODE COHORT

ENERGY CODE AMENDMENT PACKAGE



Advancing Together

In Colorado, local governments have the authority to adopt and amend building codes, leading to a patchwork across the state. Fifteen neighboring jurisdictions in the Northwest Denver metropolitan area gathered to collaboratively review and adopt the 2024 International Energy Conservation Code (IECC) along with strengthening amendments, which build on recent advances by these jurisdictions and on the general approach taken in the state's energy code minimums.

Driving Down Emissions

The Metro Regional Code Cohort developed an energy code amendment package based on the most recent national energy code for commercial and residential new construction and major remodels. This amendment package exceeds the State's minimum Low Energy and Carbon Code while meeting local goals and increasing regional alignment. Communities that adopt this package will simplify compliance for builders and building departments while moving together towards healthy, low-emissions buildings for generations to come.

Goals of the Amendment Package

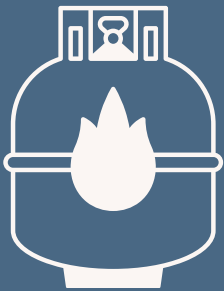
- 1 Reduce greenhouse gas emissions and pollution**
- 2 Maintain affordability & equity**
- 3 Improve regional consistency**
- 4 Reduce vulnerability to legal challenges**
- 5 Improve flexibility without sacrificing performance**
- 6 Align with state minimum energy code but simplify**
- 7 Allow tailoring to local community needs**

Key Amendments



Electric-Preferred Approach

These amendments encourage all-electric buildings by accounting for their higher efficiency over mixed-fuel buildings that use gas. Supporting all-electric buildings provides significant benefits for local air quality and the climate, while keeping costs stable. In the Prescriptive Path, all-electric buildings require fewer additional efficiency credits than mixed-fuel buildings. In the Simulated Building Performance Path, all-electric buildings need less annual energy reduction from a “standard reference design” than mixed-fuel buildings. In the Energy Rating Index (ERI) path, all-electric buildings can use a less stringent ERI score than mixed fuel buildings.



Fuel Neutrality

The base 2024 IECC (like prior IECC editions) contains a bias towards gas equipment by comparing minimum-efficiency gas equipment to more-efficient gas equipment, and comparing minimum-efficiency heat pumps to more-efficient heat pumps – rather than comparing them both on the same scale and recognizing that heat pumps far outperform gas systems in total efficiency. “Fuel debiasing” remedies that current bias by setting an overarching efficiency baseline rather than a technology-specific baseline. It also ensures that the compliance metrics are uniformly energy-based rather than based on variable energy costs.

Large Home Threshold

Very large homes have much higher energy loads from internal and external amenities (hot tubs, snowmelt systems, home theaters, etc.) and from larger heating, cooling, and water heating systems – so they require more energy and emissions reductions to compensate. The amendments require large homes to achieve higher energy efficiency, and require extra large homes to reach full net zero.



New Compliance Pathway



Builders value flexibility in how they can comply with the code. The cohort amendments include a new optional Passive House Certification pathway in both the commercial and residential sections, streamlining the permitting and approval of homes and buildings that meet these standards. Passive House homes and buildings are designed to greatly exceed the efficiency of conventional construction through a combination of air tightness, better insulation, and mechanical ventilation.

The Roadmap to Zero Emissions New Construction

FACT SHEET

Introduction

The Metropolitan Regional Building Policy Cohort, composed of 15 jurisdictions in the Denver metropolitan region, has developed a Roadmap to achieve zero emissions in new construction by 2030. The Roadmap outlines a phased approach to energy code policies for new construction and major remodels and is a key mechanism to help local governments address carbon emissions from the built environment, which accounts for 52% of regional greenhouse gas emissions.

The Cohort is tracking with Roadmap goals through coordinated adoption of the 2024 International Energy Conservation Code (IECC) in general alignment with the state's Model Low Energy and Carbon Code, plus strengthening amendments.

Contact: Greg Miao, Project Manager, Denver Regional Council of Governments
Email: gmiao@drcog.org



Lafayette, Colorado

Participating communities are:

- Boulder County
- City of Boulder
- City of Brighton
- City and County of Broomfield
- City of Edgewater
- City of Golden
- City of Lafayette
- Town of Berthoud
- City of Longmont
- City of Louisville
- City of Northglenn
- City of Thornton
- City of Westminster
- Town of Erie
- Town of Superior

KEY TERMS

Demand Response: The capability to shift electricity use to lower-demand times to enable a more renewably-powered grid.

Electrification: The process of replacing equipment that is traditionally powered with fossil fuels to that which is powered by electricity.

Electric-Preferred: A code or standard that fully accounts for the significantly greater efficiency and lower emissions of electric equipment relative to gas equipment.

Energy Storage Ready: Providing space during construction for the placement of energy storage such as batteries, conduits, and raceways.

Energy Use Intensity (EUI): Energy use per square foot – a metric for measuring a building's energy efficiency against other buildings of the same type.

Fuel Debiasing: Objective, energy-based compliance metrics that fully and fairly account for the greater efficiency of all-electric relative to mixed-fuel buildings.

Passive House: A voluntary standard for energy efficiency that reduces a building's carbon footprint and results in a highly efficient building that requires less energy for space heating and cooling.

Zero Emissions Building: Structures that do not emit any greenhouse gases from their operational energy use.

The Roadmap to Zero Emissions New Construction

RESIDENTIAL

Policy Component	2024 IECC Amendments*	2027 IECC Amendments	2030 IECC Amendments
Load Reduction	Add Passive House pathway	Continued from 2024	Continued from 2027
Electrification	Adopt electric-preferred requirements and fuel debias the code	Strengthen electric-preferred requirements over the 2027 IECC	Adopt zero-emissions or near-zero emissions building and appliance requirements**
Performance Pathway	Use energy use or EUI instead of energy cost as the performance metric	Continued from 2024	Continued from 2027
Home Size	Add additional energy efficiency requirements for large homes. Require extra large homes to be net zero	Increase stringency of requirements for large and extra large homes	Continued from 2027
Demand Response	Require demand response for water heating, space heating and cooling	Continued from 2024	Continued from 2027
Energy Storage	N/A	Require energy storage-ready spaces	Require energy storage installation

*Refer to the IECC Amendments Appendix for the cohort amendments to the 2024 IECC – Residential Chapter.

**The Cohort will monitor the legal landscape and the strategies, costs, policies, and technologies for decarbonization and adjust this goal if needed.

The Roadmap to Zero Emissions New Construction

COMMERCIAL

Policy Component	2024 IECC Amendments*	2027 IECC Amendments	2030 IECC Amendments
Load Reduction	Add Passive House pathway	Continued from 2024	Continued from 2027
Electrification	Adopt electric-preferred requirements and fuel debias the code. Add an optional all-electric pathway	Strengthen electric-preferred requirements over the 2027 IECC	Adopt zero-emissions or near-zero emissions building and appliance requirements**
Performance Pathway	Set minimum EUI Performance Standards for common building types. Use EUI instead of energy cost metric	Increase EUI stringency of Performance Standards from 2024	Increase EUI stringency of Performance Standards from 2027
Demand Response	Require demand response capability for water heating, space heating, and lighting	Continued from 2024	Continued from 2027
Energy Storage	N/A	Require energy storage-ready spaces	Require energy storage installation
Renewable Energy	Remove requirement for onsite PV from the base 2024 IECC	Continued from 2024	Continued from 2027

*Refer to the IECC Amendments Appendix for the cohort amendments to the 2024 IECC – Residential Chapter.

**The Cohort will monitor the legal landscape and the strategies, costs, policies, and technologies for decarbonization and adjust this goal if needed.

