City of Louisville
COLORADO • SINCE 1878

# Building Code Board of Appeals

## Agenda

**March 20, 2024**
**City Hall, Spruce Room**
**749 Main Street**
**6:30 PM**

*Members of the public are welcome to attend and give comments remotely; however, the in-person meeting may continue even if technology issues prevent remote participation.*

- *Zoom Login: https://louisvilleco.zoom.us/j/3297175559*
- *Zoom Password: "BCBOA0320"*
- *You can log in via your computer. Please visit the City's website here to link to the meeting: www.louisvilleco.gov/bcboa*

*The Board will accommodate public comments during the meeting. Anyone may also email comments to the Board prior to the meeting at Building@LouisvilleCO.gov.*

1. Call to Order
2. Roll Call
3. Approval of Agenda
4. Approval of Minutes from 5.18.23 Meeting
5. Discussion of adoption of 2024 ICC codes
6. Public Comments on Items Not on the Agenda
7. New Business
    A. **Housekeeping Informational Items** (no vote/discussion needed):
        i. 2024 Open Government Pamphlet
        ii. Rules of Procedure

Persons planning to attend the meeting who need sign language interpretation, translation services, assisted listening systems, Braille, taped material, or special transportation, should contact the City Clerk's Office at 303 335-4536 or MeredythM@LouisvilleCO.gov. A forty-eight-hour notice is requested.

Si requiere una copia en español de esta publicación o necesita un intérprete durante la reunión, por favor llame a la Ciudad al 303.335.4536 o 303.335.4574.

B. **Housekeeping Voting Items**:

i. Election of Officers for 2024

ii. Approval of Posting locations for Agendas

8. Discussion Items for Next Meeting
9. Adjourn

City of Louisville
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# *Building Code Board of Appeals*

## *Meeting Minutes*

**May 18, 2023**
**City Hall, Spruce Room**
**749 Main Street**
**6:30pm**

**Call to Order** – Chairperson Matt Berry called the meeting to order at 6:35pm.

**Roll Call** was taken and the following members were present:

Board Members Present:
Matt Berry
Christian Dino
Mason Gatto
Peter Geise – joined 7:05pm

Board Members Absent:
Steve Knapp

Staff Members Present:
Randy Dewitz, City Inspector
Julie Burgener, Permit Technician

**Approval of Agenda** – The agenda was approved by all members.

**Approval of Meeting Minutes** – Meeting minutes for October and November meetings was approved by all members.

**Public Comments** – None

**Discussion Items**

***Discussion of Board feedback to City manager based on request by City Clerk***

**Berry** explained the Louisville Board training/review of basic rules he attended. City Council wants to make sure the meetings are consistent across all City Boards. Council also discussed consolidating specific Boards but does not apply to BCBOA. He further explained that each Board's goals should be clear and maximize the effectiveness of the advisory role of the Boards.

For discussion
Any group disccsuon must in a group meeting. Items must be presented for the City Council June 6 meeting.

**Berry** read the items from the email and specific questions are

- What do you consider to be the purpose and role of the board?
- Are there any changes proposed for the future?

**Berry** two roles
Primary role of BCBOA: Quasi- judicial board for Building Code Appeals and Contractor Licensing.
Secondary role would be as Advisory – between bldg. and city council related to building dept function and building codes.

**Burgener** spoke with Rob Zuccaro, Director of Community Development, regarding this meeting and stated that BCBOA is NOT an advisory Board, they are an appeals board.

**Berry** explained he knew there would be push-back on this and felt that this item would be a complaint that the entire BCBOA board would agree.

**Burgener** explained that this could be changed with the bylaws.

**Berry** explained that with previous iterations of the Board there was more collaboration with contractors and architects regarding building code changes.

**Burgener** read from the BCBOA bylaws:

**Section 3. Purpose and Duties**

**B Duties.**

*"The role of the Board will include, but not be limited to, advising the City Council on such matters as:*

*(i) Hearing and deciding appeals of orders, decisions, or determinations made by building officials relative to the application of the building code;*

*(ii) Hearing and deciding licensee or registration suspensions or revocations relative to violations of the building code, refusal to obey orders issued under the code, or neglecting to pay any fee assessed under the building code; and*

*(iii) Advising City Council on matters related to the building code as requested."*

The Board discussed the quasi-judicial hearings that the BCBOA has heard in the past and the decisions that were made from those hearings.

**Berry** re-iterated that 99.9% of BCBOA time is spent on building code adoption and changes. Berry suggested changing the title of the Board to emphasize what they do for the majority of their meeting time.

**Burgener** added that it could stress more of the advisory piece, as an advisory board to City Council.

**Berry** explained that the building official receives a packet for the BCBOA to comment on and it is introduced at the next meeting of the BCBOA. Berry didn't recommend changing the role of the board.

**Mason** asked if that part of the decision should include what the board recommends in their decision.

**Berry** explained that the BCBOA board cannot force City Council to use their recommendation.

**Burgener** explained that the director of Community Development, Rob Zuccaro supported the idea that the BCBOA could offer more advice and explanation on building code adoption and changes.

**Dino** explained that the board should be consulted for their expert opinion on building code decisions.

**Berry** interjected that Council person Dickenson did not know that the current year of the code is the year that the code should be adopted by a building dept.

Board Member Peter Geise joined the meeting. **Berry** caught up **Geise** on what has already been discussed, specifically regarding the role of the BCBOA board and that Rob Zuccaro was under the impression that the BCBOA was not an advisory board, however, it is stated in the bylaws that they do have an advisory role as requested by City Council.

**Berry** suggested moving the advisory role to the front of the bcboa bylaws and Dino Suggested removing the “as requested” portion.

**Berry** asked for suggestions on changing that role into more of an advisory role by moving the advisory role to the front of the bcboa bylaws and **Dino** suggested removing the “as requested” portion and that it should be a “duty” for the BCBOA to advise City Council on building code changes.

**Berry** moved on to the next bullet point of discussion regarding greatest successes and failures.

**Berry** explained the quasi-judicial decisions that the board has been involved in the past as the board’s successes.

**Berry** commented on the greatest failures to be the last iteration of building code changes because their suggestions were not fully utilized by City Council.

**Gatto** commented that the time and effort the board spent reviewing and refining the IECC Energy Code was the board’s greatest achievement even if it was not recognized by City Council.

**Geise** explained that each of them has different work experience within the building industry such as engineering, architecture, building, or inspections. With those differences they were all able to come together and agree on how the code should be interpreted.

**Berry** summed up that they had thoughtful, thorough comments on code issues brought to the BCBOA.

**Burgener** and **Geise** agreed that what the board recommended not to do, the City Council did, and it backfired.

**Berry** agreed, adding that the board was never given the opportunity to voice their concerns about what City Council was going to adopt regaring the 2021 IECC Energy Code.

**Geise** explained that there is no “reading” on the “first reading” and that the members of the board had to go the City Council meeting as private citizens to explain the board’s position with only three minutes to comment because City Council did not listen to the recommendations of the board initially.

**Berry** commented that their comments were never brought up in that form during the City Council meeting and that perhaps it was brought up in a work session but the board was not invited to those either.

**Berry** added that the failure is that the board was not able to get any of their comments regarding the 2021 IECC Energy Code adopted and that none of their suggestions were used.

**Berry** read the next question: How is your process to develop your annual work plan and how does it align with Council's work plan?

**Berry** – we are don't have a work plan since the board is on an as-needed basis.

**Geise** added that most of what the board has to present are new code issues that arise as well as new code adoption to keep the City code current for insurance purposes.

**Dino** commented that the board's work plan is fluid and their agenda is based on the considerations of City Council regarding code adoption.

**Dewitz** added that the board should be seen as an asset to the City and City Council even if City Council does not use their suggestions.

**Berry** summed up by stating that the BCBOA is on an as needed basis and the agenda changes

**Gatto** asked the question that are there situations where City Council has to consider the board's suggestions.

**Berry** answered that the only way that City Council would be forced to consider suggestions would be to have the topic added as an item to the agenda for a City Council meeting. The BCBOA would need to be invited to present at a City Council meeting as part of their agenda.

**Gatto** then commented that to his recollection there is supposed to be a Council liaison for each board. Berry answered that it would be addressed later in the meeting.

**Berry** stated that the BCBOA does not have a process for an annual work plan. The board meets based on judicial needs.

**Berry** read from the email that City Council is considering changes and what changes would the board recommend. If there is technical legislature then City Council should be required to utilize the BCBOA for suggestions and input.

**Geise** commented that if Council brought in a third party that was used to getting energy code passed and took up most of the meeting time for the residential 2021 IECC that there was no time for the BCBOA to participate. **Geise** further commented that he is in favor of the new energy code and moving forward with

new building codes, however, some new portions of the code are limiting the availability of supply due to the technology in the code being further ahead than the products needed to support the code.

**Berry** read the question again posed by the City Council as to what changes the BCBOA would suggest to Council. The recommendation from the BCBOA is that if technical legislation is being considered then Council must consider advice from the technical board, i.e., the BCBOA. Berry further explained that if there is legislation that is being recommended by an entity that supports green building, then there should also be a counterpoint provided by the BCBOA.

**Geise** commented that Chad Root had referenced, for the 2021 IECC residential code adoption that there were fourth-graders who called in to the City Council meeting when that was being discussed to sway the Council to pass the legislation. However, the BCBOA board, comprised of professionals in the building industry were not invited to discuss and comment on the decision.

**Berry** added that the board needs to know in advance of when building code legislation is going to be discussed that they can be proactive to get their opinions heard. **Berry** further added that the board is not political and their views are based on fact. For the 2021 IECC Residential code decision the board was not consulted until months after discussions had already started with City Council and the contulation firm. When any code adoption is being studied is the time when the BCBOA board should be consulted for input.

**Berry** and the board agreed that the final decision on the IECC energy code had already been decided by the time that the BCBOA board was consulted and it was a waste of time for the board to meet and discuss it.

**Berry** this is a technical board and they look at the facts and the council is doing a disservice to the constituents if they do not use a technical board when considering legislation that is entirely technical. Further, the board needs to do a better job of presenting their opinion based on the facts and experience with particular code items.

**Berry** commented that the board has been effective in providing advice to the building department, but ineffective in providing advice to City Council.

**Berry** read the last item to discuss regarding that City Council has an informal policy of managing meeting time and canceling or reducing meeting times when agendas are light. What are the practices of your board in regards to agenda development, meeting duration, and meeting tempo? **Berry** answered that this board only meets as needed.

**Burgener** commented that she confirmed with Rob Zuccaro that the BCBOA does not have a Council liaison because the BCBOA is appeals board and not an advisory board.

**Berry** asked if quasi-judicial boards have liaisons. **Burgener** did not know the answer.

**Geise** commented that a liaison would be helpful when the board has questions.

**Berry** added that having a liaison would be useful so that the board can get Council's interpretation of an agenda item and that the liaison would be able to tell the board about items on the agenda that might involve this board.

**Burgener** read from an email from Jeff Durbin, City Manager that he has been working with staff liaisons as an initial step to understand their perspectives. Burgener asked Rob Zuccaro who the staff liaison was for the BCBOA and he responded that the BCBOA does not have a liaison.

**Berry** commented on the board training that he attended and pointed out not to let any one member bully or dominate the board. Berry also commented that he would like to keep the meeting duration concise.

**Berry** explained the process for the Council vote on the 2021 IECC residential code at the October, 2021 meeting and that the addition of the Appendix RC was thrown in during the middle of the vote even though the Council members did not know what it was. **Berry** explained further that the building department did not know that it was going to be considered as part of the vote.

**Burgener** suggested that the board include their background knowledge and include their background with Council to help them understand the diversity of different areas that each person represents.

**Berry** stated that because the board spends the majority of their time advising, perhaps that should be more emphasized in their type of board.

**Geise** commented that there is not a hospital or business entity that disregards the advice of their board, or at the least, what hospital or business does not even consider the advice of their board.

**Dino** questioned if there was a way to rescind or amend the code to revert to a previous version.

**Berry** commented that typically City Council would not walk back the code, but rather adopt another code instead.

**Berry** commented that the 2021 IECC code was too far ahead of technology the time it was adopted and still is today.

**Geise** and **Dino** discussed possibly adding a new appendix with changes to the existing 2021 IECC adopted code.

**Berry** outlined the points the board should make to the City Manager:

- The BCBOA board has been effective at providing council to the building department.
- The BCBOA board has been ineffective at providing guidance to City Council because City Council has not taken the board's advice for previous code adoptions.
- The BCBOA advisory services are not being utilized when the board is not given the opportunity to comment on adopted codes, such as the 2021 IECC Residential code.
- If City Council is considering legislation regarding building codes, they must consider advice from a technical board.
- There should be transparency when City Council disregards a technical board's advice.
- Consideration of changing the BCBOA bylaws to change the board to more of an advisory board, which would require City Council adoption.

**Berry** also reminded the board that regarding open government law, they cannot discuss as a group but only as individuals.

**Discussion Items for Next Meeting**

Agenda items for next meeting:

1. Create a work plan for the board.
2. Discuss feedback from City Council on the results of this meeting.

Next meeting on June 15, 2023.

**Adjourn** – The meeting was adjourned at ____7:59pm_____.

City of Louisville
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# CITY COUNCIL COMMUNICATION
## AGENDA ITEM ___

**SUBJECT:** **ORDINANCE NO. __, SERIES 2024 – AN ORDINANCE AMENDING CHAPTER 15.18.030 OF THE LOUISVILLE MUNICIPAL CODE CONCERNING THE 2021 INTERNATIONAL ENERGY CONSERVATION CODE – 1st READING – SET HEARING 4/16/24**

**DATE:** **MARCH 19, 2023**

**PRESENTED BY:** **ROB ZUCCARO, AICP, COMMUNITY DEVELOPMENT DIRECTOR**

**SUMMARY:**

Attached for consideration on first reading, and to set the public hearing for April 15 2024, is a draft ordinance amending Louisville Municipal Code Section 15.18.030. The proposed ordinance is the result of staff research and public input on how to ensure the feasibility of implementing the City's amendments to the 2021 International Energy Conservation Code (IECC). The proposed code update provides alternative paths to meet the intended code outcomes, clarifies certain aspects of the code, streamlines certain administrative procedures, and aligns the code with equipment and material availability. Specific changes to the code include the following:

- Specifies that the commercial all-electric space and water heating requirement only applies to all new construction and removes any standards for additions and alternations to existing commercial buildings.
- Allows gas backup space heating equipment for the commercial all-electric space heating standards.
- Removes post-construction documentation, one-year compliance check, monitoring and metering requirements for new commercial construction subject to Appendix PT, Energy Use Intensity (EUI) modeling standards.
- Clarifies the EUI standards applicable to small office development between 0-5,000 sq. ft.
- Clarifies that R-1 and R-2 occupancies shall be subject to Appendix PT, the EUI modeling standards, rather than Appendix RC, Zero Energy Residential Building Provisions.
- Amends the commercial door U-value to match market availability of commercial type doors.
- Changes the minimum glazing standards for industrial and warehouse development to be measured by wall area rather than floor area.
- Corrects missing commercial R-values for insulation of metal buildings, and for piping and ducting.
- Adds minimum heat pump standards for both commercial and residential development to ensure that they are climate appropriate.

- Updates furnace efficiency standards to match product availability.
- Allows an exception to meeting Appendix RC, Zero Energy Residential Building Provisions if a home is certified through the Passive House Institute US, Inc. (PHIUS) program.
- Allows a Home Energy Rating System (HERS) in lieu of the Energy Rating Index (ERI) specified in the code.
- Removes the requirement to install electric vehicle charging infrastructure for commercial development when parking spaces are added or reconfigured if not part of a new building or building addition.

**BACKGROUND:**

On October 29, 2021, the City Council adopted the 2021 IECC with amendments, including the adoption of Appendix RC, which provides net-zero development standards for new residential development. The 2021 IECC provides minimum energy efficiency standards found in the International Residential Code (IRC) and International Building Code (IBC). The ordinance also included minimum electric vehicle (EV) charging standards for all new development. Ordinance No. 1816, Series 2021 and the minutes from the adoption hearing are included as Attachment Nos. 2 and 3.

On December 20, 2022, the City Council adopted further amendments to the 2021 IECC specific to commercial development. This included the adoption of all-electric standards for commercial space and domestic water heating, with exemptions for commercial kitchens and a broad range of commercial, industrial and institutional processes. The ordinance also included a new appendix that requires certain commercial uses, including office, multi-family residential development, and warehouse development, to meet minimum energy use performance targets that is more stringent than the base IECC or IBC codes. As part of the development of this code, the City hired Group 14 Engineering and Lotus Engineering and Sustainability to conduct a study and gather community input on options to strengthen the City's commercial energy code standards. This included an analysis of a net-zero commercial code option vs an energy use standard as an alternative to a full net-zero code. The final report and recommendations from Group 14/Lotus are included as Attachment No. 4 Ordinance 1845, Series 2022 and the minutes from the adoption hearing are included as Attachment Nos. 5 and 6.

Following the adoption of Ordinance No. 1845, Series 2022, City Council asked that staff conduct outreach on the adopted codes after hearing concerns over the feasibility and stringency of some of the code standards. In August of 2023 City staff and a City consultant with Shums Coda Associates held a public open house to gather feedback on the adopted codes. Staff received feedback from residents, business owners, land owners, developers and their design consultants on specific issues of concern. The feedback received at the open house is the basis for several of the proposed updates to the code. City staff has also identified several code provisions as part of implementing

the codes since their adoptions and after conducting further research that are included in proposed updates.

**ANALYSIS:**
The purpose of the proposed code updates is to meet the same intent of the original code adoption to have progressive energy standards than the base codes, but also ensuring that the codes are structured so that they are feasible and balanced to support economic vitality in the City. Staff has worked with the community and a consultant with Shums Coda Associates with special expertise in drafting energy codes.

**PUBLIC COMMENTS:**
No public comments have been received.

**FISCAL IMPACT:**
No fiscal impact is anticipated from the changes to the code.

**STAFF RECOMMENDATION:**
Staff recommends approval of Ordinance No. __, Series 2023 on first reading and setting the public hearing for April 16, 2024

**ATTACHMENTS:**
1. Ordinance No. __, Series 2023
2. Ordinance 1816, Series 2021
3. October 19, 2021 City Council Minutes
4. Group 14/Lotus Energy Code Update Recommendation Report
5. Ordinance 1845, Series 2022
6. December 20, 2022 City Council Minutes

**STRATEGIC PLAN IMPACT:**

| | | | |
|---|---|---|---|
| ☐ | **Financial Stewardship & Asset Management** | ☐ | **Reliable Core Services** |
| ☒ | **Vibrant Economic Climate** | ☐ | **Quality Programs & Amenities** |
| ☒ | **Engaged Community** | ☐ | **Healthy Workforce** |
| ☐ | **Supportive Technology** | ☐ | **Collaborative Regional Partner** |

**ORDINANCE NO. _____**
**SERIES 2024**

**AN ORDINANCE AMENDING CHAPTER 15.18.030 OF THE LOUISVILLE MUNICIPAL CODE CONCERNING THE 2021 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 2021 edition of the International Energy Conservation Code with amendments and additions to such code; and

**WHEREAS,** the City Council adopted Ordinance No. 1816, Series 2021 and Ordinance No. 1845, Series 2022, which included the adoption of Appendix RC to the 2021 edition of the International Energy Conservation Code, and provisions for electric space and water heating provisions for commercial development, and a new Appendix PT setting standards for energy ratings for certain commercial development; and

**WHEREAS,** following additional research and public input on the provisions adopted in Ordinance No. 1816, Series 2021 and Ordinance No. 1845, Series 2022, the City desires to make certain amendments to such codes to ensure the feasibility of implementation of the codes; and

**WHEREAS,** the City of Louisville remains committed to its adopted goals to reduce energy consumption, increase clean energy sources, and support the transition to a low-carbon community as outlined in the Sustainability Action Plan and Resolution 25, Series 2019, A Resolution Setting Clean Energy and Carbon Reduction Goals; and

**WHEREAS,** reducing building energy consumption is an effective strategy to reduce community-wide energy consumption and increase long-term cost savings for businesses; and

**WHEREAS**, the City Council is committed to environmental, economic and social sustainability, ensuring the International Energy Conservation Code is attainable for current and future business owners and tenants, supporting affordable housing and local businesses development.

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

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

Section 15.18.030 of the Louisville Municipal Code, concerning amendments and deletions to the 2021 International Energy Conservation Code, is hereby amended as follows (deleted text in ~~strikethrough~~ and new text underlined):

1. *Section C101.1 Title*, is amended to insert "the City of Louisville" so the section will read:

   **C101.1 Title.** These regulations shall be known as the Energy Conservation Code of the City of Louisville, and shall be cited as such. It is referred to herein as "this code."

2. *Section C103.2 Information on construction documents*, is hereby amended to read as follows:

   **C103.2 Information on construction documents.** Construction documents shall be drawn to scale upon suitable material. Electronic media documented are permitted to be submitted when *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment herein governed. Details shall include the following as applicable:

      1. Energy compliance path.
      2. Insulation materials and their *R*-values
      3. Fenestration *U*-factor and solar heat gain coefficients (SHGCs).
      4. Area-weighted *U*-factor and solar heat gain coefficient (SHGC) calculations.
      5. Mechanical system design criteria.
      6. Mechanical and service water heating systems and equipment types, sizes, fuel source and efficiencies.
      7. Economizer description.
      8. Equipment and system controls.
      9. Fan motor horsepower (hp) and controls.
      10. Duct sealing, duct and pipe insulation and location.
      11. Lighting fixture schedule with wattage and control narrative.
      12. Location and *daylight* zones on floor plans.
      13. Air barrier and air sealing details, including the location of the air barrier.
      14. Location of pathways for routing of raceways or cable from the solar ready zone to the electrical service panel.

3. *Section C202 General Definitions*, is hereby amended by adding, in alphabetical order, the following definitions:

*All-Electric Building:* A building that contains no combustion equipment, or piping or plumbing for combustion equipment, installed within the building or building site.

*Combustion Equipment: Any equipment or appliance used for space heating, service water heating, cooking, clothes drying and/or lighting that uses fuel gas or fuel oil.*

~~*Electric Vehicle (EV):* A vehicle registered for on-road use, primarily powered by an electric motor that draws current from a rechargeable storage source that is charged by being plugged into an electrical current source.~~

~~*Electric Vehicle Supply Equipment (EVSE):* The electrical conductors and associated equipment external to the electric vehicle that provide a connection between the premises wiring and the electric vehicle to provide electric vehicle charging.~~

~~*Electric Vehicle Capable Space:* A designated parking space that is provided with conduit sized and rated for a minimum 40-amp, 208/240-Volt dedicated branch circuit and shall be no less than 1" in size. Conduit must be continuous from the future or existing electrical panelboard or switchboard location(s) and end at a junction box or receptacle located within close proximity of the parking space. The electrical panel serving the parking space shall have sufficient capacity and physical space for a dual-pole, 40-amp breaker. The conduit shall be sealed at the junction or outlet box that is capped off, with the conduit sealed and the cap labeled as "For future electric vehicle charging".~~

~~*Electric Vehicle Ready Space:* A designated parking space that is provided with a dedicated branch circuit with wiring capable of supporting a minimum 40-ampere, 208/240- Volt circuit that terminates at a receptacle, plug, junction box, or an installed electric vehicle supply equipment within close proximity of the parking space. There shall be adequate reserved space in an electrical panelboard or switchboard to meet the electric vehicle requirements.~~

~~*Electric Vehicle Supply Equipment (EVSE) Installed Space:* A designated parking space with dedicated electric vehicle supply equipment capable of supplying a minimum 40-amp, dedicated circuit rated at 208/240 Volt from a building electrical panelboard.~~

*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 annual building site energy use per square foot of gross floor area in units of kBTU/sq ft.

*Residential Building: For this code, includes detached one- and two-family dwellings and multiple single-family dwellings (townhouses) R-3 and R-4 buildings three stories or less in height above grade plane.*

*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.*

*Tenant Finish: The first tenant occupying a space(s) in a core and shell. Multiple tenants may be considered as a tenant finish until the entire space within the core and shell has had a tenant. Once a space within a core and shell has been occupied it becomes an existing building.*

4. *C401.2.* Commercial buildings shall comply with ~~Section C401.2.1~~ <u>one of the following, as applicable</u>

   C401.2.1 Performance targets. New commercial building types included in the scope of Appendix PT shall comply with Appendix PT and Sections C403.2.4 and C404.10.

   C401.2.2 Core and shell. Core and shell buildings shall comply with the provisions of Section C402.1.3 through C402.5. When mechanical systems are installed, core and shell buildings shall also meet the provisions in C403.2.4, C404.10, and Section C408.

   C401.2.2.1 Core and shell buildings shall submit a letter of agreement to the City stating the tenant spaces included in the scope of Appendix PT shall meet the EUI target established in Table PT103 and shall include these requirements in their lease or purchase agreements.

   C401.2.3 Tenant finish. Tenant finishes included in the scope of Appendix PT shall comply with Appendix PT and C403.2.4 and C404.10. All other tenant finishes shall comply with the Prescriptive Compliance option, which requires compliance with Sections C401.3, C401.4, C402 through C406, and C408.

C401.2.4 Other commercial building types. Commercial building types not included above, including additions, shall comply with the Prescriptive Compliance option, which requires compliance with Sections C401.3, C401.4, C402 through C406, and C408.

Exception: ~~Additions, alterations,~~ Alterations, repairs, and changes of occupancy to existing buildings complying with Chapter 5.

5. *Section C401.2.1 International Energy Conservation Code*, is hereby deleted and replaced to read as follows:

   C401.2.1 International Energy Conservation Code

   Commercial buildings shall be built all-electric unless the fuel gas options of C403.3.2 and the additional electric infrastructure requirements of C405.14 are met. All buildings must comply with the following:

   City of Louisville's Prescriptive Compliance. The Prescriptive Compliance option requires compliance with Sections C401.3, C401.4, C402 through C406, and Section C408.

   Core and shell buildings shall be required to comply with the provisions of Section C402.1.3 through C402.5 of the 2021 International Energy Conservation Code.

6. *Section C401.2.2 ASHRAE 90.1*, is hereby deleted in its entirety.

7. A new *Section C401.4 Mandatory Requirements for Commercial Buildings*, is hereby 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 | C402.5 |
| 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 | C403.11, except C403.11.3 |
| Construction of HVAC system elements | C403.12 |
| Mechanical systems located outside of the building thermal envelope | C403.13 |
| Service water heating | C404 |
| Electrical power and lighting systems | C405, except C405.3 |
| Maintenance information and system commissioning | C408 |

8. *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 C402.2.1 | |
| Insulation entirely above roof deck | R-49 |
| Metal buildings[a] | R-21 + R-11 LS |
| Attic and other | R-49 |
| Walls. Above grade C402.2.2 | |
| Mass[d] | R-21 |
| Metal buildings | R-21 + R-10ci |
| Metal framed | R-21+ R-10ci |
| Wood framed and other | R-21 |
| Walls, Below grade C402.2.5 | |
| Below-grade wall[b] | R-10 |
| Floors C402.2.3 | |
| Mass[c] | R-21 |
| Joist/framing | R-38 |
| Slab-on-grade floors C402.2.4 | |

| | |
|---|---|
| Unheated | R-20 for 24" below |
| Heated[e] | R-15 for 36" below + R-5 full slab |

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m$^2$, 1 pound per cubic foot = 16 kg/m$^3$.
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.
c."Mass floors" shall be in accordance with Section C402.2.3.
d."Mass walls" shall be in accordance with Section C402.2.2.
e. The first value is for perimeter insulation and the second value is for full, under-slab insulation.

9. *Section C402.1.4 Assembly U-factor, C-factor or F-factor-based method,* is hereby deleted in its entirety.

10. *Section C402.1.5 Component performance alternative,* is hereby deleted in its entirety.

11. *Table C402.4 Building Envelope Fenestration Maximum U-Factor and SHGC Requirements,* is hereby deleted and replaced with the following:

Table C402.4
Building Envelope Fenestration

| Vertical Fenestration | |
|---|---|
| Maximum U-Factor | 0.45 |
| Maximum SHGC | 0.33 |
| Maximum Air leakage rate for all fenestration except curtain walls and storefront glazing | .20 cfm/ft2 |
| Maximum air leakage rate for curtain walls and storefront glazing | .06 cfm/ft |
| Skylights | |
| Maximum U-Factor | 0.50 |
| Maximum SHGC | 0.40 |
| Maximum Air leakage rate | .20 cfm/ft2 |

~~12. *Section C402.4.1 Maximum area*, is hereby deleted and replaced with the following:~~

~~C402.4.1 Minimum area of natural lighting. Not less than eight percent of the floor area shall be glazed.~~

12. *Section C402.4.1.2* is deleted and replaced with the following:

    C402.4.1 Minimum area of natural lighting. Not less than 8% of wall area for warehouses, and industrial shall be glazed.

~~13. *Section C402.4.2 Minimum skylight fenestration area*, is hereby deleted and replaced with the following:~~

    ~~**C402.4.2 Minimum area of natural lighting.** A minimum skylight area of three percent of the roof area shall be provided for all roofs.~~

        ~~Exception: Roof areas designated for solar ready zones shall not be included in roof area calculation.~~

13. **C403.2** *System design.* Mechanical systems shall be designed to comply with Sections C403.2.1 through ~~403.2.3~~ C403.2.4. Where elements of a building's mechanical systems are addressed in Sections C403 through C403.14, such elements shall comply with the applicable provisions of those sections.

14. Section C403.2.4 Space heating equipment is added as follows:

    C403.2.4 Space heating equipment. Fossil-fuel warm air furnaces appliances and electric resistance space heating equipment shall not be permitted for space heating in new construction.

    4. Heat pump efficiencies:
        a. Ductless System
            1. 14.3 SEER2;
            2. 7.5 HSPF2; or
            3. EnergyStar Cold Climate certified
        b. Ducted System
            1. 15.2 SEER2;
            2. 9 HSPF2; or
            3. EnergyStar Cold Climate certified

    Exceptions:
    1. *Emergency backup.* Where it is required by an applicable law or regulation to provide space heating with an emergency power system or a standby power system.
    2. *Certain make-up air systems.* Electric resistance in make-up air systems where energy recovery ventilation is prohibited by the International Mechanical Code.
    3. *Supplementary heat.* Electric resistance and natural gas/ propane heat used for supplementary heat in accordance with Section C403.4.1.1

4. *Electric resistance budget.* In addition to any exceptions in this section, Up to 5 W of electric resistance space heating per square foot of conditioned floor area in the building, not including supplementary heat.
5. *Integrated units.* Electric resistance heating elements, natural gas, propane supplemental heating integrated into heat pump equipment.
6. *Heated plenums.* Electric resistance in heated plenums.
7. *Temporary systems.* Temporary electric resistance heating systems are permitted where serving future tenant spaces that are unfinished and unoccupied, provided that the heating equipment is sized and controlled to achieve interior space temperatures no higher than needed to prevent freezing.
8. *Freeze protection.* Electric resistance in heating systems intended for freeze protection.
9. Outdoor systems. Equipment used for outdoor heating.
10. Specific conditions. Portions of buildings that require fossil fuel or electric resistance space heating for specific conditions approved by the Building Official for research, health care, process or other specific needs that cannot practicably be served by heat pump or other space heating systems. This does not constitute a blanket exception for any occupancy type.
11. Replacements. Replacement fuel-fired appliances.
12. Backup heat. For back up heat to operate when the heat pump cannot adequately heat the space/buildings due to extreme cold weather.
13. Where cfm/sq. ft. ventilation requirements result in conditions where the Building Official determines that space heating requirements cannot reasonably be met without combustion space heating systems.

14. *Section C403.3.2 HVAC equipment performance requirements*, is hereby ~~deleted in its entirety and replaced~~ amended by adding the following at the beginning of the section with remainder of section to remain ~~to read as follows~~:

C403.3.2 When HVAC fuel fired equipment is permitted to be installed, equipment shall meet the minimum efficiency requirements of Tables C403.3.2(1) through C403.3.2(16) when tested and rated in accordance with the applicable test procedure. Plate-type liquid-to-liquid heat exchangers shall meet the minimum requirements of AHRI 400. The efficiency shall be verified through certification under an approved certification program or, where a certification program does not exist, the equipment efficiency ratings shall be supported by data furnished by the manufacturer. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements. Where components, such as indoor or outdoor coils, from different manufacturers are used, calculations and supporting data shall be furnished by the designer that demonstrates that the combined efficiency of the specified components meets the requirements herein.

~~HVAC/fuel fired equipment performance requirements. Unless built all-electric, all new combustion equipment shall comply with the more efficient HVAC equipment performance of Sections C406.2, C406.2.3, and C406.2.4 and the additional~~

~~electric infrastructure requirements in Section C405.14. A mechanical compliance certificate demonstrating compliance with section C406.2.3 and/or C406.2.4 shall be required for all HVAC, fuel fired and Service Water Heating equipment.~~

~~The efficiency shall be verified through certification under an approved certification program or, where a certification program does not exist, the equipment efficiency ratings shall be supported by data furnished by the manufacturer. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements. Where components, such as indoor or outdoor coils, from different manufacturers are used, calculations and supporting data shall be furnished by the designer that demonstrates that the combined efficiency of the specified components meets the requirements herein. (Tables C403.2.(1) through (16) are expressly retained and remain applicable to HVAC equipment performance.)~~

~~Exceptions:~~

~~1. Factory, laboratory, and high hazard occupancy combustion equipment, except for HVAC and domestic water heating.~~

~~2. Commercial Kitchens.~~

~~3. Other combustion equipment approved by the Building Official based on demonstration by the applicant that compliance with this section is not feasible and the equipment proposed is the most efficient appliance reasonably available.~~

16. *Section C403.4.1 Thermostatic controls*, is hereby deleted and replaced with the following:

**C403.4.1 Thermostatic controls.** The supply of heating and cooling energy to each *zone* shall be controlled by individual thermostatic controls capable of responding to temperature within the *zone*. Where humidification or dehumidification or both is provided, no fewer than one humidity control device shall be provided for each humidity control system. Occupancy sensors shall be provided on the thermostat to setback in accordance with C403.4.2.1

Exception: Independent perimeter systems that are designed to offset only building envelope heat losses, gains or both serving one or more perimeter *zones* also served by an interior system provided that both of the following conditions are met:

1. The perimeter system includes not fewer than one thermostatic control *zone* for each building exposure having exterior walls facing only one orientation (within ±45 degrees) (0.8 rad) for more than 50 contiguous feet (15 240 mm).
2. The perimeter system heating and cooling supply is controlled by thermostats located within the *zones* served by the system.

17. *Section C403.12.1 Duct and plenum insulation and sealing*, is hereby deleted and replaced with the following:

**C403.12.1 Duct and plenum insulation and sealing.** All supply and return air ducts and plenums shall be insulated with not less than R-12. Ducts, air handlers and filter boxes shall be sealed. Joints and seams shall comply with Section 603.9 of the International Mechanical Code.

18. *Section C403.12.3 Piping insulation*, is hereby amended to read as follows:

**C403.12.3 Piping insulation.** Piping serving as part of a heating or cooling system shall be thermally insulated to R-5.

19. *Section C404.4 Insulation of piping*, is hereby amended to read as follows:

**C404.4 Insulation of piping**. Piping from a water heater to the termination of the heated water fixture supply pipe shall be insulated to R-3. On both the inlet and outlet piping of a storage water heater or heated water storage tank, the piping to a heat trap or the first 8 feet (2438 mm) of piping, whichever is less, shall be insulated. Piping that is heat traced shall be insulated to R-3 or the heat trace manufacturer's instructions.

20. Section C404.10 Water heating equipment is added as follows:

**C404.10 Water heating equipment.** Fossil fuel and electric resistance instantaneous and storage water heaters shall not be used to provide hot water <u>in new construction.</u>

Exceptions:

1. *Emergency backup.* Where it is required by an applicable law or regulation to provide water heating with an emergency power system or a standby power system.
2. *Integrated units*. Resistance heating elements integrated into heat pump water heating equipment.
3. *Recirculation loops*. Electric resistance elements used for recirculation loop temperature maintenance.
4. *Small systems.* Electric storage water heaters with a rated water storage volume no greater than 20 gallons.
5. *Point-of-use systems.* Instantaneous electric water heaters located within 10 feet of the point of use.
6. *Renewable electricity*. Electric resistance equipment where not less than 100 percent of the annual service water-heating requirement is provided by an *on-site renewable energy system* not used to meet any other provision of this code.
7. *Renewable or waste thermal energy*. Electric resistance storage water heating equipment in *buildings* where not less than 75% of the annual

service water heating requirement is met by a solar thermal system or other renewable thermal system.

8. *High-temperature requirements*. Water heating systems that serve end-uses or have a storage requirement that necessitates a water temperature of 141°F (55°C) or hotter.
9. *Electric resistance budget.* In addition to any exceptions in this section, a budget of 24 kW plus 0.1 watts per square foot of building area of electric resistance service water heating capacity per building.
10. *Commercial kitchens*. Electric booster-heaters serving commercial dishwashers, commercial food service equipment, and other approved process equipment that require supply water temperatures of 120°F (49°C) or higher.
11. *Replacements.* Replacement of gas-fired storage water heaters or instantaneous water heaters.

21. Section C405.2.1 Occupant sensor controls, is hereby amended to read as follows:

**C405.2.1 Occupant sensor controls.** Occupant *sensor controls* shall be installed to control lighting.

22. *Section C405.2.2 Time-switch controls*, is hereby deleted in its entirety.

23. *Section C405.2.2.1 Time-switch control function*, is hereby deleted in its entirety.

24. *Section C405.2.3 Light-reduction controls*, is renumbered to C405.2.2.

25. *Section C405.2.3.1 Light-reduction function*, is renumbered to C405.2.2.1.

26. *Section C405.2.4 Daylight-responsive controls*, is renumbered to C405.2.3.

27. *Section C405.2.4.1 Daylight-responsive control function*, is renumbered to C405.2.3.1.

28. *Section C405.2.4.2 Sidelit daylight zone*, is renumbered to C405.2.3.2.

29. *Section C405.2.4.3 Toplit daylight zone,* is renumbered to C405.2.3.3.

30. *Section C405.2.4.4 Atriums,* is renumbered to C405.2.3.4.

31. *Section C405.2.5 Specific application controls,* is renumbered to C405.2.4.

32. *Section C405.2.6 Manual controls,* is renumbered to C405.2.5.

33. *Section C405.2.7 Exterior lighting controls,* is renumber to C405.2.6.

34. *Section C405.2.7.1 Daylight shut off,* is renumbered to C405.2.6.1.

35. *Section C405.2.7.2 Building façade and landscape lighting,* is renumbered to C405.2.6.2.

36. *Section C405.2.7.3 Lighting setback,* is renumbered to C405.2.6.3.

37. *Section C405.2.7.4 Exterior time-switch control function,* is renumbered to C405.2.6.4.

38. *Section C405.2.8 Parking garage lighting control*, is renumbered to C405.2.7.

39. *Section C405.4.3 Gas lighting, is hereby amended to read as follows:*

**C405.4.3 Gas lighting.** Gas-fired lighting appliances shall not be permitted.

40. A new *Section C405.13 Electric vehicle charging infrastructure for new construction and building addition of 25% or more of original square footage*, is hereby added to read as follows:

**Section C405.13.1 Electric vehicle charging infrastructure for new construction and building addition of 25% or more of original square footage.** Electric vehicle charging shall be provided and installed in accordance with this section, National Electrical Code (NFPA 70), and Section 17.20.170 of the Louisville Municipal Code. ~~When parking spaces are added or modified without an increase in building floor area, only the new parking spaces are subject to this requirement.~~ All *EVSE Installed*, *EV Ready* and *EV Capable* spaces are to be included in the calculation for the number of minimum vehicle spaces required, as provided by the applicable article of the Louisville Zoning Code.

Section C405.13.2 Identification. The circuit breakers or circuit breaker spaces reserved for the *EVSE Installed, EV Ready*, and *EV Capable* spaces shall be clearly identified in the panelboard directory. The conduit for electric vehicle capable spaces shall be clearly identified at both the panelboard and the termination point at the parking space~~.~~

40. A new *Section C405.14 Additional electric infrastructure*, is hereby added to read as follows:

**Section C405.14 Additional electric infrastructure.** All *combustion equipment* and end-uses shall be installed in accordance with this section.

**C405.14.1 Electric infrastructure for dwelling and sleeping units.** *Combustion equipment* and end-uses serving individual dwelling units or sleeping units shall comply with Section R404.5.

**C405.14.2 Combustion equipment.** *Combustion equipment* shall be provided with conduit that is continuous between a junction box located within 3 feet (914 mm) of the appliance or equipment and an electrical panel. The junction box, conduit and bus bar in the electrical panel shall be rated and sized to accommodate a branch circuit with sufficient capacity for an equivalent electric appliance, equipment or end use with an equivalent equipment capacity. The electrical junction box and electrical panel shall have labels stating, “For Future Electric Equipment”.

Exception: Industrial and manufacturing uses are exempt from Section C405.14.

41. *Section C502.1.1 General,* is hereby amended to read as follows:

Additions to an existing building, building system or portion thereof shall conform to the provisions of Section C401.2.4 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 condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.

42. *Section C503.1 General* Exception 3 is deleted in its entirety.

43. *Section C503.2 Building Envelope* is amended with exception remaining to read as follows:

New building envelope assemblies that are part of the alteration shall comply with Sections C402.1 through C402.5. Existing ceilings, roofs, all wall types, or floors exposed during construction shall comply with Table C402.1.3.

44. *Section C505.1 General*, is hereby amended to read as follows:

**C505.1 General.** Where the use in a space changes from one use in Table C405.3.2(1) or C405.3.2(2) to another use in Table C405.3.2(1) or C405.3.2(2), the installed lighting wattage shall comply with Section C405.3. Where the space undergoing a change in occupancy or use is in

a building with a fenestration area that exceeds the limitations of Section C402.4.1, the space is exempt from Section C402.4.1 provided that there is not an increase in fenestration area.

Exception: Egress doors with fenestration are allowed to bring total fenestration percentages over the allowed maximum amount of vertical fenestration.