Significant changes from 2018 to the 2024 ICodes

The 2024 International Residential Code is a comprehensive code comprising all building, plumbing, mechanical, fuel gas, and energy conservation requirements for one- and two-family dwellings and townhouses up to three stories. Important 2024 IRC changes include:

- Imaginary lot lines are added for calculating fire separation distance when considering multiple dwellings on a single lot
- Shared accessory rooms are an option in two-family dwellings.
- Many requirements for energy storage systems are added.
- New protection requirements for storage batteries in garages are added.
- Sleeping loft requirements added for habitable attic style lofts and tiny home style lofts now have maximum size limits to meet an exception.
- Reinforcement of the floor below guards at a mezzanine is now required.
- The final test of the DWV system may be visual.
- Air exhaust openings now allowed near operable windows and doors.
- A2L refrigerants are added as an option for cooling equipment.
- Solvent cement joints for CPVC pipe are allowed above and below ground.
- Snow, wind, and seismic maps updated.
- Accessibility in care facilities clarified.
- 2018 Requires Residential Sprinklers Louisville amended them out. The 2024 codes as written by ICC requires Fire Sprinklers. This is approved by the Fire District to protect Life Limb and Safe well being of the residence of Louisville.
- ESS Energy Storage system requirements of location to be placed. ESS was not in 2018
- PVC used for gas vented appliances must be tested under pressure.
- 2024 Appendix's allows for wider range of Building Materials to be used. Such as tiny Homes, ADU's, Light Straw-Clay Construction, Straw Bale Construction, COB Construction (Monolithic Adobe), Hemp Lime (Hempcrete) Construction, 3-D Printed Building Construction.

The 2024 International Building Code applies to all buildings except detached one- and two-family dwellings and townhouses up to three stories. Important 2024 IBC changes include:

- Duties and powers of the building official: Section 104 regulating duties of the building official and the approach for reviewing for code compliance has been significantly updated to reflect the current manner that alternate materials, designs and methods are evaluated.
- For the first time ever, the 2024 IBC includes provisions for tornado loadings.
- Updated wind, earthquake, and snow loads.
- The updated design rain loads are now based on the summation of the static head, the hydraulic head, and the ponding head.
- Updates to Risk Categories including Photovoltaic (PV) panel systems and facilities providing power generation.
- Updated and expanded provisions for Temporary Structures.
- New provisions regarding the wind resistance of aggregate-surfaced roofs.
- Roof Coverings: Updated provisions for underlayment.
- New special inspection provisions for metal building systems.
- New provisions for structural concrete reinforced with glass-fiber reinforcement.
- Concrete: Chapter 19 on Concrete has been Updated and reformatted.
- Masonry: TMS 402 and TMS 602 references have been updated to the latest 2022 editions.
- Increased the allowable height of a Group R-2 occupancy building with an NFPA 13R sprinkler system.
- Occupiable space requirements now apply if a roof is usable for anything more than maintenance or repair and occupants must have access to multiple egress options from a story based on the occupant load and the story requirements.
- Adult changing tables regulations are added where they are required in large assembly and mercantile, college lecture hall/classroom buildings and highway rest stops, or provided.

- Fire-resistance-rated Wall Continuity: Updates on how supporting construction for exterior walls is to be fire-resistance-rated, especially in the case of a parapet.
- Openings in Shaft Enclosures: Additional exceptions are provided for shaft enclosures, including new allowances for openings and penetrations.
- Carbon Monoxide Detection: Carbon monoxide (CO) detection is now required in all occupancies where a CO-producing device is present. Detection and notification can be addressed in several ways.
- Vapor retarders: Several updates have been made to the vapor retarder provisions for consistency with the IRC and IECC. The changes also provide additional options and better guidance for allowable types and locations of permitted vapor retarders.
- Vertical and lateral Flame propagation compliance methods: Clarification has been provided as to when testing in accordance with NFPA 285, related to vertical and lateral flame propagation, is required. Previously this information was scattered in a variety of locations within Chapters 14 and 26.
- New Appendix P sets forth the scoping limitations and technical criteria for sleeping lofts that are provided within Group R dwelling units and sleeping units.
- ESS Energy Storage system requirements of location to be placed was not in 2018

The 2024 International Plumbing Code provides minimum regulations for plumbing facilities and allows for the acceptance of new and innovative products, materials, and systems. Plumbing and plumbing fixture related accessibility provisions and requirements from the ICC A117.1 Accessibility Standard are also included. Important 2024 IPC changes include:

- Provisions added for support of buried piping beneath building where expansive soil conditions exist.
- Requirement added for tracer wire for buried plastic sewer piping.
- Option added for vacuum testing of DWV piping.

- Plumbing fixture requirements significantly updated for various Group I occupancies.
- Exception added for allowing special locking mechanism for doors to multiple-user toilet facilities.
- Plastic pans for gas-fired water heaters required to be tested in accordance with ASTM E84 or UL 723.
- Showerhead flow limited to 2.0 gpm with performance complying with high efficiency requirements.
- Installation standards added for solvent-cemented plastic piping joints.
- Standards added for chemical waste piping materials.

The 2024 International Mechanical Code establishes minimum regulations for mechanical systems using prescriptive and performance-related provisions that allow the use of new and innovative materials, methods and designs. Important 2024 IMC changes include:

- Provisions prohibiting the use of domestic ductless range hoods in Groups I-1 and I-2 were removed.
- An identification requirement was added for Group A2L and B2L refrigerants.
- The requirements for machinery rooms containing Group A2L refrigerants were changed and Group B2L refrigerants were added to the provisions.
- Limits for the use of Group A1 and A2L refrigerants changed in high probability systems used for human comfort, unless permitted as excepted.
- UL 2158A Standard was added to the requirements for commercial dryer exhaust.
- Ventilation requirements for outpatient healthcare facilities to match the requirements in ASHRAE 62.1-2019.
- Addition of a new minimum landing at the roof hatch for personnel to safely use the hatch when accessing the roof for repair and maintenance.
- Addition of a new testing option for grease ductwork.
- Requirements for steam baths were added.

- A new standard requirement for refrigeration systems containing carbon dioxide was added

The 2024 International Fuel Gas Code (IFGC®) addresses the design and installation of fuel gas systems and gas-fired appliances through prescriptive and performance requirements. Important 2024 IFGC® changes include:

- [BS] 302.3.1 Engineered wood products. Sections 302.3.2, 302.3.3, and 302.3.4 have all been deleted.
- 304.1 General. The entire section is new for the 2024 Codes. Existing code language has been deleted.
- 304.12 Protection from fumes and gases. Existing code language has been deleted. The entire section is new for the 2024 Codes.
- 403.6 Workmanship and defects. Existing code language has been rewritten and additional code language has been added for the 2024 Codes.
- Appendix C - C105.2, Test for combustion air and vent drafting for natural draft and Category I appliances. Existing code language has been deleted. The entire section is new for the 2024 Codes (appendices are voluntary and apply only if specifically adopted)

The 2024 International Existing Building Code encourages the use and reuse of existing buildings. This code covers repair, alteration, addition and change of occupancy for existing buildings and historic buildings to achieve appropriate levels of safety without requiring full compliance with new construction requirements. Important 2024 IEBC® changes include:

- Occupiable roofs. The concept of occupiable roofs requirements has been incorporated in a variety of locations to correlate with the IBC.
- Storm Shelters. The requirements have been coordinated with revisions in the IBC and ICC 500, clarifying that where constructed, storm shelters shall comply with IBC Section 423.
- Risk category increase. Clarifies how risk categories should be assigned for structural design where the addition and the existing building have different uses.

- Smoke compartment requirements. Existing Group I-1, condition 2 occupancies and ambulatory care facilities may be required to divide stories into no fewer than two smoke compartments for more substantial additions and alterations.
- Adult Changing stations. Where additional toilet facilities are being added and IBC Section 1110.4.1 would require adult changing stations, Section 306.7.15 would require that at least one accessible family or assisted use toilet room must contain one.
- Exterior wall covering and wall envelopes sprinkler requirement. Section 309.2.1 has been added to require that if combustible exterior wall envelopes or coverings are installed on a high-rise building, the building must be equipped throughout with a sprinkler system. There are some exceptions for smaller installations and when only a combustible water resistive barrier is installed.
- Owner's responsibility at construction sites. Section 1502 was added to address the need for the owner to properly develop, implement and maintain a site safety plan during construction. A site safety director must be designated who is responsible for conducting daily fire safety inspections.
- Non-required automatic sprinkler system. A section has been added to Chapter 10 (under the change of occupancy classification requirements) to allow removal of a nonrequired existing automatic sprinkler system if several criteria are met.
- APPENDIX E TEMPORARY EMERGENCY USES. This new appendix was created to provide guidance for designers, engineers, architects, and fire and building officials to allow temporary emergency uses of existing buildings with respect to the minimum code requirements. This appendix is intended to serve as a template or checklist for use during an emergency that references the relevant code requirements.