## APPENDIX PT
## MODELING TO A PERFORMANCE TARGET

**PT101 Scope.** This section establishes criteria for demonstrating compliance with a performance target, and is required for new hotels (occupancy R-1), multifamily (occupancy R-2), offices, primary and secondary schools, and warehouses. All end use load components within and associated with the building and their building sites shall be modeled.

**PT102 Mandatory requirements.** The requirements in this section are mandatory requirements and shall be required in addition to the provisions of ASHRAE 90.1 Appendix G.

**PT103 Performance target.** Projects of the types listed in Table PT103 shall demonstrate that the proposed design reaches a fixed energy use intensity (EUI) less than or equal to the values in Table PT103, calculated utilizing the energy modeling procedures of Appendix G of ASHRAE 90.1. For *buildings* with multiple occupancy types, the modeled performance target shall be a weighted average of the floor area of each occupancy type.

Exception: Energy used for electric vehicle charging, data centers, and process loads shall be excluded from compliance modeling.

### TABLE PT103
### PERFORMANCE TARGETS

| BUILDING TYPE | PERFORMANCE TARGET (kBTU/ft2) |
|---|---|
| Hotel (Occupancy R-1) | 32 |
| Multifamily (Occupancy R-2) | 32 |
| Office, small (≥ 0 - 5,000 ft2) | 19 |

| | |
|---|---|
| Office, medium (5,000 – 50,000 ft2) | 23 |
| Office, large (>50,000 ft2) | 28 |
| School, primary | 34 |
| School, secondary | 31 |
| Warehouse | 11 |

**PT104 Renewable Energy.** On-site renewable energy generated by a system installed as part of this project that is used by the building shall be subtracted from the proposed design energy consumption prior to calculating the proposed building performance.

**PT105 Performance documentation.** Documentation to verify compliance with this section shall be provided to the code official.

**PT105.1 Projected compliance report.** Permit submittals shall include a report documenting the proposed design is projected to meet the EUI target. The compliance report shall include the following specific information beyond the information required in ASHRAE 90.1 Appendix G:

1. Address of the building.
2. An inspection checklist documenting the building component characteristics of the proposed design.
3. Name of individual completing the report.
4. Name and version of compliance software tool.
5. Documentation of the reduction in energy use associated with on-site energy.

**PT105.2 Construction plan requirements.** Construction plans shall depict all component characteristics of the proposed design utilized for the EUI in accordance with ASHRAE 90.1 Appendix G.

~~**PT105.3 Measured performance report.** Projects shall demonstrate compliance with this code by documenting that the building has achieved the EUI performance calculated based on 12 months of metered energy use after occupancy.~~

~~**PT105.3.1 Demonstration of operating energy use.** Metered energy data demonstrating compliance with the EUI target shall be reported to the building official using Energy Star Portfolio Manager and adjusted for the percentage of floor area occupied. While at least 75 percent~~

~~occupied, the building shall operate at or below its assigned energy use target established in Section PT103 for any recording period of 12 consecutive months that is completed within three years of the date of the Certificate of Occupancy. The owner shall notify the building official when this 12-month period has been successfully completed.~~

~~**PT106 Energy metering and monitoring.** All projects must install submetering or monitoring capabilities to support building energy performance analysis. The project must include capabilities to store and access a 24-month continuous data set on an ongoing basis.~~

~~**PT106.1 End-use monitoring.** Measurement devices shall be installed in new *buildings* to monitor the electric energy use of each of the following separately:~~

~~1. Total electric energy.~~
~~2. HVAC systems energy use.~~
~~3. Interior lighting.~~
~~4. Exterior lighting.~~
~~5. Receptacle circuits.~~
~~6. Data centers representing over 10 percent of total building load or 5 percent of building floor area.~~
~~7. Other process loads that represent 10 percent or more of total building energy use based on building energy use modeling.~~

~~**PT106.2 Independent metering.** The following items shall be independently metered. Individual meters used to comply with this section may not serve multiple *buildings*.~~

~~1. All fuel sources serving the building.~~
~~2. Energy production from on-site renewable energy systems.~~
~~3. Electric vehicle (EV) supply equipment.~~
~~4. Data centers representing over 10 percent of total building load or 5 percent of building floor area.~~
~~5. Other process loads that represent 10 percent or more of total building energy use based on building energy use modeling.~~
~~6. Individual tenant energy loads.~~

45. *Section R101.1 Title,* is amended to insert "the City of Louisville" so the section will read:

**R101.1 Title.** These regulations shall be known as the Energy Conservation Code of the City of Louisville and shall be cited as such. It is referred to herein as "this code."

46. *Section R103.2 Information on construction documents,* is amended to read as follows:

**R103.2 Information on construction documents.** Construction documents shall be drawn to scale upon suitable material. Electronic media documented are permitted to be submitted when *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment herein governed. Details shall include the following as applicable:

1. Energy compliance path.
2. Insulation materials and their *R*-values
3. Fenestration *U*-factor and solar heat gain coefficients (SHGCs).
4. Area-weighted *U*-factor and solar heat gain coefficient (SHGC) calculations.
5. Mechanical system design criteria.
6. Mechanical and service water heating systems and equipment types, sizes, fuel source and efficiencies.
7. Equipment and system controls.
8. Duct sealing, duct and pipe insulation and location.
9. Air sealing detail.
10. Location of pathways for routing of raceways or cable from the solar ready zone to the electrical service panel.

47. *Section R202 General Definitions*, is hereby amended by adding, in alphabetical order, the following definitions:

*All-Electric Building:* A building that contains no combustion equipment, or plumbing <u>or piping</u> for combustion equipment, installed within the building or building site.

*Combustion Equipment:* Any equipment or appliance used for space heating, service water heating, cooking, clothes drying and/or lighting that uses fuel gas or fuel oil.

~~*Electric Vehicle (EV):* A vehicle registered for on-road use, primarily powered by an electric motor that draws current from a rechargeable storage source that is charged by being plugged into an electrical current source.~~

~~*Electric Vehicle Supply Equipment (EVSE):* The electrical conductors and associated equipment external to the electric vehicle that provide a connection between the premises wiring and the electric vehicle to provide electric vehicle charging.~~

~~*Electric Vehicle Capable Space:* A designated parking space that is provided with conduit sized and rated for a minimum 40-amp, 208/240-Volt dedicated branch circuit and shall be no less than 1" in size. Conduit must be continuous from the future or existing electrical panel board or switchboard location(s) and end at a junction box or receptacle located within close proximity of the parking space. The electrical panel serving the parking space shall have sufficient capacity and physical space for a dual-pole, 40-amp breaker. The conduit shall be sealed at the junction or outlet box that is capped off, with the conduit sealed and the cap labeled as "For future electric vehicle charging".~~

~~*Electric Vehicle Ready Space:* A designated parking space that is provided with a dedicated branch circuit with wiring capable of supporting a minimum 40-ampere, 208/240- Volt circuit that terminates at a receptacle, plug, junction box, or an installed electric vehicle supply equipment within close proximity of the parking space. There shall be adequate reserved space in an electrical panel board or switchboard to meet the electric vehicle requirements~~.

*Residential Building.* For this code, includes detached one- and two-family dwellings and multiple single-family dwellings (townhouses) and R-3 and R-4 buildings three stories or less in height above grade plane.

48. *Section R401.2 Application,* is hereby deleted and replaced with the following:

**R401.2 Application.** New ~~R~~residential buildings shall be built using appendix RB and RC and shall be built all-electric unless the fuel gas options of R403.7 and additional electric infrastructure requirements of R404.5 are met. ~~All residential buildings shall comply with the R401.2.1 City of Louisville's Prescriptive Compliance or R406 Energy Rating Index with a maximum rating index of 50 before the installation of solar panels~~

Exceptions:

1. New residential buildings certified through the Passive House Institute US, Inc. (PHIUS) program
2. Additions shall comply with R401.2.1 and Chapter 5
3. ~~Additions,~~ ~~a~~Alterations, repairs and changes of occupancy to existing buildings complying with Chapter 5.

49. *Section R401.2.1 Prescriptive Compliance Option,* is hereby deleted and replaced with the following:

**R401.2.1 City of Louisville's Prescriptive Compliance.** The City of Louisville's Prescriptive compliance requires compliance with Sections R401 through R404.

*50. Section R401.2.2 Total Building Performance Option*, is hereby deleted in its entirety.

*51. Section R401.2.4 Tropical Climate Region*, is hereby deleted in its entirety.

52. *Section R401.2.5 Additional Energy Efficiency*, is hereby amended to read as follows:

**Section R401.2.5 Additional Energy Efficiency.** Building shall comply with one of the additional efficiency options and shall be installed in according to Section R408.2.

53. A new *Section R401.4 Mandatory requirements for residential buildings*, is hereby added to read as follows:

**R401.4 Mandatory requirements for residential buildings.** Residential building must comply with the following sections from the 2021 International Energy Conservation Code found in Table R401.4 and Section R401.2.

**Table R401.~~3~~4**
**Mandatory requirements for residential buildings**

| Title | IECC Section |
|---|---|
| Vapor retarder | R402.1.1 |
| Eave baffle | R402.2.3 |
| Access hatches and doors | R402.2.4.1 |
| Crawl space wall insulation | R402.4.1.2 |
| 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 |
| Snow melt and ice systems | 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 |

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

**R402.1 General.** The building thermal envelope shall comply with the requirements of Section R402.1.1 and R402.1.2.

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

**R402.1.2 Insulation ~~and fenestration~~.** New and replacement ~~A~~assemblies shall have R-value of insulation materials equal to or greater than that specified in Table R402.1.2 ~~unless an alternative path is specified while using HERS energy rating index of 50.~~

Exception: New Construction complying with R401.2 or exception 1

56. *Section R402.1.2.1 Fenestration* is hereby added to read as following*:*

R402.1.2.1 Fenestration. New and replacement assemblies shall not exceed the value specified in Table R402.1.2.

Exception: New Construction complying with R401.2 or exception 1

Table R402.1.2
Average Insulation and Fenestration Requirements by Component

| | |
|---|---|
| Roof | R-60 |
| Above grade walls | R-21 |
| Below grade walls | R-21 |
| 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 |
| Hot Water Pipes | R-5 |

| | |
|---|---|
| Warm Air Ducts | R-8 |

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

56. Section R402.3.3 Glazed fenestration exemption, is hereby amended to read as follows:

**R402.3.3 Glazed fenestration exemption.** Not greater than 15 square feet (1.4 $m^2$) of glazed fenestration per dwelling unit shall be exempt from the U-factor and SHGC requirements in Section R402.1.2.

57. *Section R402.4.1.2 Testing*, is hereby deleted and replaced to read as follows:

**Section R402.4.1.2 Testing.** All new buildings or dwelling units that are heated or cooled, and additions over 500 square feet shall be tested for air leakage.

58. *Section R402.5 Maximum fenestration U-factor and SHGC*, is hereby deleted and replaced with the following*:*

**Section R402.5 Maximum fenestration U-factor and SHGC.** The maximum U-factor and solar heat gain coefficient (SHGC) for fenestration shall not be required in storm shelters complying with ICC 500.

59. *Section R403.3.1 Ducts located outside conditioned space*, is hereby deleted and replaced with the following*:*

**R403.3.1 *Ducts located outside conditioned space*.** All supply and return ducts shall be insulated to a minimum R-8 if located outside a conditioned space.

60. *Section R403.5.2 Hot water pipe insulation*, is hereby deleted and replaced with the following*:*

**R403.5.2 Hot water pipe insulation.** All service hot water piping shall be insulated to a minimum R-5.

61. *Section R403.6.1 Heat and recovery ventilation*, is hereby deleted and replaced in its entirety and the following is hereby added in lieu thereof*:*

**R403.5.2 Heat and recovery ventilation**. All new buildings and additions over 500 square feet shall be provided with a heat recovery or energy recovery ventilation system. The system shall be balanced with a minimum sensible heat recovery efficiency of 65 percent at 32°F (0°C) at a flow greater than or equal to the design airflow.

62. *Section R403.7 Equipment sizing and efficiency rating*, is hereby deleted and replaced with the following*:*

**R403.7 Equipment sizing and efficiency rating.** All new buildings and additions greater than 500 square feet with heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies. In addition to complying with Sec. R404.6 Additional Electric Infrastructure, new and replacement electrical heating and cooling equipment shall have an efficiency rating equal to or greater than the minimum required by federal law for the geographic location where the equipment is installed. New gas heating equipment shall comply with the following efficiencies:

1. Gas furnaces shall have a minimum of 96% efficiency.
2. Gas boilers shall have a minimum of 90% AFUE.
3. On demand water heaters shall have a greater than .92 uniform energy factor.
4. Heat pump efficiencies:
   a. Ductless System
      1. 14.3 SEER2;
      2. 7.5 HSPF2; or
      3. EnergyStar Cold Climate certified
   b. Ducted System
      1. 15.2 SEER2;
      2. 9 HSPF2; or
      3. EnergyStar Cold Climate certified

Exception: Solid fuel stoves/gas fireplaces, outdoor fire pits, gas stoves and ovens.

63. *Section R404.1.1 Fuel gas lighting equipment, is hereby amended to read as follows:*

**R404.1.1 Fuel gas lighting equipment.** Fuel gas lighting systems shall not be installed.

64. A new *Section R404.4 Electric vehicle charging infrastructure for new construction and building addition of 50% or more of original square footage*, is hereby added to read as follows:

**Section R404.4 Electric vehicle charging infrastructure for new construction and building addition of 50% or more of original square footage**. Electric infrastructure for the current and future charging of *electric vehicles* shall be installed in accordance with this section per

Section 17.20.170 of the Louisville Municipal Code*. EV ready spaces and EV capable spaces* are permitted to be counted toward meeting minimum parking requirements.

R404.4.1 One- and two- family dwellings and townhouses. One- and two-family dwellings and townhouses with a dedicated attached or detached garage or on-site parking spaces shall be provided with electric vehicle charging in accordance with Section 17.20.170 of the Louisville Municipal Code.

R404.4.1.1 Minimum EV Ready infrastructure. Minimum EV Ready Space infrastructure shall require the following:

1. Installation of conductors:
    a. Conductors shall be installed of sufficient size to accommodate a minimum 240VAC 40Amp branch circuit to each parking space where required.
    b. Conductors shall terminate in either a receptacle, plug, junction or outlet box, or an *EVSE* installed in the parking space.
2. The electrical panel directory shall designate the branch circuit as “EV Ready” and the junction box or receptacle shall be labelled “EV Ready.”

R404.4.1.2 Construction documents. Construction documents shall graphically indicate and label all EV ready spaces and associated termination locations. For all Townhouses and one- and two-family dwellings with an electrical utility service of 200 Amps or greater, a panelboard schedule shall be provided indicating the EV Ready circuit breaker space(s) and the circuit designation(s).

R404.4.2 Group R occupancies. Group-R occupancies (~~R-2,~~ R-3, and R-4 buildings three stories and less) with three or more dwelling units and/or sleeping units shall be provided with electric vehicle charging in accordance with Section 17.20.170 of the Louisville Municipal Code.

Electric vehicle charging shall be provided and installed in accordance with this section and the National Electrical Code (NFPA 70). When parking spaces are added or modified without an increase in building floor area, only the new parking spaces are subject to this requirement.

65. A new *Section R404.5 Additional electric infrastructure*, is hereby added to read as follows:

**R404.5 Additional electric infrastructure.** *Combustion equipment* shall be installed in accordance with this section.

R404.5.1 Combustion equipment and end-uses. *Combustion equipment* shall be provided with a dedicated, appropriately phased circuit that shall have a minimum amperage requirement for a comparable electric appliance, equipment or end use, an electrical receptacle or junction box that is connected to the electric panel, and conductors of adequate capacity within 6 feet (1829 mm) of the appliance or equipment.

Each such circuit shall be accessible with no obstructions. A reserved circuit breaker space shall be installed in the electrical panel adjacent to the circuit breaker for the branch circuit and labeled for each circuit. Both ends of the unused conductor or conduit shall be labeled “For Future Electric Equipment” and be electrically isolated.

66. *Section R405 Total building performance*, is deleted in its entirety.

67. *Section R406.3 Building thermal envelope*, is hereby deleted in its entirety and replaced with the following:

**R406.3 Building thermal envelope.** ~~Building and portions thereof shall comply with Table R406.3.~~ The building thermal envelope shall be greater or equal to the levels of efficiency and SHGC in Table R406.3.

**Table R406.3**
**Average of the Minimum Insulation and Maximum Fenestration Requirements by Component**

| | |
|---|---|
| Roof | R-60 |
| Above grade walls | R-21 |
| Below grade walls | R-21 |
| 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 |
| Heated Water Pipes | R-5 |
| Heated air Ducts | R-8 |

68. *Section R406.3.1 On-site renewables are not included,* is deleted in its entirety.

69. *Section R406.3.2 On-site renewables are included,* is deleted in its entirety.

70. *Section ~~406.3.2~~* R407 *Tropical Climate Region Compliance Path,* is deleted in its entirety.

71. *Section R502.1.1 General,* is hereby amended to read as follows:

Additions to an existing building, building system or portion thereof shall conform to the provisions of R401.2.1 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 condition 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.

72. *Section R503.1.1 Building Envelope* is amended to read as follows:
Building envelope assemblies that are part of the alteration shall comply with Section R401.2.1

*Section R503.1.1 Building envelope* Exception 2 is deleted in its entirety and replaced with the following.

2. Section R402.4.1.2 Testing

73. *Section R505.1 General* is hereby amended to remove the exception.

74. *Section R505.1.1 Unconditioned space,* is hereby deleted and replaced with the following:

**R505.1.1 Unconditioned space.** Any unconditioned or low-energy space that is altered to become a conditioned space shall comply with Section R503.

75. RC102.1 General is amended to read as follows.

*RC102.1 General*. New residential buildings shall comply with Sections RC102.2 through RC102.9.

76. RC102.2 Energy Rating Index zero energy score is amended to read as follows.

RC102.2 Energy Rating Index zero energy score.
Compliance with this section requires that the rated design be shown to have a Home Energy Rating System (HERS) score of 47 before solar and 0 with solar when compared to the Energy Rating Index (ERI) reference design determined in accordance with RESNET/ICC 301 for both of the following:

1. ERI value not including on-site power production (OPP) calculated in accordance with RESNET/ICC 301.
2. ERI value including on-site power production calculated in accordance with RESNET/ICC 301 with the OPP in Equation 4.1.2 of RESNET/ICC 301 adjusted in accordance with Equation RC-1.

Adjusted OPP = OPP + CREF + REPC (Equation RC-1)

where:
CREF = Community Renewable Energy Facility power production—the yearly energy, in kilowatt hour equivalent (kWheq), contracted from a community renewable energy facility that is qualified under applicable state and local utility statutes and rules, and that allocates bill credits to the rated home.
REPC = Renewable Energy Purchase Contract power production—the yearly energy, in kilowatt hour equivalent (kWheq), contracted from an energy facility that generates energy with photovoltaic, solar thermal, geothermal energy or wind systems, and that is demonstrated by an energy purchase contract or lease with a duration of not less than 15 years.

RC102.2.1 HERS Score. Buildings shall comply with the scores in Table RC102.2.1.

Table RC102.2.1.

| HERS SCORE NOT INCLUDING OPP | HERS SCORE INCLUDING OPP |
|---|---|
| 47 | 0 |

76. RC102.3 through RC102.9 are added to Appendix RC to read as follows.

RC102.3 Mandatory Sections. All projects shall comply with all sections within Table RC102.3.

Table RC102.3
Mandatory requirements for residential buildings

| Title | IECC Section |
|---|---|
| Vapor retarder | R402.1.1 |
| Eave baffle | R402.2.3 |

| | |
|---|---|
| Access hatches and doors | R402.2.4.1 |
| Crawl space wall insulation | R402.4.1.2 |
| 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 |
| Snow melt and ice systems | 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 |

RC102.4 Building Envelope. The building thermal envelope shall be greater or equal to the levels of efficiency and SHGC in Table RC102.4.

Table RC102.4
Average of the Minimum Insulation and Maximum Fenestration Requirements by Component

| | |
|---|---|
| Roof | R-60 |
| Above grade walls | R-21 |
| Below grade walls | R-21 |
| 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 |

RC102.5 Verification by approved agency.
Verification of compliance with Section R102.4 as outlined in Sections of this appendix shall be completed by an approved third party. Verification of compliance with Section R102.3 shall be completed by the authority having jurisdiction or an approved third-party inspection agency in accordance with Section R105.4.

RC102.6 Documentation.
Documentation of the software used to determine the ERI and the parameters for the residential building shall be in accordance with Sections RC102.6.1 through RC102.6.4

RC102.6.1 Compliance software tools.
Software tools used for determining HERS shall be Approved Software Rating Tools in accordance with RESNET/ICC 301.

RC102.6.2 Compliance report.
Compliance software tools shall generate a report that documents that the home and the HERS score of the rated design complies with RC102. Compliance documentation shall be created for the proposed design and shall be submitted with the application for the building permit. Confirmed compliance documents of the built dwelling unit shall be created and submitted to the code official for review before a certificate of occupancy is issued. Compliance reports shall include information in accordance with Sections RC102.6.3 and RC102.6.4.

RC102.7 Additional documentation.
The code official shall be permitted to require the following documents:

1. Documentation of the building component characteristics of the ERI reference design.

2. A certification signed by the builder providing the building component characteristics of the rated design.

3. Documentation of the actual values used in the software calculations for the rated design.

RC102.8 Specific approval.

Performance analysis tools meeting the applicable subsections of Section RC102 shall be approved. Documentation demonstrating the approval of performance analysis tools in accordance with Section RC102shall be provided.

RC102.9 Input values.
Where calculations require input values not specified by Sections RC 102, those input values shall be taken from RESNET/ICC 301.

**INTRODUCED, READ, PASSED ON FIRST READING, AND ORDERED PUBLISHED** this _____ day of _____, 2024.

_____
Christopher M. Leh, Mayor

ATTEST:

_____
Meredyth Muth, City Clerk

APPROVED AS TO FORM:

_____
Kelly PC, City Attorney

**PASSED AND ADOPTED ON SECOND AND FINAL READING,** this _____ day of _____, 2024.

_____
Christopher M. Leh, Mayor

ATTEST:

_____
Meredyth Muth, City Clerk

Second Reading Amendments

Ordinance No. 1816, Series 2021 is revised to read as follows (amendments are shown in **bold underline** and ~~**bold strikeout**~~):

**ORDINANCE NO. 1816**

**AN ORDINANCE ADOPTING BY REFERENCE THE 2021 INTERNATIONAL ENERGY CONSERVATION CODE, WITH AMENDMENTS, REPEALING CHAPTER 15.60 OF THE LOUISVILLE MUNICIPAL CODE CONCERNING THE PRESCRIPTIVE ENERGY CODE AND DESIGN CRITERIA, AND AMENDING TITLE 17 OF THE LOUISVILLE MUNICIPAL CODE CONCERNING ELECTRIC VEHICLE CHARGING INFRASTRUCTURE**

**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 2021 edition of the International Energy Conservation Code; and

**WHEREAS,** the City of Louisville remains committed to its adopted goals to reduce energy consumption, increase clean energy sources, and support the transition to a low-carbon community as outlined in the Sustainability Action Plan and Resolution 25, Series 2019, "A Resolution Setting Clean Energy and Carbon Reduction Goals"; and

**WHEREAS,** reducing building energy consumption is an effective strategy to reduce community-wide energy consumption and increase long-term cost savings for residents and businesses; and

**WHEREAS**, the City Council desires to add requirements for solar readiness, electric vehicle charging infrastructure, and building electrification to build a more resilient building stock and support future building and transportation electrification efforts pursued by residents and businesses; 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 2021 edition of the International Energy Conservation Code has 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:

## INTERNATIONAL ENERGY CONSERVATION CODE



### Sec. 15.18.010. - Adoption.

The International Energy Conservation Code, 2021 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 Energy Conservation Code is to regulate and govern energy efficient building envelopes and the installation of energy efficient mechanical, lighting and power systems in the City of Louisville, and to provide for the issuance of permits and collection of fees therefor. The International Energy Conservation Code, 2021 Edition, is adopted as amended by the City, including the outline table of contents and index, for the minimum requirements for minimum energy efficiency.

### Sec. 15.18.20. Appendices adopted.

The following appendices of the 2021 International Energy Conservation Code are hereby specifically adopted; any appendices not listed are not adopted: **Appendix RC, Zero Energy Residential Building Provisions,** Appendix CB, Solar Ready Zone – Commercial and Appendix RB, Solar Ready Provisions – Detached One and Two-Family Dwellings and Townhouses. Group R2, R3, and R4, three stories or less shall comply with Appendix RB.

### Sec. 15.18.030. - Amendments and Deletions to the 2021 International Energy Conservation Code

The 2021 International Energy Conservation Code adopted in Section 15.18.010 is hereby amended in the following respects. An ellipsis (…) indicates when the remainder of a section of the 2021 International Energy Conservation Code is to remain unchanged and in full force and effect.

1. ***Section C101.1 Title***, is amended to insert "the City of Louisville" so the section will read:

**C101.1 Title.** These regulations shall be known as the Energy Conservation Code of the City of Louisville, and shall be cited as such. It is referred to herein as "this code."

**2. *Section C103.2 Information on construction documents*, is hereby amended to read as follows:**

**C103.2 Information on construction documents. Construction documents shall be drawn to scale upon suitable material. Electronic media documented are permitted to be submitted when *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment herein governed. Details shall include the following as applicable:**

1. **Energy compliance path.**
2. **Insulation materials and their *R*-values**
3. **Fenestration *U*-factor and solar heat gain coefficients (SHGCs).**
4. **Area-weighted *U*-factor and solar heat gain coefficient (SHGC) calculations.**
5. **Mechanical system design criteria.**
6. **Mechanical and service water heating systems and equipment types, sizes, fuel source and efficiencies.**
7. **Economizer description.**
8. **Equipment and system controls.**
9. **Fan motor horsepower (hp) and controls.**
10. **Duct sealing, duct and pipe insulation and location.**
11. **Lighting fixture schedule with wattage and control narrative.**
12. **Location and *daylight* zones on floor plans.**
13. **Air barrier and air sealing details, including the location of the air barrier.**
14. **Location of pathways for routing of raceways or cable from the solar ready zone to the electrical service panel.**

~~2.~~ **3.** ***Section C202 General Definitions***, is hereby amended by adding, in alphabetical order, the following definitions:

***All-Electric Building:*** **A building that contains no combustion equipment, or plumbing for combustion equipment, installed within the building or building site.**

*Combustion Equipment:* Any equipment or appliance used for space heating, service water heating, cooking, clothes drying and/or lighting that uses fuel gas or fuel oil.

*Electric Vehicle (EV):* A vehicle registered for on-road use, primarily powered by an electric motor that draws current from a rechargeable storage source that is charged by being plugged into an electrical current source.

*Electric Vehicle Supply Equipment (EVSE):* The electrical conductors and associated equipment external to the electric vehicle that provide a connection between the premises wiring and the electric vehicle to provide electric vehicle charging.

*Electric Vehicle Capable Space:* A designated parking space that is provided with conduit sized and rated for a minimum 40-amp, 208/240-Volt dedicated branch circuit and shall be no less than 1" in size. Conduit must be continuous from the future or existing electrical panelboard or switchboard location(s) and end at a junction box or receptacle located within close proximity of the parking space. The electrical panel serving the parking space shall have sufficient capacity and physical space for a dual-pole, 40-amp breaker. The conduit shall be sealed at the junction or outlet box that is capped off, with the conduit sealed and the cap labeled as "For future electric vehicle charging".

*Electric Vehicle Ready Space:* A designated parking space that is provided with a dedicated branch circuit with wiring capable of supporting a minimum 40-ampere, 208/240- Volt circuit that terminates at a receptacle, plug, junction box, or an installed electric vehicle supply equipment within close proximity of the parking space. There shall be adequate reserved space in an electrical panelboard or switchboard to meet the electric vehicle requirements.

*Electric Vehicle Supply Equipment (EVSE) Installed Space*: A designated parking space with dedicated electric vehicle supply equipment capable of supplying a minimum 40-amp, dedicated circuit rated at 208/240 Volt from a building electrical panelboard.

~~3.~~ **4.** ***Section C401.2 Application*****,** is hereby amended to read as follows:

**C401.2 Application**
Commercial buildings shall comply with Section C401.2.1

~~4.~~ **5.** ***Section C401.2.1 International Energy Conservation Code*****,** is hereby deleted and replaced to read as follows:

**C401.2.1 International Energy Conservation Code**

Commercial buildings shall **be built all-electric unless the fuel gas options of C403.3.2 and the additional electric infrastructure requirements of C405.14 are met. All buildings must comply** with the following:

City of Louisville's Prescriptive Compliance. The Prescriptive Compliance option requires compliance with Sections C401.3, C401.4, C402 through C406, and Section C408.

Core and shell buildings shall be required to comply with the provisions of Section C402.1.3 through C402.5 of the 2021 International Energy Conservation Code.

~~5.~~ **6.** ***Section C401.2.2 ASHRAE 90.1***, is hereby deleted in its entirety.

~~6.~~ **7.** A new ***Section C401.4 Mandatory Requirements for Commercial Buildings***, is hereby 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 | C402.5 |
| 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 | C403.11, except C403.11.3 |
| Construction of HVAC system elements | C403.12 |
| Mechanical systems located outside of the building thermal envelope | C403.13 |
| Service water heating | C404 |
| Electrical power and lighting systems | C405, except C405.3 |

| | |
|---|---|
| Maintenance information and system commissioning | C408 |

~~7.~~ **8.** ***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 C402.2.1** | |
| Insulation entirely above roof deck | R-49 |
| Metal buildings[a] | R-21 + R-11 LS |
| Attic and other | R-49 |
| **Walls. Above grade C402.2.2** | |
| Mass[d] | R-21 |
| Metal buildings | R-21 |
| Metal framed | R-21 |
| Wood framed and other | R-21 |
| **Walls, Below grade C402.2.5** | |
| Below-grade wall[b] | R-10 |
| **Floors C402.2.3** | |
| Mass[c] | R-21 |
| Joist/framing | R-38 |
| **Slab-on-grade floors C402.2.4** | |
| Unheated | R-20 for 24" |
| Heated[e] | R-15 for 36" below + R-5 full slab |

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m$^2$, 1 pound per cubic foot = 16 kg/m$^3$.
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.
c. "Mass floors" shall be in accordance with Section C402.2.3.
d. "Mass walls" shall be in accordance with Section C402.2.2.
e. The first value is for perimeter insulation and the second value is for full, under-slab insulation.

~~8.~~ **9.** ***Section C402.1.4 Assembly U-factor, C-factor or F-factor-based method,*** is hereby deleted in its entirety.

~~9.~~ **10.** ***Section C402.1.5 Component performance alternative,*** is hereby deleted in its entirety.

~~10.~~ **11.** ***Table C402.4 Building Envelope Fenestration Maximum U-Factor and SHGC Requirements,*** is hereby deleted and replaced with the following:

**Table C402.4**
**Building Envelope Fenestration**

| | |
|---|---|
| **Vertical Fenestration** | |
| Maximum U-Factor | 0.30 |
| Maximum SHGC | 0.33 |
| Maximum Air leakage rate for all fenestration except curtain walls and storefront glazing | .20 cfm/ft2 |
| Maximum air leakage rate for curtain walls and storefront glazing | .06 cfm/ft |
| **Skylights** | |
| Maximum U-Factor | 0.50 |
| Maximum SHGC | 0.40 |
| Maximum Air leakage rate | .20 cfm/ft2 |

~~11.~~ **12.** ***Section C402.4.1 Maximum area***, is hereby deleted and replaced with the following:

**C402.4.1 Minimum area of natural lighting.** Not less than eight percent of the floor area shall be glazed.

~~12.~~ **13.** ***Section C402.4.2 Minimum skylight fenestration area***, is hereby deleted and replaced with the following:

**C402.4.2 Minimum area of natural lighting.** A minimum skylight area of three percent of the roof area shall be provided for all roofs.

**Exception:** Roof areas designated for solar ready zones shall not be included in roof area calculation.

~~13.~~ **14.** ***Section C403.3.2 HVAC equipment performance requirements*****, is hereby deleted in its entirety and replaced to read as follows:**

~~**A. The first paragraph is hereby deleted in its entirety and replaced to read as follows:**~~

**C403.3.2 HVAC/fuel fired equipment performance requirements. Unless built all-electric, all new combustion equipment shall comply with the more efficient HVAC equipment performance of Sections C406.2, C406.2.3, and C406.2.4 and the additional electric infrastructure requirements in Section C405.14. A mechanical compliance certificate demonstrating compliance with section C406.2.3 and/or C406.2.4 shall be required for all HVAC, fuel fired and Service Water Heating equipment.**

**The efficiency shall be verified through certification under an approved certification program or, where a certification program does not exist, the equipment efficiency ratings shall be supported by data furnished by the manufacturer. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements. Where components, such as indoor or outdoor coils, from different manufacturers are used, calculations and supporting data shall be furnished by the designer that demonstrates that the combined efficiency of the specified components meets the requirements herein. (Tables C403.2.(1) through (16) are expressly retained and remain applicable to HVAC equipment performance.)**

**Exceptions:**

**1. Factory, laboratory, and high hazard occupancy combustion equipment, except for HVAC and domestic water heating.**

**2. Commercial Kitchens.**

**3. Other combustion equipment approved by the Building Official based on demonstration by the applicant that compliance with this section is not feasible and the equipment proposed is the most efficient appliance reasonably available.**

~~13.~~ **15.** ***Section C403.4.1 Thermostatic controls***, is hereby deleted and replaced with the following:

**C403.4.1 Thermostatic controls**. The supply of heating and cooling energy to each *zone* shall be controlled by individual thermostatic controls capable of responding to temperature within the *zone*. Where humidification or dehumidification or both is provided, no fewer than one humidity control device shall be provided for each humidity control system. Occupancy sensors shall be provided on the thermostat to setback in accordance with C403.4.2.1

**Exception:** Independent perimeter systems that are designed to offset only building envelope heat losses, gains or both serving one or more perimeter *zones* also served by an interior system provided that both of the following conditions are met:

1. The perimeter system includes not fewer than one thermostatic control *zone* for each building exposure having exterior walls facing only one orientation (within ±45 degrees) (0.8 rad) for more than 50 contiguous feet (15 240 mm).
2. The perimeter system heating and cooling supply is controlled by thermostats located within the *zones* served by the system.

~~14.~~ **16.** ***Section C403.12.1 Duct and plenum insulation and sealing***, is hereby deleted and replaced with the following:

**C403.12.1 Duct and plenum insulation and sealing.** All supply and return air ducts and plenums shall be insulated with not less than R-12. Ducts, air handlers and filter boxes shall be sealed. Joints and seams shall comply with Section 603.9 of the International Mechanical Code.

~~15.~~ **17.** ***Section C403.12.3 Piping insulation***, is hereby amended to read as follows:

**C403.12.3 Piping insulation.** Piping serving as part of a heating or cooling system shall be thermally insulated to R-5.

~~16.~~ **18.** ***Section C404.4 Insulation of piping***, is hereby amended to read as follows:

**C404.4 Insulation of piping.** Piping from a water heater to the termination of the heated water fixture supply pipe shall be insulated to R-3. On both the inlet and outlet piping of a storage water heater or heated water storage tank, the piping to a heat trap or the first 8 feet (2438 mm) of piping, whichever is less, shall be insulated. Piping that is heat traced shall be insulated to R-3 or the heat trace manufacturer's instructions.

~~17.~~ **19.** ***Section C405.2.1 Occupant sensor controls***, is hereby amended to read as follows:

**C405.2.1 Occupant sensor controls.** Occupant *sensor controls* shall be installed to control lighting.

~~18.~~ **20.** ***Section C405.2.2 Time-switch controls***, is hereby deleted in its entirety.

~~19.~~ **21.** ***Section C405.2.2.1 Time-switch control function***, is hereby deleted in its entirety.

~~20.~~ **22.** ***Section C405.2.3 Light-reduction controls***, is renumbered to C405.2.2.

~~21.~~ **23.** ***Section C405.2.3.1 Light-reduction function***, is renumbered to C405.2.2.1.

~~22.~~ **24.** ***Section C405.2.4 Daylight-responsive controls***, is renumbered to C405.2.3.

~~23.~~ **25.** ***Section C405.2.4.1 Daylight-responsive control function***, is renumbered to C405.2.3.1.

~~24.~~ **26.** ***Section C405.2.4.2 Sidelit daylight zone***, is renumbered to C405.2.3.2.

~~25.~~ **27.** ***Section C405.2.4.3 Toplit daylight zone,*** is renumbered to C405.2.3.3.

~~26.~~ **28.** ***Section C405.2.4.4 Atriums,*** is renumbered to C405.2.3.4.

~~27.~~ **29.** ***Section C405.2.5 Specific application controls,*** is renumbered to C405.2.4.

~~28.~~ **30.** ***Section C405.2.6 Manual controls,*** is renumbered to C405.2.5.

~~29.~~ **31.** ***Section C405.2.7 Exterior lighting controls,*** is renumber to C405.2.6.

~~30.~~ **32.** ***Section C405.2.7.1 Daylight shut off,*** is renumbered to C405.2.6.1.

~~31.~~ **33.** ***Section C405.2.7.2 Building façade and landscape lighting,*** is renumbered to C405.2.6.2.

~~32.~~ **34.** ***Section C405.2.7.3 Lighting setback,*** is renumbered to C405.2.6.3.

~~33.~~ **35.** ***Section C405.2.7.4 Exterior time-switch control function,*** is renumbered to C405.2.6.4.

~~34.~~ **36.** ***Section C405.2.8 Parking garage lighting control***, is renumbered to C405.2.7.

**37.** ***Section C405.4.3 Gas lighting, is hereby amended to read as follows:***

> **C405.4.3 Gas lighting. Gas-fired lighting appliances shall not be permitted.**

~~35.~~ **38.** A new ***Section C405.13 Electric vehicle charging infrastructure for new construction and building addition of 25% or more of original square footage***, is hereby added to read as follows:

> **Section C405.13.1 Electric vehicle charging infrastructure for new construction and building addition of 25% or more of original square footage.** Electric vehicle charging shall be provided and installed in accordance with this section, National Electrical Code (NFPA 70), and Section 17.20.170 of the Louisville Municipal Code. When parking spaces are added or modified without an increase in building floor area, only the new parking spaces are subject to this requirement. All *EVSE Installed*, *EV Ready* and *EV Capable* spaces are to be included in the calculation for the number of minimum vehicle spaces required, as provided by the applicable article of the Louisville Zoning Code.
>
> **Section C405.13.2 Identification.** The circuit breakers or circuit breaker spaces reserved for the *EVSE Installed, EV Ready*, and *EV Capable* spaces shall be clearly identified in the panelboard directory. The conduit for electric vehicle capable spaces shall be clearly identified at both the panelboard and the termination point at the parking space.

~~36.~~ **39.** A new ***Section C405.14 Additional electric infrastructure***, is hereby added to read as follows:

**Section C405.14 Additional electric infrastructure.** All *combustion equipment* and end-uses shall be installed in accordance with this section.

**C405.14.1 Electric infrastructure for dwelling and sleeping units.** *Combustion equipment* and end-uses serving individual dwelling units or sleeping units shall comply with Section R404.5.

**C405.14.2 Combustion equipment.** *Combustion equipment* shall be provided with conduit that is continuous between a junction box located within 3 feet (914 mm) of the appliance or equipment and an electrical panel. The junction box, conduit and bus bar in the electrical panel shall be rated and sized to accommodate a branch circuit with sufficient capacity for an equivalent electric appliance, equipment or end use with an equivalent equipment capacity. The electrical junction box and electrical panel shall have labels stating, "For Future Electric Equipment".

Exception: Industrial and manufacturing uses are exempt from Section C405.14.

~~37.~~ **40.** ***Section C505.1 General***, is hereby amended to read as follows:

**C505.1 General.** Where the use in a space changes from one use in Table C405.3.2(1) or C405.3.2(2) to another use in Table C405.3.2(1) or C405.3.2(2), the installed lighting wattage shall comply with Section C405.3. Where the space undergoing a change in occupancy or use is in a building with a fenestration area that exceeds the limitations of Section C402.4.1, the space is exempt from Section C402.4.1 provided that there is not an increase in fenestration area.

**Exception: Egress doors with fenestration are allowed to bring total fenestration percentages over the allowed maximum amount of vertical fenestration.**

~~38.~~ **41.** ***Section R101.1 Title,*** is amended to insert "the City of Louisville" so the section will read:

**R101.1 Title.** These regulations shall be known as the Energy Conservation Code of the City of Louisville and shall be cited as such. It is referred to herein as "this code."

**42. *Section R103.2 Information on construction documents*, is amended to read as follows:**

**R103.2 Information on construction documents. Construction documents shall be drawn to scale upon suitable material. Electronic**

**media documented are permitted to be submitted when *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment herein governed. Details shall include the following as applicable:**

1. **Energy compliance path.**
2. **Insulation materials and their *R*-values**
3. **Fenestration *U*-factor and solar heat gain coefficients (SHGCs).**
4. **Area-weighted *U*-factor and solar heat gain coefficient (SHGC) calculations.**
5. **Mechanical system design criteria.**
6. **Mechanical and service water heating systems and equipment types, sizes, fuel source and efficiencies.**
7. **Equipment and system controls.**
8. **Duct sealing, duct and pipe insulation and location.**
9. **Air sealing detail.**
10. **Location of pathways for routing of raceways or cable from the solar ready zone to the electrical service panel.**

~~39.~~ **43.** ***Section R202 General Definitions***, is hereby amended by adding, in alphabetical order, the following definitions:

***All-Electric Building:*** **A building that contains no combustion equipment, or plumbing for combustion equipment, installed within the building or building site.**

*Combustion Equipment:* Any equipment or appliance used for space heating, service water heating, cooking, clothes drying and/or lighting that uses fuel gas or fuel oil.

*Electric Vehicle (EV):* A vehicle registered for on-road use, primarily powered by an electric motor that draws current from a rechargeable storage source that is charged by being plugged into an electrical current source.

*Electric Vehicle Supply Equipment (EVSE):* The electrical conductors and associated equipment external to the electric vehicle that provide a connection between the premises wiring and the electric vehicle to provide electric vehicle charging.