The 2024 International Fire Code (IFC®) addresses regulations affecting or relating to structures, processes, premises and safeguards for life safety and fire hazards. Important 2024 IFC changes include:

- Energy Storage Systems (ESS) and Lithium-ion Batteries:

- The 2024 IFC significantly expands regulations for ESS and lithium-ion batteries, including those used in testing, research, manufacturing, storage, and sales. Fire sprinklers are now required in Group B, F-1, M, and S-1 occupancies that use or store these batteries, regardless of whether they are part of an ESS.
- Carbon Monoxide Detection: The 2024 IFC, along with the 2024 IBC, mandates carbon monoxide (CO) detection or alarms in all occupancies where CO-producing devices are present.
- Powered Micromobility Devices: The 2024 IFC includes a new section addressing the hazards associated with charging these devices.
- A2L Refrigerants: The 2024 IFC acknowledges the use of A2L (flammable) refrigerants while implementing safety measures.
- Distilled Spirits and Wine Storage: Fire protection requirements for these storage areas have been refined based on data from FM Global.
- Outdoor Assembly Events Added section 3107 is New
- Temporary Heating and Cooking Operations is New Chapter 41
- Other Notable Changes: The 2024 IFC also addresses valet trash collection (now requiring approval), inflatable amusement devices, temporary heating and cooking operations, and the Emergency Responder Communications Enhancement System (ERCES).

The 2024 International Property Maintenance Code (IPMC®) provides requirements for continued use and maintenance of buildings, site conditions, swimming pools, plumbing, mechanical, electrical and fire protection systems in existing residential and nonresidential structures.

The 2024 International Swimming Pool and Spa Code (ISPSC®) is a comprehensive swimming pool code coordinated with the current requirements in the I-Codes and ANSI standards. Developed with the Pool and Hot Tub Alliance (PHTA) [formerly The Association of Pool & Spa Professionals (APSP)], to establish minimum regulations for public and residential pools, spas, and hot tubs, the ISPSC also contains a reference that mandates the requirements within PHTA/ICC-7 Standard for Suction Entrapment Avoidance.



RESEARCH



US Experience with Sprinklers

Tucker McGree
April 2024

KEY FINDINGS

Sprinklers in Reported Structure Fires: All Occupancies

From 2017 to 2021, local fire departments responded to an estimated average of 52,948 structure fires per year (11 percent of the total structure fires) in which sprinklers were present. These fires caused an annual average of 36 civilian deaths (1 percent of all structure fire deaths); 1,002 civilian injuries (8 percent); and \$1.2 billion in direct property damage (10 percent).

Sprinklers reduce the impact of fires. Compared to reported fires in properties with no automatic extinguishing systems (AES), when sprinklers were present, the civilian fire death and injury rates per fire were 90 percent and 32 percent lower, respectively. In addition, the rate of firefighter injuries per fire was 35 percent lower.

Fire spread was confined to the object or room of origin in 94 percent of the reported structure fires in which sprinkler systems were present compared to 70 percent in properties with no AES.

Sprinklers have proven to be reliable in reported structure fires considered large enough to activate them. From 2017 to 2021, sprinklers operated in 92 percent of such fires and were effective at controlling the fire in 97 percent of the incidents. Overall, sprinkler systems operated and were effective in 89 percent of the fires considered large enough to activate them. The most common reason that sprinklers failed to operate was the systems being shut off at some point before the fire.

One sprinkler is usually enough to control a fire. In 77 percent of the structure fires where sprinklers operated, only one operated. In 96 percent, five or fewer operated. In 98 percent, 10 or fewer operated.

Sprinklers in Reported Home Fires

Sprinklers were present in an estimated 23,675 (7 percent) of the reported home structure fires per year from 2017 to 2021. These fires resulted in an annual average of 22 civilian deaths (1 percent of all home fire deaths), 550 civilian injuries (5 percent), and \$249 million (3 percent) in direct property damage.

Sprinklers operated in 95 percent of the home structure fires in which systems were present and the fires were considered large enough to activate them. They were effective at controlling the fire in 98% of the fires in which they operated. Overall, sprinklers operated effectively in 93 percent of the fires large enough to trigger them.

In 85 percent of the home fires with operating sprinklers, only one sprinkler operated. In 99.2 percent of the fires, five or fewer operated.

Sprinklers save lives and reduce injuries and property loss. From 2017 to 2021, the civilian death and injury rates in home structure fires where sprinklers were present were 89 percent and 31 percent lower, respectively, than in home structure fires with no AES. In addition, the average property loss per home structure fire was 55 percent lower in reported home fires where sprinklers were present compared to fires in homes with no sprinkler systems and the firefighter injury rate was 48 percent lower.

In reported home structure fires where sprinklers were present, the fire was confined to the object or room of origin 96 percent of the time, compared to 72 percent in homes with no AES.

Introduction

This report provides a statistical overview of sprinkler presence and performance in reported fires. This information is essential for understanding the prevalence, impact, reliability, and effectiveness of these systems and increasing their positive impact. Because most fire

deaths are caused by home fires, additional details are provided on sprinklers in fires in these properties.

Estimates were derived from the details collected by the US Fire Administration's (USFA's) [National Fire Incident Reporting System \(NFIRS\)](#) and NFPA's annual fire department experience survey. Unless otherwise specified, estimates in this report exclude fires in properties under construction. In addition, the casualty and loss estimates can be heavily influenced by the inclusion or exclusion of one unusually serious fire.

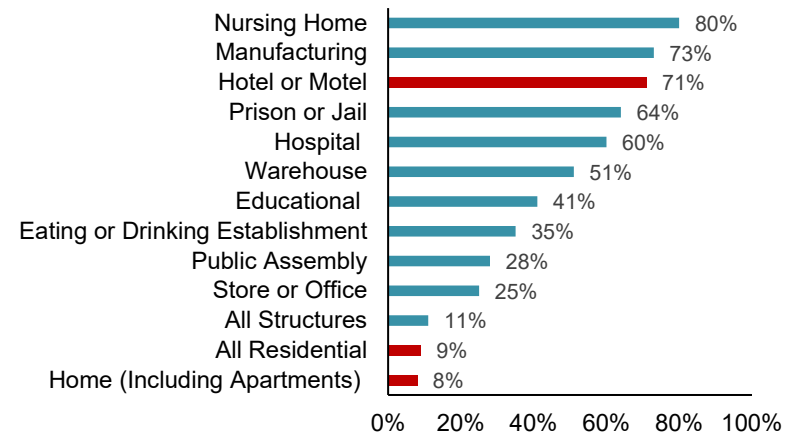
More detailed information is available in the [supporting tables](#).

Sprinkler Presence and Type

Some type of sprinkler system was present in an estimated 52,948 (11 percent) of the reported structure fires during 2017–2021. Sprinkler presence varied widely by occupancy. Figure 1 shows the percentage of fires by occupancy in which any type of sprinkler system was present. Sprinklers were most likely to be found in institutional occupancies, such as nursing homes, hospitals, and prison or jails, as well as in industrial occupancies, such as manufacturing and warehouse properties.

Most structure fires and associated civilian fire deaths, injuries, and direct property damage occurred in residential properties, particularly homes. Only 9 percent of the reported residential fires occurred in properties with sprinklers. The outlier with regard to residential fires was hotel and motel properties, which were much more likely to have sprinklers compared to all other residential properties. Sprinklers were present in only 8 percent of fires in homes (including apartments).