*Electric Vehicle Capable Space:* A designated parking space that is provided with conduit sized and rated for a minimum 40-amp, 208/240-Volt dedicated branch circuit and shall be no less than 1" in size. Conduit must be continuous from the future or existing electrical panel board or switchboard

location(s) and end at a junction box or receptacle located within close proximity of the parking space. The electrical panel serving the parking space shall have sufficient capacity and physical space for a dual-pole, 40-amp breaker. The conduit shall be sealed at the junction or outlet box that is capped off, with the conduit sealed and the cap labeled as "For future electric vehicle charging".

*Electric Vehicle Ready Space:* A designated parking space that is provided with a dedicated branch circuit with wiring capable of supporting a minimum 40-ampere, 208/240- Volt circuit that terminates at a receptacle, plug, junction box, or an installed electric vehicle supply equipment within close proximity of the parking space. There shall be adequate reserved space in an electrical panel board or switchboard to meet the electric vehicle requirements.

~~40.~~ **44.** ***Section R401.2 Application,*** is hereby deleted and replaced with the following:

> **R401.2 Application.** Residential buildings shall be **built** ~~**100%**~~ all-electric unless **the** fuel gas **options of R403.7 and additional electric infrastructure requirements of R404.5** are met. ~~**and all**~~ **All** residential buildings shall comply with the R401.2.1 City of Louisville's Prescriptive Compliance or R406 Energy Rating Index with a maximum rating index of 50 before the installation of solar panels.
>
> **Exception:** Additions, alterations, repairs and changes of occupancy to existing buildings complying with Chapter 5.

~~41.~~ **45.** ***Section R401.2.1 Prescriptive Compliance Option,*** is hereby deleted and replaced with the following:

> **R401.2.1 City of Louisville's Prescriptive Compliance.** The City of Louisville's Prescriptive compliance requires compliance with Sections R401 through R404.

~~42.~~ **46.** ***Section R401.2.2 Total Building Performance Option***, is hereby deleted in its entirety.

~~43.~~ **47.** ***Section R401.2.4 Tropical Climate Region***, is hereby deleted in its entirety.

~~44.~~ **48.** ***Section R401.2.5 Additional Energy Efficiency***, is hereby amended to read as follows:

> **Section R401.2.5 Additional Energy Efficiency.** Building shall comply with one of the additional efficiency options and shall be installed in according to Section R408.2.

~~45.~~ **49.** A new ***Section R401.4 Mandatory requirements for residential buildings***, is hereby added to read as follows:

**R401.3 Mandatory requirements for residential buildings.** Residential building must comply with the following sections from the 2021 International Energy Conservation Code.

**Table R401.3**
**Mandatory requirements for residential buildings**

| Title | IECC Section |
|---|---|
| Vapor retarder | R402.1.1 |
| Eave baffle | R402.2.3 |
| Access hatches and doors | R402.2.4.1 |
| Crawl space wall insulation | R402.4.1.2 |
| 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 |
| Snow melt and ice systems | 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 |

~~46.~~ **50.** ***Section R402.1 General***, is hereby amended to read as follows:

**R402.1 General.** The building thermal envelope shall comply with the requirements of Section R402.1.1 and R402.1.2.

~~47.~~ **51.** ***Section R402.1.2 Insulation and fenestration***, is hereby deleted and replaced with the following*:*

**R402.1.2 Insulation and fenestration.** Assemblies shall have R-value of insulation materials equal to or greater than that specified in Table R402.1.2 unless an alternative path is specified while using HERS energy rating index of 50.

**Table R402.1.2**
**Average Insulation and Fenestration Requirements by Component**

| | |
|---|---|
| **Roof** | R-60 |
| **Above grade walls** | R-21 |
| **Below grade walls** | R-21 |
| **Floors** | R-38 |
| **Non heated slab on grade** | R-10 for 4ft |
| **Heated slab on grade[a]** | R-15 for 4 ft + R-5 under full slab |
| **Fenestration U-Factor** | .30 |
| **Fenestration SHGC** | .33 |
| **Skylight U-Factor** | .50 |
| **Skylight SHGC** | .40 |

**a. The first value is for perimeter insulation and the second value is for full, under-slab insulation.**

~~48.~~ **52.** ***Section R402.1.5 Total UA alternative***, is hereby deleted in its entirety.

~~49.~~ **53.** ***Section R402.3.3 Glazed fenestration exemption***, is hereby amended to read as follows:

> **R402.3.3 Glazed fenestration exemption**. Not greater than 15 square feet (1.4 $m^2$) of glazed fenestration per dwelling unit shall be exempt from the U-factor and SHGC requirements in Section R402.1.2.

~~50.~~ **54.** ***Section R402.4.1.2 Testing***, is hereby deleted and replaced to read as follows:

> **Section R402.4.1.2 Testing.** All new buildings or dwelling units that are heated or cooled, and additions over 500 square feet shall be tested for air leakage.

~~51.~~ **55.** ***Section R402.5 Maximum fenestration U-factor and SHGC***, is hereby deleted and replaced with the following***:***

> **Section R402.5 Maximum fenestration U-factor and SHGC.** The maximum U-factor and solar heat gain coefficient (SHGC) for fenestration shall not be required in storm shelters complying with ICC 500.

~~52.~~ **56.** ***Section R403.3.1 Ducts located outside conditioned space*****,** is hereby deleted and replaced with the following*:*

**R403.3.1** ***Ducts located outside conditioned space.*** All supply and return ducts shall be insulated to a minimum R-8 if located outside a conditioned space.

~~53.~~ **57.** ***Section R403.5.2 Hot water pipe insulation*****,** is hereby deleted and replaced with the following:

**R403.5.2 Hot water pipe insulation.** All service hot water piping shall be insulated to a minimum R-5.

~~54.~~ **58.** ***Section R403.6.1 Heat and recovery ventilation*****,** is hereby deleted and replaced in its entirety and the following is hereby added in lieu thereof:

**R403.5.2 Heat and recovery ventilation.** All new buildings and additions over 500 square feet shall be provided with a heat recovery or energy recovery ventilation system. The system shall be balanced with a minimum sensible heat recovery efficiency of 65 percent at 32°F (0°C) at a flow greater than or equal to the design airflow.

~~55.~~ **59.** ***Section R403.7 Equipment sizing and efficiency rating*****,** is hereby deleted and replaced with the following:

**R403.7 Equipment sizing and efficiency rating.** All new buildings and additions greater than 500 square feet with heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies. In addition to complying with Sec. R404.6 Additional Electric Infrastructure, new and replacement **electrical** heating and cooling equipment shall have an efficiency rating equal to or greater than the minimum required by federal law for the geographic location where the equipment is installed. **New gas heating equipment shall comply with the following efficiencies:**

1. **Gas furnaces shall have a minimum of 96% efficiency.**
2. **Gas boilers shall have a minimum of 90% AFUE.**
3. **On demand water heaters shall have greater than .92 uniform energy factor.**

**Exception: Solid fuel stoves/gas fireplaces, outdoor fire pits, gas stoves and ovens.**

**60.** ***Section R404.1.1 Fuel gas lighting equipment, is hereby amended to read as follows:***

**R404.1.1 Fuel gas lighting equipment. Fuel gas lighting systems shall not be installed.**

~~56.~~ **61.** A new ***Section R404.4 Electric vehicle charging infrastructure for new construction and building addition of 50% or more of original square footage,*** is hereby added to read as follows:

**Section R404.4 Electric vehicle charging infrastructure for new construction and building addition of 50% or more of original square footage.** Electric infrastructure for the current and future charging of *electric vehicles* shall be installed in accordance with this section per Section 17.20.170 of the Louisville Municipal Code. *EV ready spaces and EV capable spaces* are permitted to be counted toward meeting minimum parking requirements.

**R404.4.1 One- and two- family dwellings and townhouses.** One- and two-family dwellings and townhouses with a dedicated attached or detached garage or on-site parking spaces shall be provided with electric vehicle charging in accordance with Section 17.20.170 of the Louisville Municipal Code.

**R404.4.1.1 Minimum EV Ready infrastructure.** Minimum EV Ready Space infrastructure shall require the following:

1. Installation of conductors:
    a. Conductors shall be installed of sufficient size to accommodate a minimum 240VAC 40Amp branch circuit to each parking space where required.
    b. Conductors shall terminate in either a receptacle, plug, junction or outlet box, or an *EVSE* installed in the parking space.
2. The electrical panel directory shall designate the branch circuit as "EV Ready" and the junction box or receptacle shall be labelled "EV Ready."

**R404.4.1.2 Construction documents.** Construction documents shall graphically indicate and label all EV ready spaces and associated termination locations. For all Townhouses and one- and two-family dwellings with an electrical utility service 200 Amps or greater, a panelboard schedule shall be provided indicating the EV Ready circuit breaker space(s) and the circuit designation(s).

**R404.4.2 Group R occupancies.** Group-R occupancies (R-2, R-3, and R-4 buildings three stories and less) with three or more dwelling units and/or sleeping units shall be provided with electric vehicle

charging in accordance with Section 17.20.170 of the Louisville Municipal Code.

Electric vehicle charging shall be provided and installed in accordance with this section and the National Electrical Code (NFPA 70). When parking spaces are added or modified without an increase in building floor area, only the new parking spaces are subject to this requirement.

~~57.~~ **62.** A new ***Section R404.5 Additional electric infrastructure*****,** is hereby added to read as follows:

**R404.5 Additional electric infrastructure.** *Combustion equipment* shall be installed in accordance with this section.

**R404.5.1 Combustion equipment and end-uses.** *Combustion equipment* shall be provided with a dedicated, appropriately phased circuit that shall have a minimum amperage requirement for a comparable electric appliance, equipment or end use, an electrical receptacle or junction box that is connected to the electric panel, and conductors of adequate capacity within 6 feet (1829 mm) of the appliance or equipment.

Each such circuit shall be accessible with no obstructions. A reserved circuit breaker space shall be installed in the electrical panel adjacent to the circuit breaker for the branch circuit and labeled for each circuit. Both ends of the unused conductor or conduit shall be labeled "For Future Electric Equipment" and be electrically isolated.

~~58.~~ **63.** ***Section R405 Total building performance*****,** is deleted in its entirety.

~~59.~~ **64.** ***Section R406.3 Building thermal envelope*****,** is hereby deleted and replaced with the following:

**R406.3 Building thermal envelope.** Building and portions thereof shall comply with Table R406.3.

**Table R406.3**
**Average of the Insulation and Fenestration Requirements by Component**

| | |
|---|---|
| **Roof** | R-60 |
| **Above grade walls** | R-21 |
| **Below grade walls** | R-21 |
| **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 |

~~60.~~ **65.** ***Section R406.3.1 On-site renewables are not included,*** is deleted in its entirety.

~~61.~~ **66.** ***Section R406.3.2 On-site renewables are included,*** is deleted in its entirety.

~~62.~~ **67.** ***Section R406.3.2 Tropical Climate Region Compliance Path,*** is deleted in its entirety.

~~63.~~ **68.** ***Section R505.1 General,*** is hereby amended to remove the exception.

~~64.~~ **69.** ***Section R505.1.1 Unconditioned space,*** is hereby deleted and replaced with the following:

> **R505.1.1** Unconditioned space. Any unconditioned or low-energy space that is altered to become a conditioned space shall comply with Section R503.

**Sec.15.18.040. – Design criteria.**

All new heated commercial and residential heated structures shall meet the following design criteria:

1. **Non-reducible ~~Snow~~ roof snow load**: 30 pounds per square foot.

2. Wind speed:

   a. 145 miles per hour three second gust ASCE-7-10;

   b. ASTM D3161 test with Class F Application.

3. Wind exposure: "C", unless in the opinion of the Chief Building Official greater restrictions are needed to protect public safety.

4. Seismic zone: B.

5. Frost line depth: 36 inches below finished grade.

6. Weathering: Severe – Climate Zone 5B.

7. Termite: Slight.

8. Decay: Slight.

9. Winter design temperature: one degree.

10. Anticipated snow: six inches.

11. Ice and water shield: required on all shingled roofs – eaves only. Shields must extend from the lowest edges to a point at least 24 inches inside the exterior wall line of the building.

12. Drip edge: required on both eaves and rakes of roof.

13. Air freezing index: less than 1000.

14. Mean annual temperature: 47 degrees.

15. Elevation: 5,337 feet above sea level.

16. Sump pumps:

a. Cannot drain into sanitary or storm sewer;

b. Must daylight into lawn away from foundation;

c. Perimeter foundation systems must day light or drain into sump pit and then sump pump, and sump pump must drain into lawn.

17. Drainage from house: slope at least six inches in the first ten feet.

18. Retaining walls:

a. Less than 48 inches from the bottom of the footing to the top of the retaining wall with no surcharge: no permit required.

b. More than 48 inches from bottom of footing to top of retaining wall, or any wall with surcharge: requires stamped engineering plans.

19. Backflow preventer: required on all residential irrigation systems (see cross connection control regulations).

20. Hot water heaters:

a. Expansion tanks required for all hot water heaters;

b. Drain pan required if placed on wood floor.

**Sec.15.18.050. - Applicability.**

Notwithstanding anything in the International Energy Conservation Code to the contrary, a developer/owner of a residential or commercial building may elect an inspection in accordance with the policies and procedures of the International Energy Conservation Code, as amended herein.

**Sec. 15.18.060. - Copies available.**

At least one copy of the International Energy Conservation Code, 2021 Edition, as amended herein, certified to be true and accurate, shall be available for public inspection at the office of the Building Safety Division, during business hours. 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. 15.18.070. - 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 2.** Chapter 15.60 of the Louisville Municipal Code is hereby repealed.

**Section 3.** Title 17 the Louisville Municipal Code is hereby amended by the addition of a new Section 17.20.170 to read as follows:

**Sec. 17.20.170. – Electric vehicle charging infrastructure. ~~Vehicle Charging Infrastructure.~~**

A. Purpose and Intent. The purpose and intent of this section is to facilitate and encourage the use of electric vehicles, to expedite the establishment of convenient and cost-effective electric vehicle infrastructure, and establish the minimum requirements for such infrastructure to serve both short and long-term parking needs.

B. Definitions. The following definitions shall apply to this Section:

*Electric vehicle charging stations (EVCS)* means a public or private parking space that is served by battery charging station equipment that has as its primary purpose the transfer of electric energy (by conductive or inductive means) to a battery or other energy storage device in an electric vehicle.

*Electric vehicle charging station – private restricted use* means an electric vehicle charging station that is:

1. Privately owned and restricted access (e.g., single-family dwelling unit, executive parking, designated employee parking, assigned parking at multi-family residential building); or

2. Publicly owned and restricted (e.g., fleet parking with no access to the general public).

*Electric vehicle charging station – public use* means an electric vehicle charging station that is:

1. Publicly owned and publicly available (e.g., Park-n-ride, public library parking lot, Recreation and Senior Center lot, etc); or

2. Privately owned and available to visitors of the use (e.g., shopping center, hotel, office, etc.)

*Electric vehicle parking space* means any marked parking space that identifies the use to be exclusively for the parking of an electric vehicle.

C. Number of required electric vehicle charging stations. The following table sets forth the number of required charging stations for all new development or redevelopments as required in Chapter 15.18 of the Louisville Municipal Code. This list is not intended to be exhaustive of each use category, however is intended to establish general categories of use tiers. The Director of Planning and Building Safety shall determine the appropriate tier if the use is not identified in the table below.

1. Requirements will be rounded up to the nearest whole number.

2. Minimum electrical and hardware requirements for EVSE Installed, EV Ready, and EV Capable are set forth in Chapter 15.18 of the Louisville Municipal Code.

| | EV Installed | EV- Ready | EV Capable |
|---|---|---|---|
| **Residential Uses** | | | |
| Single-Family unit | | 1 space | 1 space |

| | | | |
|---|---|---|---|
| Multi-Family unit, with dedicated parking spaces or garages | | 1 space | 1 space |
| **Tier 1** | | | |
| Multi-Family, without dedicated parking spaces or garages | 10% of spaces | 10% of spaces | 50% of spaces |
| Hotel, Motel, Extended Stay Lodging Facility | | | |
| **Tier 2 – Employment oriented uses** | 7% of spaces | 10% of spaces | 15% of spaces |
| Business and Professional Offices | | | |
| General research facilities, light industrial facilities including manufacturing, assembly, warehouse and fabrication | | | |
| Hospital | | | |
| **Tier 3 – Service and Sales oriented uses** | 5% of spaces | 10% of spaces | 10% of spaces |
| Private and public recreational and social facilities, membership clubs, lodges, and fraternal organizations | | | |
| Religious institution | | | |
| Commercial amusement, indoor and outdoor | | | |
| Schools, including public, private, vocational or business | | | |
| Restaurant | | | |
| Retail | | | |
| Personal service | | | |
| Medical and dental clinics | | | |

D. Permitted locations.

1. EVCS are permitted in every zoning district when accessory to a principal permitted use. Such stations located a single-family and designated multi-family units shall be private restricted use only.

2. If the primary use of the parcel is the retail electric charging of vehicles, then the use shall be considered an automotive fueling station for zoning purposes. Installation shall be located in zone districts which permit this use.

E. General requirements.

1. Accessible spaces. A charging station will be considered accessible if it is located adjacent to, and can serve, an accessible parking space as

defined and required by the ADA. It is not necessary to designate the EVSE exclusively for the use of vehicles parked in the accessible space.

2. EVCS – public use shall be subject to the following requirements.

a. The EVCSs shall be located in a manner that will be easily seen by the public for informational and security purposes.

b. The EVCSs shall be located in desirable and convenient parking locations will serve as an incentive for the use of electric vehicles.

c. The EVCSs must be operational during the normal business hours of the use(s) that it serves.

d. The EVSE shall be maintained in all respects, including the functioning of equipment. A phone number or other contact information shall be provided on the equipment for reporting problems with the equipment or access to it.

e. The property owner may collect a service fee for the use of EVSE.

**F. The requirements of this section shall be shall be implemented through the building permit process and shall apply to:**

**1. All new construction, expansion or modification projects for which a building permit has not been issued as of November 24, 2021; and**

**2. All planned unit developments for which a building permit has not been issued as of November 24, 2021, irrespective of whether such planned unit development was approved or approved and recorded prior to such date, unless a waiver was expressly granted through the planned unit development review process set forth in Chapter 17.28.**

**Section 4.** 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 5.** 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 6.** 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 21st day of September, 2021.

Ashley Stolzmann, Mayor

ATTEST:

Meredyth Muth, City Clerk

CITY OF LOUISVILLE SEAL COLORADO

APPROVED AS TO FORM:

Kelly PC, City Attorney

**PASSED AND ADOPTED ON SECOND AND FINAL READING,** this 19th day of October, 2021.

Ashley Stolzmann, Mayor

ATTEST:

Meredyth Muth, City Clerk

CITY OF LOUISVILLE SEAL COLORADO

Kim Bauer, Preservation Planner, reviewed the site and history of the building. It meets the criteria for landmark designation by age, architectural significance, cultural significance, and physical integrity. She reviewed the criteria for a preservation grant noting how this construction fits into the preservation, rehabilitation, and restoration areas.

The Historic Preservation Commission reviewed both requests and recommends approval; staff also recommends approval of both the landmark designation and grant resolution.

Public Comments - None

Mayor Stolzmann thanked the applicant for bringing this forward.

Mayor Pro Tem Maloney stated this is exactly the intention of the program and he supports it. Councilmember Fahey agreed.

Mayor Stolzmann closed the public hearing.

**Motion:** Mayor Pro Tem Maloney moved to approve Resolution No. 71; seconded by Councilmember Fahey

**Vote:** Motion passed by unanimous roll call vote.

**Motion:** Mayor Pro Tem Maloney moved to approved Resolution No. 72; seconded by Councilmember Dickinson

**Vote:** Motion passed by unanimous roll call vote

**ORDINANCE NO. 1816, SERIES 2021 – AN ORDINANCE ADOPTING BY REFERENCE THE 2021 INTERNATIONAL ENERGY CONSERVATION CODE, WITH AMENDMENTS, REPEALING CHAPTER 15.60 OF THE LOUISVILLE MUNICIPAL CODE CONCERNING THE PRESCRIPTIVE ENERGY CODE AND DESIGN CRITERIA, AND AMENDING TITLE 17 OF THE LOUISVILLE MUNICIPAL CODE CONCERNING ELECTRIC VEHICLE CHARGING INFRASTRUCTURE – 2nd READING, PUBLIC HEARING (advertised *Daily Camera* 9/26/21)**

Mayor Stolzmann introduced the item and asked for any disclosures; seeing none she opened the public hearing.

Katie Baum, Sustainability Coordinator, presented the IECC updates. The city is currently under the 2018 IECC with prescriptive energy and design criteria and solar readiness for residential and commercial buildings. The IECC is updated every three years, but this year is the first edition with significant efficiency gains since 2012. There are multiple changes from the 2018 IECC regarding residential structures in building insulation values,

HVAC systems and lighting and power. The changes to commercial buildings are in the building envelopes, HVAC, service water heating, lighting and power and renewables.

She advised Council there are some amendments to the ordinance since 1st reading. The ordinance presented tonight was updated to require fuel source and renewable systems pathways in construction documents. All residential and commercial new construction will be all-electric or be built with high efficiency HVAC equipment and with electric-ready infrastructure. EV charging will be enforced at the time of building permit, with a clarification that projects within a PUD approved prior to the ordinance, but which have not obtained a building permit, will be required to comply with the ordinance.

Solar readiness does not require that solar be installed on new construction, but space and capacity for installing such a system is required.

Electrical vehicle readiness requires the infrastructure for an EV ready parking space or EV charging station be included at time of construction for future buildout of EV charging. The ordinance details the requirements for EV readiness for each building type.

Council requested information on building electrification requirements in other Colorado municipalities and zero energy appendices. Those were included in the packet. Staff recommends approval of the ordinance as proposed this evening with the amendment to Table R402.1.2.

Councilmember Lipton asked what types of building permit actions would trigger the need to comply with the upgraded standards. Chad Root, Chief Building Official, responded the trigger would be adding over 50% of square footage to a home would require meeting the new requirements. Commercial permits would be set up in the same fashion.

Councilmember Lipton asked about gas fireplaces. Root stated those will be exempt.

Public Comments

Hazel Van Zale, a student at Louisville Elementary School, spoke in favor of adopting the 2021 IECC and appendix to reduce greenhouse gas emissions.

Weston Gano, a student at Louisville Elementary School, spoke in favor of adopting the 2021 IECC and appendix to reduce our energy footprint.

Baxter Case, a student at Louisville Elementary School, spoke in favor of adopting the IECC and appendix.

Peter Geise, 808 Spyglass Circle, stated he is hesitant on moving forward with some of the requirements of the IECC and appendix. He urged a more cautious approach.

Tess Weltzin, spoke in favor of adopting the IECC and the appendix to reduce greenhouse gas emissions for generations to come.

Sadie Gabriel, a student at Louisville Middle School, spoke in support of adopting the IECC and appendix to reduce greenhouse gas emissions and indoor air quality.

Evan Hiatt, a student at Louisville Elementary School, spoke in support of adopting the IECC and appendix as the building sector is a large polluter.

RJ Harrington, 457 East Raintree Court, spoke in support of approving the IECC and appendix.

Grady Gabriel, a student at Louisville Middle School, spoke in support of approving the IECC and appendix. New buildings need to be run by renewable energy and not fossil fuels.

Amelie Valliere, a student at Louisville Middle School, spoke in support of adopting the IECC and appendix to reduce greenhouse gas emissions.

Isabelle Valliere, a student at Louisville Middle School, spoke in support of adopting the IECC and appendix to reduce greenhouse gas emissions and improve indoor air quality.

Arthur Towber, a student at Louisville Middle School, spoke in support of adopting the IECC and appendix to stop global warming with stricter laws for building homes.

Caleb Forrester, a student at Louisville Middle School, spoke in support of adopting the IECC and appendix to make homes more energy efficient.

Andy Johnson, 920 Lincoln Avenue, spoke in support of adopting the IECC and appendix.

Tiffany Boyd, 550 Grant Avenue, spoke in support of adopting the IECC and appendix.

Tamar Krantz, 691 West Street, spoke in support of adopting the Zero Energy Homes appendix.

Mike Kranzdorf, spoke in support of some of the proposals, but stated he doesn't understand why EV chargers need to be installed in certain areas. He asked that consideration of the appendix be moved to phase 2 of adoption and expressed concern about raising costs for low income home owners.

Councilmember Fahey noted that when people spend more on these upgrades it can be long-term cost savings in other ways such as energy use.

Mayor Pro Tem Maloney stated he supports the ordinance.

Councilmember Dickinson stated he supports the ordinance and asked if any other cities in Colorado have adopted the 2021 IECC yet. Consultant Hope Medina stated many jurisdictions are working on adopting it but Louisville might be the first or one of the first if adopted this evening.

Mayor Stolzmann stated there is consensus on adopting the code this evening. She would like to do more than the proposal by adding Appendix CC. She also proposed striking out the alternatives for fuel gas options thereby requiring all new building be all electric.

Councilmember Brown expressed support for Mayor Stolzmann's proposals.

Councilmember Lipton asked what the practical impacts would be of these additions. He asked how long it would take to do further public engagement. Director Zuccaro stated it would likely take 3-6 months to do a full public process and research on the impacts.

Councilmember Lipton voiced support of the ordinance as presented by staff, but thinks that the appendices needs more research and deliberation.

Mayor Stolzmann stated there is clear support for this from the community and sustainability initiatives are a part of the Council's work plan. The minor proposals are a start but there is a lot more work to do.

Councilmember Leh stated he wants to move quickly but he also wants to avoid unintended consequences. He doesn't know the impact on affordable housing and would like additional public input.

Councilmember Brown stated he does not feel there is the need for additional public input; he feels residents support these moves.

Mayor Stolzmann noted there are unintended consequences of inaction. There is information in the packet about how switching to electric will lower costs in the long run.

Councilmember Brown reemphasized support of the appendices and striking the gas fuel option.

Mayor Pro Tem Maloney stated he doesn't hear disagreement about direction only timing. Staff has proposed a phase II which is part of Council's work plan. All electric is something Council supports, but there needs to be more information and discussion. Phase II might take a few months, but it's not years.

Public Comments

Mark Cathcart, 7017 Sweet Clover Lane, spoke in support of the ordinance and including the appendices.

RJ Harrington, 457 E Raintree Ct, spoke in support of passage of the ordinance and including the appendices.

Maxine Most, suggested Council consider a moratorium on new construction until this can be sorted out.

Tiffany Boyd, 550 Grant Ave, a member of the Louisville Sustainability Advisory Board read sections of the letter from the board included in the packet.

Mike Kranzdorf, noted his concerns that the business community is not being considered as part of the Louisville Community. He stated builders and property owners want to help and do the right thing, but asked Council to accept input and take some additional time.

Andy Johnson, encouraged adopting IECC, and stated the residential appendix is doable. He noted there are ways for residential construction to meet these requirements; commercial is going to be a harder switch to flip and there does need to be more time for the commercial appendices.

Councilmember Lipton stated his support for the ordinance as written and getting more public input on the appendices.

Mayor Stolzmann closed the public hearing.

**Motion:** Councilmember Lipton moved to approved Ordinance No. 1816 as presented tonight; Mayor Pro Tem Maloney seconded.

**Substitute Motion:** Mayor Stolzmann moved to approved Ordinance No. 1816 as presented, but also adding the zero energy residential and commercial appendices and striking fuel gas options for new commercial and new residential buildings; Councilmember Brown seconded.

Councilmember Dickinson asked what striking fuel gas option impact would have regarding backup systems. Mayor Stolzmann responded that her intent is that there would be no fossil infrastructure to new buildings.

**Vote** on the substitute motion failed 4-3 with Mayor Stolzmann and Councilmembers Brown and Fahey voting yes.

**Substitute Motion:** Councilmember Dickinson made a substitute motion to approve Ordinance No. 1816 but adding the residential appendix. Mayor Stolzmann seconded.

**Vote** on the substitute motion by Councilmember Dickinson passed 4-3 with Councilmembers Leh and Lipton and Mayor Pro Tem Maloney voting no.

Councilmember Leh expressed his hope that Council will vote on adding the commercial appendices in three months.

Mayor Stolzmann reiterated the items coming forward in coming months, such as construction waste diversion, green roofs, amortization on retro fits, and all electric requirements, as well as EV capable requirements and insulation requirements.

**ORDINANCE NO. 1817, SERIES 2021 – AN ORDINANCE APPROVING THE VACATION OF A 125-FOOT BY 30.60-FOOT WIDE RIGHT-OF-WAY LYING SOUTH OF LOT 9, BLOCK 10, LOUISVILLE HEIGHTS SUBDIVISION IN THE CITY OF LOUISVILLE (601 MCKINLEY AVENUE) – 2nd READING, PUBLIC HEARING (advertised *Daily Camera* 10/10/21)**

Mayor Stolzmann introduced the item and asked if there are any disclosures; seeing none she opened the public hearing.

Interim Director Ritchie stated this is a request for a right of way vacation for property adjacent to 601 McKinley Avenue. She reviewed the site and history of this piece of property. She noted this piece of land was to be used for an alley that was never developed and in 1984 the previous homeowners had entered into a license agreement with the City to put in a fence. The applicant coordinated with City staff and Xcel and the ordinance establishes a 7.9' wide utility easement on the southern portion of the vacated area to allow access for Xcel to the utility line and to the City to maintain the sanitary line to the south of the property.

Staff finds that retention of the area for right of way is not needed for any current or future City purpose. Approval of the vacation request will also not result in loss of access to any property. Staff recommends approval of the ordinance.

Cody Thompson, applicant, spoke to his request for the additional land to accommodate the home he is proposing for the parcel.

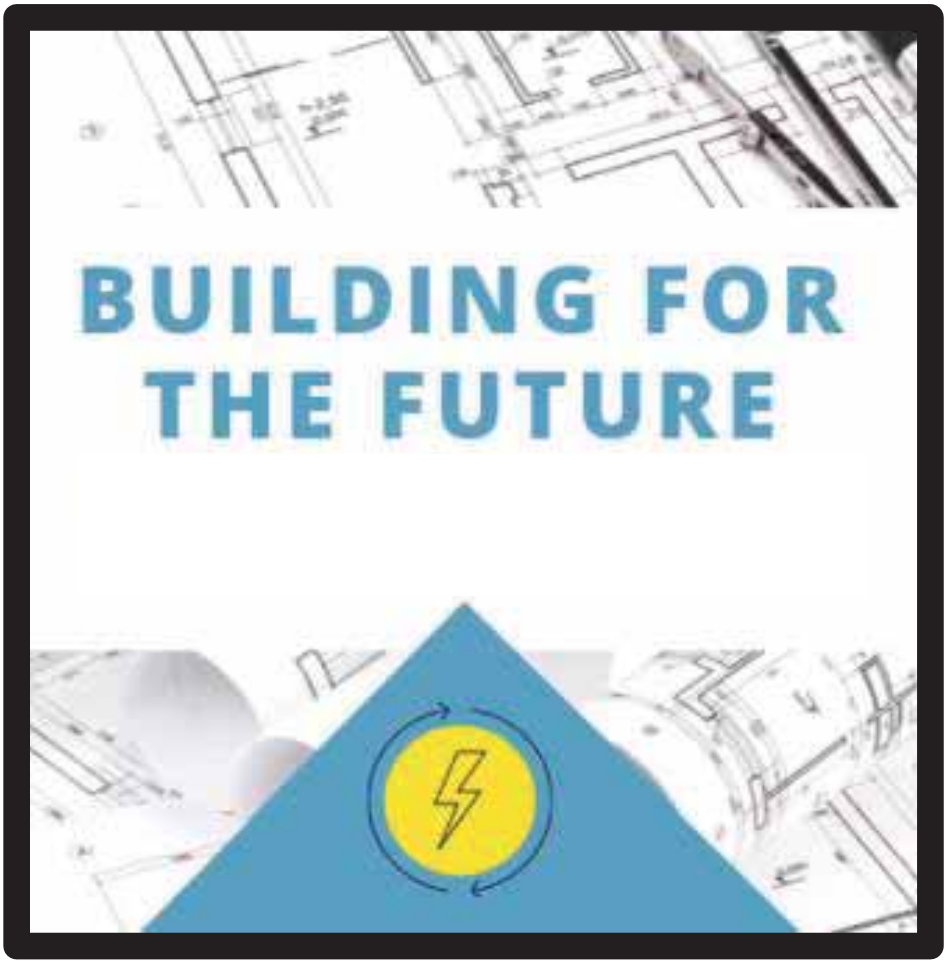
Public Comments – None

Councilmember Brown asked what the value of the property is. City Attorney Kelly stated that State Statute does not allow the City to be compensated for loss of the right of way.

Public Comments

RJ Harrington stated this is another example of a home being scraped and rebuilt.

Mayor Stolzmann stated there is likely no public purpose for the property. Additionally it has been fenced in for private use since 1984, and she feels vacation makes sense in this circumstance.




# Energy Code Update Recommandation Report

AUGUST 2022

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# Executive Summary

The City of Louisville (the City) contracted with Group14 Engineering, PBC (Group14) and Lotus Engineering and Sustainability, LLC (Lotus) to explore updates to the City's current commercial energy code that would help the City reach their energy efficiency and greenhouse gas reduction goals. The City and consultant team examined commercial energy code policy options including higher efficiency requirements, all electric requirements, and net zero requirements. The scope of work included:

- Energy modeling of current code compliant heating, ventilation, and air conditioning systems in commercial and industrial building types to evaluate upfront cost, operational cost, and greenhouse gas (GHG) emissions. The energy modeling also included an analysis on the total solar PV required to make code compliant buildings (both mixed-fuel and all-electric) net zero. Finally, energy modeling was conducted to analyze the upfront cost, operational cost, and GHG emissions savings of buildings built to a higher efficiency performance standard.
- Research on existing commercial energy code policies from around the country.
- A public engagement process that solicited feedback on commercial code policy options via two City board meetings, two open-house style community meetings, and an online public engagement survey.

Three main policy options resulted from the project process:

- **Regional Code Cohort Alignment:** Aligning with a regional cohort of communities in and around Boulder County striving for consistent building code updates. Communities are adopting the 2021 International Energy Conservation Code (IECC) as the base code along with several supporting amendments to promote electrification and efficiency. Even though Louisville has already adopted the 2021 IECC, some of the anticipated cohort amendments would strengthen the Louisville code.
- **Policy Option 1:** Setting a minimum energy performance standard (through Energy Use Intensity (EUI) modeling at time of building permit) for commercial buildings. The energy performance standard would vary based on building type. A building owner could utilize onsite renewable energy to help reach the energy performance standard. This policy could include incentives for all building electrification.

- **Policy Option 2A & 2b:** Requiring net zero new commercial construction by adoption of Appendix CC of the 2021 IECC [2A]. The appendix does not require increased building efficiency above the 2021 IECC base code but does require renewable energy offsets to achieve net zero. Amendments to the appendix related to purchase of off-site renewable offsets would be needed to make implementation feasible. The City could also opt to add an all-electric new construction requirement to Appendix CC [2B].

**Based on information and insight gleaned from the energy modeling and community input, the project team recommends the City adopt Policy Option 1**, to set energy performance goals for commercial and industrial new construction. This option strikes a balance between Louisville's sustainability goals, economic considerations, and community needs.

# 1. Introduction

Climate change is impacting Colorado and the City of Louisville (the City / Louisville) today. This is evidenced by extreme weather events such as the Marshall Fire, an unusual and out-of-season wildfire exacerbated by a warming climate, long term drought, and statewide average temperature increases.

A press release published in April of 2022 by the Intergovernmental Panel on Climate Change begins with a sentence written in bold text: **"The evidence is clear: the time for action is now. We can halve emissions by 2030."**[i] It is short and demanding, yet hopeful. The press release emphasizes the weight held by choices made in this decade and the power held by decision makers to "secure a livable future" for their communities.

## 1.1 The City of Louisville's Sustainability Goals

The City of Louisville has recognized the need for climate action, and has made a strong commitment to public health and safety by way of the City's clean energy and carbon emissions reduction goals which are outlined in Resolution 25, Series 2019,[ii]:

1. Meet all of Louisville's municipal electric needs with 100% carbon-free sources by 2025.
2. Reduce core municipal GHG emissions[iii] annually below the 2016 baseline through 2025.
3. Generate 75% of Louisville's residential and commercial/industrial electric needs from carbon-free sources by 2030.
4. Reduce core community GHG emissions[iv] annually below the 2016 baseline through 2030.

As reported in Louisville's Sustainability Action Plan, electricity and natural gas are the City's largest sources of emissions.[v] Therefore, a crucial path forward for achieving these goals involves transforming energy use in the City's residential and commercial building stock. Reducing the energy consumption of buildings and transitioning away from fossil-fuel combustion equipment are effective strategies to decrease emissions and support meeting electricity needs with carbon-free sources. This report focuses on code options for new buildings, but future efforts should address existing build stock to help meet carbon emission reduction goals.

## 1.2 Current Commercial and Residential Code Standards for New Construction

The lifetime of buildings constructed today ranges from 30 to 130 years.[vi] If not built to a more stringent energy code, new construction can contribute to carbon pollution from less efficient buildings for generations, creating increasingly difficult conditions for climate change

mitigation. Model building codes for new construction present an opportunity for innovation, employing the built environment as a climate action tool, rather than an obstacle, that can support City goals. Building energy codes are an effective policy mechanism local government can utilize to decarbonize new construction, future-proof their building stock, and accelerate clean energy use.

The City of Louisville has already shown a commitment to climate action by adopting the 2021 International Energy Conservation Code (IECC) with amendments outlined in Table 1.

| Commercial Buildings | Residential Buildings* |
|---|---|
| • Increased insulation levels. | • Increased insulation levels. |
| • Increased doors and windows efficiency requirements. | • Increased ductwork and piping insulation requirements. |
| • Increased HVAC efficiency. | • Mandatory heat recovery. |
| • Electric vehicle charging and infrastructure.** | • Electric vehicle charging and infrastructure.** |
| • Electric-ready wherever gas appliances are installed. | • Electric-ready wherever gas appliances are installed. |
| • Solar-ready zone required (Appendix CB). | • Solar-ready provisions required (Appendix RB). |
| | • Net zero Appendix RC required. |

*Marshall Fire rebuilds are exempt.

**Amendment to Municipal Code Chapter 17.20, Off-street Parking and Loading

*Table 1: Overview of City of Louisville's current adopted code amendments.*

# 2. Building for The Future: Energy Code Update

## 2.1 Project Overview

The current adopted code and accompanying amendments encourage energy efficiency and the implementation of future-proofing strategies into new construction. However, these efforts alone will not be enough to fully achieve the City's energy and emissions reduction goals.

In their 2022 Work Plan,[vii] Louisville City Council outlined Phase 2 of the 'Building for the Future' project, directing City Staff to "consider additional measures to code adopted in 2021, which could include the IECC Net Zero Commercial Appendix, other net zero goals and strategic implementation and all-electric construction requirements" specifically for new construction of single-family homes, multifamily buildings, and commercial buildings.

The City contracted with Group14 Engineering, PBC (Group14) and Lotus Engineering and Sustainability, LLC (Lotus) to identify policy options that would encourage higher efficiency, net zero development, and/or all electric development. The scope of work consisted of energy modeling of different building code scenarios, development of policy options based on research and the modeling results, and public engagement on the policy options developed.

A common framework used to create more effective sustainability strategies is consideration of the three pillars of sustainability: economy, environment, and equity. Creating a more sustainable Louisville requires consideration of the whole community, not just environmental impacts of the action being done. Recognizing this, the project team used the three pillars as guiding principles throughout this work.

### 2.1.1 Energy Modeling

For the first iteration of modeling, Group14 modeled four building types—multifamily, office, retail, and single-family home—with different heating, ventilation, and air conditioning (HVAC) designs that meet current Louisville energy codes. Each building type model consisted of mixed-fuel options that utilize natural gas and electricity, and all-electric options. All other variables such as insulation and lighting were modeled to meet the current code adopted by Louisville and remained constant for each system within each building type. The modeling examined upfront costs and annual costs of each HVAC system per building type, the amount of photovoltaics (PV) required for a building to be net zero with each HVAC system per building type, PV payback periods, and greenhouse gas (GHG) emissions at base code.

Additional modeling was conducted later in the project to investigate the upfront cost, operational cost, and GHG emissions from buildings complying with the finalized policy options.

### 2.1.2 Policy Research

Group14 examined existing frameworks for all-electric and net zero energy codes from the City of Boulder, several jurisdictions in California, City of Boston, and New York City. This policy landscape review aimed to complement the energy modeling conducted, and the consulting team utilized both resources to best inform the commercial energy code policies recommended to the City of Louisville. For more detail on the on the policy research and initial energy modeling results, see Group14's report in Appendix A.

### 2.3 Community Outreach

Public input is crucial to building community trust and ensuring feasibility when developing policies. Recognizing this, the consultant teams and City staff presented the project and energy code considerations to the public through multiple engagement opportunities:

1. Two open-house style community meetings.
2. An online survey that was open from June 27, 2022 to August 5, 2022.
3. Presentations to the Louisville Sustainability Advisory Board and the Building Code Board of Appeals.

Feedback from each engagement method was collected, data was cleaned and analyzed, and engagement results were incorporated into the final policy recommendation. For a full description of community outreach conducted and a summary of results, see Appendix B.

## 3. Project Results and Discussion

### 3.1 Refining the Project Scope

As the 'Building for the Future' project progressed, the consultant team and City Staff continuously refined the energy modeling and the policy options, carefully considering efficacy and relevance to City Council intent. One result of this iterative process was shifting the focus of the analysis away from single-family home policy, due to the City having already adopted Appendix RC of the 2021 IECC. Consequently, the subsequent sections address policy options for commercial and industrial building types only.

Based on public feedback, improved analyses, and internal conversations, the project team finalized three policy options for the City Council's review, each of which are discussed below.