Figure 1. Presence of sprinklers in US structure fires by occupancy: 2017–2021 annual averages



Some properties had both sprinkler and non-sprinkler AES. This was particularly common in commercial kitchens. For example, 60 percent of properties identified as eating and drinking establishments in which a structure fire occurred reported the presence of non-sprinkler AES. In such cases, the type of AES in the fire area is the only one recorded. This could result in underestimates of the presence of sprinklers in some occupancies.

Figure 2 shows that wet pipe systems were in use at almost nine out of every ten reported fires in which sprinklers were present.

Figure 2. Types of sprinklers present at US structure fires: 2017–2021 annual averages

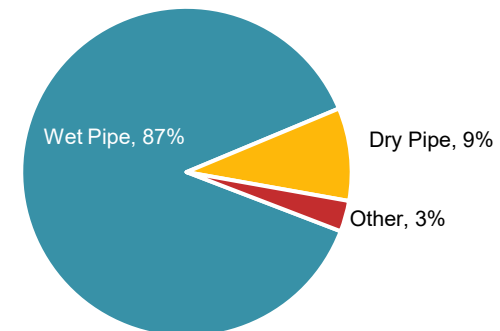
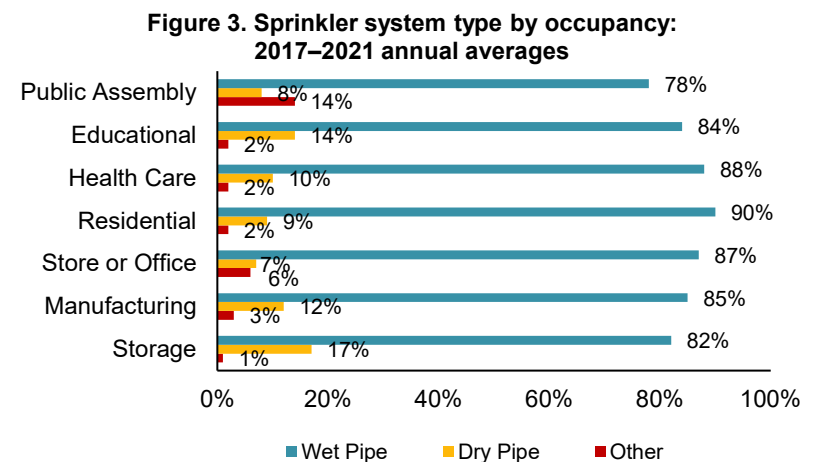


Table A. Summary of AES presence and type in reported structure fires: 2017–2021 annual averages

AES Presence and Type	Fires		Civilian Deaths		Civilian Injuries		Firefighter Injuries		Direct Property Damage (in Millions)	
AES present	62,820	(13%)	37	(1%)	1,077	(8%)	497	(8%)	\$1,238	(11%)
Sprinkler system present	52,948	(11%)	36	(1%)	1,002	(8%)	436	(7%)	\$1,179	(10%)
Wet pipe sprinkler system	46,316	(9%)	33	(1%)	894	(7%)	394	(7%)	\$1,076	(9%)
Dry pipe sprinkler system	4,909	(1%)	2	(0%)	91	(1%)	32	(1%)	\$91	(1%)
Other type of sprinkler system	1,722	(0%)	0	(0%)	17	(0%)	10	(0%)	\$12	(0%)
Non-sprinkler AES present	9,872	(2%)	1	(0%)	75	(1%)	61	(1%)	\$59	(1%)
Partial AES system of any type present	2,253	(0%)	4	(0%)	62	(0%)	44	(1%)	\$106	(1%)
AES of any type not in fire area and did not operate	1,473	(0%)	2	(0%)	37	(0%)	25	(0%)	\$88	(1%)
No AES present	421,775	(86%)	2,840	(99%)	11,640	(91%)	5,381	(90%)	\$9,943	(87%)
Total	488,321	(100%)	2,883	(100%)	12,817	(100%)	5,947	(100%)	\$11,374.31	(100%)
Rate per thousand fires with any sprinkler present:			0.68		18.92		8.23		22.27	
Rate per thousand fires with no AES present			6.73		27.60		12.76		23.57	
Percent reduction from no AES to any sprinkler system			90%		31%		35%		6%	

Figure 3 shows that wet pipe systems were the leading type of sprinkler in use overall. Dry pipe systems were more common in storage occupancies. Table 2 in the [supporting tables](#) shows that other types of sprinkler systems were seen most frequently in eating and drinking establishments and grocery or convenience stores. It is possible that some of these systems were miscodes of systems designed specifically for cooking equipment.



Fires in Properties with Sprinklers vs. with No AES

Figure 4 shows that the death rate per 1,000 reported fires was 90 percent lower in properties with sprinklers than in properties with no AES. These rates are based strictly on the reported presence or absence of this equipment; whether the system operated or not was not considered. Civilian deaths in sprinklered properties are discussed in greater detail later in this report.

Figure 4. Civilian death rates per 1,000 reported fires in properties with sprinklers vs. with no AES: 2017–2021 annual averages

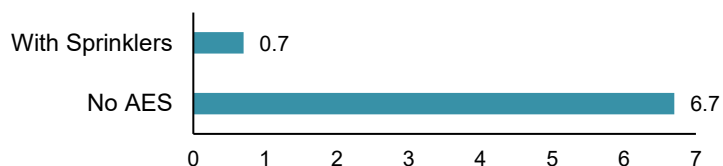


Figure 5 shows that the civilian injury rate per 1,000 reported fires was 31 percent lower in properties with sprinklers than in properties with no AES. Many of the injuries that occurred in sprinklered properties were caused by fires that were too small to activate the sprinklers. It is also possible that some of the injuries occurred while victims were attempting to fight a fire before the sprinklers activated.

Figure 5. Civilian injury rates per 1,000 reported fires in properties with sprinklers vs. with no AES: 2017–2021 annual averages

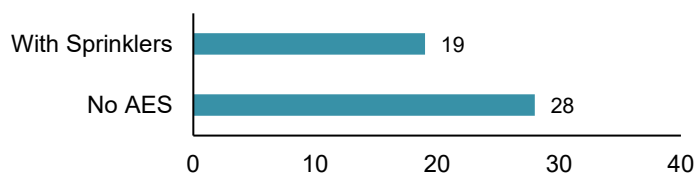
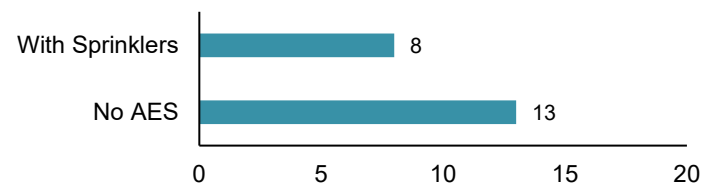


Figure 6 shows that the rate of firefighter injuries per 1,000 fires was 35 percent lower in structure fires where sprinklers were present compared to fires in properties without AES protection. Sprinklers can begin to control a fire when they activate, making the situation less dangerous for responding firefighters.

Figure 6. Firefighter injury rates per 1,000 reported fires in properties with sprinklers vs. with no AES: 2017–2021 annual averages



Reductions in the average dollar loss per fire when sprinklers were present varied greatly by occupancy. Table 4 in the [supporting tables](#) shows that compared to properties with no AES, the average overall loss was 6 percent lower in fires where sprinklers were present. However, the reduction in loss was 69 percent for store and office properties, 66 percent for public assembly properties, 60 percent for residential properties, and 59 percent for health care properties.

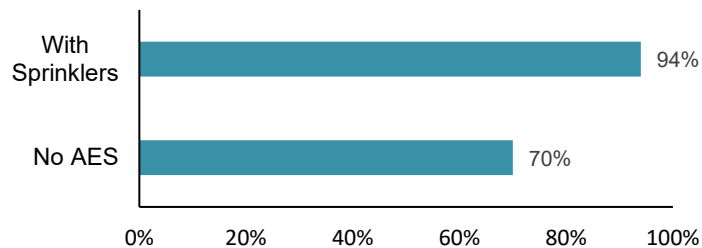
The average loss per fire was higher in sprinklered warehouses and manufacturing properties than in those with no AES. It should be kept in mind that these data cover all types of warehouses and manufacturing. A total loss in a small unsprinklered facility can be less than a limited loss in a large sprinklered facility where expensive machinery or commodities may be damaged due to smoke damage even when the fire is controlled by sprinklers. In rare cases when a sprinkler system fails to operate or operates ineffectively, the monetary loss can be exceedingly high. This scenario increases the average loss for the occupancy type. For example, the average loss in sprinklered manufacturing properties was inflated by a \$1.1 billion loss caused by a November 2019 Texas petrochemical plant

explosion and the resulting multi-day fire and additional explosions.¹ The plant's wet pipe sprinkler system did not operate.

According to FM Global automatic sprinklers provide the best protection against devastating fires in commercial occupancies. Comparisons of fire events from a commercial property insurer prove this year in, and year out. Their analysis shows that loss costs are typically about 8.5 times smaller at manufacturing facilities with adequate automatic sprinkler protection. This can often be a difference of millions of dollars and resuming operations within days, rather than months.

Sprinklers can also limit fire spread. Figure 7 shows a 24 percent increase in fires that were confined to the object or room of origin when sprinklers were present compared to fires with no AES.

Figure 7. Percent of fires confined to the object or room of origin in properties with sprinklers vs. with no AES: 2017–2021 annual averages



Sprinkler Operation, Effectiveness, and Issues

From 2017 to 2021, sprinklers operated in 92 percent of the fires in which they were present, and the fire was considered large enough to activate them. They were effective at controlling the fire in 97 percent of fires in which they operated. In looking at these two estimates, it can be said that sprinklers operated effectively in 89 percent of the fires large enough to trigger them (see Figure 8.)

Details on sprinkler operation and effectiveness in different occupancies and for wet and dry pipe systems are provided in Table 6 of the [supporting tables](#).

Sprinkler systems are designed to operate only where fire is present. Only one sprinkler activated in more than three-quarters (76 percent) of the fires in which sprinklers of any type operated, and 77 percent of the fires with operating wet pipe sprinkler systems. Figure 9 shows that in 96 percent of the fires in which sprinklers operated, five or fewer were activated. This was true for 93 percent of the dry pipe sprinkler systems. See Table 7 in the [supporting tables](#) for additional details.

Figure 8. Sprinkler operation and effectiveness: 2017–2021 annual averages

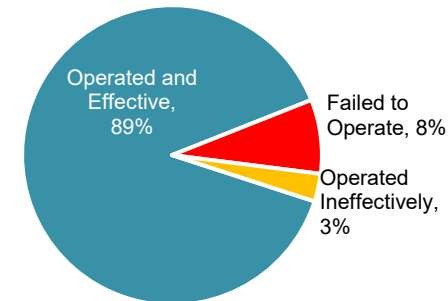
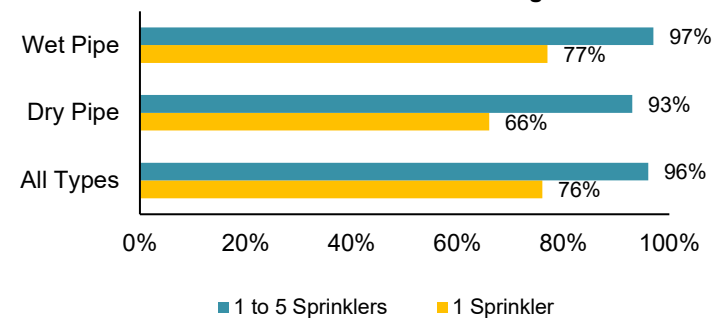


Figure 9. Percentage of fires in which one or one-to-five sprinklers operated by type of sprinkler system: 2017–2021 annual averages



¹ S. Badger, "Large-Loss Fires and Explosions in the United States in 2019," *NFPA Journal*, November/December 2020. [nfpa.org/News-andResearch/Publications-and-media/NFPA-Journal/2020/November-December2020/Features/LL-Report](https://www.nfpa.org/News-andResearch/Publications-and-media/NFPA-Journal/2020/November-December2020/Features/LL-Report)

In 99 percent of the fires in which one sprinkler operated, it was effective. Figure 10 shows that sprinklers were somewhat less likely to be effective when more sprinklers operated.

Figure 10. Percentage of fires in which sprinklers were effective by number that operated: 2017–2021 annual averages

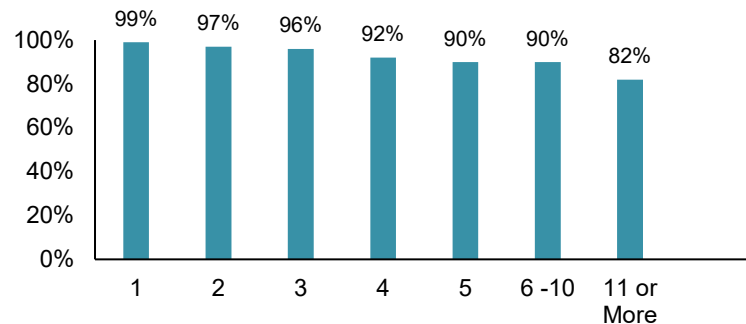


Figure 11 shows that the most common reason for sprinkler failure was because the system had been shut off.

Figure 11. Reasons for sprinkler failure: 2017–2021 annual averages

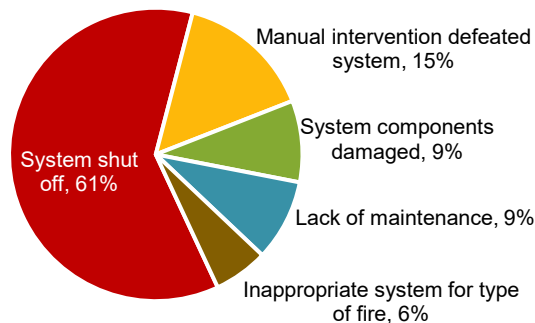
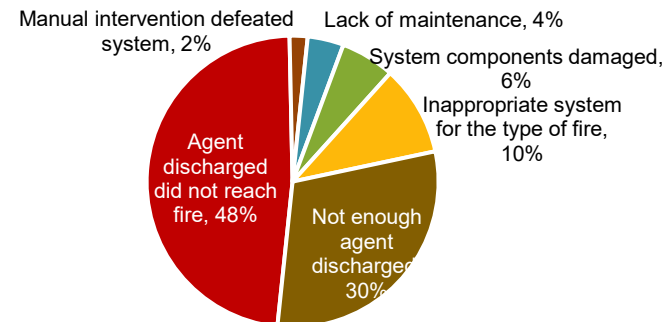


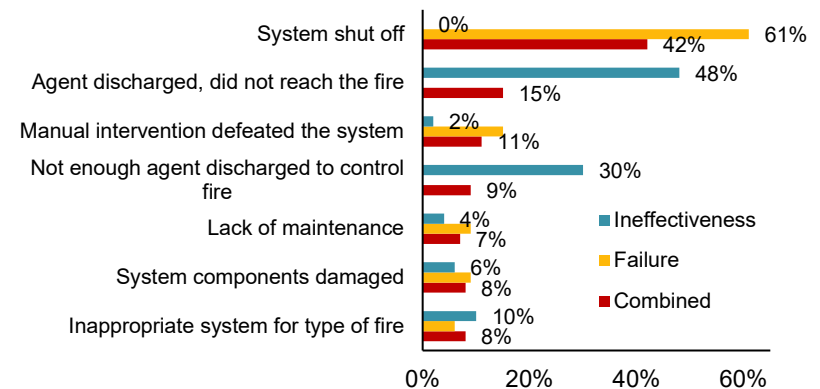
Figure 12 shows that when sprinkler systems operated ineffectively, the problem often involved getting water (or another agent) to the fire.