## 3.2 Final Policy Options

***Note:*** *All policy options presented are in addition to the current Louisville energy code which includes the following provisions: 2021 IECC base code; Louisville-specific energy efficiency amendments; electric vehicle (EV) ready requirements; the solar-ready Appendix for residential and commercial; and electric-ready requirements for residential and commercial new construction.*

### 3.2.1 Alignment with Regional Cohort

#### Policy Description

The City of Louisville could align with an existing regional cohort consisting of communities in and around Boulder County, working in a coordinated effort to adopt a regionally consistent building code (see Box 2). Louisville is a participant in the code cohort, but City Council direction led to an independent pursuit of community-specific options. Based on the City's current code, the primary changes Louisville would need to make are updating the City's current electric preferred standard to align with the cohort, updating the solar-ready appendix language to cover all buildings under the solar-ready requirements, and including additional code language to require cool roofs and high-efficiency horticulture lighting. Group14 did not conduct energy, cost, or greenhouse gas modeling for this code option, but the project team decided to include it due to expressed public interest in regional alignment. Additional detail on the amendments being considered by the Code Cohort are included in Appendix C.

**Colorado Department of Local Affairs Code Cohort**

**Phase 1:** Regional adoption of the 2021 IECC and supporting amendments including solar-ready requirements, EV-ready requirements, electric-preferred requirements, and additional efficiency requirements such as cool roofs and horticulture lighting. These amendments are applicable to residential and commercial buildings.

**Phase 2:** Beginning in August 2022, communities will work together to develop a roadmap to net zero new construction code for the region by 2030.

Participating communities include:

- City of Louisville
- Town of Superior
- Boulder County
- Town of Erie
- City of Lafayette
- City of Northglenn
- City and County of Broomfield
- City of Longmont

The City of Boulder, City of Westminster, and Town of Berthoud did not participate in Phase 1 but will participate in Phase 2.

*Box 1: Code cohort overview.*

**DISCUSSION**

Alignment with the regional code cohort's current IECC 2021 supporting amendments, and the future roadmap to net zero new construction would begin a code update process that increases stringency over time, allowing Council to take a stepped approach toward net zero code adoption by 2030. This approach would align Louisville with its neighboring communities and would provide Louisville an opportunity to co-develop a regional plan to get to net zero new construction. It's important to note that while a regional roadmap will be developed with the goal of consistency across the region, compliance, enforcement, and timelines for net zero code adoption may look unique to each community within the Cohort. Alignment with the Phase 1 code recommendations for the Cohort would increase efficiency requirements for mixed-fuel buildings but not all-electric buildings and does not require all-electric or net zero. This option represents the smallest step forward for above code policy options the City could consider and adopt.

### 3.2.2 POLICY OPTION 1: ENERGY PERFORMANCE STANDARDS FOR BUILDING TYPES

### POLICY DESCRIPTION

New construction projects would be required to meet an energy performance standard that would be dictated by building type. The standards would be set using a metric called energy use intensity (EUI), which models the total energy consumption of a building for one year divided by the total square footage of the building. On-site PV could contribute to a building meeting the EUI target. Builders following a performance pathway for code compliance would need to meet their respective EUI targets and provide a modeling report as part of the building permit submittal.

If the builder were to pursue a prescriptive-based code compliance pathway, additional efficiency measures such as increased insulation levels and reduced lighting power densities would be required to deliver an equivalent level of efficiency as the energy performance standard.

### PREDICTED ENERGY PERFORMANCE GOALS

The City of Boulder's building code[viii] and the New Buildings Institute (NBI)[ix] each have example energy performance standards, using site EUI as a metric, for various building types that the City of Louisville could look to (See Table 2). The City of Boulder standards were developed in 2018 off the previous code cycle. The City of Boulder is lowering these EUI targets ever few years to eventually achieve net zero. NBI's Zero Energy Performance Standards are based on the energy performance of best-in-class buildings for each building type. The NBI standards for Zero Energy Performance were developed with an 'efficiency only' lens, and do not consider the cost effectiveness of achieving the efficiency levels for all building types.

| Building Type | City of Boulder Performance Standard (kBtu / sqft.) | NBI Zero Energy Performance Standard (kBtu / sqft.) |
|---|---|---|
| **Medium office (5,000 – 50,000 sf)** | 23 | 21 |
| **Mid-rise apartment (Type R2)** | 32 | 23 |
| **Primary school** | 34 | 25 |
| **Small office (<5,000 sf)** | 19 | 17 |
| **Secondary school** | 31 | 29 |
| **Warehouse** | 11 | 9 |
| **Retail** | NA | 34 |

*Table 2: Example energy performance goals for specific building types.*

Group14 modeled predicted site EUI, upfront costs, and annual energy costs for each building type to achieve the NBI EUI targets (see Table 3) under this policy option. The Group14 model investigated the most cost-effective means of achieving the NBI standards using both efficiency and onsite PV to reach each standard. Note, this differs from the NBI methodology, which only incorporated energy efficiency measures to meet each target.

| Building Type | HVAC Fuel Type | EUI targets modeled | Estimated Upfront Cost of HVAC without PV | EUI earned without PV | PV size required to reach EUI Target (kW) | Estimated Upfront Costs with PV | Annual Energy Cost Savings after PV |
|---|---|---|---|---|---|---|---|
| Multifamily | Mixed-Fuel | 23 | $206,661 | 36 | 111kW | $484,161 | $12,432 |
| | All-Electric | | $182,500 | 23 | 4kW | $192,500 | $448 |
| Office | Mixed-Fuel | 21 | $4,180,608 | 29 | 185kW | $4,643,108 | $20,720 |
| | All-Electric | | $4,353,828 | 29 | 177kW | $4,796,328 | $19,824 |
| Retail | Mixed-Fuel | 34 | $1,123,500 | 103 | 310kW | $1,898,500 | $34,720 |
| | All-Electric | | $1,232,200 | 63 | 223kW | $1,789,700 | $24,976 |

*Table 3: EUI target modeling and associated costs for buildings compliant with Policy Option 1: Energy performance standards.*

### GREENHOUSE GAS EMISSIONS

To assess how this option might contribute to Louisville's emissions reduction goals, Group14 also modeled GHG emissions resulting from a building achieving its energy performance standard, based on the building type. Energy performance standards help to drive up energy efficiency and drive down building emissions, as illustrated in Figures 1 and 2. In each building type, for mixed fuel and all-electric systems, a building that has achieved its energy performance standard creates less GHG emissions than the same building compliant with current code.

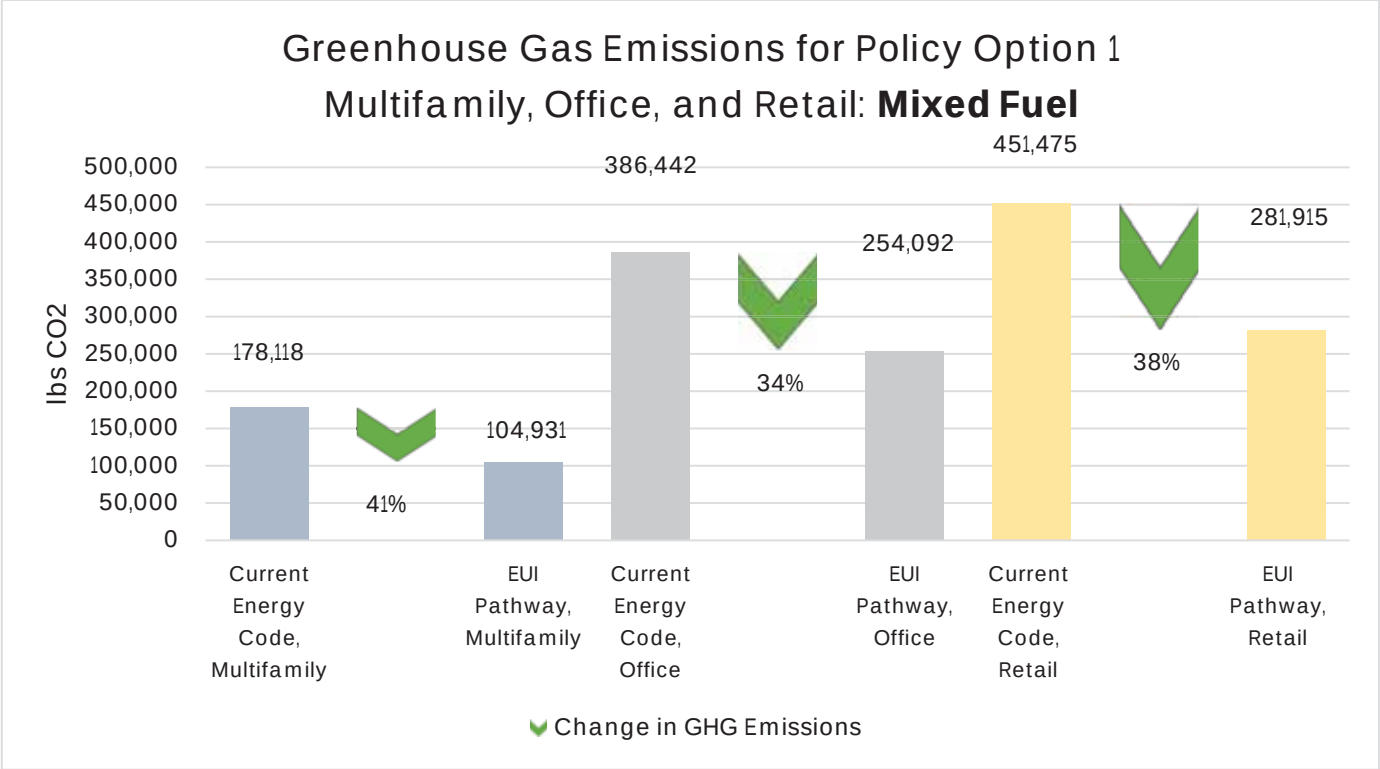


*Figure 1: Annual GHG emissions for **mixed fuel** buildings compliant with current code, compared to GHG emissions for buildings compliant with Policy Option 1: Energy performance standards for building types.*

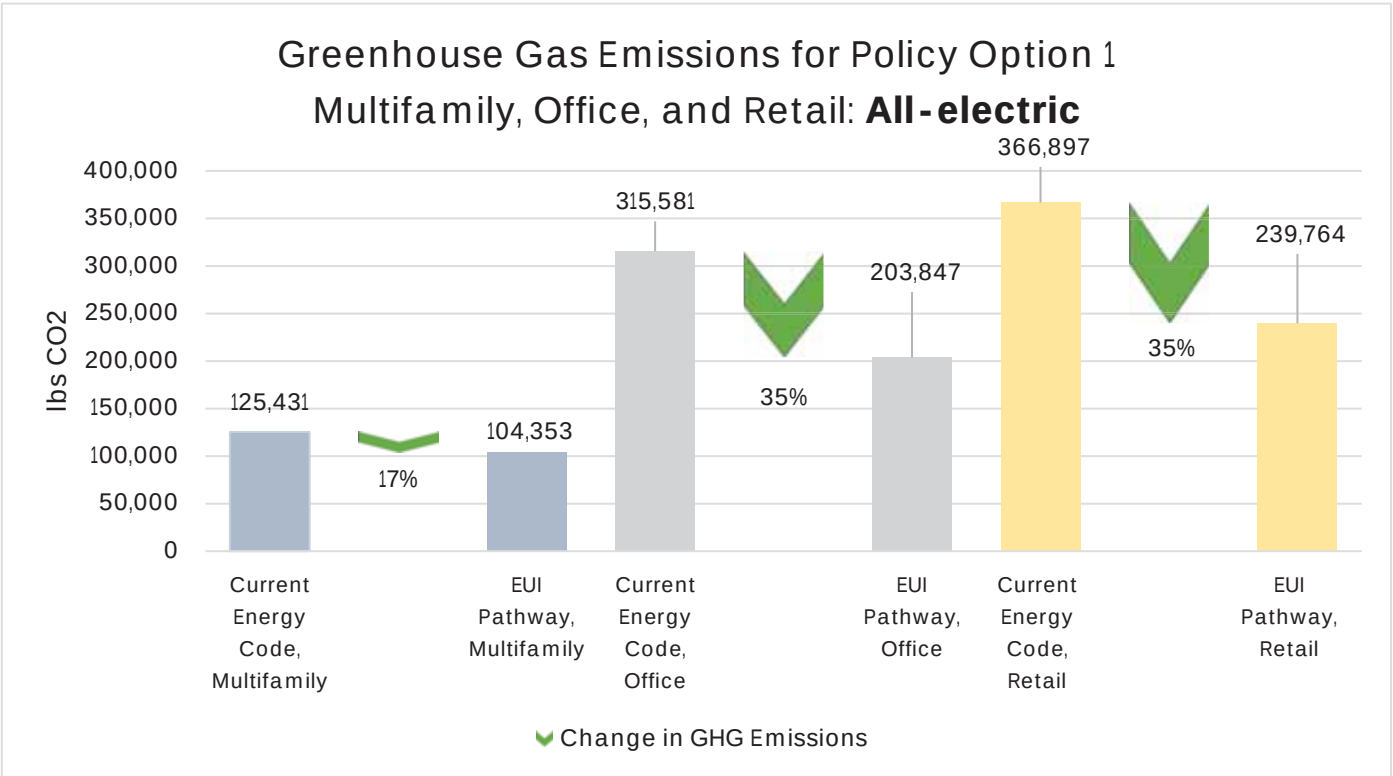


*Figure 2: Annual GHG emissions for **all-electric** buildings compliant with current code, compared to GHG emissions for buildings compliant with Policy Option 1: Energy performance standards for building types.*

#### DISCUSSION

Policy Option 1 is the most flexible of the code options. Buildings must reach an energy performance standard specific to that property type, but a building owner has options for how they chose to reach their energy performance standard. Onsite renewable energy can also contribute to the building's predicted EUI, adding another option in addition to efficiency to reach the target. This code results in more energy efficient, lower emitting buildings than the code package from the regional cohort and Appendix CC of the 2021 IECC.

All-electric buildings can reach much lower predicted EUIs because electricity has a lower energy density[x] than natural gas. Therefore, lower energy performance goals will naturally lead builders to all-electric options, which will result in lower GHG emissions over time as the electric grid becomes cleaner. This policy option allows the City to limit exemptions from the building code because energy performance standards can be applied to all building types, including those with high energy needs, such as a hospital. Finally, this option does not mandate building owners to invest in on or offsite PV to comply with code but provides building owners the option to use onsite PV to their own financial benefit if they so choose.

The NBI Standards modeled for this project are higher than both the City of Denver and the City of Boulder's standards for building types, making them more aggressive than local large cities surrounding Louisville. If the City chooses to pursue this policy option, additional analysis will be required to determine which targets are the most appropriate for the City of Louisville to adopt. Alignment with the City of Boulder's soon to be updated standards, could be advantageous to Louisville and would promote regional consistency.

***Policy option 1 is the consultant and staff recommendation for the City's energy code. See Section 4 for further discussion.***

### 3.2.3 POLICY OPTION 2A AND 2B: APPENDIX CC AND/OR ALL-ELECTRIC REQUIREMENT

#### POLICY DESCRIPTION

Policy Option 2A mandates compliance with Appendix CC of the 2021 IECC, zero energy commercial building provisions. Policy Option 2B builds upon 2A, adding a requirement that HVAC and plumbing systems must be all-electric. Appendix CC does not require commercial buildings to meet a higher level of efficiency above the base requirements in the IECC 2021. It does, however, require that commercial buildings must, in theory, offset 100% of the energy consumed onsite over a 15-year period using renewable energy. Note, it is likely that every commercial building will require both on and offsite renewable energy to reach the 100% offset requirement of Appendix CC. Procurement of offsite renewable energy to meet the 100% offset requirement is more complicated in practice. Appendix CC penalizes buildings

for procuring offsite renewables as opposed to generating 100% of their energy offset onsite, requiring buildings to procure more offsite renewables than a direct offset would require. These complications are discussed in more detail in the Offsite Procurement Discussion section below.

### MODELED COST AND RENEWABLE ENERGY REQUIREMENTS

As noted previously, Group14 examined upfront cost and the annual energy bill costs for HVAC systems in each modeled building type (Office, Retail, Multifamily) that are compliant with current code. Further analysis for this policy option provided the amount of PV a building would be required to invest in, to achieve net zero and earn compliance with Appendix CC, as well as related cost data. It is important to note that in all cases, for commercial buildings that meet 2021 base code efficiency, covering the available roof area with PV did not result in a net zero building. Therefore, it is anticipated that all commercial buildings will need to invest in offsite PV to fulfill the requirements of Appendix CC. The cost of offsite PV procured via 15-year contracts for green retail tariffs and Renewable Energy Certificates (RECs) was also modeled. Results are outlined in Tables 4, 5, and 6. Though results vary by HVAC system, on average, all-electric systems with PV had a quicker payback period due to needing less renewable energy to offset their building energy use than natural gas systems.

| Multifamily<br>HVAC System Options | Cost for Code Compliant Building | | Costs for Onsite PV | | | | | Net Zero Offsite PV – REC Pricing | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Upfront Cost of HVAC System | Total Annual Energy Bills | PV (kW) required for Net Zero | PV that can fit onsite (kW) | Cost of Onsite PV | Annual Energy Bill with Onsite PV | Total Annual Energy Cost Savings with PV | kW Remaining to Offset | Green Tariff Cost (15 years, purchased in kWhs)[xi] | Unbundled RECs Cost (15 years, purchased in MWhs)[xii] |
| Mixed Fuel Option 1 | $157,321 | $40,785 | 338 kW | 98 kW | $245,000 | $28,809 | $10,976 | 240 kW | $137,303 | $70,482 |
| Mixed Fuel Option 2 | $278,321 | $25,230 | 365 kW | | | $14,254 | | 267 kW | $152,838 | $78,457 |
| Mixed Fuel Option 3 | $267,321 | $38,038 | 303 kW | | | $27,062 | | 205 kW | $117,259 | $60,193 |
| Mixed Fuel Option 4 | $459,821 | $27,071 | 357 kW | | | $16,095 | | 259 kW | $148,328 | $76,142 |
| All-Electric Option 1 | $135,000 | $40,383 | 236 kW | | | $29,407 | | 138 kW | $79,174 | $40,643 |
| All-Electric Option 2 | $245,000 | $40,601 | 232 kW | | | $29,625 | | 134 kW | $76,493 | $39,266 |
| All-Electric Option 3 | $437,500 | $28,431 | 201 kW | | | $17,455 | | 103 kW | $59,226 | $30,402 |

*Table 4: Data detailing costs and PV amounts for a multifamily building under Policy Option 2A and 2B.*

| Office<br>HVAC System Options | Cost for Code Compliant Building | | Net Zero Requirements and Costs for Onsite PV | | | | | Net Zero Offsite PV – REC Pricing | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Upfront Cost of HVAC System | Total Annual Energy Bills | PV (kW) required for Net Zero | PV that can fit onsite (kW) | Cost of Onsite PV | Annual Energy Bill with Onsite PV | Total Annual Energy Cost Savings with PV | kW Remaining to Offset | Green Tariff Cost (15 years, purchased in kWhs)[xi] | Unbundled RECs Cost (15 years, purchased in MWhs)[xii] |
| Mixed Fuel Option 1 | $2,327,633 | $104,604 | 722 kW | 250 kW | $625,000 | $76,604 | $28,000 | 472 kW | $285,152 | $146,378 |
| Mixed Fuel Option 2 | $1,786,323 | $135,278 | 777 kW | | | $107,278 | | 527 kW | $317,602 | $163,036 |
| Mixed Fuel Option 3 | $4,492,873 | $95,077 | 772 kW | | | $67,077 | | 522 kW | $315,006 | $161,703 |
| All-Electric Option 1 | $1,948,716 | $131,993 | 755 kW | | | $103,393 | | 505 kW | $304,622 | $156,373 |
| All-Electric Option 2 | $3,789,170 | $90,551 | 544 kW | | | $62,551 | | 294 kW | $179,548 | $92,168 |
| All-Electric Option 3 | $3,464,384 | $94,324 | 567 kW | | | $66,324 | | 317 kW | $192,996 | $99,071 |
| All-Electric Option 4 | $4,005,694 | $103,660 | 578 kW | | | $75,660 | | 328 kW | $199,485 | $102,403 |

*Table 5: Data detailing costs and PV amounts for an office building under Policy Option 2A and 2B.*

| Retail HVAC System Options | Cost for Code Compliant Building | | Net Zero Requirements and Costs for Onsite PV | | | | | Net Zero Offsite PV – REC Pricing | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Upfront Cost of HVAC System | Total Annual Energy Bills | PV (kW) required for Net Zero | PV that can fit onsite (kW) | Cost of Onsite PV | Total Annual Energy Bill with Onsite PV | Total Annual Energy Cost Savings with PV | kW Remaining to Offset | Green Tariff Cost (15 years, purchased in kWhs)[xi] | Unbundled RECs Cost (15 years, purchased in MWhs)[xii] |
| Mixed Fuel Option 1 | $570,500 | $164,492 | 1741 kW | 600 kW | $1,500,000 | $97,292 | $67,200 | 1,141 kW | $689,194 | $353,786 |
| Mixed Fuel Option 2 | $456,000 | $182,683 | 1564 kW | | | $115,483 | | 964 kW | $584,178 | $299,878 |
| Mixed Fuel Option 3 | $630,500 | $158,096 | 1566 kW | | | $90,896 | | 966 kW | $585,261 | $300,434 |
| All-Electric Option 1 | $660,000 | $193,161 | 1449 kW | | | $125,961 | | 849 kW | $515,973 | $264,866 |
| All-Electric Option 2 | $708,000 | $185,053 | 1369 kW | | | $117,853 | | 769 kW | $468,337 | $240,413 |
| All-Electric Option 3 | $3,167,500 | $156,491 | 1157 kW | | | $89,291 | | 557 kW | $342,752 | $175,946 |

*Table 6: Data detailing costs and PV amounts for a retail building under Policy Option 2A and 2B.*

### OFFSITE PROCUREMENT DISCUSSION

To achieve the net zero requirement for both Policy Options 2A and 2B, a typical commercial or industrial building would not be able to fit the necessary PV on the building's available roof space and must supplement by procuring offsite renewable energy. Appendix CC does not require a building to pursue onsite renewable energy before they purchase offsite offsets. To ensure building maximize onsite renewable energy, the City could consider amending Appendix CC to require building to max out their onsite PV potential before pursuing offsite offsets.

Options for offsite procurement include community solar gardens, REC purchases, green retail tariffs, and virtual power purchase agreements (VPPAs). In Appendix CC, offsite renewable energy procurement is penalized based on the type of offsite a building pursues. For any remaining energy that must be offset offsite, a procurement factor must be applied which will increase the offsite renewables a building must procure. The procurement factor is a penalty for opting for offsite purchasing instead of onsite renewable energy generation and is required per the energy offset calculations in Appendix CC.

Appendix CC lists specific offsite offset requirements which mandate that renewable energy must be generated within the utility service territory and the contract must be 15 years in length, among others. As a result, there is a feasibility challenge with this policy option including insufficient onsite roof space to completely offset energy use, limited availability of local offsite renewable resources like community solar gardens, and constraints on open-market REC procurements that meet the requirements of Appendix CC.

Green retail tariffs, which are RECs purchased directly from the electric utility, pose a challenge for Appendix CC compliance. Green retail tariffs cannot be procured on a 15-year contract basis, and they only cover building electricity consumption, not overall building energy consumption.

Community solar gardens are local and can be procured on a 15-year contract basis, however, according to discussions with Xcel Energy, there is limited availability and high demand for these gardens, making it unlikely that a building owner would be able to procure the necessary offsite PV to comply with code.

RECs tend to be low cost and an easy procurement method, making them a popular option for offsetting energy use. However, they likely do not represent local renewable energy generation and there is no 15-year contract option available, thus violating the Appendix CC requirements.

Virtual PPAs can have 15-year contracts, however, like RECs, the renewable energy generation might not be local, making this option potentially invalid according to Appendix CC.

For Policy Options 2A and 2B to be feasible, City staff would need to amend the Appendix CC language to accommodate for the challenges in offsite procurement and to require onsite PV be required ahead of offsite procurement.

**Offsite Renewable Energy Procurement**

**Unbundled Renewable Energy Certificate (REC):** a market-based instrument that represents the property rights to the environmental, social, and other non-power attributes of renewable energy generation. A REC is one megawatt-hour of electricity generated and delivered to the grid.

**Community solar:** an offsite solar installation that a customer can contribute funds to and receive the benefits of via bill credit.

**Green retail tariff:** a program offered by utilities in which a customer can buy renewable energy credits at an additional charge to cover monthly electric use.

**Virtual Power Purchase Agreement (PPA):** a method for large commercial entities to purchase offsite renewable energy at a fixed rate for a fixed amount of time.

## GREENHOUSE GAS EMISSIONS

The GHG impact of Policy Options 2A and 2B must be viewed through two lenses: GHG reductions from onsite renewable energy and GHG reductions from offsite renewable energy.

If a building utilizes onsite PV to achieve the net zero requirement, that onsite renewable energy generation will create a direct reduction of GHG emissions. This is the same emissions reduction mechanism that occurs from PV installed to comply with the requirements of Policy Option 1.

GHG emission reductions from offsite renewable energy vary due to several factors such as procurement method and location of the renewable energy that was purchased. In addition, Appendix CC penalizes buildings for purchasing offsite energy in the form of RECs, via the procurement factor. For example, purchasing enough RECs in theory could offset all emissions created by the building. However, when a property owner purchases a REC, they are buying the right to a unit of energy from a solar garden or a wind farm that already exists, and would have existed if the building owner did not purchase the REC. Thus, the building owner's purchase is not generating any new renewable energy resources that would offset the emissions produced by the building. This would not be the case for a local community solar garden since the purchase would contribute to the development of new renewable energy resources.

Furthermore, the emissions intensity of the grid (how clean or dirty the power source for the grid is) where the renewable energy is being purchased from impacts GHG reduction. If the grid the building is drawing power from is cleaner than the grid the building owner is buying RECs from, the REC purchase has a larger GHG reduction impact but if the situation were reversed, the REC purchase has a smaller GHG reduction impact.

GHG emission reductions from Policy Options 2A and 2B are outlined below (Figures 3, 4 and 5). Net zero emissions represent a scenario in which the building has installed the maximum amount of PV they can fit on their available roof space. Figure 6 shows the emissions savings resulting from the remaining energy use being offset by RECs, with a procurement factor applied. Code compliant HVAC systems, both mixed fuel and all-electric, were modeled for each building type. Policy Options 2A and 2B have much larger GHG emissions reductions than Policy Option 1, as expected due to the nature of a net zero and/or all-electric building.

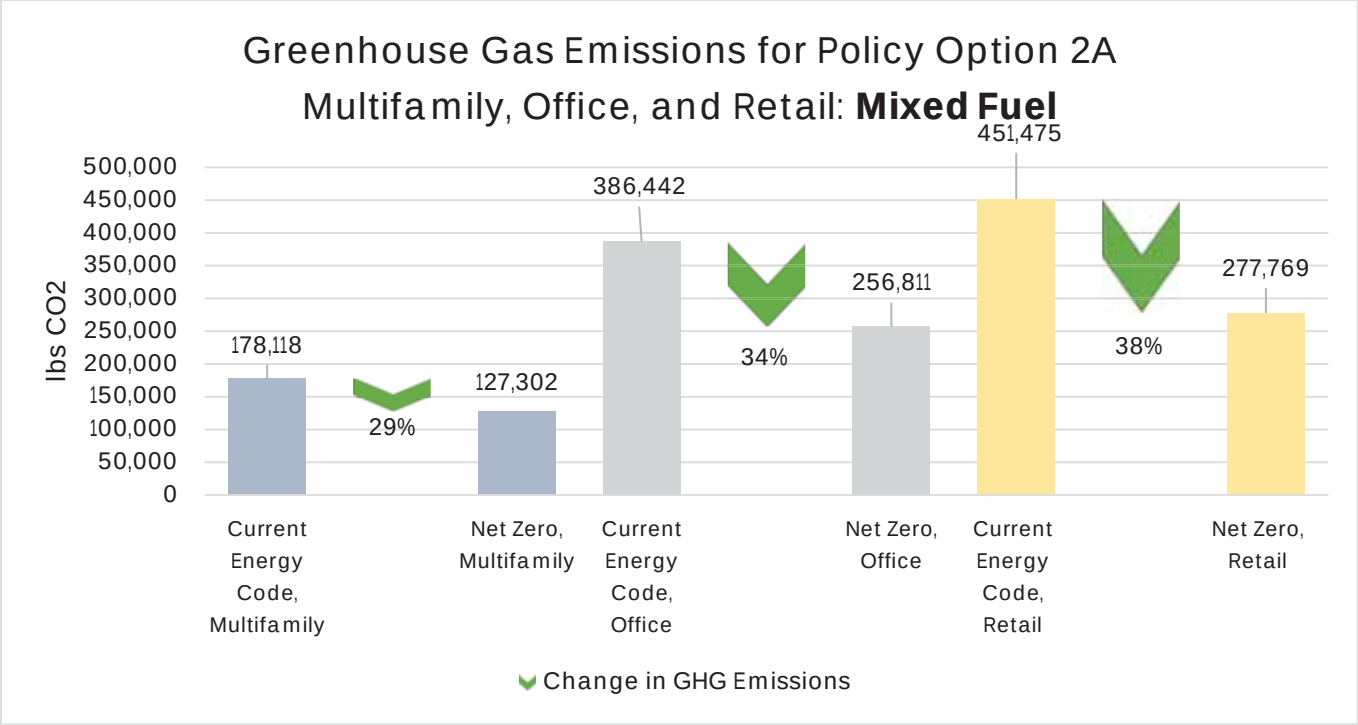


*Figure 3: Annual GHG emissions for **mixed fuel** buildings compliant with current code, compared to GHG emissions for **mixed fuel** buildings compliant with Policy Option 2A: Appendix CC, Net Zero.*

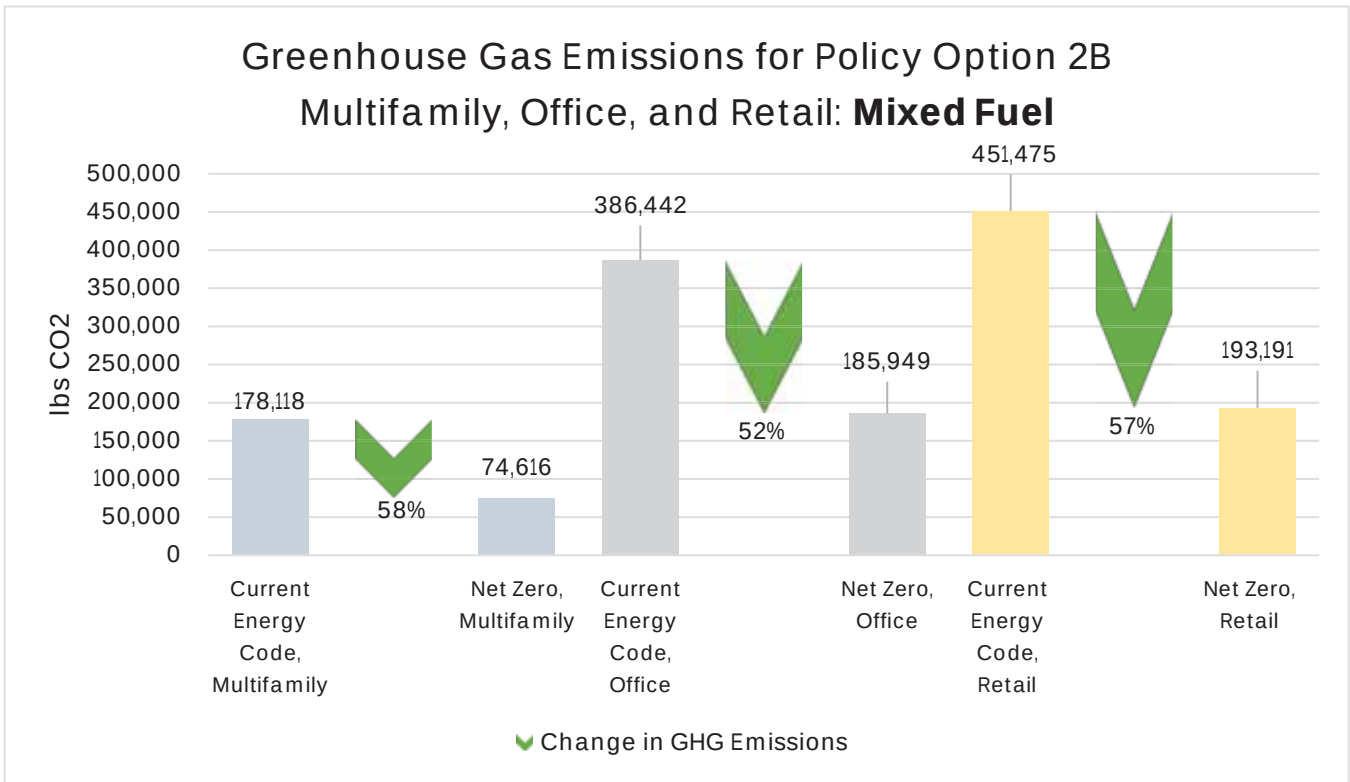


*Figure 4: Annual GHG emissions for **mixed fuel** buildings compliant with current code, compared to GHG emissions for **all-electric** buildings compliant with Policy Option 2B: Appendix CC, Net Zero + all-electric.*

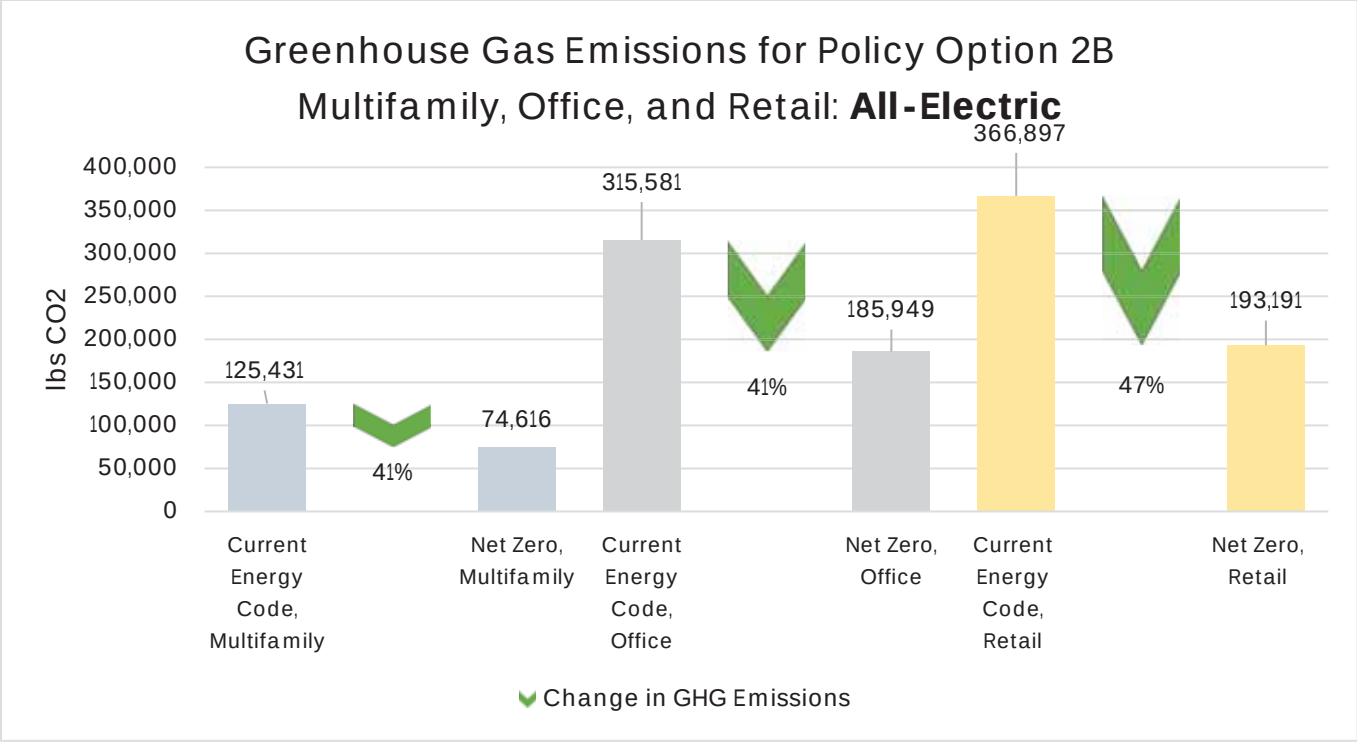


*Figure 4: GHG emissions for **all-electric** buildings compliant with current code, compared to GHG emissions for **all-electric** buildings compliant with Policy Option 2B: Appendix CC, Net Zero + all-electric.*

The GHG emissions modeling for unbundled REC purchasing used the nationwide average electricity emissions intensity, 0.85 lbs/kWh, as reported by the Energy Information Administration. The GHG calculations also included a mandatory application of a procurement factor which requires buildings who offset with RECs to purchase five times the total RECs required for a full offset.

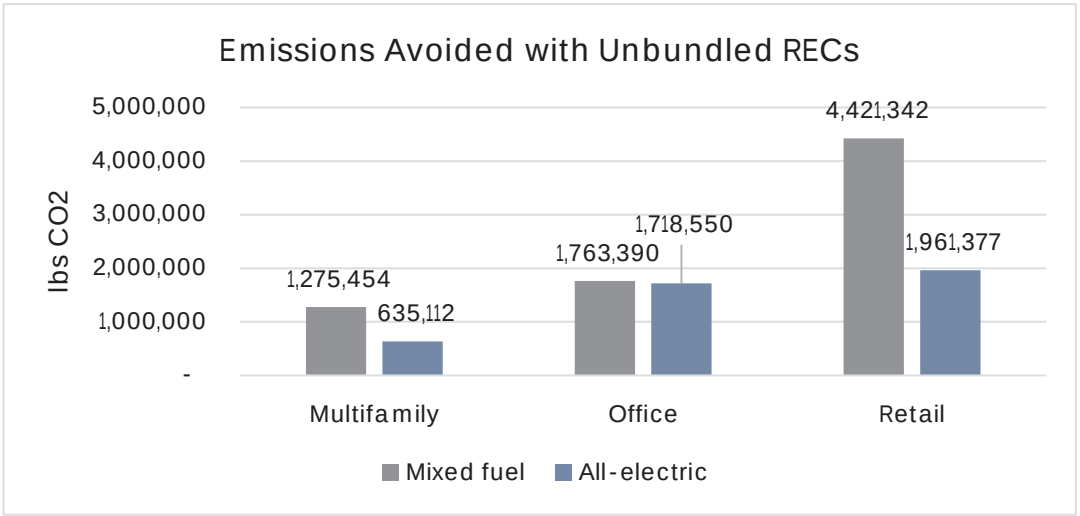


*Figure 5: Emissions avoided with unbundled RECs purchased to offset any energy consumption remaining after installing the maximum amount of onsite PV.*

### DISCUSSION

Policy Options 2A and 2B are most aggressive options in reducing GHG emissions through onsite PV, but do not increase the energy efficiency of the building over base code. Policy Options 2A and 2B require net zero with onsite and offsite PV, and 2B is the only option that also mandates all-electric, disallowing fuel choice. Exemptions for both Policy Options 2A and 2B could be considered for certain building types that contain processes that cannot be net zero or all-electric due to unfeasible cost or lack of technology. These process load exemptions may impact buildings such as laboratories, manufacturing facilities, industrial processing, restaurants, and/or hospitals. If exempted, these process loads, under Policy Options 2A and 2B would be exempt from the net zero or all-electric requirement.

These policy options do come with complications, including the need to amend Appendix CC for offsite procurement and the variability of the potential GHG impacts. Additionally, post hoc modeling revealed that the payback period for PV installation is no less than 22 years for any HVAC system in any of the building types modeled. The upfront investment building owners would need to make in onsite PV will payback overtime, but it's important to note that investments in offsite PV will always be an additional cost and will never represent revenue or financial benefit.

## 3.3 OVERALL PUBLIC FEEDBACK SUMMARY

The public engagement process was conducted with recognition that an energy code update will impact community members from all sectors. An in-depth review and analysis of the input received can be found in Appendix B.

**General feedback from all public outreach methods indicated that the Louisville community does not feel ready for an aggressive approach to energy code updates.** This is indicated by levels of support for each of the recommendations (Figures 7, 8, 9, and 10) and by both written and oral comments (Appendix B). While some were supportive of the desire to achieve sustainability goals, many showed concern about the upfront and ongoing costs that the code updates would impose on the community, the capability of the grid to handle electrification pushes, and the very limited access to offsite renewable energy.