Figure 12. Reasons for sprinkler ineffectiveness: 2017–2021 annual averages



From 2017 to 2021, there was an estimated annual average of 771 fires where the sprinkler system failed to operate. In the same time period, in an annual estimate of 311 fires, the sprinkler system operated but was determined to be ineffective. Figure 13 shows the breakdown of each cause of failure or ineffectiveness individually and combined.

Figure 13. Reasons for combined sprinkler failure and ineffectiveness: 2017–2021 annual averages



Civilian Deaths in Sprinklered Properties

While sprinklers were present in 11 percent of all the properties in which fires occurred from 2017 through 2021, only 1 percent of all fire deaths occurred in these properties. Fires in sprinklered properties killed an average of 36 people annually during this period. Fires in properties that were not under construction and had no automatic extinguishing system caused an estimated 2,840 deaths annually. Sprinkler systems operated in 27 of the estimated annual deaths that occurred in fires in sprinklered properties, 20 of which occurred when the sprinklers were reported to have operated effectively. See Figure 14.

Figure 14. Civilian fire deaths by sprinkler performance: 2017–2021 annual averages

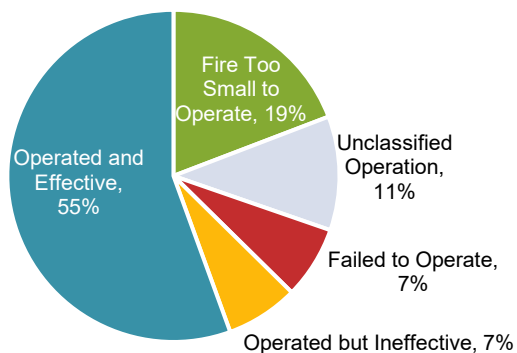
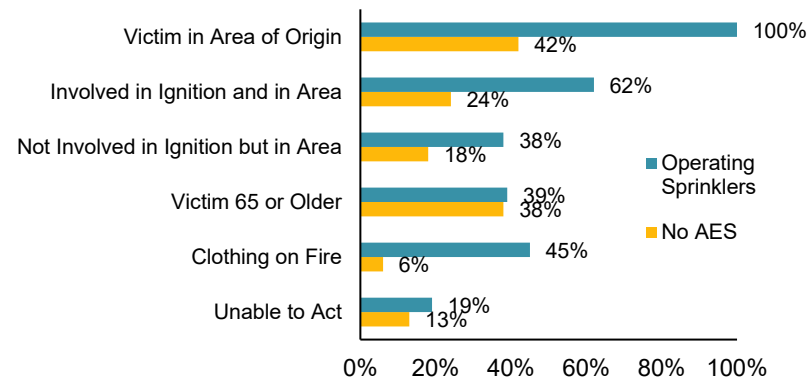


Figure 15 shows the characteristics of the deaths in sprinklered properties.

Figure 15. Victim characteristics in fires with operating sprinklers vs. with no AES: 2017–2021 annual averages



There are limits to even the best fire protection. When someone is directly involved in the ignition of a fire or their clothing is burning, they may be fatally injured before the sprinkler system operates. In addition, if someone is physically incapable of getting themselves to safety, even a fire controlled by sprinklers can still cause them harm.

Of the fire deaths in sprinklered properties, 76 percent resulted from fires that were confined to the object or room of origin. This was true for only 18 percent of the deaths that occurred in fires in which no AES was present. When present, data indicates that sprinklers keep the fire from spreading and threatening those in other areas. A fire that is confined to the room of origin is much less dangerous to those outside the room.

Sprinklers in Home Fires

Sprinkler Presence and Type

During 2017–2021, some type of sprinkler system was present in an estimated average of 23,675 (7 percent) of reported home structure fires per year. Properties under construction were excluded from these estimates. Table B summarizes information about automatic extinguishing systems (AES), including sprinklers, in all reported home structure fires except those in buildings under construction.

Figure 16 shows that wet pipe sprinkler systems were the most common systems present in reported home structure fires with sprinklers.

Figure 16. Types of sprinkler systems present at home structure fires: 2017–2021 annual averages

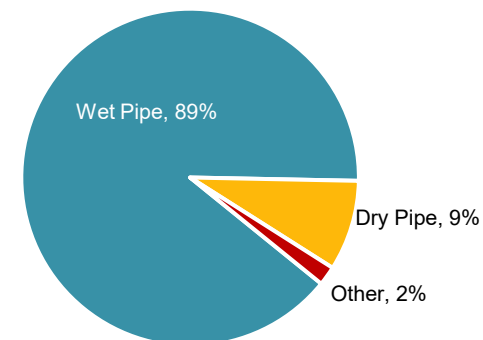


Table B. Summary of AES presence and type in reported home structure fires: 2017–2021 annual averages

AES Presence and Type	Fires		Civilian Deaths		Civilian Injuries		Firefighter Injuries		Direct Property Damage (in Millions)	
AES present	24,830	(7%)	23	(1%)	575	(5%)	178	(4%)	\$252	(3%)
Sprinkler system present	23,675	(7%)	22	(1%)	550	(5%)	176	(4%)	\$249	(3%)
Wet pipe sprinkler system	21,185	(6%)	21	(1%)	488	(4%)	164	(4%)	\$229	(3%)
Dry pipe sprinkler system	2,055	(1%)	2	(0%)	54	(0%)	11	(0%)	\$19	(0%)
Other type of sprinkler system	435	(0%)	0	(0%)	8	(0%)	1	(0%)	\$1	(0%)
Non-sprinkler AES	1,156	(0%)	1	(0%)	25	(0%)	2	(0%)	\$3	(0%)
Partial AES system of any type present	839	(0%)	2	(0%)	42	(0%)	12	(0%)	\$24	(0%)
AES of any type not in fire area and did not operate	534	(0%)	1	(0%)	25	(0%)	9	(0%)	\$53	(1%)
No AES present	310,677	(92%)	2,578	(99%)	10,454	(94%)	4,456	(96%)	\$7,295	(96%)
Total	336,881	(100%)	2,605	(100%)	11,095	(100%)	4,655	(100%)	\$7,624.53	(100%)
Rate per thousand fires with any sprinkler present			0.94		23.23		7.45		\$10.51	
Rate per thousand fires with no AES present			8.30		33.65		14.34		\$23.48	
Percent reduction from no AES to any sprinkler system			89%		31%		48%		55%	

Fires in Homes with Sprinklers vs. with No AES

Figure 17 shows that the civilian death rate per 1,000 reported fires was 89 percent lower in homes with sprinklers than in homes with no AES during 2017–2021. These rates are based on the reported presence or absence of an AES; whether the system operated was not considered.

Figure 17. Civilian death rates per 1,000 fires in homes with sprinklers vs. with no AES: 2017–2021 annual averages

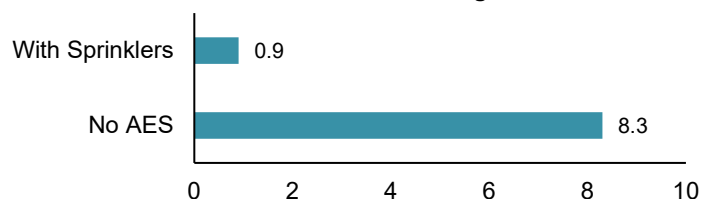


Figure 18 shows that the civilian injury rate per 1,000 reported fires was 31 percent lower in homes with sprinklers than in homes with no AES. In many cases, the injuries in sprinklered homes were caused by fires that were too small to activate the sprinkler system. In others, it's possible victims were injured while trying to fight the fire before the sprinklers operated.