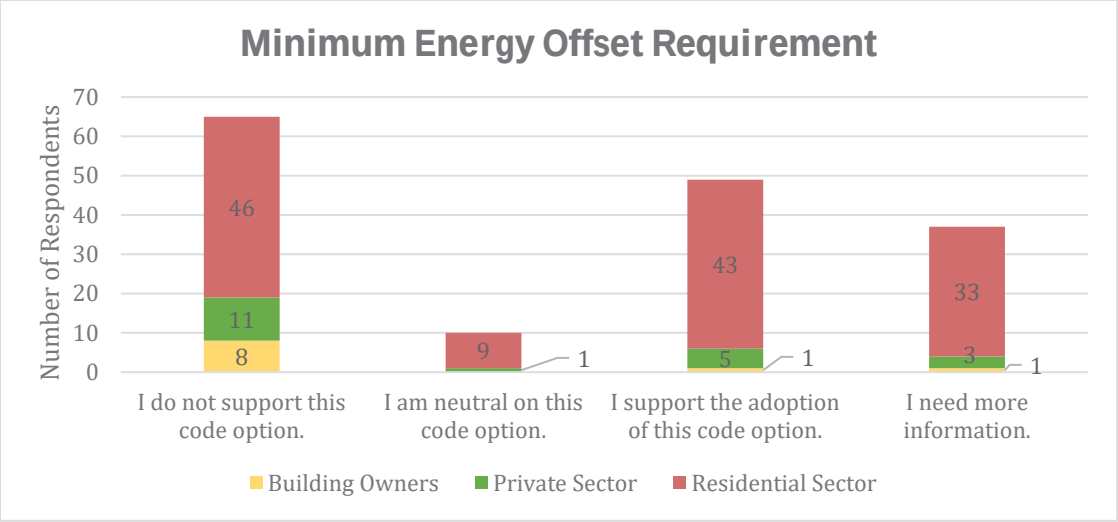


*Figure 7: All sector levels of support for Minimum Energy Offset code option.* ***How supportive would you be of including a minimum energy offset requirement in addition to the 2021 code, which would require on-site or off-site solar?***

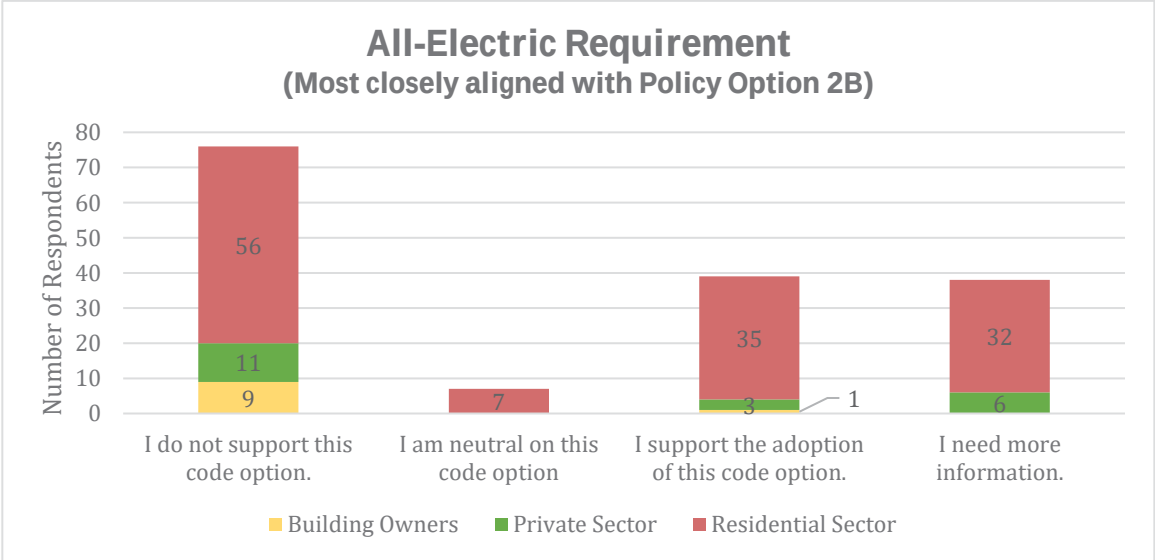


*Figure 8: All sector levels of support for All-Electric Requirement code option.* ***How supportive would you be if the City were to consider an all-electric requirement for new commercial construction code if industrial processes were exempt?***

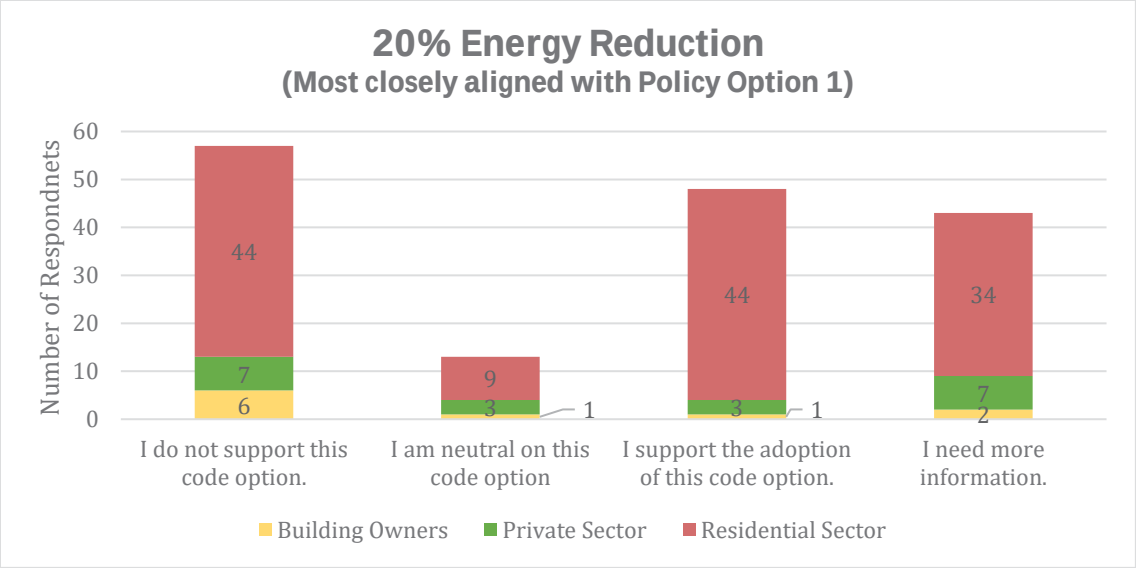


*Figure 9: All sector levels of support for 20% Energy Reduction code option.* ***How supportive would you be if the City were to consider an energy code that required a 20% reduction in energy use from the 2021 energy code for commercial construction?***

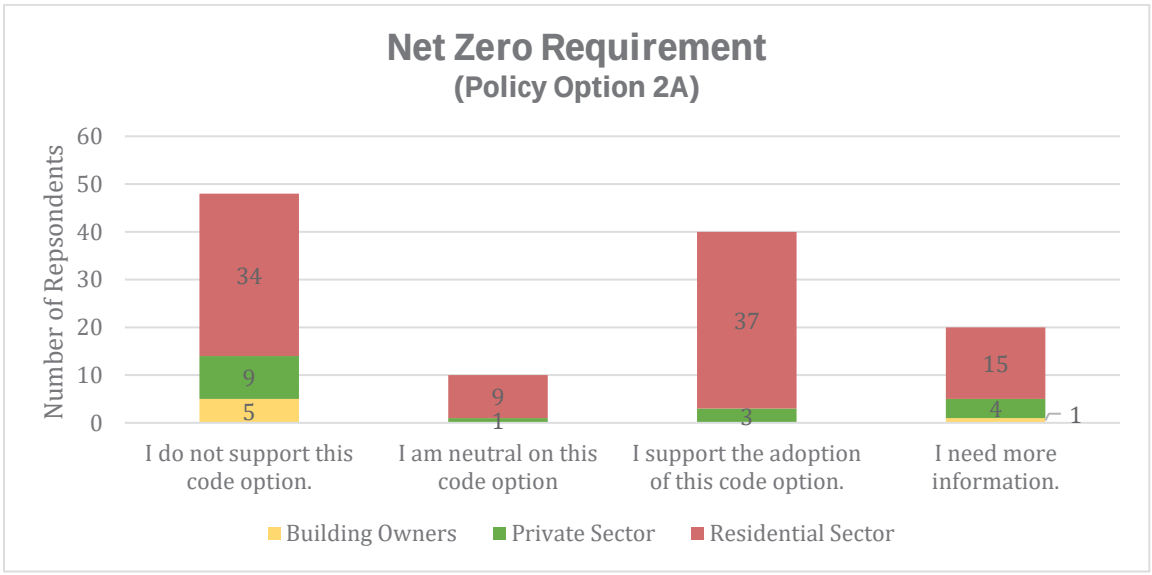


*Figure 10: All sector levels of support for Net Zero code option.* ***How supportive would you be if the City were to consider a commercial energy code that required net zero energy through efficiency and onsite/off-site renewable energy?***

In the online public engagement survey, the project team asked business and building owners what payback period they would tolerate for the additional upfront costs of installing solar for net zero and all-electric buildings. It is important to note that most respondents indicated that they would not tolerate any increased upfront cost, despite the payback period. Three out of ten building owners selected a payback period of zero-to-5-years, and

only one building owner was comfortable with a 10-20-year timeframe. Six out of 22 business owners would be comfortable with a zero-to-5-year payback timeframe, only two selected payback periods of 10 years or more, and six others were not interested in solar at all. In sum, according to the survey, the tolerance threshold for increasing upfront costs for onsite solar, all-electric construction, and net zero construction is low.

The project team also wanted to use the survey to assess where community values fall as they relate to adopting stricter energy codes. The survey asked, "What's the most important consideration for the City in adopting stricter energy codes for residential and commercial construction?". The results of this question emphasized the need for balance (Figure 11) and reinforced sentiments heard from the other public engagement sessions and shown by the support assessment questions. Overall, the community wants council to carefully consider this ordinance and focus on understanding its potential impacts, rather than rushing to be a leader in the energy code space.

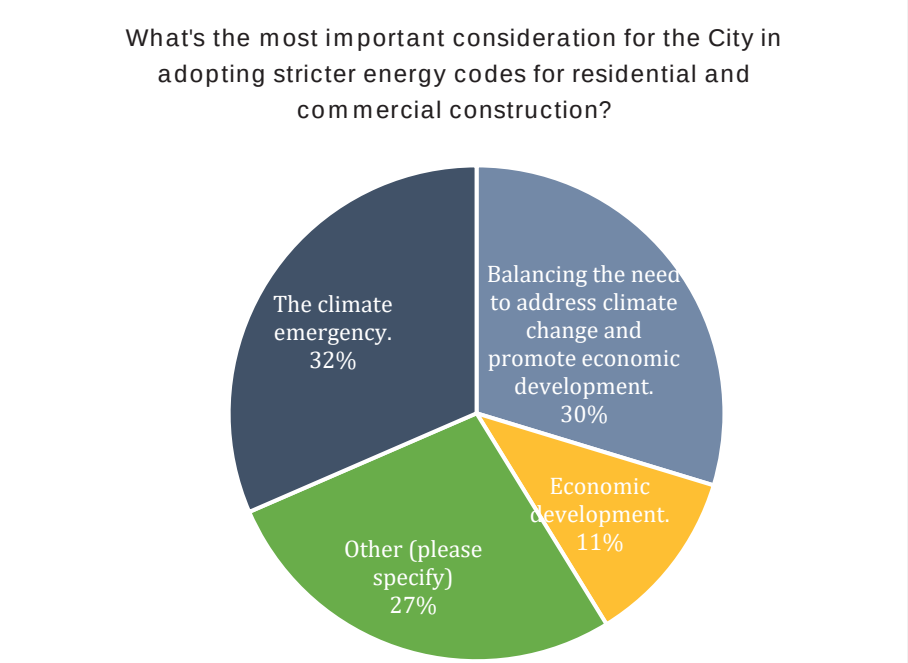


*Figure 11: Percentage breakdown of answers for important considerations for stricter energy code.*

# 4. Conclusion

## 4.1 Final Policy Recommendation

The project team diligently considered the City of Louisville's sustainability goals, the energy modeling and policy research, public feedback, and the estimated GHG impacts of the policies when deliberating a final recommendation for Louisville's energy code. ***Based on a need for balance and feasibility, the project team recommends City Council pursue Policy Option 1: Energy Performance Standards for Building Types.***

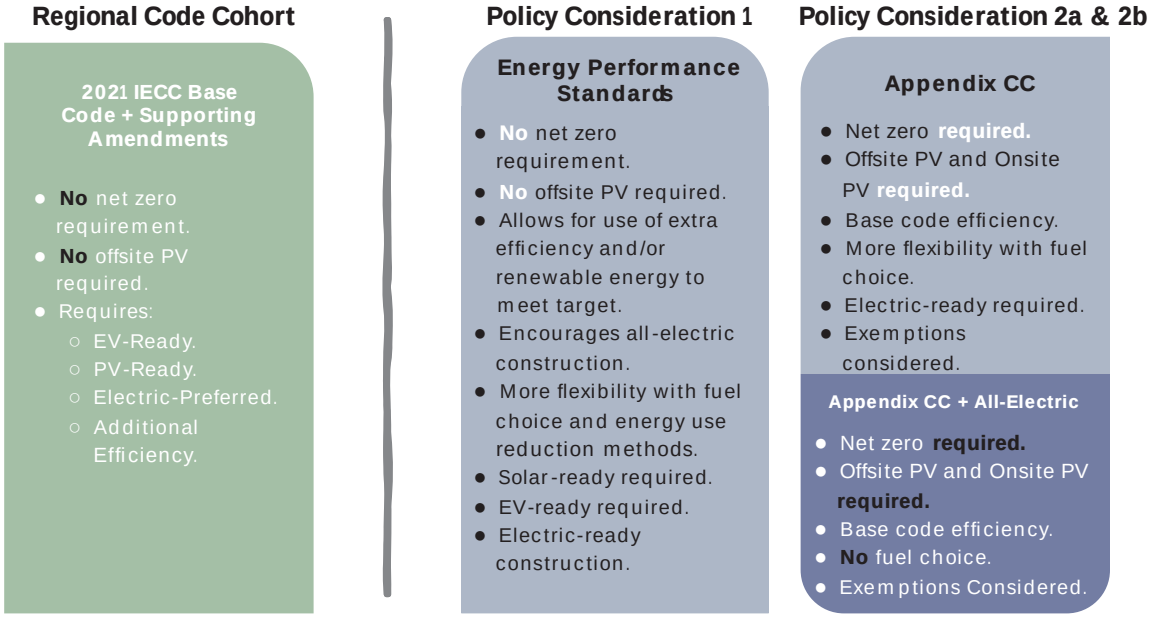


*Figure 12: Summary graphic detailing the features of each policy option.*

Energy performance standards emphasize energy efficiency and result in lower emitting buildings, thus contributing to Louisville's sustainability goals. There is also no net zero or all-electric requirement, which increases feasibility for building owners, and significantly reduces the upfront cost impacts. While all-electric systems are not mandated in this policy option, energy performance goals, via EUI targets, are more easily achieved with all-electric HVAC and plumbing systems than mixed-fuel systems. Therefore, this code option encourages all-electric new construction while still giving developers and owners choice. Additionally, the code option encourages local renewable energy generation because onsite renewable energy installation can help a building owner achieve the energy performance goal. The last advantage to this code option is that exemptions are not necessary. Buildings with heavy energy loads can still pursue energy use reduction via other efficiency measures.

Policy Option 1 does not create as large of a GHG reduction as Policy Options 2A and 2B, since it is a less aggressive code package. However, the annual energy costs of this policy option were generally lower than those in a building compliant with current code, depending on the building type and system installed. Annual energy costs of Policy Options 2A and 2B are generally lower than both current code compliant buildings and buildings modeled with Policy Option 1 requirements, but PV and offsite renewable energy add significant costs. Under Policy Option 1, a building owner could opt to utilize PV, onsite or offsite, if they would like it to contribute to the building's energy performance standard, but only if they deem it financially beneficial. Thus, Policy Option 1 provides more flexibility with the cost burden a building owner is willing to take on.

## 4.2 Future Considerations

The project team and the City recognize that stricter building energy codes alone will not achieve the City of Louisville's energy and climate goals. This section captures ideas that were brought forward throughout the project that the City could consider to further support achieving these goals.

First, public engagement brought many questions about how the code updates will impact existing buildings. Current code language says that an addition, alteration, repair, or renovation must be completed to the most up-to-date code for the scope of work intended (if the scope of the project triggers requirements in the code). Any building components not in the intended scope of work do not need to be brought up to code. The project team recommends that council carefully consider how existing buildings will be impacted by the new commercial construction code, including the cost impacts of the code update they choose to enact on these types of existing building projects. Making additions, alterations, repairs and/or renovations too expensive may encourage a property owner to scrape and rebuild rather than renovate. This would create more embodied carbon and obstruct the City's sustainability efforts. Existing buildings can be used as a climate action strategy if additions, alterations, repairs and/or renovations are allowed to pursue a prescriptive pathway to incremental efficiency improvements. The 2021 building code is more efficient than any previous code cycle and consequently, incremental changes to the existing building stock will still be impactful.

Other policy mechanisms also exist to address the existing building stock, that may be more appropriate than new construction code triggers. Benchmarking and building performance standards stand out as the most pursued policy mechanism to address existing building energy use and GHG emissions. The City of Louisville can look to City of Denver[xiii] or City of Boulder's[xiv] benchmarking programs for examples.

For a more holistic approach to increasing the positive environmental impact of new construction, the City can also look into green building codes and certifications. The International Green Construction Code (IgCC)[xv] and LEED[xvi] certifications are two examples of options that address building sustainability more comprehensively, including requirements topic areas like waste, materials management, water use, land use, and connectivity.

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[i] https://www.ipcc.ch/report/ar6/wg3/resources/press/press-release/

[ii] https://www.louisvilleco.gov/home/showpublisheddocument/25430/637114996226870000

[iii] "Core Municipal GHG Emissions" refers to the total GHG emissions from all municipal activity.

[iv] "Core Community GHG Emissions" refers to the total GHG emissions from the entire City of Louisville including all residential, commercial, and industrial energy consumption.

[v] https://www.louisvilleco.gov/home/showpublisheddocument/28886/637376646025230000

[vi]https://www.mckinsey.com/industries/engineering-construction-and-building-materials/our-insights/call-for-action-seizing-the-decarbonization-opportunity-in-construction

[vii]https://www.google.com/url?q=https://www.louisvilleco.gov/home/showpublisheddocument?id%3D22360&sa=D&source=docs&ust=1660286628507708&usg=AOvVaw1EUGqL2jm5HmMJ3ZUliJzc

[viii] https://bouldercolorado.gov/services/building-performance-ordinance

[ix] https://newbuildings.org/wp-content/uploads/2019/09/ZeroEnergyCommercialBuildingTargets.pdf

[x] https://energyeducation.ca/encyclopedia/Energy_density

[xi] Note, 15-year contracts are not available for Green Retail Tariffs. Green Retail Tariffs can also only be purchased to offset electricity use. Pricing shown here is meant for informative purposes only.

[xii] Note, 15-year contracts are not available for unbundled RECs. Pricing in table reflects REC pricing today.

[xiii]https://www.denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Climate-Action-Sustainability-Resiliency/Goals-and-Policies/Energize-Denver-Benchmarking

[xiv] https://bouldercolorado.gov/services/building-performance-ordinance

[xv]https://codes.iccsafe.org/content/IGCC2021P1/preface#:~:text=The%20IgCC%20is%20a%20model,on%20the%20natural%20environment%20and

[xvi] https://www.usgbc.org/leed

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# ENERGY CODE ANALYSIS – ENERGY MODELING AND POLICY CONSIDERATIONS

6/24/2022

**PREPARED BY:**

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# LIST OF ABBREVIATIONS

| Abbreviation | Definition |
|---|---|
| ACH | Air Changes per Hour |
| BTU | British Thermal Unit |
| CO2 | Carbon Dioxide |
| CSG | Community Solar Garden |
| DHW | Domestic Hot Water |
| DOAS | Dedicated Outdoor Air System |
| ECO | Energy Conservation Opportunity |
| ECM | Energy Conservation Measure (synonymous to ECO) |
| EUI | Energy Utilization Index |
| ERI | Energy Rating Index |
| ERV | Energy Recovery Ventilator |
| EV | Electric Vehicle |
| F | Fahrenheit |
| FCU | Fan Coil Unit |
| FY | Fiscal Year |
| HERS | Home Energy Rating System |
| HSPF | Heating Seasonal Performance Factor |
| HVAC | Heating, Ventilation, and Air-Conditioning |
| HW | Hot Water |
| IECC | International Energy Conservation Code |
| IWG | Inches of Water Gauge |
| kBtu | Thousand British Thermal Units |
| kW | Kilowatt/Thousand Watts |
| kWh | Kilowatt Hour |
| PNNL | Pacific Northwest National Laboratory |
| PV | Photovoltaic |
| SEER | Seasonal Energy Efficiency Ratio |
| SCC | Social Cost of Carbon |
| Sq. Ft., SF | Square Foot |
| TBD | To Be Determined |
| UEF | Uniform Energy Factor |

# 1 INTRODUCTION

## 1.1 Executive Summary

Group14's scope for this report is to evaluate the current energy codes established in the City of Louisville and to provide recommendations for future all-electric and net zero codes to meet the City's carbon reduction goals. To produce this report, Group14 has modeled four different building types:

1. Multifamily building – 42,000 SF
2. Office building – 110,000 SF
3. Commercial development – 90,000 SF
4. Single family home – 2,820 SF

These energy models were created with feedback from the City's planning department as well as average CBECS data for the mountain west region. Each building type is modeled with different HVAC designs which meet the current Louisville energy codes (both Mixed-Fuel and all-electric). Greenhouse gas emissions and net present value analysis is also provided.

In the policy section of this report, all-electric and net zero energy codes from around the country are analyzed. Recommendations are made to push Louisville's energy codes towards all-electric, net zero new construction, while also considering the upcoming IECC code cycles and codes in surrounding counties.

Out energy modeling results show that the all-electric buildings have much lower carbon emissions than mixed fuel buildings but typically have slightly higher annual energy costs. First costs between both the mixed fuel and all-electric designs are similar, due to the current Louisville requirement for all-electric ready new construction. The cost to install the electric infrastructure drives up the cost of the mixed fuel buildings.

# 2 ENERGY MODELING RESULTS

## 2.1 Multifamily Building

The multifamily building modeled is typical of multifamily new construction in the City of Louisville. This design is three stories tall, 42,000 SF, with wood framed walls. The different HVAC system options modeled are:

- Mixed-Fuel options:
  - 1: Packaged terminal heat pumps (9.5 EER and 2.9 COP)
    - Ventilation provided through the unit
    - 95% efficient natural gas water heaters
    - C406 pathway: Efficient fossil fuel water heater, Reduced lighting power
  - 2: Split DX fan coil units (SEER 14) with combined heating and domestic water heating
    - Ventilation provided by exhaust fans running continuously
    - 95% efficient natural gas water heaters
    - C406 pathway: Efficient fossil fuel water heater, Reduced lighting power
  - 3: Split heat pumps (SEER 14, 9.2 HSPF)
    - Ventilation provided by exhaust fans running continuously
    - 95% efficient natural gas water heaters
    - C406 pathway: Efficient fossil fuel water heater, Reduced lighting power
  - 4: Water source heat pumps (13 EER, 4.3 COP)
    - Supplemental 80% efficient boiler
    - Variable speed cooling tower
    - Ventilation provided by exhaust fans running continuously
    - 95% efficient natural gas water heaters
    - C406 pathway: Efficient fossil fuel water heater, Reduced lighting power
- All-Electric Options:
  - 1: Packaged terminal heat pumps (10.0 EER, 3.2 COP)
    - Ventilation provided by exhaust fans running continuously
    - Heat pump domestic water heater with supplementary electric heat (3.0 UEF)
    - C406 pathway: 5% cooling improvement, 10% heating improvement, reduced lighting power, heat pump water heater
  - 2: Split heat pumps (SEER 14.7, 9.0 HSPF)
    - Ventilation provided by exhaust fans running continuously
    - Heat pump domestic water heater with supplementary electric heat (3.0 UEF)
    - C406 pathway: 5% cooling improvement, 10% heating improvement, reduced lighting power, heat pump water heater
  - 3: Water source heat pumps (13.6 EER, 4.3 COP)
    - Supplemental electric boiler
    - Ventilation provided by exhaust fans running continuously
    - Heat pump domestic water heater with supplementary electric heat (3.0 UEF) with condenser water heat recovery
    - C406 pathway: 5% cooling improvement, 10% heating improvement, reduced lighting power, heat pump water heater

All other inputs to the energy models meet the existing Louisville energy code (2021 IECC with amendments), including insulation and glazing values. The options comply with the code via the prescriptive path, which includes compliance with Section C406. Each design reflects the most cost-effective compliance pathway. All energy

modeling for the multifamily building assumer commercial utility rates – the building is on a master electrical utility meter with submeters serving each unit.

| Multifamily - System Type | *Annual Energy Cost* | *First Cost* | *Annual Energy Cost with PV Required for Net Zero Energy* | *First Cost with PV Required for Net Zero Energy* |
|---|---|---|---|---|
| **Mixed Fuel Option1** | $40,785 | $157,321 | $4,329 | $1,001,660 |
| **Mixed Fuel Option 2** | $25,230 | $278,321 | $8,461 | $1,190,470 |
| **Mixed Fuel Option 3** | $38,038 | $267,321 | $4,131 | $1,024,164 |
| **Mixed Fuel Option 4** | $27,071 | $459,821 | $7,578 | $1,352,283 |
| **All-Electric Option1** | $40,383 | $135,000 | $13,924 | $725,600 |
| **All-Electric Option 2** | $40,601 | $245,000 | $14,667 | $823,897 |
| **All-Electric Option 3** | $28,431 | $437,500 | $5,873 | $941,024 |

The first cost analysis for the multifamily building show that the mixed fuel options are similar first costs to the all-electric option due to the electric-ready infrastructure required under the current Louisville energy code.

Our energy modeling results show that the multifamily buildings with gas heating have lower annual energy costs than those that are all-electric. When photovoltaics are considered to make the buildings net zero, however, we found that the all-electric options require less PV and have a positive net present value. This positive net present value is calculated over a period of 20 years, with a 3% energy escalation rate. Each net present value option is evaluated against Mixed Fuel Option 1. A positive net present value means that the investment in the estimated initial construction investment is paid off before the end of the 20-year period.

| Multifamily | *PV Size Required for Net Zero Energy (kW)* |
|---|---|
| **Mixed Fuel Option1** | 338 |
| **Mixed Fuel Option 2** | 365 |
| **Mixed Fuel Option 3** | 303 |
| **Mixed Fuel Option 4** | 357 |
| **All-Electric Option1** | 236 |
| **All-Electric Option 2** | 232 |

| | |
|---|---|
| **All-Electric Option 3** | 201 |

| Multifamily | Payback, No PV Included (years) | Payback, Net Zero (years) |
|---|---|---|
| **Mixed Fuel Option1** | | |
| **Mixed Fuel Option 2** | 9 | >50 |
| **Mixed Fuel Option 3** | >50 | >50 |
| **Mixed Fuel Option 4** | 37 | >50 |
| **All-Electric Option1** | 1 | 1 |
| **All-Electric Option 2** | >50 | 1 |
| **All-Electric Option 3** | 39 | 1 |

Another important note is the greenhouse gas emissions created by each system type. Using NREL's Cambium tool, Group14 calculated the hourly greenhouse gas emissions throughout the year based on the average emissions expected in the entire State of Colorado. With Xcel Energy's goal to be 79% carbon neutral by 2035, we expect that the greenhouse gas emissions of these design options will be much lower in 2035, rather than the values shown in our analysis.

Without PV, the mixed fuel options have average emissions of 170,000 lbs CO2 in 2022 as compared to 110,000 lbs CO2 for the all-electric options. In 2035, the average carbon emissions drop to 95,000 lbs CO2 for the mixed fuel options and 67,000 lbs CO2 for the all-electric options.

## 2.2 Office Building

The office building is a 110,000 SF, 3-story building with metal-framed walls and is 40% glazed. To select the size of this building, we used information from the 2018 CBECS data for the average size of an office building in the mountain west region. The different HVAC options modeled are as follows:

- Mixed-Fuel options:
    - 1: Packaged VAV with hot water reheat (10.3 EER)
        - Condensing boilers (94% efficient)
        - 80% efficient natural gas water heaters
        - C406 pathway: 5% cooling efficiency improvement, reduced lighting power
    - 2: Packaged VAV with gas heat and electric reheat (10.3 EER)
        - 80% efficient natural gas water heater
        - C406 pathway: 5% cooling efficiency improvement, reduced lighting power

    - 3: Four pipe fan coil units
        - Ventilation is provided by a DOAS with gas heat and DX cooling (80% efficient and 9.8 EER, 3.3 COP)
        - Chilled water is provided by air cooled chiller (9.7 FL | 16.1 IPLV)
        - Heating water is provided by 94% efficient central boilers
        - 80% efficient natural gas water heater
        - C406 pathway: Dedicated outdoor air system, reduced lighting power

- All Electric Options:

    - 1: Packaged VAV with heat pump and electric reheat (10.3 EER)
        - Energy recovery ventilation (0.5 effectiveness)
        - Electric water heating
        - C406 pathway: 5% cooling efficiency improvement, reduced lighting power

    - 2: Water source heat pumps (13 EER, 4.3 COP)
        - Condenser water loop is served by variable speed cooling tower and electric boiler
        - Ventilation is provided by a heat pump DOAS (9.8 EER, 3.3 COP)
        - Energy recovery ventilation (0.5 effectiveness)
        - Electric water heating
        - C406 pathway: Dedicated outdoor air system, reduced lighting power

    - 3: Variable refrigerant flow (SEER 13, 7.7 HSPF)
        - Ventilation is provided by a heat pump DOAS (9.8 EER, 3.3 COP)
        - Energy recovery ventilation (0.5 effectiveness)
        - Electric water heating
        - C406 pathway: Dedicated outdoor air system, reduced lighting power

    - 4: Two pipe fan coil units with chilled water cooling and electric heating coils
        - Ventilation is provided by a DOAS with gas heat and DX cooling (80% efficient and 9.8 EER, 3.3 COP) with energy recovery ventilation (0.5 effectiveness)
        - Chilled water is provided by air cooled chiller (9.7 FL | 16.1 IPLV)
        - Electric water heating
        - C406 pathway: Dedicated outdoor air system, reduced lighting power

Our analysis of the different office buildings shows that the annual energy costs of an all-electric office building are comparative to that of a Mixed-Fuel building. Heating energy use in offices is relatively small and is primarily for heating outdoor air for ventilation.

| Office - System Type | *Annual Energy Cost* | *First Cost* | *Annual Energy Cost with PV Required for Net Zero Energy* | *First Cost with PV Required for Net Zero Energy* |
|---|---|---|---|---|
| **Mixed Fuel Option 1** | $104,604 | $2,327,633 | $23,730 | $4,132,873 |
| **Mixed Fuel Option 2** | $135,278 | $1,786,323 | $48,276 | $3,728,323 |
| **Mixed Fuel Option 3** | $95,077 | $4,492,873 | $8,835 | $6,423,932 |
| **All-Electric Option 1** | $131,993 | $1,948,716 | $47,442 | $3,836,012 |
| **All-Electric Option 2** | $90,551 | $3,789,170 | $29,616 | $5,149,336 |
| **All-Electric Option 3** | $94,324 | $3,464,384 | $30,850 | $4,881,224 |
| **All-Electric Option 4** | $103,660 | $4,005,694 | $38,960 | $5,449,886 |

The predicted energy use of the modeled office buildings is lower than actual building performance due to how office buildings are operated. Often, building owners will increase the operational hours of their building for cleaning crews or early/late workers, and even operate them 24/7 to maintain a single zone at a prescribed temperature. The analysis assumes a standard 7 AM – 6 PM, Monday through Friday, occupancy schedule. In addition, control settings are often overridden to limit economizer operation and hold the supply air temperature at 50-55 F rather than allowing the supply temperature to reset upwards when the outside air is cooler.

To meet net zero, the photovoltaic systems sizes predicted are too large to fit on the roof of the example building. The buildings would be required to purchase off-site PV to fully offset the building's energy use.

| Office | *PV Size Required for Net Zero Energy (kW)* | *Estimated PV Area (SF)* |
|---|---|---|
| **Mixed Fuel Option 1** | 722 | 103,157 |
| **Mixed Fuel Option 2** | 777 | 110,971 |
| **Mixed Fuel Option 3** | 772 | 110,346 |
| **All-Electric Option 1** | 755 | 107,845 |
| **All-Electric Option 2** | 544 | 77,724 |
| **All-Electric Option 3** | 567 | 80,962 |
| **All-Electric Option 4** | 578 | 82,525 |

The net present value analysis for the office buildings shows that the buildings will not pay back within the expected life of the equipment for most of the options. Each net present value option is evaluated against Mixed Fuel Option 1. The two most cost-effective options, Mixed-Fuel options 1 and 2 without PV, are the cheapest first cost options that were analyzed, as expected. With PV, Mixed Fuel Option 2 and All-Electric Option 1 are more cost-effective than Mixed Fuel Option 1.

| Office | Payback, No PV Included (years) | Payback, Net Zero (years) |
|---|---|---|
| **Mixed Fuel Option 1** | | |
| **Mixed Fuel Option 2** | 1 | 1 |
| **Mixed Fuel Option 3** | >50 | >50 |
| **All-Electric Option 1** | 1 | 1 |
| **All-Electric Option 2** | >50 | >50 |
| **All-Electric Option 3** | >50 | >50 |
| **All-Electric Option 4** | >50 | >50 |

The carbon emissions analysis shows that the all-electric designs show much lower emissions than the Mixed-Fuel options. In 2022, the mixed-fuel buildings have an average carbon emissions of 380,000 lbs CO2. In 2035, they have a predicted emissions of 215,000 lbs CO2. The all-electric buildings have an average carbon emissions of 315,000 lbs CO2 in 2022 and 170,000 lbs CO2 in 2035.

## 2.3 Commercial Development

The commercial development is assumed to be a strip mall with two food service anchors – a café and a quick-service restaurant. The building is 90.000 SF with concrete block walls and is one story. The building size was determined via the 2018 CBECS data for the mountain west region. The different HVAC options modeled are as follows:

- Mixed-Fuel options:
    - 1: Packaged single-zone rooftop units with DX cooling (SEER 14) and gas heat (80% efficient)
        - Café and food service: 80% efficient natural gas water heaters
        - Retail: electric water heating
        - C406 pathway: Reduced lighting power
    - 2: Packaged single-zone rooftop units with heat pump and back-up electric heat (SEER 14, 8.0 HSPF)
        - Café and food service: 80% efficient natural gas water heaters
        - Retail: electric water heating
        - C406 pathway: Reduced lighting power

  - 3: Packaged variable volume single-zone rooftop units with DX cooling (SEER 14) and gas heat (80% efficient)
    - Café and food service: 80% efficient natural gas water heaters
    - Retail: electric water heating
    - C406 pathway: Reduced lighting power

- All-Electric Options:
  - 1: Packaged single-zone rooftop units with heat pump and back-up electric heat (SEER 14, 8.0 HSPF)
    - Energy recovery ventilation (0.5 effectiveness)
    - Electric water heating
    - C406 pathway: Reduced lighting power
  - 2: Packaged single zone rooftop units with heat pump and back-up electric heat (SEER 14, 8.0 HSPF)
    - Energy recovery ventilation (0.5 effectiveness)
    - Electric water heating
    - C406 pathway: Reduced lighting power
  - 3: Water source heat pumps (13 EER, 4.3 COP)
    - Loop is served by electric boiler and variable speed cooling tower
    - Ventilation is provided by a heat pump DOAS (9.8 EER, 3.3 COP) with energy recovery ventilation (0.5 effectiveness)
    - Café and food service: Electric water heating
    - Retail: electric water heating
    - C406 pathway: Reduced lighting power

In the commercial development models, due to the high service water heating and plug load requirements, the annual energy costs of the mixed fuel buildings are, on average, slightly lower than the all-electric energy costs.

| Commercial Development - System Type | *Annual Energy Cost* | *First Cost* | *Annual Energy Cost with PV Required for Net Zero Energy* | *First Cost with PV Required for Net Zero Energy* |
|---|---|---|---|---|
| **Mixed Fuel Option 1** | $164,492 | $570,500 | $23,730 | $4,923,423 |
| **Mixed Fuel Option 2** | $182,683 | $456,000 | $48,276 | $4,366,330 |
| **Mixed Fuel Option 3** | $158,096 | $630,500 | $8,835 | $4,545,393 |
| **All-Electric Option 1** | $193,161 | $660,000 | $47,442 | $4,282,873 |
| **All-Electric Option 2** | $185,053 | $708,000 | $29,616 | $4,130,109 |
| **All-Electric Option 3** | $156,491 | $3,167,500 | $30,850 | $6,060,323 |

The high internal loads drive up the amount of PV energy required to make the building net zero energy. The predicted size of the PV systems will not fit on the roof of the building off-site PV would need to be purchased to achieve net zero energy.

| Commercial Development | *PV Size Required for Net Zero Energy (kW)* | *Estimated PV Area (SF)* |
|---|---|---|
| **Mixed Fuel Option 1** | 1741 | 248,738 |
| **Mixed Fuel Option 2** | 1564 | 223,447 |
| **Mixed Fuel Option 3** | 1566 | 223,708 |
| **All-Electric Option 1** | 1449 | 207,021 |
| **All-Electric Option 2** | 1369 | 195,549 |
| **All-Electric Option 3** | 1157 | 165,304 |

While the net present value of the options without renewables is mostly negative, the net present value of the designs including renewables is mostly positive. Each net present value option is evaluated against Mixed Fuel Option 1. This assumes that the building will be paid for all of the electricity generated by the PV. However, as noted, the buildings do not have space for all of the onsite solar. Systems of this size are not often available in community solar gardens. With Xcel Energy's goal of net zero energy production by 2035, the requirement for photovoltaics to offset energy use would be greatly reduced in the coming years, as the electricity provided to these buildings moves closer to meeting the net zero carbon emissions goal.

| Commercial Development | Payback, No PV Included (years) | Payback, Net Zero (years) |
|---|---|---|
| **Mixed Fuel Option 1** | | |
| **Mixed Fuel Option 2** | 1 | 1 |
| **Mixed Fuel Option 3** | 12 | 1 |
| **All-Electric Option 1** | >50 | 1 |
| **All-Electric Option 2** | >50 | 1 |
| **All-Electric Option 3** | >50 | >50 |

The carbon emissions analysis, like those above, show that carbon emissions for the all-electric buildings are much lower than those of the mixed fuel buildings. This is due to the high amount of service water required by the food service tenants. The average emissions for a mixed-fuel retail building in 2022 is 850,000 lbs C02. In 2035,

the mixed-fuel buildings are expected to have an average emissions of 470,000 lbs CO2. The all-electric design options have an expected average emissions of 680,000 lbs CO2 in 2022 and 380,000 lbs C02 in 2035.

## 2.4 Single-Family Home

The single-family home is a 2,820 SF 2-story home with a finished basement. The different HVAC options modeled are as follows:

- Mixed-Fuel options:
  - 1: 96% efficient gas furnace with SEER 16 split DX cooling
    - 0.92 UEF water heater
  - 2: Split heat pump with back-up gas heat (SEER 16, HSPF 10, 96% efficient gas back-up)
    - 0.92 UEF water heater
- All Electric Options:
  - 1: Split heat pump with back-up gas heat (SEER 16, HSPF 10, 96% efficient gas back-up)
    - 3.0 UEF heat pump water heater with supplementary electric resistance heat
  - 2: Ground source heat pump (18 EER, 3.7 COP)
    - 3.0 UEF heat pump water heater with supplementary electric resistance heat
- Appendix RC Options
  - Mixed Fuel Option: 96% efficient furnace with SEER 21 cooling
    - 0.94 UEF water heater
  - All-Electric Option: Cold climate heat pump
    - 3.48 UEF heat pump water heater

In our analysis of the single-family home options, we found that the annual energy costs of the all-electric homes are only slightly higher than the lowest cost option. This is due to the highly efficient and cost-effective all-electric design options available to residential consumers. The design options compliant with Appendix RC have the lowest annual energy costs.

| Single-Family Home - System Type | *Annual Energy Cost* | *First Cost* | *Annual Energy Cost with PV Required for Net Zero Energy* | *First Cost with PV Required for Net Zero Energy* |
|---|---|---|---|---|
| **Mixed Fuel Option 1** | $2,375 | $4,040 | $386 | $51,775 |
| **Mixed Fuel Option 2** | $2,388 | $4,540 | $371 | $51,135 |
| **All-Electric Option 1** | $2,511 | $3,255 | $966 | $37,738 |
| **All-Electric Option 2** | $2,026 | $22,405 | $807 | $49,621 |

| | | | | |
|---|---|---|---|---|
| **Mixed Fuel Option - Appendix RC** | $1,946 | 19805 | $302 | $61,128 |
| **All-Electric Option - Appendix RC** | $1,795 | 21750 | $519 | $50,249 |

The PV system sizes required for each option are shown below. The all-electric options require the smallest PV sizes to reach net zero energy. The mixed-fuel system options and the Appendix RC compliant mixed-fuel system option require a much larger PV size when compared to the all-electric system options.

| Single-Family Home | *PV Size Required for Net Zero Energy (kW)* |
|---|---|
| **Mixed Fuel Option 1** | 19 |
| **Mixed Fuel Option 2** | 19 |
| **All-Electric Option 1** | 14 |
| **All-Electric Option 2** | 11 |
| **Mixed Fuel Option - Appendix RC** | 17 |
| **All-Electric Option - Appendix RC** | 11 |

To achieve net zero energy, the PV will only fit on a home that has optimal sun exposure and a large enough roof to fit the PV. This will not be feasible on most homes, which will require enrollment in a community solar program to meet the net zero requirement. COSSA has stated that there will be enough community solar available for homeowners in the City of Louisville. The cost of community solar will not increase utility bills or have an enrollment cost.

| Single-Family Home | Payback, No PV Included (years) | Payback, Net Zero (years) |
|---|---|---|
| **Mixed Fuel Option 1** | | |
| **Mixed Fuel Option 2** | >50 | 1 |
| **All-Electric Option 1** | 1 | 1 |
| **All-Electric Option 2** | >50 | 1 |
| **Mixed Fuel Option - Appendix RC** | >50 | >50 |

| | | |
|---|---|---|
| **All-Electric Option - Appendix RC** | >50 | 1 |

The net present value analysis shows that most of the options have a negative net present value without on-site PV. Each net present value option is evaluated against Mixed Fuel Option 1. This means that the systems will not pay back within the system life span, mainly due to the high cost of electricity in comparison to the mixed fuel baseline. When on-site PV is added, however, the net present values become positive, meaning they will pay back before the end of the 20-year analysis period.

Consistent with the analysis above, the carbon emissions of the all-electric options have much lower greenhouse gas emissions than the Mixed-Fuel options. The design option compliant with Appendix RC that has natural gas use has more carbon emissions than the all-electric new construction options that do not comply with Appendix RC. The average carbon emissions of the mixed-fuel options is 9,000 lbs $CO_2$ in 2022 and 5,000 lbs $CO_2$ in 2035. The all-electric options have an estimated average carbon emissions of 6,000 lbs $CO_2$ in 2022 and 3,500 lbs in 2035.

# 3 POLICY CONSIDERATIONS

Across the country, from Seattle to Boston, cities are establishing building energy codes to reduce carbon emissions for new construction. The City of Louisville has a goal to create a new construction energy code that will set them on a path towards net zero energy buildings. Louisville's current amendments to the 2021 IECC require some additional energy savings and all-electric ready construction items:

**Commercial New Construction**

- Increased insulation levels
- Increased fenestration efficiency requirements
- Increased HVAC efficiency
- Electric vehicle charging and infrastructure
- Electric-ready wherever gas appliances are installed
- Solar-ready zone required

**Residential New Construction**

- Increased insulation levels
- Increased ductwork and piping insulation requirements
- Mandatory heat recovery
- Electric vehicle charging and infrastructure
- Electric-ready wherever gas appliances are installed
- Net zero Appendix RC required

To further increase the energy savings and carbon reduction potential of Louisville's energy code, this report discusses different advanced energy codes across the country and makes recommendations on the future cycles of Louisville's energy code development.

**Background**

Throughout California, multiple cities require all-electric new construction. In colder climate zones, such as Boston and New York City, jurisdictions have adopted their states' optional stretch codes. These codes require additional energy savings such as mandatory energy recovery, electric vehicle charging, or in some cases a net zero new construction provision that requires electric-ready new construction.

In Colorado, a new bill (HB 22-1362) recently passed that requires jurisdictions to update their energy code to the 2021 version of the IECC when one or more of their building codes are updated. Beginning in July 2023, jurisdictions will also be required to adopt electric and solar-ready requirements and begin enforcing a low energy and carbon code when one or more of their building codes are updated. This sets a great precedent for increasing the energy efficiency requirements of Louisville's energy code.

In the 2021 IECC, there are two appendices, Appendix CC and RC which require net zero commercial and residential new construction, respectively. Appendix CC gives two options for net zero new construction: 1- for buildings complying with the prescriptive pathway energy use intensities are established for each building type and must be offset by either on-site or off-site renewables, or 2- for buildings complying with the performance pathway, they must offset their predicted energy use shown by an energy model with on-site or off-site renewables. Appendix RC, which is currently adopted by the City of Louisville, requires that new construction homes have an ERI rating of 47 or less and the predicted energy use must be offset by on-site or off-site renewables.

Another code to consider in this discussion is Boulder's energy code. In this code, buildings with an estimated construction cost of $500,000 or greater are required to comply with the performance path. This path prescribes maximum Energy Use Intensities (EUIs) that the building design must meet, shown through an energy model. After construction, building owners must reserve funds in escrow to cover the cost to reduce the building's energy use if the building does not meet the maximum allowed EUI.

In addition to these existing codes, there are amendments to the 2024 IECC that have passed preliminary committee approval which will further increase the energy savings of the base code. The all-electric-ready new construction amendment requires that anytime a natural gas appliance will be installed that appropriately sized electric infrastructure will be installed to accommodate a future electrical appliance. The on-site renewable energy amendment will require 0.75 W/sf gross floor area, not to exceed the combined gross conditioned floor area of the three largest floors on all new-construction commercial buildings. These addendums to the 2024 IECC will reduce the carbon emissions of new construction buildings and will encourage all-electric new construction. The IECC will continue to push towards net zero new construction with each code cycle, which will provide a framework for jurisdictions also hoping to require net zero new construction.

There are hurdles to providing all-electric new construction for commercial buildings. In comparison to all-electric space heating and domestic water heating, annual heating costs with natural gas are lower. In Louisville's climate specifically, we find that heat pump systems will have to utilize electric resistance heating during very cold times, further driving up annual energy costs. Additionally, demand response controls for reducing peak energy use and costs are not yet widely supported by Xcel Energy in large commercial buildings. We expect that this hurdle will be overcome in the coming years.

In addition to these climate and utility hurdles, we have found that industrial, laboratory, and manufacturing buildings all have systems that currently cannot be electrified. In Louisville there are major food, machinery, and plastics manufacturers, with specialized processes that use natural gas and cannot currently be replicated with electricity. In the energy codes discussed above, these processes are exempt from the electrification requirement, including the all-electric ready new construction requirement.

Resiliency is another factor to consider in this decision-making process. The Marshall Fire has highlighted concerns on how to make sure Louisville is a safe, resilient place to live and work. Through the energy codes, resiliency can be increased by requiring on-site solar and peak shifting controls to reduce demand and therefore peak loads on the grid.

**Considerations**

For the City of Louisville, we are recommending three different pathways for commercial energy code adoption:

- Option 1: Require all-electric-ready new construction as an addendum to the 2021 IECC, with on-site or off-site PV required to match the 2024 IECC on-site renewable amendment.
- Option 2: Require projects above a certain construction cost (or size) to meet a maximum-allowed EUI that is low enough that an all-electric design will comply more easily than a Mixed-Fuel building. Provide a prescriptive pathway that requires an equivalent amount of energy efficiency as the performance pathway. All new construction will be required to be electric-ready.
- Option 3: Require all-electric ready, net-zero new construction for all buildings and utilize Appendix CC from the 2021 IECC for buildings that do not pursue the performance path for compliance.
- Option 3B: Require all-electric net zero new construction for all buildings and utilize Appendix CC from the 2021 IECC for buildings that do not pursue the performance path for compliance.

For residential energy code adoption, Louisville has already adopted Appendix RC as a mandatory measure for all new construction buildings. Our recommendation is to amend Appendix RC to allow HERS ratings in lieu of ERI scores. This appendix maintains that buildings can comply with the code with or without natural gas; however, the appendix greatly incentivizes all-electric new construction to meet the energy scores calculated during design. Appendix RC also requires homes to offset their energy use with on-site or off-site renewables.

Discussion

**Option 1**

This option, seen as the least stringent of the three policies listed above, also requires the least number of amendments for the City of Louisville. This simple code can easily be automatically updated as each new version of the IECC is released.

This code would have the following main items:

- 2021 IECC adopted as the base code (currently adopted in Louisville)
- Electric vehicle charging and electric vehicle ready spaces amended (currently adopted in Louisville)
- All-electric or all-electric ready construction required (currently adopted in Louisville)
- On-site or off-site PV required to match the amendment to the 2024 IECC, alternatively, PV could be provided as required to offset any carbon emissions by natural gas systems used on site.
- Automatic update to the newest version of the IECC upon release

There are many benefits to this code pathway – primarily that the energy code for Louisville will continue to be updated as the code is updated. This also allows for engineers, architects, and building owners to navigate code updates and expectations.

**Option 2**

In this option, Louisville would use the City of Boulder's Energy Code as a framework for their efficiency code. Boulder's code has additional energy efficiency requirements above the 2018 IECC base code and is estimated to provide 20% additional energy efficiency. The additional energy savings are through mandatory and prescriptive compliance items such as:

- Air barrier testing
- Additional insulation levels
- Additional HVAC controls
- Reduced lighting power densities and additional lighting controls
- Electric vehicle charging
- Solar-ready zone
- Site energy Use Intensity (EUI) targets for the performance pathway

There are many benefits to aligning Louisville's energy code with the City of Boulder. Firstly, creating a unified energy code throughout the area would be beneficial for potential building owners and developers. A consistent energy code will set expectations and establish cost estimates and investments for new construction in the region. In addition, the EUI approach simplifies performance modeling by eliminating a baseline model to compare to.

If Louisville wishes to create a similar code based on the 2021 IECC, analysis could be performed to customize a set of EUIs for performance compliance. City of Boulder mandatory measures could be adopted along with additional mandatory measures, including:

Electric vehicle charging and electric vehicle ready spaces amended (currently adopted in Louisville)

All-electric or all-electric ready construction required (currently adopted in Louisville)

Along with this approach, all-electric buildings could be provided with a simpler path to code compliance and mixed-fuel buildings could require additional energy savings to above the base code to show compliance. For example, an all-electric building would solely have to meet the mandatory requirements in the base code,

however a mixed-fuel building would have to show 10% additional energy savings above the base code. This encourages designers and owners to build all-electric buildings without requiring all-electric new construction for all buildings.

The code maximum EUIs would be difficult to achieve via a Mixed-Fuel building and easier to meet for an all-electric building. As seen in our energy modeling results, the all-electric buildings that comply with Louisville's current energy code have lower energy use intensities than their mixed-use equivalents.

In this pathway, industrial and laboratory occupancies would use a traditional performance modeling compliance pathway and show energy savings. This allows industrial and laboratory occupancies to exclude process energy use from the energy savings calculation, including those processes that utilize natural gas. This results in energy-efficient envelope, lighting and HVAC systems having to offset increased heating and cooling loads from the process equipment.

In addition to this pathway, we recommend that on-site PV is incentivized by Louisville for buildings where PV is best suited, for example buildings with large, open roof spaces and sites that are optimized for solar production. Xcel Energy is targeting 2035 for zero carbon electricity production. There are benefits to buildings with on-site photovoltaics; however, utility-scale photovoltaics are generally better maintained than smaller systems.

**Option 3**

Under this option, Appendix CC of the 2021 IECC would be made mandatory for new construction commercial buildings. This appendix requires that buildings complying prescriptively provide a set amount of photovoltaics to offset their building's energy use based on their occupancy type. Performance compliance pathways are required to offset their building's estimated energy use shown through an energy model. This net zero requirement can be met through on-site or off-site photovoltaics.

The benefit to this pathway is that the Appendix will continue to be updated to be more effective at each iteration of code amendments at the national level until, hopefully, it is codified in the energy code. While this pathway is the most energy efficient and effective at reducing operational carbon, net zero construction has the highest first cost of all three pathways. The pathway also needs a post-construction performance assessment, such as benchmarking, to confirm net-zero achievement.

**Option 3B**

Under this option, Appendix CC of the 2021 IECC would be mandatory, with an additional requirement for all-electric new construction. No combustion systems would be allowed, except for the following occupancy types:

- Industrial
- Laboratories
- Manufacturing

In these building types, HVAC and plumbing systems would be required to be all-electric, however processes requiring natural gas would not be. For example, a steam industrial process that requires a large amount of steam would not be required to be electrified.

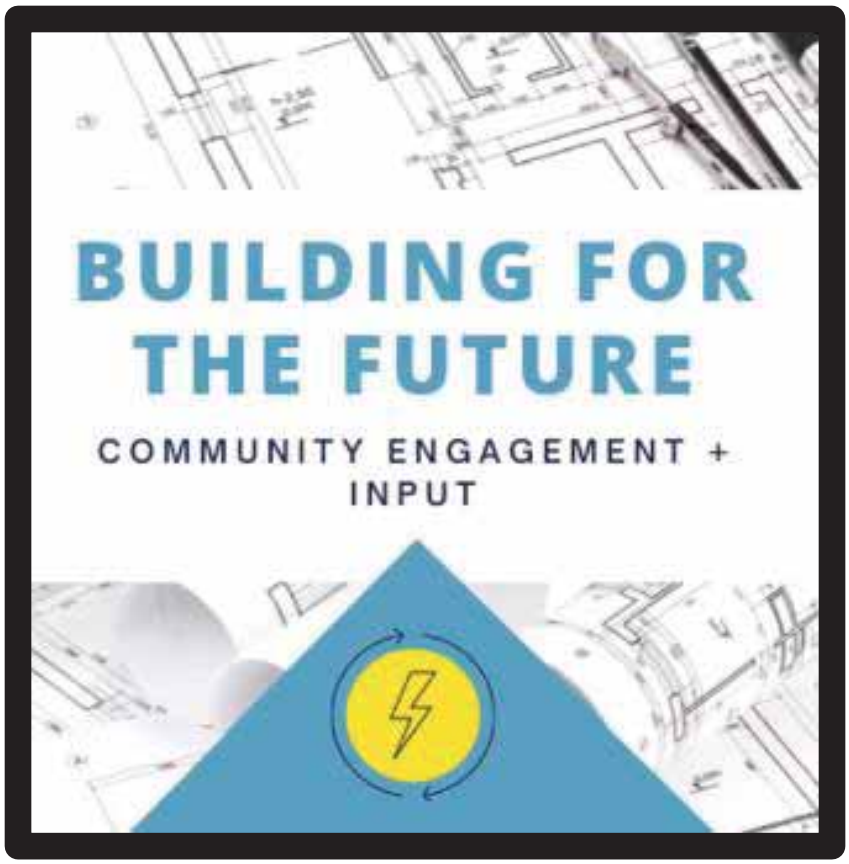
**Future Work**

Based on the desired pathway that City Council selects for their energy code, future work will include development of a set of mandatory, prescriptive, and performance measures to ensure that each pathway provides equivalent levels of energy efficiency requirements. Additional work is needed to ensure that resiliency considerations are made for renewable energy systems required, including battery back-up for both peak shifting and emergency power when possible. Any prescriptive pathway set by the city should encourage all-electric new construction and reduce use of natural gas.

# 4 CONCLUSION

The City of Louisville goals to reduce energy use and greenhouse gas emissions are important steps in addressing our climate crisis. Louisville relies on Xcel Energy for their electricity. Xcel Energy's goal to deliver carbon-free electricity by 2035 is realistic and results in Louisville having access to much cleaner power than the power provided to the rest of the state. Our recommendation is to leverage Xcel Energy's goal to deliver carbon-free electricity by 2035, and focus the energy code on energy efficiency, all-electric buildings, and renewables to offset gas use.

Louisville is surrounded by other counties that also have goals to reduce emissions and increase the efficiency required by the energy code. Creating an energy code that is similar and consistent across the region lets business developers and homeowners know what to expect when looking for a place to build, and helps contractors and engineers find the most cost-effective and energy efficient ways to meet the code. This will improve the efficiency of commercial and residential buildings across the region and encourage designers to find the most cost-effective solutions to the code.




# City of Louisville Energy Code Update

# Public Engagement Summary

August 2022

LOTUS Engineering & Sustainability

City of Louisville

# Background

In 2021, the City of Louisville adopted the 2021 International Energy Conservation Code (IECC) with specific amendments that included more stringent efficiency requirements, and a requirement for electric-readiness and EV-readiness for all new construction. The City also adopted the Zero Energy Appendix (Appendix RC) that requires net zero energy construction for all new single-family homes in the City.

Now, the City is considering additional code options that would encourage higher efficiency, net zero, and/or all electric for multi-family and commercial new construction. Energy modeling was conducted to evaluate the City's current energy codes and other code development options. The modeling also investigated the up-front cost, annual cost, and lifetime cost of building to the new potential standards.

**Public input is critical to the investigation and development of these new multi-family and commercial code options.** Code changes impact multiple sectors of the community, from building developers to businesses to tenants and homeowners. City staff engaged the broader public through an online survey and two community meetings. In addition, the City staff engaged with two of the City's boards, the Louisville Sustainability Advisory Board, and the Building Code Board of Appeals, to present code options for feedback. The feedback received from this outreach will support City staff in identifying unforeseen barriers or challenges with new building code policy and will help inform where the opportunity is to drive more efficiency and climate protection in the building code.

# City of Louisville Energy Code Update Public Engagement Survey

## Survey Methodology

The survey questions were designed with the goal of capturing feedback and assessing support levels for potential code options for the Louisville community, as well as to gain an understanding of the perceived impacts of the code update. This was gathered through a combination of multiple choice and open-ended response questions. The open-ended questions were included to give respondents sufficient opportunity to provide comments. Demographics information was collected to understand what sectors and communities responded to the survey, and which might require additional outreach. Choice logic was used to tailor questions to three main groups: Group 1, Building Owners/Developers, Group 2, Business and Tradespersons, and Group 3, Residential. The survey was designed using SurveyMonkey software and was distributed via publication on the EngageLouisville

website, email listservs, and advertised during the two community meetings. The survey was open from June 27, 2022 to August 5, 2022.

Results of the survey were analyzed to find and remove duplicate responses and to determine whether incomplete responses should be included. Multiple choice question results were summarized and converted into sector-specific charts. Open-ended responses were categorized and summarized.

## SURVEY RESULTS

| Key Takeaways | |
|---|---|
| The survey had a total of 206 responses.<br>*Note: the total number of answers per question may vary from the total number of respondents due to incomplete surveys.* | |
| Nearly ¾ of survey takers were homeowners, with the remaining ¼ representing building owners and industry professionals. | |
| Generally, survey takers tended to lean toward opposing each of the code policy considerations. However, the number of survey takers who supported each of the code policy considerations was still significant. | |
| Survey takers perceived the largest barriers to energy code updates to be additional cost burdens and creating a hostile environment for businesses. | |
| Survey takers saw the largest benefits to energy code updates to be greenhouse gas reductions and public health improvements (i.e., air quality). | |
| Survey takers expressed themselves in a wide variety of open responses. Some expressed staunch support for code updates, others expressed staunch opposition. A few of these comments are highlighted below. | |
| Example responses from those opposing the energy code updates: | Example responses from those supporting the energy code updates: |
| "Louisville is already not attracting new businesses like surrounding communities are. I want a vibrant economy here and I want to help businesses, not create barriers." | "If we work together (industry and government) to GREATLY reduce the GHG emissions of homes and buildings in the Denver metropolitan area, then we have addressed one of the largest sectors of emissions in CO. This would give upcoming generations a foothold to fight the omnipresent climate crisis. We must invest NOW to help future generations, it's not about us." |

| | |
|---|---|
| "Cost. I am supportive of #'s 21-24, but I think the considerations need a very careful approach with financial implications well laid out in either case studies or similar programs in the U.S. Its tough to for a smaller town, like Louisville, to be on the bleeding edge of the change without a City like Denver helping to lead the way." | "Commercial buildings consume large quantities of power - often 24/7. Since they consume large amounts of power, addressing their electricity consumption should have a real benefit from a climate change perspective." |
| "1) Addressing climate change while promoting economic development is a prime concern. 2) However, many people will not be able to afford the upgrades!" | "While the impacts to the environment are obvious, I think what these codes can represent is the start of a workforce that is trained in building to higher standards. Codes like these are the future of buildings and it has to start somewhere, so let's start that here!" |

## DEMOGRAPHICS

The survey asked for race/ethnicity, sector represented, and whether the respondent lives and/or works in the City of Louisville.

### RACE/ETHNICITY

- White (83%)
- Hispanic or Latino (3%)
- Multiracial or Biracial (2%)
- Native American or Alaskan Native (1%)
- Asian or Pacific Islander (1%).
- The remaining were write-in responses with many failing to specify.

90% of survey respondents live in Louisville and 42% of respondents work in Louisville.

Most survey respondents were homeowners (74%). The breakdown of the remaining sectors is illustrated in Figure 1. Sector selection determined which questions the respondent would receive. Building Owner and Building Developer selectors were placed in the Building Owner/Developer Group. Business Owner / Manager, Energy Efficiency Expert, Engineer, Architect, or Designer, General Contractor, and Other business were placed in the Business and Tradespersons Group. Those who selected Home Owner,

Affordable Housing Representative, or Residential Tenant or Occupant were placed in the Residential Group.

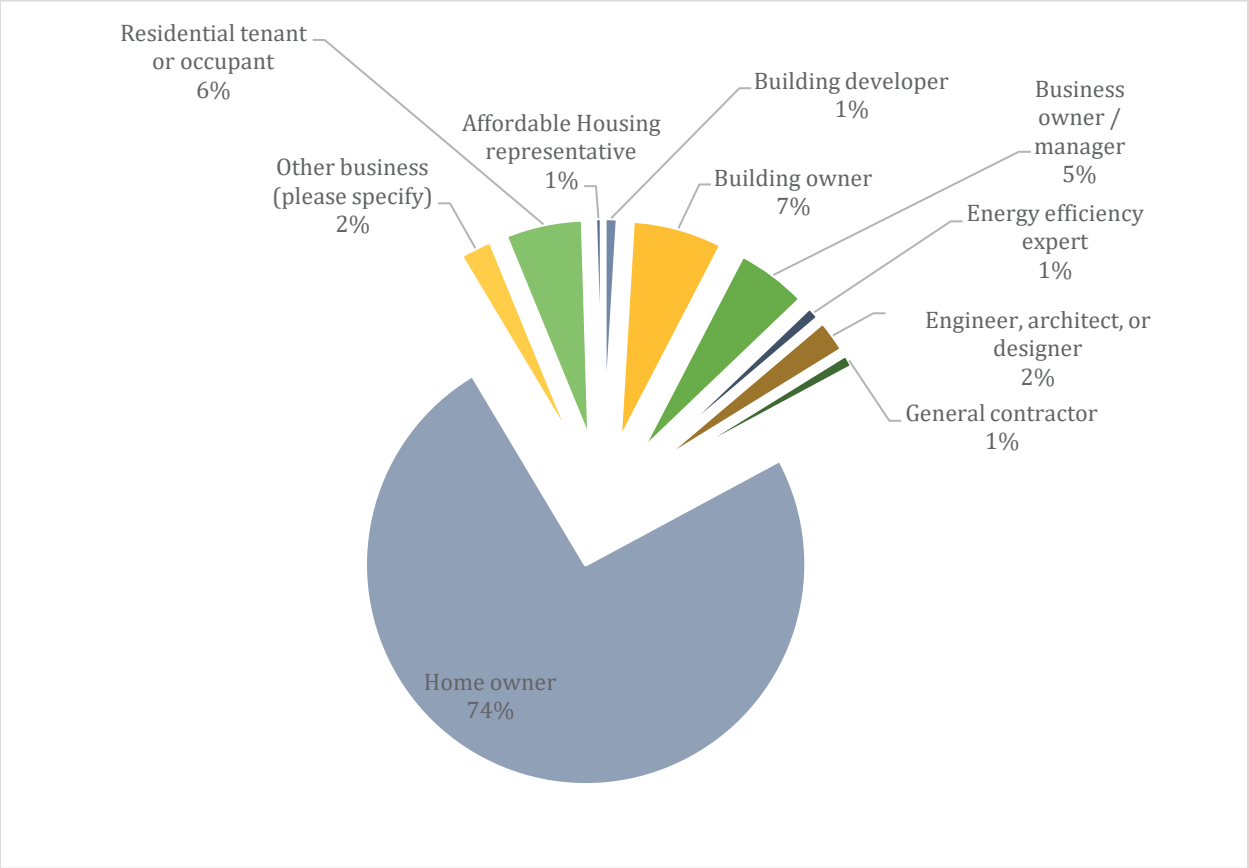



*Figure 1: Breakdown of sectors represented in online survey.*

## Summary of Survey Results from All Groups

### Important Considerations for Adopting Code Updates

**What's the most important consideration for the City in adopting stricter energy codes for residential and commercial construction?**

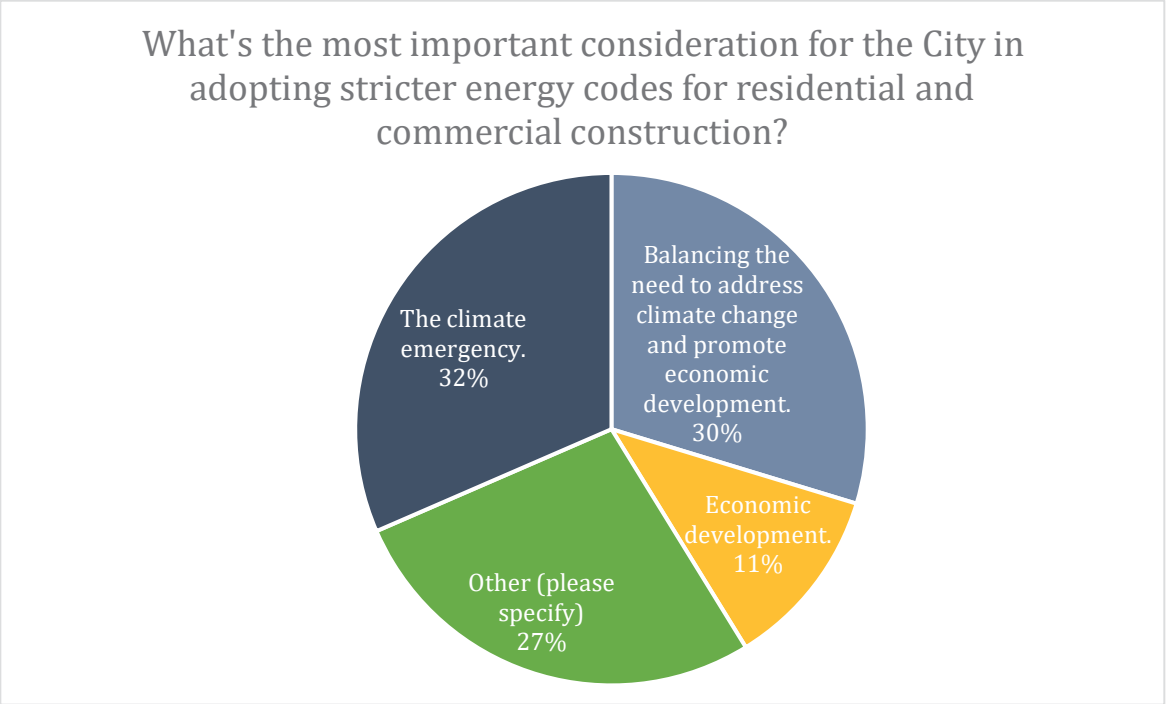



*Figure 2: Percentage breakdown of answers for important considerations for stricter energy code.*

To evaluate how survey respondents' values may influence their support of code updates or other sustainability measures, the survey asked respondents "What's the most important consideration for the City in adopting stricter energy codes for residential and commercial construction?" See Figure 2 for a breakdown of the results.

'Other' answers included responses expressing the need for cost/benefit analyses, desires for less government interference, and cost concerns. (See Appendix A for open-ended responses.)

### Support for Code Considerations

Survey takers were given questions describing potential City code considerations and asked to indicate their level of support via a 3-point Likert scale ranging from opposition to full support, with a fourth answer choice allowing respondents to indicate if they need more information to decide. Results are illustrated in Figures 3-6.

**HOW SUPPORTIVE WOULD YOU BE OF INCLUDING A MINIMUM ENERGY OFFSET REQUIREMENT IN ADDITION TO THE 2021 CODE, WHICH WOULD REQUIRE ON-SITE OR OFF-SITE SOLAR?**

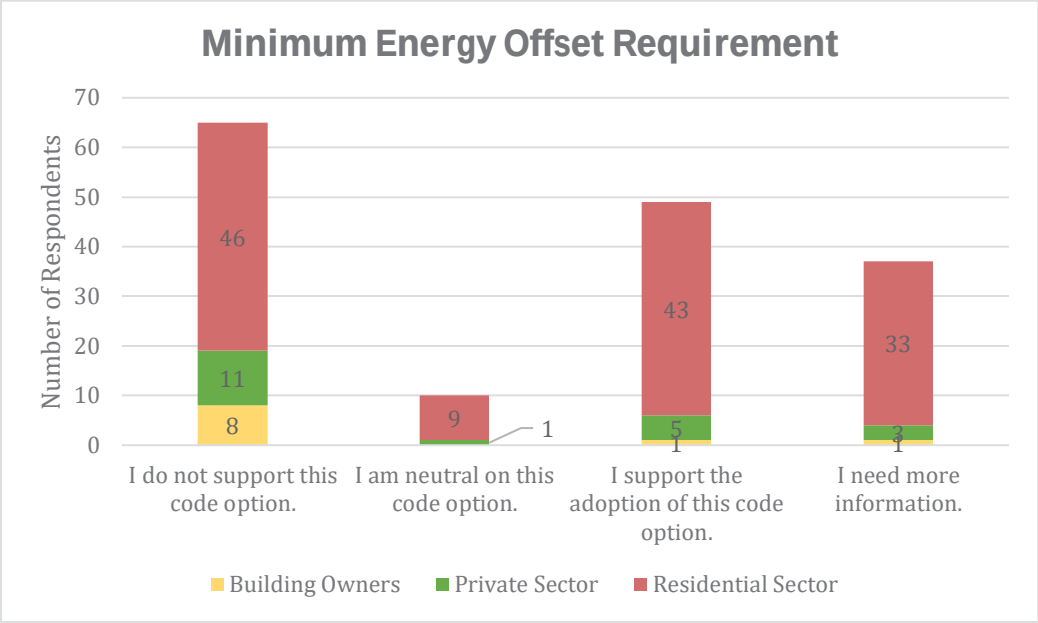



*Figure 3: All sector levels of support for Minimum Energy Offset code option.*

**HOW SUPPORTIVE WOULD YOU BE IF THE CITY WERE TO CONSIDER AN ALL-ELECTRIC REQUIREMENT FOR NEW COMMERCIAL CONSTRUCTION CODE IF INDUSTRIAL PROCESSES WERE EXEMPT?**

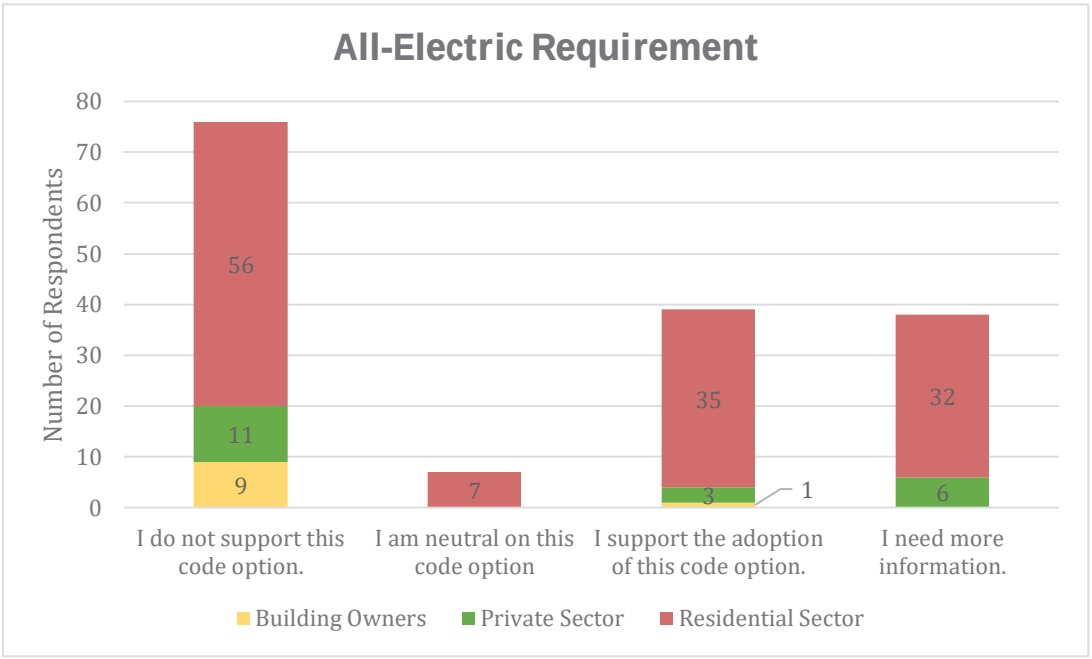



*Figure 4: All sector levels of support for All-Electric Requirement code option.*

**HOW SUPPORTIVE WOULD YOU BE IF THE CITY WERE TO CONSIDER AN ENERGY CODE THAT REQUIRED A 20% REDUCTION IN ENERGY USE FROM THE 2021 ENERGY CODE FOR COMMERCIAL CONSTRUCTION?**

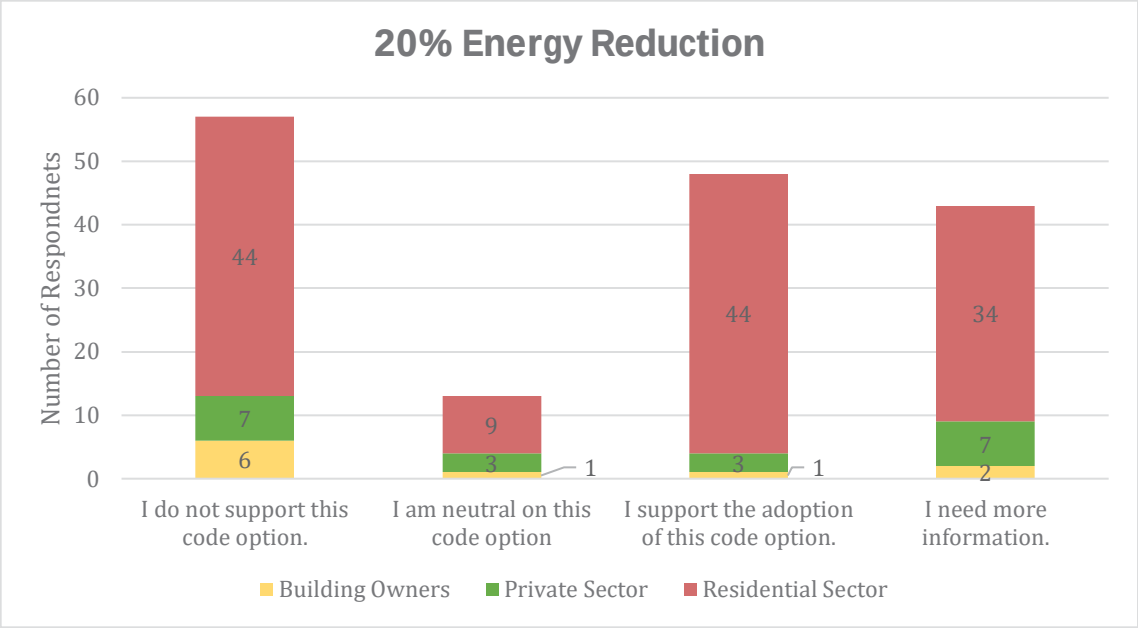



*Figure 5: All sector levels of support for 20% Energy Reduction code option.*

**HOW SUPPORTIVE WOULD YOU BE IF THE CITY WERE TO CONSIDER A COMMERCIAL ENERGY CODE THAT REQUIRED NET ZERO ENERGY THROUGH EFFICIENCY AND ONSITE/OFF-SITE RENEWABLE ENERGY?**

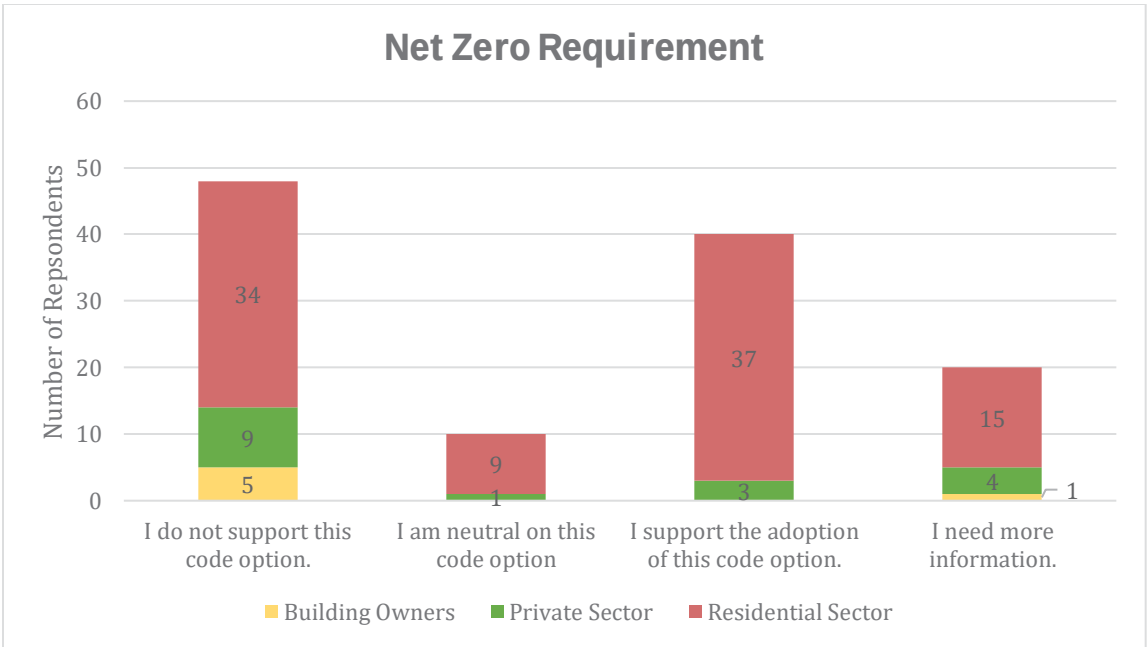



*Figure 6: All sector levels of support for Net Zero code option.*

## Barriers and Benefits

The survey asked open-ended questions to assess what respondents' perceived barriers and benefits were to the code considerations presented to them. The following provides a summary of the open-response comments received in the survey.

Summarized Barriers:

- Cost burdens for builders and tenants alike.
- The code considerations will make the City of Louisville a hostile environment for businesses.
- Residents and builders have a lack of knowledge and education regarding the benefits of code upgrades.

Summarized Benefits:

- Cleaner air.
- Clean energy use and greenhouse gas reductions.
- Increased energy efficiency in buildings.

See Appendix A for a complete list of responses.

## Equity Considerations

All participants were asked the open-ended question: "Are there any considerations to address equity for low-income residents or disproportionately impacted communities that the City of Louisville should consider for any of the three commercial code scenarios considered above?"

Common themes resulting from survey responses included:

- Ensuring affordable/inclusionary housing is not unduly burdened by cost because of implementing these energy codes.
- Suggestions that the City provide grants and financial mechanisms for those who qualify.

See Appendix A for a complete list of responses.

## BUILDING OWNERS & DEVELOPER GROUP RESPONSES

The Building Owner / Developer Group had 16 total responses, however, not everyone answered each question.

One survey taker expressed great enthusiasm and support for energy code upgrades. The rest were at the opposite end of the spectrum, showing opposition to all code considerations.

### DOES YOUR COMPANY HAVE SUSTAINABILITY OR CLIMATE RELATED GOALS?

5 respondents have started or are fully implementing sustainability/climate goals at their company, while 6 do not have any goals.

### WOULD YOU PREFER ENERGY CODE REQUIREMENTS THAT:

- (Performance approach). Set an energy consumption performance target and allow for flexibility in how a building meets that requirement which can include onsite PV if needed to meet the performance target.
- (Performance + prescriptive approach). Set an energy consumption performance target that specifies an efficiency standards for equipment that must be met and requires mandatory PV on all new buildings.

7 building owners selected the performance approach and 3 selected the performance + prescriptive approach.

### SUPPORT FOR CODE CONSIDERATIONS

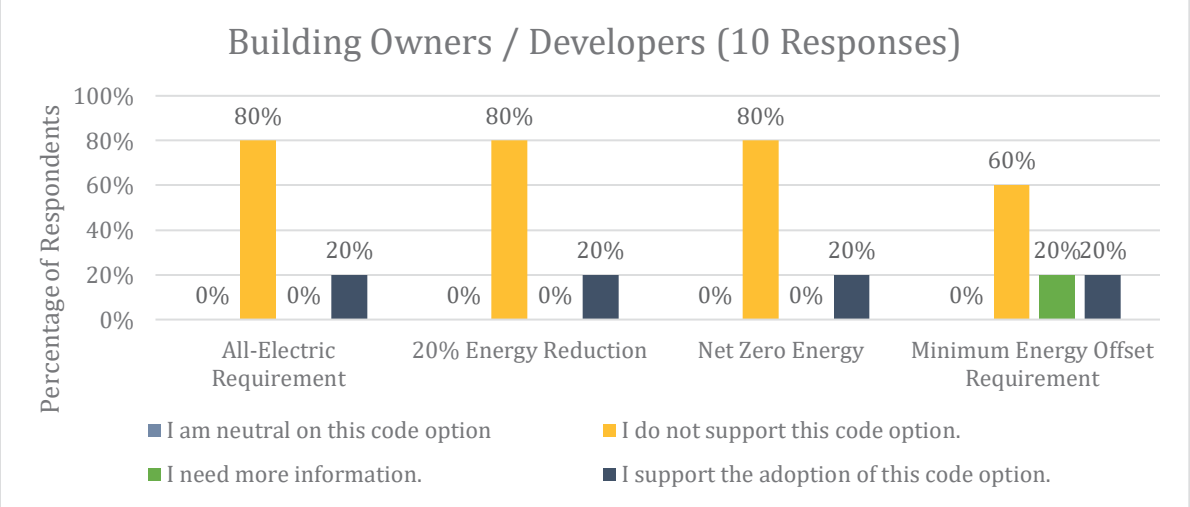



*Figure 7: Building Owners / Developers sector levels of support for code options.*

## Business + Tradespersons Group Responses

The Business + Tradespersons Group had 25 total responses, however, not everyone answered each question.

The survey asked about location of their workspaces.

- 5 own their office/workspace in the City of Louisville.
- 7 rent their office/workspace in the City of Louisville.
- 10 do not have an office/workspace in the City of Louisville.

### Does your company have sustainability or climate related goals?

9 respondents do not have sustainability goals, plans, or programs in place. 13 have either begun efforts or have established sustainability plans and/or programs and goals at their company.

### Support for Code Considerations

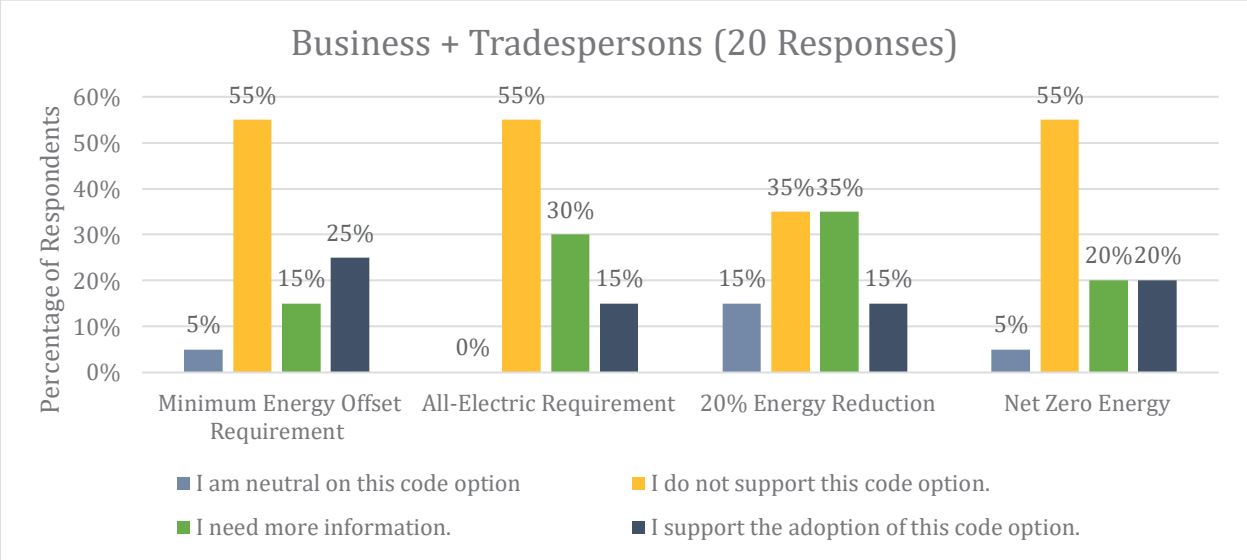



*Figure 8: Business + Tradespersons sector levels of support for code options.*

## Residential Group Responses

The Residential Group had 169 total responses, however, not everyone answered each question.