Figure 18. Civilian injury rates per 1,000 fires in homes with sprinklers vs. with no AES: 2017–2021 annual averages

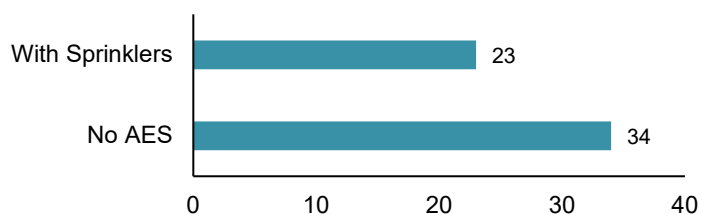
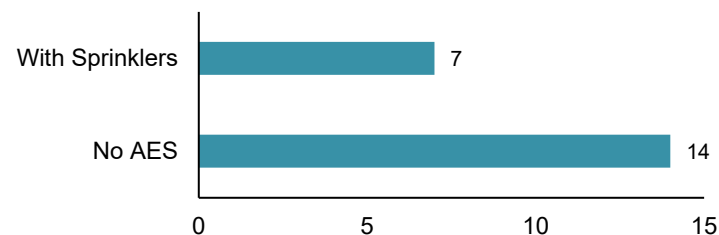


Figure 19 shows that the average firefighter injury rate per 1,000 reported home fires was 48 percent lower when sprinklers were present compared to fires in homes with no AES.

Figure 19. Firefighter injury rates per 1,000 fires in homes with sprinklers vs. with no AES: 2017–2021 annual averages



When sprinklers were present in reported home fires, the average property loss per fire was 55 percent lower than the average in homes with no AES. Figure 20 shows the rate of loss per 1,000 fires for homes with sprinklers versus homes with no AES. See also Table B.

Figure 20. Rate of loss (in millions) per 1,000 fires in homes with sprinklers vs. with no AES: 2017–2021 annual averages

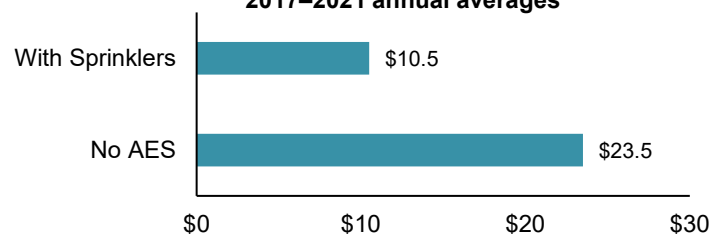
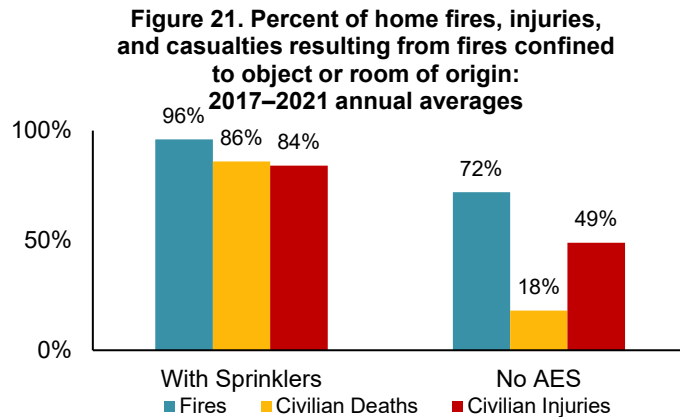


Figure 21 shows that when sprinklers were present, almost all of the home structure fires were confined to the object or room of origin. Most of the civilian deaths and injuries resulting from fires in homes with sprinklers were caused by these fires.

In home fires that lacked AES, 72 percent of the fires were confined to the object or room of origin. Less than a fifth of the deaths and less than half of the injuries in home fires with no AES present resulted from such fires.



Sprinkler Operation, Effectiveness, and Issues in Home Fires

Figure 22 shows that sprinklers operated in most of the home fires in which sprinklers were present and the fires were considered large enough to activate them. They effectively controlled the fire in 98 percent of the time.

Figure 22. Sprinkler operation and effectiveness in home fires: 2017–2021 annual averages

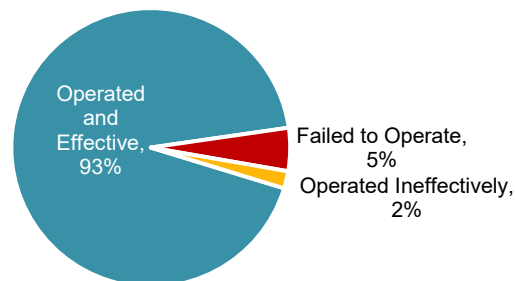
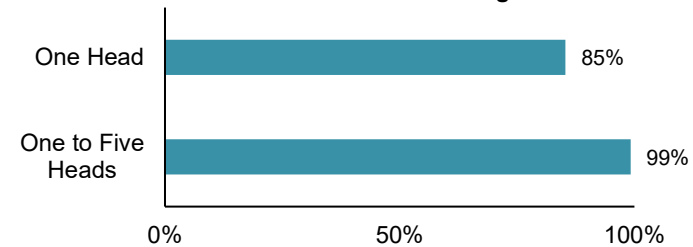


Figure 23 shows that in nearly all the home fires in which sprinklers operated, five or fewer individual sprinklers operated.

Figure 23. Percent of home fires in which one or one-to-five sprinklers operated: 2017–2021 annual averages

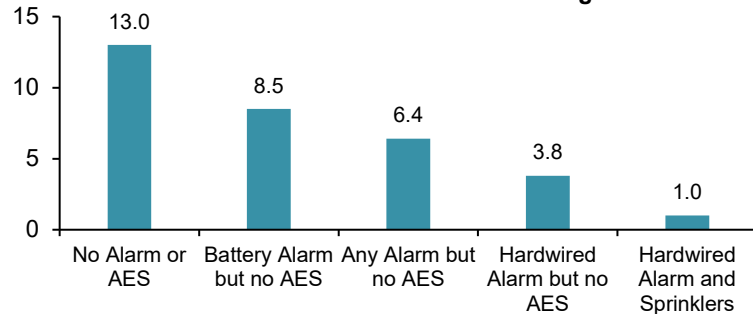


Impact of Smoke Alarm and Sprinkler Presence on Death Rates per 1,000 Home Fires

The lowest home fire death rate per 1,000 reported fires was found in homes with sprinkler systems and hardwired smoke alarms. Figure 24 shows that compared to reported home fires in which no smoke alarms or AES were present (*including* properties under construction), the death rate per 1,000 fires was:

- 34 percent lower when battery-powered smoke alarms were present, but AES protection was not
- 51 percent lower when smoke alarms with any power source were present but AES protection was not
- 71 percent lower when hardwired smoke alarms were present but AES protection was not
- 92 percent lower when sprinklers and hardwired smoke alarms were present

Figure 24. Average fire death rate per 1,000 reported home structure fires by presence of smoke alarms and AES: 2017–2021 annual averages



Note that these rates are based on the *presence* of various types of fire protection; operation was not considered. Minor fires in homes with monitored smoke alarms are more likely to result in a fire department response than comparable fires in homes with unmonitored smoke alarms. Thus, they are more likely to be reported. Smoke alarms in monitored systems are generally hardwired.

Methodology

The statistics in this analysis are estimates derived from the US Fire Administration’s (USFA’s) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association’s (NFPA) annual survey of US fire departments. Fires reported to federal, or state fire departments or industrial fire brigades are not included in these estimates. Unless otherwise specified, properties under construction were excluded from the analysis.

The NFPA fire department experience survey provides estimates of the bigger picture. NFIRS is a voluntary system through which

participating fire departments report detailed factors about the fires to which they respond.

To compensate for fires reported to local fire departments but not captured in NFIRS, scaling ratios are calculated and then applied to the NFRIS database using the formula below:

NFPA’s fire experience survey projections

NFIRS totals

NFPA also allocated unknown data proportionally to compensate for fires for which information was undetermined or not reported.

Fires in which partial sprinkler systems were present and fires in which sprinklers were present but failed to operate because they were not in the fire area were excluded from the estimates of presence and operation. Fires with one of the six NFIRS confined fire incident types were included in estimates of sprinkler presence, fire spread, and sprinklers operating, but not of operation or effectiveness in general.

Confined structure fires in NFIRS include confined cooking fires, confined chimney or flue fires, confined trash fires, confined fuel burner or boiler fires, confined commercial compactor fires, and confined incinerator fires (NFRIS incident types 113–118). Losses are generally minimal in these fires, which, by definition, are assumed to have been limited to the object of origin. Although detailed data about detection is not required for these fires, it is sometimes available.

The raw NFIRS data for 2017–2021, excluding properties under construction, contained a total of 7,661 confined structure fires (1 percent of total confined fires) in which some type of AES was present and 33,654 confined structure fires (5 percent of total confined fires) in which none was present. AES presence was

undetermined or left blank for 93 percent of the confined structure fires. A total of 3,953 of the reported confined fires with AES present indicated that wet pipe, dry pipe, or other sprinklers were present. The AES type was undetermined or not reported in 2,799 of the confined fires with AES present.

Sprinkler operation was reported in a total of 89 percent (3,522) of the confined fires in which sprinklers were present. Sprinkler operation for confined fires was used to calculate the number of sprinklers that operated but not for overall estimates of operation or effectiveness.

Non-confined structure fires are identified by NFIRS incident type 110–123, excluding incident types 113–118. The raw NFIRS data for 2017–2021 contained a total of 51,883 non-confined structure fires (7 percent of total non-confined fires) in which some type of AES was present and 641,040 non-confined structure fires (80 percent of total non-confined fires) in which none was present. Non-confined structure fires where some type of AES was present were associated with a total of 99 civilian deaths; 2,010 civilian injuries; and \$4.1 billion in direct property damage. AES presence was known for 87 percent of the non-confined fires, 91 percent of the deaths, 95 percent of the injuries, and 90 percent of the direct property damage. The AES type was known in 64 percent of the non-confined fires, 80 percent of the deaths, 80 percent of the injuries, and 81 percent of the associated property loss when AES was present.

When sprinklers were present in non-confined structure fires, sprinkler operation was known for a five-year raw total of 30,008 fires, which resulted in 76 deaths; 1,505 injuries; and \$3.2 billion in direct property damage. When present, sprinkler operation was known for 86 percent of the non-confined fires, 70 percent of the deaths, 86 percent of the injuries, and 83 percent of the direct

property damage. The NFIRS code “Operation of AES, other” was considered an unknown value.

When AES was coded as present but failed to operate, and the reason given was “Fire not in the area protected,” NFPA recoded the AES presence to “Not in fire area; did not operate.” These incidents and incidents coded to indicate the presence of partial systems were excluded from further analysis. Property damage has not been adjusted for inflation.

For more information on the methodology used for this report see, *How NFPA’s National Estimates Are Calculated for Home Structure Fires*.

Acknowledgments

The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that makes this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the US Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

To learn more about research at NFPA, visit nfpa.org/research.

Email: research@nfpa.org

NFPA No. USS14

City Council Discussion Direction

August 26, 2025

2024 International Code Series (I-Code) Adoption

*Presented by: Rob Zuccaro, Community Development Director and
Chad Root, Chief Building Official*



1

2024 I-Code Series

- Would Replace Current 2018 I-Codes and Local Amendments
 - ✓ 2024 International Building Code
 - ✓ 2024 International Residential Code
 - ✓ 2024 International Mechanical Code
 - ✓ 2024 International Fuel Gas Code
 - ✓ 2024 International Plumbing Code
 - ✓ 2024 International Fire Code
 - ✓ 2024 International Energy Conservation Code
 - ✓ 2024 International Property Maintenance Code
 - ✓ 2024 International Existing Building Code
 - ✓ 2024 International Swimming Pool and Spa Code
 - ✓ 1997 Uniform Housing Code



2

2024 I-Code Series

- Codes Adopted by Reference, with Local Amendments Listed in LMC Title 15, Building and Construction
- Staff Has Worked with BCBOA on Initial Draft of Code Package, with Local Amendments
- Specific Policies for City Council Input
 - ✓ International Energy Conservation Code Amendment Package
 - BCBOA Recommends Minimal Amendments
 - Regional Cohort Code Option with Roadmap for Future Codes
 - ✓ Residential Fire Sprinklers



3

2024 I-Code Series

- I-Codes Updated Every Three Years – City Last Updated to 2018 I-Codes, with interim Update to 2021 Energy Conservation Code
- Codes Set Minimum Standards to Protect Health, Safety, and the Environment
- Three-Year I-Code Updates Include Input and Consensus from Across the Country and Building Industry Interests
- Reflects Updates to Building Science and Technology, Industry Best Practices, Feasibility and Cost Considerations, and Legal Compliance
- Summary of Changes between 2018 and 2021 I-Codes Provided as Attachment No. 10 to Staff Memo



4

International Energy Conservation Code

- Evolution of City's 2021 IECC Adoption:
 - ✓ 2021, City Initially Adopted 2021 IECC with Amendments, Including Appendix RC (Net-Zero Residential Construction)
 - ✓ 2022, City Adopted Commercial Amendments, Including All-Electric Heat Pump Requirements and Energy Modeling Requirements
 - ✓ 2025, City Adopted Additional Commercial Amendments to Address Cost and Feasibility Concerns with 2022 Amendment Package
 - Removed Requirement for Appendix RC
 - Removed One-Year Monitoring and Submetering for EUI Modeling
 - Allowed Natural Gas Back Up for Heat Pump Systems



5

International Energy Conservation Code

- Potential Options for Adoption of IECC:
 - ✓ Maintain the City's Current Code, 2021 IECC and Amendments
 - Maintains All-Electric Heat Pump for Commercial
 - Recent Amendments to Address Cost and Feasibility
 - ✓ Adopt Regional Cohort Code Package Based on 2024 IECC
 - Strongly Incentivizes All-Electric Heat Pump Use
 - Addresses Concerns for Limitations on Regulated Gas-Fired Appliances
 - More Stringent Standards for Large Homes
 - Provides Multiple Compliance Pathways
 - ✓ Adopt BCBOA Code Package Based on 2024 IECC
 - Requires Mandatory Minimum Standards for Thermal Envelop
 - Allows Multiple Compliance Pathways
 - More Straight Forward and Easier to Administer for Building Community
 - Relies on Base Code that has been Nationally Vetted



6

Residential Fire Sprinklers

- City Initially Adopted Fire Sprinkler Requirements with 2018 I-Codes But Later Amended out As Part of Marshall Fire Amendments to Save Costs on Rebuilding
- LFPD Has Submitted Letter Recommending Adoption of Residential fire Sprinkler Requirements with 2024 I-Codes
- Other Communities that Require Residential Fire Sprinklers:
 - ✓ Boulder County
 - ✓ Town of Superior
 - ✓ City of Lafayette
 - ✓ City and County of Broomfield
 - ✓ Town of Erie
 - ✓ City of Westminster
 - ✓ City of Boulder



7

Residential Fire Sprinklers

- Statistics from 2024 NFPA Publication
 - ✓ Effective in Controlling Fire 98% of Time
 - ✓ Only One Sprinkler Activated in 85% of Fires, Limiting Water Damage
 - ✓ Civilian Deaths and Injuries 89% and 31% Lower Than In Homes Without Fire Sprinklers
 - ✓ Property Loss 55% Lower Than In Homes Without Fire Sprinklers
 - ✓ Firefighter Injury Rate 48% Lower Than In Homes Without Fire Sprinklers
- Cost Estimated at Around \$1.65 Per Sq. Ft. for New Construction
 - ✓ For 2,500 Sq. Ft. Home, Cost Estimated at \$4,125
 - ✓ If Home Costs \$250 per Sq. Ft. to Build, Equates to 0.7% of Cost of Home



8

Alternatives

- All Codes (Excluding IECC and Residential Sprinkler Policy)
 - ✓ Proceed with 2024 I-Code Package Recommended by BCBOA
 - ✓ Direct Any Specific Local Amendments Not Included In BCBOA Version
 - ✓ Take No Action and Maintain Current 2018 I-Codes
- IECC
 - ✓ BCBOA Code Package, 2024 IECC Base
 - ✓ Cohort Code Package, 2024 IECC Base
 - ✓ Maintain Current 2021 IECC with Amendments
- Fire Sprinklers
 - ✓ Include Residential Fire Sprinkler in 2024 I-Code Package
 - ✓ Remove Residential Fire Sprinkler from 2024 I-Code Package