### Outside of the Marshall Fire rebuild efforts, do you plan to build a new home or undergo a major retrofit on your home in the next 1-3 years?

- 31 respondents' homes are part of the Marshall Fire rebuild effort.

- 19 are planning a major retrofit in the next 1-3 years.
- 81 are not planning any major retrofits.

**DO YOU CURRENTLY LIVE IN AN ALL-ELECTRIC AND/OR NET ZERO HOME OR HAVE YOU TAKEN STEPS TO START TO ELECTRIFY YOUR HOME?**

- 22 respondents are working on electrifying their home.
- 21 are working on making their home net zero.
- 88 are not doing either.

**SUPPORT FOR CODE CONSIDERATIONS**

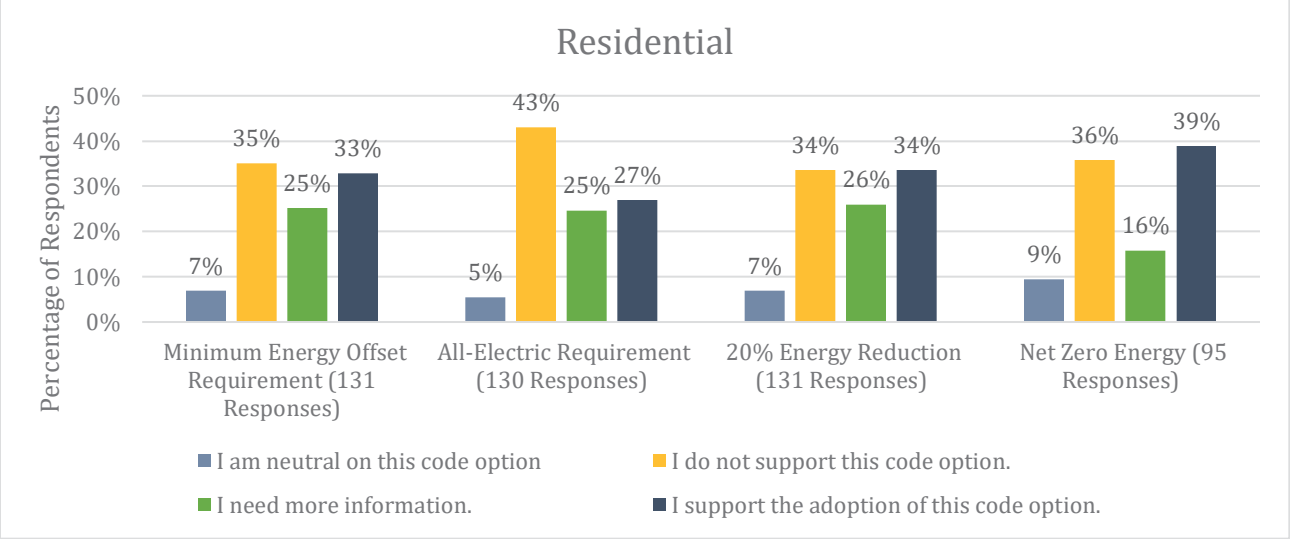



*Figure 9: Residential sector levels of support for code options.*

## Community Meetings

The City of Louisville held two community meetings. The first was June 29th, 2022 from 6:00pm to 8:00pm. The second was July 28th, 2022 from 11:30am to 1:30pm. The meetings were held in open-house format, with a presentation outlining the code modeling and policy considerations, followed by time for participants to ask questions and make comments.

In both meetings, similar concerns to those brought up in the online survey were expressed. Questions and comments included (summarized, not direct quotes):

- Concern that businesses are leaving Louisville.
- Concern about costs imposed by these policy considerations.
- Concern of the electric grid not being able to handle energy code update impacts and Xcel not delivering on their stated renewable energy goals.
- Emphasis on building types that would qualify for exemptions.

- Curiosity and questions about alignment with regional code update efforts.
- A desire for the City to look closely at code for existing buildings.
- Emphasis on pushing energy efficiency before pushing electrification of building systems.
- The City should take its time developing the ordinance, rather than rushing to be a leader in this space. Careful consideration of impacts needs to be made.

# Board Meetings

### Louisville Sustainability Advisory Board

The energy code update modeling, policy considerations, and preliminary survey results were presented to the Louisville Sustainability Advisory Board (LSAB) Meeting on July 20th, 2022. This was an information session. Throughout the presentation, opportunity was given for board members to comment, as well as the public to give comment during designated public comment periods. Summarized comments and questions included:

- There is a need to push Xcel to implement resiliency measures and redundancy if we are going to electrify our systems.
- How does this project relate to existing buildings?
- Expressed need to emphasize greenhouse gas emissions benefits of the code updates.
- Concern about procuring offsite solar: lack of information available, lack of available offsite solar, and lack of funding to create more offsite solar.
- Exemptions for certain building types from code updates could create a loophole and could hinder Louisville's progress toward sustainability goals.
- How will small businesses be impacted by the code updates?
- There needs to be a scale of options ranging from a code update that is easy, a code update that is balanced, and a code update that is high impact but difficult to implement.

### Building Code Board of Appeals

A similar presentation to the one given to LSAB was given to the Louisville Building Code Board of Appeals on July 21st, 2022, also as an information and feedback collection session. Summarized comments and questions included:

- Louisville has limited access to offsite renewable energy.
- Several questions related to the feasibility of limiting commercial energy consumption via Site Energy Use Intensity targets, and how successful City of Boulder's efforts were with energy performance targets.

- Board members sought confirmation that the modeling would apply to building types that exist in the City of Louisville.
- Concern regarding the capability of the electric grid to handle buildings built to stricter commercial energy codes and/or built to be all-electric, and the reliability of Xcel's renewable energy goals.
- Curiosity about other regional code efforts and whether the 2021 IECC has been implemented elsewhere.

# Appendix A: Open-ended Responses from Online Survey

**Click the page number in the Table of Contents above to navigate to the open-ended responses for the following questions.*



## WHAT IS YOUR BIGGEST CONCERN OR PERCEIVED BARRIER TO THE COMMERCIAL CODE CONSIDERATIONS PRESENTED?

| |
|---|
| The impact to current businesses in the market and attracting new businesses as costs to implement such an aggressive code would unfairly impact business - need to be implemented slowly over a long time. |
| Perception that we cannot afford efficiency improvements and businesses will locate elsewhere. |
| There needs to be a clear presentation of the cost to builders and potential tenants. Each measure needs a cost and how long it will take to see a return on their investment. In addition what are the incentives for their participation in the plan. |
| Cost. You put the burden on these companies and they won't build here. That impacts locals who then don't have opportunity to work there. Let the free market do its thing. Companies have to have a good reason to take all the economic risks they do to build. Putting restrictions just makes them go elsewhere. |
| I think there is a very big loophole for industrial buildings. We need to look more closely at what we could require of industrial builds. I would support natural gas for emergency backup but not for processes. |
| Cost. We also have quite a few unoccupied buildings |
| Violation of owners rights to their own property. |
| The market needs time to process this type of change |
| Unreasonable cost with no clear benefit Business owners will gk elsewhere |
| Economic hardships for new businesses |
| Discouraging busisness development in Louisville. |

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| It may be difficult to guarantee clean-energy sources when weather reduces solar and when commercial operations continue after dark. (Battery storage systems may not be ready to scale up, or may cost too mucy.) |
| COST vs payback / benefit |
| I would like to first read comments from the existing commercial business and building owners. We don't want to drive away business. We want to retain and attract business. |
| We need more businesses in the area. The city will be relying only on homeowners taxes for funding at the rate we are losing businesses. |
| We need to make the City attractive to potential investors and not become too expensive. That said, Redtail Ridge, because it's an entirely new development at this point, should be held to the highest standards. In addition, I would like to see large parking lots replaced by garages to reduce the amount of pavement and increase natural landscape. Commercial properties need to include charging stations for EVs |
| Cost and the effect of not considering any balance toward economic development of our city - it's lifeblood. |
| I am all for lowering emissions and energy efficiency but I believe the cities "net zero" approach is ill advised, expensive and another elitist move that will increase the cost of housing for a minimal real world benefit. |
| Businesses and developers will fight this tooth and nail |
| Pushing cost to business owners |
| Will it keep business away being cost prohibitive? |
| Cost, added lead time on construction. |
| Cost |
| Business leaving and not choosing Louisville to build |
| Some commercial occupants might have specialized needs that could necessitate gas/ fossil fuels. We will need fossil fuels for decades. |
| This will increase cost for businesses in Louisville. We have already lost most of our cornerstone businesses to neighboring communities l. This will continue to occur until there are no businesses left if we continue to make it more expensive for them to operate here. |
| Overreach by the city Government and costs. There is already a huge vacancy of commercial space in Louisville and this would prohibit businesses from moving to Louisville. |
| Companies will not consider Louisville as viable option for building their business. |
| Not enough valid, non political info |

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| You are very focused on the wrong thing. There are so many empty buildings in the city... all this will do is raise the construction cost which will raise the rent which means that that we have more buildings to this new code with no value other than sitting empty. There should not be a mandate that should be an option if a developer wants to do it. |
| Louisville is already driving businesses out. |
| Fear of costs, fear of regualtions |
| Ability of small local businesses to absorb costs |
| Ignorant people |
| The City already is perceived as business unfriendly. |
| That it will turn away business from louisville. But we already have so much vacant buildings I am not concerned. They can use those first |
| Causing businesses to move. Money is the driver for all businesses. Tax incentives, subsidies, or loans may reduce this risk. |
| Louisville is already not attracting new businesses like surrounding communities are. I want a vibrant economy here and I want to help businesses, not create barriers. |
| It will make Louisville even less desirable as a place for new commercial buildings. |
| Inability to recoup costs. |
| I would be forced out of business |
| Louisville has already driven large businesses from here, I can't imagine that they will like the new requirement. Why do you think businesses (especially in the building industry) do not want to be in Boulder County and specifically Boulder. |
| Developers might be entrenched in traditional construction designs and methods |
| costs, impractical, no impact on climate change |
| You drive business out of Louisville when you create building requirements that drive the cost of commercial build out so much higher than surrounding cities. We are loosing commerical along the McCaslin corridor left and right. We should be focusing on how to bring companies here rather than giving them another reason to go to Lafayette or Superior. |
| Think the city needs to focus on sustaining homes and businesses. Not sustainability. |
| silly government hand outs to companies to reduce their risk to almost negligible for the promise that they'll follow the rules |
| We believe that it will hurt the economy of Louisville. Costs in construction are at an all time high with the limited supply chain. Adding code that will increase cost will only deter business and residents from moving into Louisville. I also fear that if |

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| businesses need to expand they will look to our neighboring cities that offer lower rent, tax breaks, and less restrictions (lower cost) in construction. |
| Loss of potential and existing businesses |
| Potential upfront costs and how that might affect tenants |
| Increased costs will drive away business |
| The elimination of businesses using natural gas. This would severely impact many small businesses in Louisville - restaurants, for example. |
| The city already has an anti-business climate. By issuing more mandates that raise costs it will just drive potential businesses to neighboring communities. |
| question whether what is considered sustainable today will be supported by facts in the future |
| Louisville is already seen as being anti-business. Why would we make it harder to attract new businesses? |
| Cost |
| A lack of real financial analysis of current cost of future certainty of costs. |
| Lead times for equipment |
| Unjustified and will not bring interest to Louisville. These actions will chase more business out. |
| That the costs will drive businesses away from the city and prevent new businesses from opening. |
| Driving businesses away. Need to balance the energy requirements with other incentives |
| Companies wanting to maximize profit. |
| They are greedy and wanted to do their own way. They will try to bypass this code by saying oh we cannot do this due to lack of technology higher cost or infeasible with current energy needs. Do not give them any incentives because if you do, we the city of Louisville will be on the hook. |
| Efficiency is great. Will this draw or discourage small businesses? We already have lost many businesses to neighboring communities. Where will the off-sight collectors be placed? What will that do to Open Space? Have long-term health effects been studied? Will more staff need to be hired to regulate and oversee this change? Has research been done to see the actual energy savings? |
| Business choosing to locate elsewhere |
| Cost. I am supportive of #'s 21-24, but I think the considerations need a very careful approach with financial implications well laid out in either case studies or similar programs in the U.S. Its tough to for a smaller town, like Louisville, to be on the bleeding edge of the change without a City like Denver helping to lead the way. |
| Lack of understanding is probably the biggest barrier. |

| |
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| I'd want to know more about upfront costs and whether this was being done in concert with nearby municipalities. I like the requirement to reduce energy use/become more efficient better than any specific code requirement. |
| N/A, I am unfamiliar with commercial building codes. |
| I am ignorant of the processes used in commercial buildings that are sufficiently energy intensive to require using gas. That said, I think ASHP or GSHP is the only way to go for both commercial and residential, going forward. If we cannot eliminate gas entirely, we should strive to significantly reduce it where ever possible. Heat Pump technology is sufficiently advanced that heating and cooling can use it effectively. Same for Water heating. In Commercial environments, the time horizons are longer (then some residential), so ROI should be easily achievable. |
| The fact that there is a lot of commercial tenants moving out of Louisville recently - Kohls, Lowes, Sams Club, etc |
| If the building envelope is not enhanced even beyond what is proposed. The biggest energy losses in buildings is through a lack of air tightness, then lack of glazing performance and then thermal performance. All three of these areas should be addressed before electrification. By reducing energy loads HVAC and ventilation equipment can be properly sized to meet the lower energy demand and offset costs would be much smaller and easier to manage financially. |
| Louisville is already business hostile. Look at all the stores leaving town of all sizes. The last thing we need is another barrier. |
| Just electric requirements aren't enough, we need to be sure that all energy in from renewable sources |
| Same as residential - lack of contractors with experience |
| Until the industry knows how to do this, it would likely leave us stuck with old, inefficient buildings for a long time. |
| Louisville continues do drive businesses out of town. This will accelerate the trend. |
| Reduction in number of companies wanting to build in Louisville, which means higher costs for new home owners.N/ |
| General opinion: Corporations will always resist increased financial of their operations, regardless of the impact on the environment. |
| cost |
| Reduces business opportunities in the city. Drives businesses to surrounding cities. |
| Top down approach is not good. |
| I wonder what the specific downsides to this would be. |
| Too restrictive |

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| Big concern is if higher construction costs will make Louisville less desirable for future commercial growth. |
| Cost, heavy-handed mandate |
| Disproportionate impact on small local businesses, who already have a hard time getting off the ground relative to national chains. |
| businesses moving out elsewhere… |
| Expense and reduced demand for businesses to locate in Louisville due to cost (energy and rent) |
| Cost to businesses that could deter them from investment in Louisville. |
| I need to understand the cost impacts and the impact on businesses deciding to reside in Louisville. What is the balance 'goal' to increase businesses in Louisville especially since our town hasn't had any noticeable growth in years. Especially in the McCaslin corridor. We are falling behind our neighboring towns. If it is now or in the future a result of too many regulations or cost similar to Boulder then it is an economic issue for the town and its tax paying residents that have to pick up the revenue shortage. |
| Massive extra cost, making the business uncompetitive. Better to operate outside Louisville |
| I worry that the same thing that happened with the residential code will happen with the commercial code: builders convincing people/companies that it can't be done, or can't be done affordably. Perhaps incentives for builders to get training for building to new standards could help with that (I believe EMU Systems is doing something like this). |
| Cost |
| It is none of government's business. You have enough trouble doing what you ARE supposed to do. |
| State wide adoption and regional cooperation. |
| People don't want to have to pay more, despite the climate crisis. |
| Incentivizing companies to go down this path |
| Added cost for no benefit. |
| Cost and efficiency for the company |
| Need more info |
| Companies will relocate to a cheaper city. |
| If it's too expensive to operate a business here they will go elsewhere. |
| It might deter new businesses coming into the city. |
| Cost |
| Businesses in Louisville cannot afford to convert to electric. It's best for restaurants to remain on gas. That's how good is made. |

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| Ability for our tenants to operate their businesses. |
| They would hamstring an already suffering business community and will drive potential new businesses to surrounding communities. |
| Louisville has already become a more business-hostile environment, and we have a lot of empty commercial space that needs to be addressed. I'd hope the city would pay more attention to fixing this issue instead of possibly making it even more difficult to do business in Louisville. |
| Businesses will look elsewhere to build. City Council of Louisville would appear to be anti-business. |
| This will backfire by encouraging businesses to claim false exemptions and go outside the permitting process in order to get their projects completed and online. This will result in a less efficient product then leaving the current code as-is. (Again I'm not even going into the bigger economic risks of being so far ahead of the pack, energy wise) |
| companies would elect not to be in Louisville |
| Upfront costs, willingness of commercial businesses to adopt |
| cost |
| Cost |
| Cost of doing business becomes too high; the code is implemented without staging and/or enough advance warning. |
| No! |
| Lots of technical details in these code questions. Is the technology realistically available to be aggressive in the commercial code? Much of the commercial buildings are already built. How will these buildings be included in the commercial code? This needs to be considered now. If the new code requirements only apply to new commercial construction, it will be a "feel good" action that doesn't accomplish much except make new commercial impractical. |
| I think there are others with legitimate needs for gas during the transition to 100% electric . For example, a hospital needs a way to generate power for patients hooked up to oxygen and other life saving equipment. Similarly, people with certain medical conditions may have the legitimate needs. I don't know. |
| No flexiblity. |
| Louisville has a lot of empty commercial buildings today. Why would a company whose goal is to make money and stay in business want to pay extra to build or pay extra for monthly bills. Maybe put more effort into water conservation and bringing businesses back to our community |

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| That commercial interests will find a way to get less stringent codes than the residents are required to meet, resulting in the smallest burden being placed on those with the most amount of money. |
| The cost that will be past down to the buy of goods. There is no free, taxes and fees must be passed on. Everyone is living pay check to pay check, City needs to figure out how to reduce fees and taxes so business come in and pay property tax. |
| cost to the business; property taxes are already too high |
| I'm sure they are also concerned about the upfront costs and payback period |
| May drive business away |
| Businesses not wanting to do business in Louisville |
| I have lived in Louisville for 37 years. I have watched Superior, Broomfield, Lafayette and even Erie grow their commercial presence while Louisville continues to lose both retail and non-retail (with the exception fo the Colorado Tech Center). Adding cost burdens that make building -- and operating a business, since those costs have to be passed on to the tenants -- in Louisville even less competitive does not seem like a smart thing to do right now. |
| Cost, short term |
| It may drive some wharehouse and pot greenghouse operations outside of the code affected areas (boo-hoo to that) and it may require increases in electrical generation capabilities that would require additional peaker natural gas turbines until alternative electric supplie comes online. In other words it could be short term disruptive to lectrical energy capacity if a large amount of natural gas heating capacity were suddenly required to be all electric resitive heaters. Best to pay outside consultants to model these complex issues before adopting potentially disruptive new codes. |
| The significant increase in cost to businesses who would move to a more energy friendly city. Louisville could lose a lot of business by these plans. |
| That the wrong actions are being mandated to really improve our community environment. We have bad air all too often. Minimize commuting. Maximize use of public transportation to enter and leave our business community corridors. Not allowing large commuting populations nor businesses utilizing such into our community. Not allowing any more green spaces to be covered with concrete and asphalt. Having rigidly strict emission standards and elimination of diesel vehicles in our community. Having a zero tolerance and high penalties and fines for idling diesel trucks and vehicles unnecessarily in our community. Encouraging all existing businesses to develop solar panels on their large roof expenses as well as encouraging the same for residents. Creating for provisions that replace solar panels after hail events without having the residents have to pay out of pocket |

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| removal and reinstallation fees. Do not let Xcel energy limit the amount of solar production per resident or per business we should be able to produce all that we want and contribute it to the grid without penalties from Excel energy. |
| Uncertain; need more information |
| net zero energy should be mandatory |
| It could discourage commercial development |
| None because I believe it will help keep out some of the worst area developers |
| Additional cost and pollution required by current means of production, which means dirty fuels to produce the amount of electricity you propose. |
| Driving business away from Louisville |
| availability of contractors with sufficient expertise |
| commercial buildings have too many complications. unlike residential, the users are often not the owners. sometimes there are multiple users within on energy meter. |

**IN YOUR OPINION, WHAT IS THE BIGGEST BENEFIT TO THE COMMERCIAL CODE CONSIDERATIONS PRESENTED?**

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| none, based on the current requirement - it is not feasible with today's technology and can't be afforded. |
| Climate change action. |
| If done with attention to detail, it will reduce green house gas emissions. But we need to pay attention to the bottom line. We need to find ways to attract and promote those businesses that are climate change conscious. Offer them ongoing incentives and showcase them as leaders meeting the stated goals. |
| none. if and when it becomes feasible to build in this way, then companies will naturally do so when the technology is available at affordable costs. |
| It will be a great foundation for the future--let's not work incrementally on these codes, it's important to get this done. |
| Way less emissions |
| Not sure I see a benefit |
| This could lead to a large drop in carbon-based energy use in the energy-intensive commercial sector. |
| The 2021 codes continues to improve the energy usage of commercial buildings and is broadly understood and interpreted. |
| More efficient use of power |
| Cleaner air |
| Addressing climate change |

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| Making some individual's in the city management feel like they are saving the world. Unfortunately they are shifting the financial impact to residents. |
| Reducing Louisville's carbon footprint |
| Environmental impacts, forward thinking community |
| I don't see a benefit for businesses. |
| Energy efficiency |
| Meeting the agenda of the city is all it's benefiting |
| Smaller footprint |
| There are none you are breaking our community. |
| Climate change impacts |
| I see no benefit at all |
| Future of the planet |
| Environmental impact |
| The environment, not worrying about the environment being able to support my future possible children |
| sustainability |
| Clean energy use. Lower carbon emissions |
| Be responsible beyond an individual's $. |
| None |
| Climate |
| We have to make these changes but it must provide resilient solutions, particularly in the face of climate change, I am particularly interested in subsidies for on-site or community solar solutions. If the grid has challenges, our proposals should provide resilient solutions. |
| Investing in the community where your business resides |
| Virtue signaling. |
| Commercial buildings likely have a much larger environmental footprint than residential buildings |
| I think it is a detractor and one of the reasons I sold my business in town. |
| encouraging companies to blend in with the culture of energy independence |
| It has the potential to save energy. |
| Non. I guess the council and mayor can feel like they have made a difference.. when in fact the city is becoming blighted (business). Maybe more efforts should be placed on business retention and promotion for new businesses |
| Savings in the long-run, plus client support due to the energy saving practices |
| No benefit, companies will select options that meet their needs at a reasonable cost. |

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| While I'm all for doing all we can to lessen the impact buildings have on the environment, the main cause of global warming is vehicle exhaust. Why is the city not addressing this, rather than considering a code that might severely impact small businesses while failing to address the major causes of global warming. |
| Marginal impacts on overall climate |
| energy savings, but the savings must offset actual cost in a reasonable amount of time (5 years) |
| Don't see one |
| Incremental improvements are good if done in a more thoughtful way in cooperation with businesses and property owners. Louisville is no longer friendly to homeowers or businesses. This proposal makes that worse. |
| We have to get to decarbonized buildings & policy is the only way it will happen. |
| There are none that would justify these actions. |
| Better energy efficiency for new structures. |
| It is necessary. |
| The energy saving being cost effective in both short and long terms. |
| Saving our planet |
| Building better buildings. |
| These proposals sound good in theory. Educating Louisville residents and businesses about what these all mean and how you decided on them would be great. For example, I'm wondering why a 20% reduction? Why not more? |
| Reduction in overall emissions of GHGs. |
| N/A, I am unfamiliar with commercial building codes. |
| N/A for this question. However, perhaps a consideration for luring commercial customers - if they perceive the cost of building too high, they may take a pass on Louisville. They would need to be shown when the ROI is realized. |
| Stringency. You presented the proposals at a high level (20% reduction, net zero) but there is a lot of information still needed to make any kind of decision on the proposal at this time. How compliance is shown and differences based on building types and end-use. |
| Creating the conversation around what it means to be energy efficient. |
| Using renewable energy sources! |
| A livable planet |
| Until the industry knows how to do this, it would likely leave us stuck with old, inefficient buildings for a long time. |
| Should free up parking with lots of empty parking lots. |
| Need more information |
| pretty questionable as to any benefit |

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| Makes city leadership appear effective |
| Let businesses decide for themselves. |
| lower energy costs and help towards reducing the effects of climate change |
| Too restrictive |
| This will reduce the carbon footprint for new-construction commercial properties. |
| Reducing reliance on fossil fuels and their emissions. |
| none at this moment |
| Insulation improvement is ok. |
| Impact on climate change |
| I'm all for residential and commercial to build to the latest standards but need to balance against cost and the ability to meet those requirements as they are a moving target (trained installers, rebates, etc) |
| While the impacts to the environment are obvious, I think what these codes can represent is the start of a workforce that is trained in building to higher standards. Codes like these are the future of buildings and it has to start somewhere, so let's start that here! |
| If we work together (industry and government) to GREATLY reduce the GHG emissions of homes and buildings in the Denver metropolitan area, then we have addressed one of the largest sectors of emissions in CO. This would give upcoming generations a foothold to fight the omnipresent climate crisis. We must invest NOW to help future generations, it's not about us. |
| They will help combat global warming and benefit the environment. |
| Less energy usage, more sustainability |
| There are none. Again, add incentives for different areas you want to increase. |
| Unsure, one community is a start but unless the world changes, not sure there is a benefit to justify forcing the cost on business since there are empty buildings here already |
| Need more info |
| Greatly reducing or eliminating direct fossil fuel consumption. |
| Benefit to the climate and setting an example to other communities of what is possible. |
| Some energy savings |
| Better for the environment |
| Zero |
| The general idea of being more energy efficient. |
| There would be a marginal benefit to the environment but without wide geographic support, it would be drop in the bucket at the expense of the local business community. |

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| Increased energy efficiency is a really good thing, but it cannot be so expensive that it makes Louisville too expensive a place to do business. |
| none |
| Please don't lump me into the "Non-Environmentalist" category, but the answer is none. I think the current IECC without the additional code considerations will make more of an impact than adding additional modifications because you will have greater compliance. |
| There is no benefit |
| Environmental impact / Sustainability |
| Long term benefits |
| environmental |
| Climate |
| Climate change |
| If they actually have a positive environmental effect, that's good. But I'm concerned that this is just greenwashing. |
| Nothing! |
| Addresses climate change. But there are many options to accomplish this including better site design and addressing urban heat island effects. Why were mature trees removed from former Sam's Club parking lot? Actions like these also affect the energy use of existing buildings. |
| It will make surrounding cities more attractive for commercial investment. That's a benefit, right? |
| Commercial building consume large quantities of power - often 24/7. Since they consume large amounts of power, addressing their electricity consumption should have a real benefit from a climate change perspective. |
| Some kind of offset. |
| Solar is a good option for everyone to help offset carbon at least in the summer with a/c running via electricity. Won't help alot in the winter. |
| It'll save our planet and keep our home livable. |
| Business will just go to other places to setup business. |
| environment |
| I wonder if there could be a way to requiring commercial entities greater than a certain size to adopt stricter codes. Offer incentives for smaller sized businesses? |
| Image/marketing |
| A cleaner environment and help to balance who has to follow the codes |
| Same as residential... climate friendly, and -- not including the amortized cost of building to the new codes -- potentially less expensive to operate. |

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| Even more important for longer term commercial buildings - should invest the money upfront for longer term payback. |
| Adopting new all electric codes would potentailly drive out low ccost industry and help a more expensive office and high tech client driven workspace. It would force developers to seek a higher paying end user rather than low cost warehouse space tenants that would likely site their operations along the I25 corridor. |
| We need to make sure businesses are not causing further environmental harm to our community or our world. |
| None |
| You are missing the point when you allow large expanses of concrete and asphalt to be installed, when you allow thousands of cars to enter and leave and traverse the community, when you are not limiting the types of emissions a vehicle such as diesel vehicles and not encouraging more electric vehicles, when you allow Xcel energy to limit the amount of solar production and not reimburse anyone who super produces power, when you don't even consider developing a solar farm in our community but rather have thousands of vehicles bringing in pollution and covering up green space with heat producing buildings in parking lots. |
| Uncertain; need more information |
| net zero energy should be mandatory |
| Climate impact reduction |
| Louisville will finally be taking real steps to address the global climate emergency |
| Not at this time. Look into the future with your crystal ball and see when we can have "clean electricity production". |
| Making sure that the upgrades can be achieved through cost savings that the city can bring. |
| reduction in greenhouse gas emissions |
| Louisville would feel good when meeting with other local communities. |

**What HVAC systems, process loads, other appliances, or specific building types do you think would need to be exempted from the commercial code options presented? (The rationale for exemptions could be prohibitively higher cost to operate, infeasible with current energy needs, technology does not exist, etc.)**

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| all retail and industrial uses need to be exempt - maybe office building is a place to start with it occurring over a long timeframe. |
| Backup storage and generation where technology is emerging. |
| Where ever there is a trade off in the profit margin that can not be justified by incentives or tax breaks. |

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| All |
| I think we need to be careful about making exemptions--with the rate that technology is progressing, it is extremely likely that more accessible paths toward a more stringent commercial code. I don't agree with exempting industrial from the commercial codes in a blanket fashion. Also there needs to be a way to update the requirements as new technology becomes available. |
| The policy should not be enacted. |
| Not sure at this point |
| I don't support the requirement for full electrification for businesses. |
| Industry specific would be things related to food production. I am sure their are many more industry specific needs for the use of gas. |
| Tax subsidies, perhaps at the Federal level, to encourage self-sufficiency with solar and newer technologies |
| This is way too technical a question to pose to residents. Come on. |
| There should not be exemptions, the law should not have prohibitively higher costs for any resident or business and absolutely should not be based on technology that does not exist. |
| Heat for industrial processes - no electrical options for some, excessive cost, lower reliability. |
| I don't know enough about this to offer any informed comment. |
| We should not adopt this code! |
| All of them. Let the owner decide. |
| All should be exempted. Costs in reality are always prohibited. Costs in your studies are always lower than actual. You need to present a realistic costs not just from advocates for net zero. |
| Backup heat sources for very low temp and emergency backup to electrical heat. |
| Don't know |
| Manufacturing, R&D, small business in non-tech sectors |
| Cooking, industrial uses, backup power. |
| coffee roasters |
| ALL of them - this needs to be optional |
| I don't feel qualified to respond |
| For new commercial spaces, there should be NO exemptions. All new commercial businesses should adhere to a net zero energy code. |
| there should be no exemptions based solely on the code affecting the company's profit. that is, if being all electric means their profits are 50% less than if they used gas, that is not a good enough reason for the exemption. i.e., if they are profitable, |

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| but will be more profitable with the exemption, then that would not realize the benefit the code is trying to achieve |
| Without gas it would be impossible for a restaurant to operate. Electric equipment is nearly double the cost of gas. |
| the commercial codes are burdensome |
| Gas fired cooking equipment (restaurants), gas fired boil kettles (breweries), etc. Disallowing the use of natural gas would be infeasible and prohibitively costly to achieve for many small businesses in Louisville. |
| system requirements that are more stringent than the prevailing local codes in the State of Colorado |
| I do not support the proposed requirements in any form |
| Acute healthcare (like new Avista Buildings) |
| All |
| Older and historic structures, restaurants and breweries (all use gas appliances). |
| None, they can afford the requirement changes and should follow the commercial code to the "T". it is not fair to give them exemptions and while we the residents have to suffer. |
| Are there enough choices in all electric HVAC systems to make this reasonable? |
| All of the above |
| Hot water heating, which is currently more difficult through an air-source heat pump due to the larger scale of hot water use in Commercial buildings. Historic Preservation projects should be exempt on some level. |
| Again, I'd rather see a requirement to build to reduce energy use and emissions to a defined lower level than a requirement to use/not use any particular appliance or technology. |
| N/A, I am unfamiliar with commercial building codes. |
| HVAC and water: I think all electric should be used here. Stove: induction has been shown to be a good alternative by chefs, though it takes some getting used to. N/A for other areas. If you leave it to the builder or client to figure out how to be successful, it may not happen. I suggest having some strategies already worked out and available for builders/clients to review/modify. |
| Not my expertise so cannot say with any kind of knowledge base. I imagine cooking equipment would be one type of equipment. As for HVAC, that can easily be electrified with cold climate heat pump technology. |
| Frankly, I don't think any building type or industry should be exempt. There are examples all over the world of rec centers, Hostipal, manufacturing buildings, restaurants, etc. already using significantly less energy |
| None |

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| The city should allow enough gas heat to keep vacant buildings from freezing up in the winter. |
| All of the above. |
| Need more information |
| Business that use natural gas as part of their product or services delivered |
| I don't recommend adopting the codes in the first place. |
| I don't know how to answer this question. |
| As with residential, make these code changes optional vs. mandatory |
| all of them; make it a choice |
| RTUs, water heaters, stove. |
| I don't have enough background to make an informed opinion on this. |
| ALL |
| I'm not sure I know enough about commercial building sciences to answer this question at the moment. |
| technology does not exist |
| all should be exempt |
| Let's obtain grants to help industry have the MOST efficient and low GHG emission options available to them! This is essential! |
| I'm not familiar enough with these to comment. |
| depends on the type of building |
| Commercial HVAC |
| Need more info |
| Restaurants |
| not sure |
| New builds and restaurants |
| Warehouse heaters, processing/production equipment, water heaters. |
| I think it is premature to adopt this code so exemptions become irrelevant. |
| High costs. |
| It is already clear that restaurants can't operate. Any electric heat pump systems are too high of a risk. I have not had any projects that were striving to be close to net zero have their mechanical systems in place for very long because they are such un-tested technology. The waste in removing and disposing those systems when the next generation comes along simply negates any perceived benefit. |
| Not sure |
| don't know |
| Non profits, depends on type of business. |
| Let us build what we want! Stop controlling us! |

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| All of them. This is all pointless and stupid. |
| Hospitals would need flexibility. |
| Furnace |
| Heating. There is not enough electrical power nor the infrastructure to support the load. It will take 50 years to provide the power and infrastructure to support all electric. Batteries and not here yet so extra solar energy can't be stored for night usage. City should be listening to electrical engineers that understand the real physics of going all electric. I had a hybrid and the batteries were almost gone in 7 years. |
| ones that make cost prohibitive |
| Higher operating costs |
| Don't know enough to weigh in on this. |
| None - there are biofuel based fireplaces in lieu of gas and with homes becoming substantially more efficient who needs to burn a precious resource for ambience |
| Obvious potential exemptions for many existing businesses who have insufficient insulatinion to afford an all electric forced air heating system. Natural gas direct vent heaters are also extremely efficient as 100 percent of the heat from natural gas combustion is forced into the building airspace but at the expense of air qaulity and worker pulmonary health. Buildigs that use DV forced air heaters often run with open rollup doors in wintertime and have almost no insulation in a metal framed and sided warehouse structure. |
| All electric will significantly increase the cost for doing business in Louisville. Even if all lights are LED, higher insulation requirements, etc. |
| Do not allow Excel energy to limit solar panel production on any warehouse or building. You're missing the problem you're using the wrong solutions and so many of your standards that you're trying to adopt. You are destroying the community by allowing a super large development for business and commuting. You are making solar intolerable with Exel energy limits and standards. A lot of these standards seem to be a smoke screen for bigger problems and that is what is so upsetting to this business oriented person. Why do you let the big guy destroy our environment and expect all of us small guys to do some minuscule and expensive compensation. The big climate change pollution elephant in the corner is your big Red Tail ridge Project. |
| Uncertain; need more information |
| no exemptions, please |
| None |
| See above. |
| None, Exempt them all! |

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| retail, restaurant, industrial, and office. easier to implement on hospitality, event space, big box retail, |

**ARE THERE ANY CONSIDERATIONS TO ADDRESS EQUITY FOR LOW-INCOME RESIDENTS OR DISPROPORTIONATELY IMPACTED COMMUNITIES THAT THE CITY OF LOUISVILLE SHOULD CONSIDER FOR ANY OF THE THREE COMMERCIAL CODE SCENARIOS CONSIDERED ABOVE?**

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| don't understand the question |
| Low income housing when residents are faced with rent increases. |
| Address the issues through small business loans and grants. Provide consulting services to assist with application of the best solution for their business need. |
| Yeah…don't increase cost and make it even harder to live here or hav a business here |
| There's a tradeoff between higher building costs now and lower energy costs over time. I don't think we should modify the code to help with affordability. we need to require 30% affordable housing in new builds. that's a better way to take care of this. |
| Construction prices will increase and low income families will be less likely to live in Louisville. |
| There needs to be an option in this area |
| I don't support the requirement for full electrification for businesses. |
| Apply tiered rates that are low for low-income residents--these would be offset by higher rates for heavier users of energy (e.g., large homes). |
| No additional subsidies of politically chosen groups should not be increased due to the additional requirements placed by the City, the City should first exempt them. |
| Affordable housing needs to include standards for energy efficiency to reduce the level of HVAC needs, plus subsidies, as appropriate |
| Certainly - when I hear city council talk about affordable housing, but then consider cliff legislation on net zero, the former comes off purely as a political, hollow gesture a la the CAC. |
| Yes, stop with the elitist environmental laws that hurt low income residents and place unnecessary burden on higher income families by covering those costs through additional fees and taxes. |
| I imagine there would be |
| You shouldn't force this on anyone |
| Providing grants/scholarships for businesses of low-income residents in order for them to comply with new standards and allow them to remain valuable productive members of our community. |

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| Again I don't know. |
| If we lose all of our businesses the entire tax burden for our community will need to be supported by the remaking residents including the low income residents |
| No, you should not even be considering this change. |
| Low income is relative! It's very expensive to live here even if you are middle class |
| We are being pushed out of our community by all these extra mandates that end up costing me a lot more money. My family is a fourth generation in this community and it's sad to see mandates pushing us out |
| Yes, allowing for rebates and incentives. Both UPFRONT and post building |
| City/county needs to build affordable housing following all these environment code |
| Care for them with full explanation of their long term work and needs. They need to meet our new codes. |
| Absolutely! Please make decisions that don't hurt people financially. |
| Yes, lower income demographic always bears the brunt. Subsidies and grants may be an option. |
| grants, incentives, financing |
| What low-income residents? The City has long since driven them out of town with prohibitive costs and burdensome regulations. |
| All of this makes it harder to provide low-income housing. Allow increased density. |
| If you force me out of business I expect to be compensated. You approved this equipment in 2019 |
| Construction incentives, and awareness of any exemptions that disproportionately impact certain communities |
| louisville appears fairly uniform with respect to race/economics except for artificial affordable housing occupants |
| Yes, especially for low to middle income families rebuilding after the fire. |
| government assistance for people not for companies. not sure if that makes sense, but the government is of the people, by the people, and for the people. any code should more greatly affect / benefit the people before _any_ company's profits. Not saying revenue … profits. |
| Equity for low income. What a joke of a question. What low income resident can come to or even live in Louisville at this time? |
| This may be too off-topic to this code, but make sure that all low-income housing is required to to provide recycling AND composting for all residents. |
| Consideration should be made for any person living, working, or doing business in Louisville as to the feasibility and reality of requiring something that could both cost and impact these people in a very negative way. Consideration should also |

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| be given for the economic impact of these codes and how the city could lessen that impact. Making a code requirement like this may be noble and desirous, but there needs to be a balance. |
| No - if the city recognizes there is an impact then it should waive that impact for everyone. |
| No. If you adopt them, everyone should have to pay the cost. |
| Yes. Provide support for non-profit groups and low-income renters. |
| A fund to provide onsite/ offsite solar. |
| Yes, these groups should be considered for all scenarios or it will significantly reduce diversity in an already minimally diverse area. |
| How to lower the cost of entry for low income residents. |
| It is in the Xcel rebates for leap, Xcel should provide more options for those who are living low income/impacted communities. |
| Are you creating a system that automatically needs to be subsidized? How difficult is it to apply and receive subsidies? Will this eliminate or reduce businesses owned by those for whom English is a second language? Are you willing to burden your citizens even more than the current rates? |
| No. Upfront costs will be paid for in energy savings |
| Incentivize inclusionary housing projects to reach certain levels of energy efficiency or energy independence with their projects. |
| I don't know. |
| Yes, criteria for considering equity and providing the subsidies or exemptions to achieve equity should be built into any ordinance. |
| N/A, I am unfamiliar with commercial building codes. |
| Absolutely - I think the only way to address this is through grants or some kind of funding from the city |
| Again, it is actually easier to make multi family homes more energy efficient than stand along buildings. If anything affordable housing should be held to a higher standard. It has greater long term benefits for the occupants than typical code built structures. |
| Set and meet these code requirements for everyone. Be sure to confer with these communities for the best solutions to meet their needs. Low-income residents and disproportionately impacted communities should be eligible for city grants to meet this code, we must invest in these communities. |
| Louisville is virtually uniformly white, so not really relevant |
| There should be free community solar and subsidized retrofits available for low incomes |

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| The city should hire staff to pretend to care about low income residents. Boulder has used this scam for decades. |
| Low income residents would have a difficult time living in Louisville because the cost of living here is becoming prohibitive for lower and middle class residents. |
| Need more information |
| Don’t raise costs for any residents or businesses |
| I don't recommend adopting the codes in the first place. |
| Yes, I wonder how all of these changes affect the poor. Are these changes that only the wealthy can handle? Does this make this area even less affordable? How does this affect diversity and equality? |
| Yes, there should be income-based subsidies rather than exemptions. Poorer communities of color are disproportionately affected by dirty air, water, and other environmental issues, yet we are all part of their cause. We should prioritize community-wide change toward electrification, and support those who cannot afford it with subsidies. |
| for all residents! |
| Energy costs will be higher. |
| Just concerns about cost impacts. |
| DO NOT negatively impact any of the residents |
| Yeah, they shouldn't have to pay a dime of it. Tax the rich. :) |
| Yes, white people need to pay a privileged levy that pays the difference for all new buildings to meet the new codes and not the business themselves. |
| Only if they are not paying for it. |
| Yes, low income residents should get the most support. Education, funding, and follow through from local government and industry should center those most impacted. Grants should be centered on supporting these communities FIRST! |
| Perhaps give them subsidies. |
| I'm not familiar with good solutions. I recently learned of bonds like https://nlihc.org/resource/field-atlanta-passes-homeless-opportunity-bond and https://ballotpedia.org/California_Proposition_84,_Housing_and_Homeless_Bond_Measure_(1988) |
| We need to build low-income housing and subsidize energy bill costs for low-income residents. |
| There should be. |
| No. |
| Yes. |
| The city already doesn't have a balanced budget so to damage the business community - a major revenue source for the city - and then try to come up with |

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| the money to make up for the damage is a downward spiral. The correct approach is to build the business community up first and then look at code updates when the community can absorb them. |
| No. The CC needs to help the Marshall Fire rebuild victims first before addressing "equity" of commercial builds for low-income residents or disproportionately impacted communities. |
| You cannot have this conversation and have a conversation about equity and low income at the same time. The only businesses that would choose to move forward under the proposed codes would be doing so by spending extra funds to make a statement. They will not simply absorb those costs. They will be passed along further creating a divide. |
| Businesses that help people/families shouldn't be scared away by all of these codes |
| Control control control |
| How about treating all residents equally instead of trying to foment class warfare? |
| There should be incentives or grants for low income citizens and public facilities primarily servicing low income citizens. |
| Low income can't afford to build in Louisville so no it is not needed |
| Generally low income residents are exposed to more pollution because they live in lower income areas, closer to higher commercial pollutants. Requiring new commercial construction to do better and be better, should arguably improve the health and quality of life for those living in low income areas. In fact, it'll eventually be better for all of us. |
| Why have anyone paying the high costs? |
| No specifics, but I do think there should be considerations for these type of residents. |
| Would like incentives for prior home owners/businesses especially if new construction is getting |
| I do not understand the question |
| Yes. We need to make some accommodations to allow for affordable housing. One of the key attributes Louisville had going for it was its focus on community (for lack of a better word). I wonder how much this counts any more as I look at some of the decisions/rules/requirements coming out of the Louisville City Council. |
| Build government sponsored low income housing |
| How many low income qualifying businesses operate within Louisville City limits. Can the be expempted if their numbers are very low? |
| Equity should be top of mind. Ideally, grants would be available rather than exceptions to the code. |

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| Low income would be impacted the most by the increased costs for all electric homes. |
| Exchanging homes into LED lights is a significant savings at minimal cost. No diesel vehicles be allowed in the community. You must allow natural gas options for heating. Electric heating and clothes drying can be exorbitantly more expensive. Quit preserving historic outmoded homes as if they are some kind of sacred cow. We must stop having to preserve old miners shacks and kit homes for some kind of aesthetic. Allow new and more efficient structures to replace them. Encourage all warehouse structures and residences to produce all the solar power that they want to contribute without penalties and without limits into our grid. If you don't limit what larger building surfaces can produce you'll have plenty of extra energy to help out with programs to contribute to disadvantaged or low income homes. Community Solar Farm. Whether affluent or financially struggling it is horrible to mandate more appliances such as heat pumps and electric furnaces and electric heating elements in a home where Xcel energy also has the ability to limit how much solar is produced per unit of residential and commercial space. Shame on you for your plans and financial obligations to buy these electric utilities for our homes and businesses when you allow the electricity company to maintain high prices and not reward those who can super produce more electricity. You are allowing Xcel energy to torture us and some of us are not dumb enough to fall for it. |
| Uncertain; need more information |
| all people benefit from all-renewable, net zero codes |
| Some short term break should be given up front. |
| Yes. I don't have enough info to comment in specifics, but the City should always consider low-income/disproportionately impacted communities in everything it does. That's part of being an inclusive and equitable community. |
| Don't impose any more silly restrictions upon any of us at this time. It makes no sense. Encourage a 10-20% reduction and incentives but don't impoverish anyone for a silly goal of all-electric before everyone can afford it. Remember that you're trying to be inclusive. On the other hand I do not entirely approve of incentives-which is only another word for taking tax dollars from some to give to others. That has to be done carefully for deserving people who can prove they need help which I do support. |
| Dont adopt them and low income residents will be able to live in Louisville. |
| The effects of climate change already impact such communities more severely, providing further motivation for the adoption of stronger building codes. |

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| If you make residential and commercial properties more expensive to build, you are going to continue to push lower income residents and business' out of Louisville. |

**WHAT'S THE MOST IMPORTANT CONSIDERATION FOR THE CITY IN ADOPTING STRICTER ENERGY CODES FOR RESIDENTIAL AND COMMERCIAL CONSTRUCTION? ('OTHER' ANSWERS)**

| |
|---|
| Be aware of the cost and burden this places on residents and the assumption that these costly requirements and rules have no proof to help alter any human impact on the environment |
| Energy codes for construction are a violation the property rights of residential and commercial property owners. Regulations take away the ability of the property owner to use their property as they see fit and decrease the value. Each individual is in the best position to decide how to best built their property to suit their needs. |
| City cannot be unreasonable with building code demands. Turning into Boulder will drive away residents like me. |
| We almost had to move our 42 year old business out of Louisville because of costs. With Boulder, Broomfield and now Erie pulling the larger businesses away from Louisville we should be a safe haven for small businesses and need to be careful policies do not price them/us out of 80027. |
| The city should not adopt stricter energy requirements we are already losing businesses and can not afford to lose more |
| Affordability impact on culture, making it affordable for mid-class and fixed income households |
| This isn't important at all |
| I disagree with stricter energy codes |
| HONESTLY balancing the need to address energy efficiency and promote economic development. |
| how about making this optional! |
| should not be mandated if has no meaningful impact on climate and is impractical for multiple reasons |
| I don't think they should |
| Stricter codes well hurt economic development |
| reasonable cost benefit analysis |
| I don't believe the city should make stricter codes at this time |
| Cost to residents and building owners |
| You ignore residential costs. Balance climate change with reasonable costs to business and residential owners and renters. |
| Don't enforce any of these. |

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| all of above. also City of Louisville should provide electric bike rebates Denver is beating us to the punch and they are effective and ahead of us. we need to step up our game |
| Research from various sources, don't just go with the trend. What are the long-term costs from creation to post-use of materials? What is the true gain of efficiency? The difference between the 2018 and 2021 codes are not gigantic, yet the cost differences are huge. |
| Cost/benefit analysis |
| Priceing out people who are not "true believers." |
| Stop making it astronomically impossible for our children to live here!!!!! |
| none of the above; sensible and based on citizens' afordability and needs |
| NOT imposing extra costs on the homeownwers |
| COST |
| Less government interference with construction. |
| Impact on economic development and growth |
| 1) Addressing climate change while promoting economic development is a prime concerns. 2) However, many people will not be able to afford the upgrades!!!! While my husband and I are able to afford them, the installation of solar panels, for instance, is tricky given the amount of hail storms we have here in Louisville wherein the solar panels break. It takes an extremely long time to get them replaced. The hail storm of 2018 was a prime example wherein pretty much everyone in Louisville had to replace their roofs. Those with solar panels waited as long as a year to have them replaced. How much product will be available given the decrease of a plethora of products due to the Covid-19 pandemic? |
| Businesses and residences need to recover from a massive fire and a possible redesign. We do not need to spend money on unsustainable programs. Louisville residents need to recover and rebuild before we go green unnecessarily. |
| The city council implemented building codes to conform to their political agenda. They "thought they would have time to figure it out". |
| Does it actually support your goals |
| Codes should not be stricter. The city will be making it more difficult to afford updating homes or building new |
| Diversity of residents, can't price some people out with this |
| There is no climate emergency, it's all about control! I should be able to have what I want in my house, not what the government says I should have! Are you going to pay my bills? |
| Why don't you stop imposing stupid regulations that make the city a less affordable and less desirable place to live? |

| |
|---|
| I do not support all electric. Doesn't it still require coal or some other gas emitting resources to create electricity? Xcel will only allow so electricity for solar panels. Electric heat is not as warm or affordable as gas. |
| The economic development and climate change issues *do* need to be balanced in order for fixes to the climate emergency to work, which means that both the climate emergency and economic development must be number 1 priorities. |
| High cost of electricity and infrastructure to provided power, unlike CA with rolling blackouts. |
| Traffic congestion and smog. Bad air quality days. |
| I'm all for all-electric but it is not feasible at this time. We can barely produce or afford it. The grid is not adequate for the additional load and the price is going to increase, not decrease - am I correct? |
| costs are ultimately passed onto users of the building. if its too difficult/expensive in louisville, they will go to erie, longmont, lafayette, etc. it will only hurt Louisville is they do not maintain competitiveness with the nearby communities. |

# Appendix B: Survey Questions

## Demographic Questions:

1) Name & email

2) Would you like to be updated by email on the energy code development process?

   a) Yes

   b) No

3) Which of the following best describes you (check all that apply)? (*optional*)

   a) Asian or Pacific Islander

   b) Black or African American

   c) Hispanic or Latino

   d) Native American or Alaskan Native

   e) Native Hawaiian or Other Pacific Islander

   f) White

   g) Multiracial or Biracial

   h) A race/ethnicity not listed here (write-in)

4) What sector do you primarily represent (select one):

   a) Building owner

   b) Building Developer

   c) Business owner/manager

   d) Tradesperson (electrician, plumber, etc.)

   e) Energy efficiency expert

   f) Energy or facility manager

   g) Engineer, Architect or Designer

   h) General Contractor

i) Affordable Housing representative

j) Residential tenant or occupant

k) Home owner

l) Other Business (Write-in)

5) Are you currently operating a business or considering owning/operating a business within the City of Louisville?

a) Already owns or operates in a business located in Louisville.

b) Already owns or operates in a business that conducts business in Louisville but is not located in the City.

c) Considering starting or expanding a business in Louisville.

d) No I am not.

6) Do you work within the City of Louisville?

a) Yes

b) No

7) Do you live within the City of Louisville?

a) Yes

b) No

8) How would you rate your knowledge/understanding of the City of Louisville's current energy code?
a) (Scale 1-10)

## Group 1: Building Owner / Building Developer

Note: For all open-response questions, if you don't know or do not have feedback, please write-in NA.

### Page 1 Group 1

9) Does your company have sustainability or climate related goals?

a) Yes, we have a sustainability plan/program and goals.

b) Yes, we have started small efforts to be more sustainable but no official plan/program or goals.

c) No, we've discussed internally but don't have climate or sustainability goals, plans, or programs.

d) No, we don't have climate or sustainability goals, plans or programs.

10) If so, please provide a high-level overview of your sustainability/climate related goals, plans, or programs.

a) [open-ended / optional]

11) Are you planning any major building or tenant space retrofits within the next 1-3 years?

a) Yes.

b) Yes after 3+ years.

c) No.

12) Do you have plans to build or acquire new property(ies) within the City of Louisville in the next 1-3 years?

a) Yes.

b) Yes after 3+ years.

c) No.

13) What are your main considerations when operating and/or working in Louisville? (check all that apply)

a) Cost of doing business

b) Comfort

c) Environmental impact / Sustainability

d) Culture/community

e) Rules/regulations

f) Other (write-in)

14) How would you rate your experience installing/maintaining heat-pumps and other efficient all-electric HVAC systems?

a) [scale 1-10]

15) Do any of your current buildings or tenant spaces utilize heat-pumps or other efficient all-electric HVAC systems?

a) Yes, more than one.

b) Yes, just one.

c) No.

16) How often do you currently design/build/install all-electric HVAC systems in new construction projects?

a) Never.

b) Minority of projects.

c) Approximately half of all projects.

d) Majority of the projects.

17) What's the most important consideration for the City in adopting stricter energy codes for residential and commercial construction?

a) The climate emergency.

b) Economic development.

c) Balancing the need to address climate change and promote economic development.

d) Other [write-in].

## Group 1 Page 2

## Intro:

**Current Energy Code:**

The City of Louisville has adopted the 2021 IECC, as well as additional amendments requiring further energy savings and all-electric construction items:

**Commercial New Construction**

- Increased insulation levels
- Increased fenestration efficiency requirements
- Increased HVAC efficiency
- Electric vehicle charging and infrastructure
- Electric-ready wherever gas appliances are installed
- Solar-ready zone required

**Residential New Construction**

- Increased insulation levels
- Increased ductwork and piping insulation requirements
- Mandatory heat recovery
- Electric vehicle charging and infrastructure
- Electric-ready wherever gas appliances are installed
- Net zero Appendix RC required

**Commercial Code Scenarios for Consideration:**

The City of Louisville is considering updates to the commercial energy code to improve the environmental and operational performance of new commercial buildings. These updates could include, but are not limited to, all-electric new construction, stricter efficiency requirements, energy offset requirements using solar, or net zero requirements, such as those found in Appendix CC of the current IECC 2021 code.

**Residential Code Scenarios for Consideration:**

For residential energy code adoption, Louisville has already adopted Appendix RC as a mandatory measure for all new construction buildings. The Appendix RC requires new single-family residential homes to meet a specific energy efficiency criteria and offset their energy use with onsite or offsite solar. Future residential code scenarios could include all-electric construction requirements.

Note, for all open response questions, if you don't know or do not have feedback, please write in NA.

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## Questions Page 2 Group 1

18) How do you perceive the new considerations for energy code would impact your ability to develop/design/build housing affordably in the City of Louisville?

a) [open ended]

19) How do you perceive the new considerations for energy code would impact your ability to develop/design/build commercial buildings in the City of Louisville?

a) [open ended]

20) Do you need/want training on the current energy code?

a) Yes

b) No

21) Would you need/want training on the proposed codes/policies if enacted?

a) Yes

b) No

22) What data or information do you need to better understand the potential impacts of energy code options on your business and operations?

a) [open-ended]

23) Would you prefer energy code requirements that:

a) Set an energy consumption performance target and allow for flexibility in how a building meets that requirement which can include onsite PV if needed to meet the performance target. (Performance approach).

b) Set an energy consumption performance target that specifies an efficiency standards for equipment that must be met and requires mandatory solar on all new buildings. (Performance + prescriptive approach).

24) How much flexibility in building design would you prefer to achieve code/policy requirements?

a) The more flexibility the better.

b) Some flexibility but some clear expectations/rules.

c) Set prescriptive standards (equipment efficiency, envelope requirements, mandatory solar, etc).

25) Would you be willing to pay more upfront for all-electric new construction with onsite solar if the payback was longer in order to reduce the carbon/environmental impact of the building?

a) Not willing

b) Somewhat not willing

c) Undecided

d) Somewhat willing

e) Willing

26) What is the payback time frame that you would be comfortable with, for additional upfront costs that support carbon reduction, all-electric, or net zero construction?

a) 0-5 years

b) 5-10 years

c) 10-20 years

d) 20-30 years

e) 30+ years

f) I am not interested in increasing upfront construction costs for carbon reduction.

27) What payback period would be your minimum threshold to consider solar onsite for a mixed-fuel building if it represented a higher up-front cost?

a) 0-5 years

b) 5-10 years

c) 10-20 years

d) 20-30 years

e) 30+ years

f) I am not interested in increasing upfront construction costs for solar.

28) What payback period would be your minimum threshold to consider solar onsite for an all-electric building if it represented a higher up-front cost?

a) 0-5 years

b) 5-10 years

c) 10-20 years

d) 20-30 years

e) 30+ years

f) I am not interested in increasing upfront construction costs for solar.

29) The City has in place the IECC 2021 code along with some efficiency strengthening amendments. How supportive would you be of including a minimum energy offset requirement in addition to the 2021 code, which would require on-site or off-site solar?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

30) How supportive would you be if the City were to consider an all-electric requirement for new commercial construction code if industrial processes were exempt?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

31) How supportive would you be if the City were to consider an energy code that required a 20% reduction in energy use from the 2021 energy code for commercial construction?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

32) How supportive would you be if the City were to consider a commercial energy code that required net zero energy through efficiency and onsite/off-site renewable energy?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

33) What is your biggest concern or perceived barrier to the commercial code considerations presented?

a) [open-ended question]

34) In your opinion, what is the biggest benefit to the commercial code considerations presented?

a) [open-ended question / optional]

35) What HVAC systems, process loads, other appliances, or specific building types do you think would need to be exempted from the commercial code options presented? (The rationale for exemptions could be prohibitively higher cost to operate, infeasible with current energy needs, technology does not exist, etc.)

a) [open-ended question / optional]

36) Are there any considerations to address equity for low-income residents or disproportionately impacted communities that the City of Louisville should consider for any of the three commercial code scenarios considered above?

a) [open-ended question / optional]

37) If the City provides incentives for energy efficiency or electrification upgrades, would you be more likely to support this code adoption?

a) I already support this code option.

b) Not likely to change my support.

c) Somewhat likely to change my support.

d) Yes, it would change my support.

## Group 2: Business Owner, Tradesperson (electrician, plumber, etc), Energy Efficiency Expert, Energy or Facility Manager, Engineer, Architect, Designer, General Contractor and Other Business.

### Group 2 Page 1

Note, for all open response questions, if you don't know or do not have feedback, please write in NA.

38) Does your business rent or own your office/workplace in the City of Louisville?

a) Rent.

b) Own.

c) Don't have an office/workplace in the City of Louisville.

39) Does your company have sustainability or climate related goals?

a) Yes, we have a sustainability plan/program and goals.

b) Yes, we have started small efforts to be more sustainable but no official plan/program or goals.

c) No, we've discussed internally but don't have climate or sustainability goals, plans, or programs.

d) No, we don't have climate or sustainability goals, plans or programs.

40) If so, please provide a high-level overview of your sustainability/climate related goals, plans, or programs.

a) [open-ended]

41) Do you have plans to build new or retrofit existing office space within the City of Louisville in the next 1-3 years?

a) Yes

b) Yes after 3+ years

c) No

42) What payback period would be your minimum threshold to consider solar onsite for your business?

a) 0-5 years

b) 5-10 years

c) 10-20 years

d) 20-30 years

e) 30+ years

f) I am not interested in solar for my business.

g) I already have solar onsite for my business.

43) What are your main considerations when operating and/or working in Louisville? (check all that apply)

a) Cost

b) Comfort

c) Environmental impact / Sustainability

d) Culture/community

e) Rules/regulations

f) Other (write-in)

44) How would you rate your experience designing/building/installing heat-pumps and other efficient all-electric HVAC systems?

a) [scale 1-10 or Not Applicable]

45) What's the most important consideration for the City in adopting stricter energy codes for residential and commercial construction?

a) The climate emergency.

b) Economic development.

c) Balancing the need to address climate change and promote economic development.

d) Other [write-in].

## Group 2 Page 2

## Intro:

**Current Energy Code:**

The City of Louisville has adopted the 2021 IECC, as well as additional amendments requiring further energy savings and all-electric construction items:

**Commercial New Construction**

- Increased insulation levels
- Increased fenestration efficiency requirements
- Increased HVAC efficiency
- Electric vehicle charging and infrastructure
- Electric-ready wherever gas appliances are installed
- Solar-ready zone required

**Residential New Construction**

- Increased insulation levels
- Increased ductwork and piping insulation requirements
- Mandatory heat recovery
- Electric vehicle charging and infrastructure
- Electric-ready wherever gas appliances are installed
- Net zero Appendix RC required

**Commercial Code Scenarios for Consideration:**

The City of Louisville is considering updates to the commercial energy code to improve the environmental and operational performance of new commercial buildings. These updates could include, but are not limited to, all-electric new construction, stricter efficiency requirements, energy offset requirements using solar, or net zero requirements, such as those found in Appendix CC of the current IECC 2021 code.

**Residential Code Scenarios for Consideration:**

For residential energy code adoption, Louisville has already adopted Appendix RC as a mandatory measure for all new construction buildings. The Appendix RC requires new single-family residential homes to meet a specific energy efficiency criteria and offset their energy use with onsite or offsite solar. Future residential code scenarios could include all-electric construction requirements.

Note, for all open response questions, if you don't know or do not have feedback, please write in NA.

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## Questions Page 2 Group 2:

46) How do you perceive the new considerations for energy code would impact your ability to maintain or expand your current business in the City of Louisville?

a) [open ended]

47) Do you need/want training on the current energy code?

a) Yes

b) No

48) Would you need/want training on the proposed codes/policies if enacted?

a) Yes

b) No

49) What data or information do you need to better understand the potential impacts of energy code options on your business and operations?

a) [open-ended]

50) The City has in place the IECC 2021 code along with some efficiency strengthening amendments. How supportive would you be of including a minimum energy offset requirement in addition to the 2021 code, which would require on-site or off-site solar?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

51) How supportive would you be if the City were to consider an all-electric requirement for new commercial construction code if industrial processes were exempt?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

52) How supportive would you be if the City were to consider an energy code that required a 20% reduction in energy use from the 2021 energy code for commercial construction?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

53) How supportive would you be if the City were to consider a commercial energy code that required net zero energy through efficiency and onsite/off-site renewable energy?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

54) What is your biggest concern or perceived barrier to the commercial code considerations presented?

a) [open-ended question]

55) In your opinion, what is the biggest benefit to the commercial code considerations presented?

a) [open-ended question / optional]

56) What HVAC systems, process loads, other appliances, or specific building types do you think would need to be exempted from the commercial code options presented? (The rationale for exemptions could be prohibitively higher

cost to operate, infeasible with current energy needs, technology does not exist, etc.)

a) [open-ended question / optional]

57) Are there any considerations to address equity for low-income residents or disproportionately impacted communities that the City of Louisville should consider for any of the three commercial code scenarios considered above?

a) [open-ended question / optional]

58) If the City provides incentives for energy efficiency or electrification upgrades, would you be more likely to support this code adoption?

a) I already support this code option.

b) Not likely to change my support.

c) Somewhat likely to change my support.

d) Yes, it would change my support.

## Group 3: Residential Section

### Group 3, Page 1

### Intro:

**Current Energy Code:**

The City of Louisville has adopted the 2021 IECC, as well as additional amendments requiring further energy savings and all-electric construction items:

**Commercial New Construction**

- Increased insulation levels
- Increased fenestration efficiency requirements
- Increased HVAC efficiency
- Electric vehicle charging and infrastructure

**Residential New Construction**

- Increased insulation levels
- Increased ductwork and piping insulation requirements
- Mandatory heat recovery
- Electric vehicle charging and infrastructure

- Electric-ready wherever gas appliances are installed
- Solar-ready zone required

- Electric-ready wherever gas appliances are installed
- Net zero Appendix RC required

**Commercial Code Scenarios for Consideration:**

The City of Louisville is considering updates to the commercial energy code to improve the environmental and operational performance of new commercial buildings. These updates could include, but are not limited to, all-electric new construction, stricter efficiency requirements, energy offset requirements using solar, or net zero requirements, such as those found in Appendix CC of the current IECC 2021 code.

**Residential Code Scenarios for Consideration:**

For residential energy code adoption, Louisville has already adopted Appendix RC as a mandatory measure for all new construction buildings. The Appendix RC requires new single-family residential homes to meet a specific energy efficiency criteria and offset their energy use with onsite or offsite solar. Future residential code scenarios could include all-electric construction requirements.

Note, for all open response questions, if you don't know or do not have feedback, please write in NA.

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## Page 1 Group 3 Questions:

59) What are your main considerations for choosing to live in Louisville? (check all that apply)

a) Cost

b) Comfort

c) Environmental impact / Sustainability

d) Culture/community

e) Rules/regulations

f) Other (write-in)

60) Outside the Marshall Fire rebuild efforts, do you plan to build a new home or undergo a major retrofit on your home in the next 1-3 years

a) Yes

b) No

c) My home is part of the Marshall Fire rebuild effort.

61) Do you currently live in an all-electric and/or net zero home OR have you taken steps to start to electrify your home?

a) Yes, I live in an all-electric home.

b) Yes, I live in a net-zero home.

c) Yes, I am working on electrifying my home.

d) Yes, I am working on making my home net zero energy.

e) No.

62) Do you currently have solar installed on your home?

a) Yes.

b) No.

63) What's the most important consideration for the City in adopting stricter energy codes for residential and commercial construction?

a) The climate emergency.

b) Economic development.

c) Balancing the need to address climate change and promote economic development.

d) Other [write-in].

The City has adopted the Zero Energy Appendix (Appendix RC) for all new single-family home construction:

64) Do you have a clear understanding of the City of Louisville's current residential new construction code requirements?

a) [Sliding scale 1-5]

65) How do you perceive that Louisville's residential building code standards impact affordability of housing in the City?

a) Positively impact housing by reducing energy costs for residents and tenants.

b) Negatively impact housing by increasing upfront costs.

c) I don't see there being an impact.

d) Other [write-in].

66) What is your biggest concern or perceived barrier to building new homes to the Zero Energy Appendix?

a) [open-ended question]

67) In your opinion, what is the biggest benefit to building new homes to the Zero Energy Appendix?

a) [open-ended question / optional]

68) If the City were to consider an all-electric requirement for new single-family home construction:

69) What is your biggest concern or perceived barrier to building all-electric new homes?

a) [open-ended question]

70) In your opinion, what is the biggest benefit to building all-electric new homes?

a) [open-ended question / optional]

71) Should there be an exemption or flexibility granted for certain community members to allow them to build with natural gas?

a) [open-ended question / optional]

72) If the City provides incentives for electrification, would you be more likely to support an all-electric code requirement for new single-family home construction?

a) I already support this code option.

b) Not likely to change my support.

c) Somewhat likely to change my support.

d) Yes, it would change my support.

## Optional Commercial Code Questions for Group 3:

The City of Louisville is considering updates to the commercial energy code to improve the environmental and operational performance of new commercial buildings. These updates could include, but are not limited to, all-electric new construction, stricter efficiency requirements, energy offset requirements using solar, or net zero requirements, such as those found in Appendix CC of the current IECC 2021 code.

73) The City has in place the IECC 2021 code along with some efficiency strengthening amendments. How supportive would you be of including a minimum energy offset requirement in addition to the 2021 code, which would require on-site or off-site solar?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

74) How supportive would you be if the City were to consider an all-electric requirement for new commercial construction code if industrial processes were exempt?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

75) How supportive would you be if the City were to consider an energy code that required a 20% reduction in energy use from the 2021 energy code for commercial construction?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

76) How supportive would you be if the City were to consider a commercial energy code that required net zero energy through efficiency and onsite/off-site renewable energy?

a) I do not support this code option.

b) I am neutral on this code option.

c) I support the adoption of this code option.

d) I need more information.

77) What is your biggest concern or perceived barrier to the commercial code considerations presented?

a) [open-ended question]

78) In your opinion, what is the biggest benefit to the commercial code considerations presented?

a) [open-ended question / optional]

79) What HVAC systems, process loads, other appliances, or specific building types do you think would need to be exempted from the commercial code options presented? (The rationale for exemptions could be prohibitively higher cost to operate, infeasible with current energy needs, technology does not exist, etc.)

a) [open-ended question / optional]

80) Are there any considerations to address equity for low-income residents or disproportionately impacted communities that the City of Louisville should consider for any of the three commercial code scenarios considered above?

a) [open-ended question / optional]

81) If the City provides incentives for energy efficiency or electrification upgrades, would you be more likely to support this code adoption?

a) I already support this code option.

b) Not likely to change my support.

c) Somewhat likely to change my support.

d) Yes, it would change my support.

Appendix C

# 2021 International Energy Conservation Code


**About I-Codes:** Building codes improve the quality of construction of the built environment and thereby promote the health, safety, resiliency, affordability, sustainability, and general welfare of our communities. Building codes set a bare minimum construction quality that local officials deem necessary and that consumers expect. Most jurisdictions across the country adopt model building codes published by the International Code Council, and these are updated every three years in an extensive process involving builders, trades, architects, manufacturers and suppliers, low-income advocates, and, crucially, local building officials who are ultimately responsible for enforcing the codes. These codes are then adopted at local level. The 2021 codes are the most recent edition.

**About the 2021 International Energy Conservation Code (IECC):** After two previous cycles of stagnant efficiency, building officials voted overwhelmingly in favor of provisions in the latest IECC to strengthen energy efficiency. Overall, the 2021 IECC reduces energy by 8-9% (and reduces energy bills by 8-9%) compared to the previous 2018 IECC. The 2021 also includes language clean-up and clarifications, and an expanded focus on flexibility and options. Most of the changes "tighten up" provisions already in the code. Key changes for residential new construction include a better "thermal envelope" (e.g. walls, insulation, windows, doors, etc.), windows that take into account "solar heat gain" in climate zone 5B (the climate zone for the front range of Colorado), changes to duct testing, and increased use of lighting controls. On the commercial side, key changes include air barrier commissioning (i.e. testing and verification of the layer in walls that keeps outside air out and clean, conditioned inside air in), more efficient mechanical systems, technology for energy monitoring in larger buildings so that building operators can better measure and track their building's energy use, and increased options for additional energy efficiency "points."

**Jurisdictions with the 2021 IECC:** Arapahoe County, Aurora, Fort Collins, Larimer County, Longmont, Louisville, Parker, Superior, and Vail. At least 39 other jurisdictions covering 49% of Colorado's population have announced plans to adopt the 2021 IECC within the next year.

**New Colorado Law (2022):** The Colorado legislature passed a new bipartisan law that updates minimum energy code requirements. Jurisdictions must adopt at least the 2021 IECC, along with EV-ready, PV-ready, and electric-ready, when updating any other building codes between July 1, 2023 and July 1, 2026. After that date, jurisdictions must adopt at least a low-energy and carbon code. A new Energy Code Board will identify code language for the EV-ready, PV-ready, electric-ready, and low energy and carbon code, and jurisdictions can choose to adopt that code language, something equivalent, or something stronger.

**Cost Discussion:** An extensive analysis from the Pacific Northwest National Labs (PNNL, the entity charged by the U.S. Congress to perform energy code cost-effectiveness studies) calculates that the increased first cost per household is $3,376 for the 2021 IECC versus the 2015 IECC in Climate Zone 5B (as of Dec. 2021). PNNL's analysis is considered the most credible compared to other estimates because of PNNL's long-standing peer-reviewed methodology, and its absence of profit motive or conflict of interest. The majority of the first cost increase compared to the 2015 IECC is an increase in insulation levels. (Cost data is roughly similar between the 2015 and 2018 IECC, since the efficiency levels were similar.)

- Note: Applying a 19% inflation/supply chain adder as recommended by the National Association of Home Builders, and slightly increasing the size of the average house to better represent our region, yields an increased first cost of $5,118, per PNNL. Also, natural gas prices for residential customers in Colorado have nearly doubled since the study, which would improve the energy cost savings as compared to the original report.

| Increased First Cost (vs 2015) | Mortgage Increase | Annual Energy Savings | Net Savings | Years to Positive Savings | Lifecycle Cost Savings |
|---|---|---|---|---|---|
| $3,376 | $122 | $161 | $20/yr | 9 | $1,247 |

**Mild/Medium/Aggressive Rating:** Mild. The 2021 IECC is the minimum energy code required by the state of Colorado and even before the state law, jurisdictions covering half of Colorado's population had already announced plans to adopt it. As such, "mild" also includes EV-ready, PV-ready, and electric-ready as required by Colorado law. A "medium" rating would include a higher degree of electric transition – for instance, allowing a choice of either all-electric or mixed fuel new construction but requiring mixed fuel homes and buildings to pursue additional energy efficiency to make up for the extra emissions from fossil gas use onsite. An "aggressive" rating would include either all-electric requirements, the zero energy appendices, or both.

**Notes on Cost Studies:**

- In a memo to Marshall fire households, the Home Builders Association. of Metro Denver estimated $100,000 in additional upfront costs for 2021 IECC, then scaled back to $11,000 at the state legislature in April 2022 based on a study from Home Innovation Research Labs for National Association of Home Builders.
- Another study from ICF International showed HIRL/NAHB's $11,000 estimate used incorrect economic assumptions, and determined that the estimates in PNNL's study are more accurate.
- A City of Louisville survey of two builders estimated $6,450 in additional first cost for the 2021 IECC vs Louisville's amended 2018 IECC (for a slightly larger house size).
- Natural gas prices were $6.06/thousand cubic feet in PNNL's analysis, versus $11.93 as of April 2022, per EIA.

**Prepared For:** DOLA Code Cohort for Northwestern Metro / Boulder County
**Date Updated:** July 19, 2022

SWEEP
SOUTHWEST ENERGY EFFICIENCY PROJECT

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# Solar-Ready

**About:** Solar-Ready appendices (RB for residential and CB for commercial) are officially prepared by the International Code Council as "add-on" to the IECC. They prepare homes and buildings for the future installation of solar by requiring conduit, space on the electrical panel, space reserved on the roof free from obstructions and shady objects, adequate roof structural capacity, notation on construction documentation, and a permanent certificate. Shady roofs are exempted. The current appendices only include multifamily buildings 4-5 stories tall, so an amendment is needed to include all multifamily buildings – a provision we call "expanded solar-ready".

**Cost Discussion:** Upfront costs are minimal (<$200). Cost savings include avoiding the need to tear up walls, redo wiring, and potentially upgrade an electrical panel. They also avoid the situation where roof penetrations for attic vents, etc. are poorly placed in a way that prevents future solar.

**Jurisdictions with Solar-Ready:** Avon, Boulder, Boulder County, Breckenridge,* Craig, Denver, Fort Collins, Frisco,* Golden, Lafayette, Louisville, Superior, Vail, and Wheat Ridge. Others considering or in the process of adopting it, besides Code Cohort communities, include Eagle County (*via Summit County sustainability program). Note: a new 2022 Colorado law requires all upcoming IECC adoptions to include solar-ready provisions equivalent to or better than a version to be identified by the state's Energy Code Board. We highly anticipate Appendices RB and CB with the multifamily fix will meet the law.

**Mild/Medium/Aggressive Rating:** Mild. A "medium" rating would require solar to actually be installed on some buildings for part of the energy load, plus a residential solar access law. An "aggressive" rating would require solar installed on all buildings for all of the energy load, a residential solar access law, and a retrofit policy.

**Prepared For:** DOLA Code Cohort for Northwestern Metro / Boulder County
**Date Updated:** July 7, 2022

SWEEP
SOUTHWEST ENERGY EFFICIENCY PROJECT

LOTUS
Engineering & Sustainability

SHUMS CODA ASSOCIATES

# EV-Ready

**About:** Electric Vehicle Ready (EV-Ready) appendices prepare homes and buildings for the current transition to electric vehicles. These appendices recognize that the vast majority of all electric vehicle charging will occur at home, with some charging infrastructure needed at work or around town. New single family homes will require one EV-ready space, and new multifamily and commercial buildings will require a percentage of EV-capable, EV-ready, and EV-installed spaces depending on the building type and use.

- Note: EV-ready is especially important for multifamily buildings, for equity reasons, since renters can't retrofit their parking lot or garage to install a 240-volt outlet on their own.

These percentages align with levels recently approved by Denver's code committee, and are less than the percentages adopted in some other jurisdictions (Superior, for instance). Multifamily percentages were reduced to ease the cost impact to new housing, and commercial building percentages were reduced to account for charging behavior based on building type.


| Building Type | Minimum EV Installed Spaces | Minimum EV Ready Spaces | Minimum EV Capable Spaces |
|---|---|---|---|
| Single-family Duplex, Townhome | N/A | 1 Space | N/A |
| Group A, B, E, M | 10% | 5% | 10% |
| Group F, I, R-3, R-4 | 2% | 0% | 5% |
| Group R-1 and R-2[a] | 15% | 5% | 40% |
| Group S-2 Parking Garages | 10% | 5% | 0% |

a. Where all (100%) parking serving R-2 occupancies are EV ready spaces, requirements for EVSE spaces for R-2 occupancies shall not apply.

(In I-code terminology, Group A is Assembly, B is Business, E is Education, F is Factory & Industrial, I is Institutional, M is Mercantile, R-1 is transient residential, R-2 is apartments and other non-transient residential, R-3 and R-4 are small group homes including halfway houses, rehab centers, care facilities, etc., and S is Storage.)

**Market Discussion:** EVs comprised 9% of new vehicle sales in Colorado in Q1 2022, and dealers continue to have long waitlists, especially with the recent rises in gas prices. All major auto brands have announced plans to shift the majority of their fleets to EVs by the mid-2030s or sooner. Newer models have ranges of well over 300 miles. Besides the reduced environmental impact, buyers like the faster acceleration, the low maintenance, the safety ratings, and the convenience of avoiding trips to the gas station.

**Cost Discussion:** One EV-ready space for a single-family home averages about $325-$400 at the time of construction. Federal and Xcel Energy rebates are available. Retrofitting even just the wiring later can run $481-$1,493 per space (depending on the distance from the panel to the garage) plus potential costs to upgrade the electrical panel. For commercial and multifamily, costs can run $300 for EV-capable, $1,300 for EV-ready, and $2,500 for EV-Installed per space. Federal, Colorado, and Xcel Energy rebates are available. Retrofits done later can cost several times more, and may include the need to tear up and rebuild walls (and in the case of commercial and multifamily, parking lots and landscaping), redo wiring, and upgrade the electrical panel.

**Jurisdictions with EV-Ready:** Aspen, Avon, Boulder, Boulder County, Breckenridge, Denver, Dillon, Durango, Eagle County, Fort Collins, Frisco, Golden, Lafayette, Lakewood, Larimer County, Louisville, Pueblo County, Steamboat, Summit County, Superior, Westminster, and Vail, Others in the Code Cohort communities are also planning to adopt it. Note: a new 2022 Colorado law requires all upcoming IECC adoptions to include EV-ready provisions equivalent to or better than a version to be identified by the state's Energy Code Board. We highly anticipate these amendments will meet the new law.

**Mild/Medium/Aggressive Rating:** Medium. A “mild” rating would have lower percentages for commercial and multifamily. An "aggressive" rating would require every space in multifamily to have some level of infrastructure, plus a policy for renovations.

**Prepared For:** DOLA Code Cohort for Northwestern Metro Area / Boulder County
**Date Updated:** July 7, 2022

# Electric-Ready and Electric Preferred

**About:** Electric-ready amendments prepare homes and buildings for the choice between electric and gas equipment and appliances by ensuring they have the wiring and panel capacity available for future electric equipment (and enough physical space, in the case of water heaters). Electric-transition amendments, the next step, still allow new construction to be either all-electric or "mixed fuel" (e.g. natural gas) but mixed fuel homes and buildings require extra efficiency to make up for extra emissions.

In particular, the residential amendments in the prescriptive path require mixed fuel homes to select three "additional efficiency packages" instead of one. Mixed fuel homes choosing the "Energy Rating Index" (ERI) pathway would seek a score of 50 instead of 55.* For commercial buildings, mixed fuel buildings would choose extra efficiency options totaling an extra 10 points. The amendment also fixes two places in the commercial code where gas equipment was given more points than electric.

**Market Developments:** Air source heat pumps have been commonplace in other parts of the country, and are now making inroads in Colorado thanks to rapid technological developments that allow "cold climate" heat pumps to supply heat even when outdoor temps fall to -22F. Other configurations are possible as well, such as a non-cold-climate heat pump plus extra "strip heat" that can kick in for extra cold times. (This configuration is cheaper upfront but more expensive to run in extra cold temperatures when the heat strips are on.) For water heating, heat pump water heaters are an easy replacement for a typical gas or electric hot water storage tank. Finally, on the cooking side, some homeowners may express a preference for gas, but induction stoves are proving their mettle with twice-as-fast boil times, more finely-tunable controls, safety protections (e.g. the ability to touch the burner and not get burned) and the near-elimination of harmful air pollutants that lead to increased asthma rates and other respiratory distress.

**Cost Discussion:** Upfront costs depend highly on the configuration selected by the builder. All-electric homes, depending on supply chain availability and builder/contractor familiarity, can be built at no additional cost compared to mixed fuel [1]. Although the upfront costs of an air source heat pump and heat pump water heater are typically more than gas equivalents, the big savings come from avoiding the gas connection and gas piping costs to and within the home or building, and state and utility rebates offset the cost as well. For mixed fuel homes, electric-ready infrastructure is estimated at $300 for a water heater and the same for a stove (or possibly increased to $400 each with inflation and a tight labor market). No additional costs are incurred for electric readiness for a furnace, because central air conditioning or other space cooling would be provided anyway.

* Before 5% efficiency required in R401

**(Cost Discussion Cont'd)** A high-efficiency gas furnace (95-96% AFUE vs 92-93% AFUE), one of the most likely options for the required "additional efficiency package," is a difference of $200-$500 plus labor [2]. Data from the forthcoming Colorado Residential Field Study shows half of new homes are installing high-efficiency gas furnaces already. For water heaters, the difference between meeting the federal minimum efficiency standards of 0.63 UEF and an 0.92 UEF on-demand water heater is $500 plus labor [3] [4]. After heating and water heating, mixed fuel homes would then need to select one more "additional efficiency package" from the list provided in the 2021 IECC.

- Note: separate market transformation efforts are underway to train builders and contractors for the transition to all-electric equipment, and the familiarity and economies of scale are expected to bring total costs down as well.

**Jurisdictions with Electric-Ready and/or Electric Transition:** Boulder, Boulder County, Denver (in progress), Fort Collins, Longmont, Louisville, Superior, other Code Cohort communities (in progress). Note: a new 2022 Colorado law requires all upcoming IECC adoptions to include electric-ready provisions equivalent to or better than a version to be identified by the state's Energy Code Board. We highly anticipate these amendments will be in compliance with the law.

**Mild/Medium/Aggressive Rating:** Medium. A “mild” rating would be just electric ready – i.e. just the wiring and panel capacity. An “aggressive” rating would require all-electric heating and water heating for most residential, multifamily, and commercial buildings, or, even further, no gas connections at all.

[1] Despite a few recent studies, a couple local home builders report challenges getting the costs to "pencil out." State policies passed since then, like the 10% tax credit for heat pumps, heat pump water heaters, and panels, plus regulatory dockets underway at the Public Utilities Commission, may improve the cost calculations.
[2] Manufacturer model database review from electrification expert David Petroy, January 23, 2022. Note: Mr. Petroy notes that some comparisons may show wider differences because more efficient models are more likely to have higher-end “bells and whistles” that don’t affect performance.
[3] Home Depot website comparison of in-stock 0.64 UEF gas storage water heater ($800) and 0.93 gas tankless water heater ($1,300), Feb 9, 2022.
[4] Another full study on the economics of all-electric homes in CO is available at https://swenergy.org/pubs/heat-pump-study-2022

# Efficiency Amendments

**About:** One amendment improves the lighting efficiency in horticulture facilities, and another amendment addresses the heat island effect, as explained below.

These two were selected from a wide array of other strengthening amendments, including a review of other nearby jurisdictions' codes, decarbonization model codes, and the 2024 IECC proposals. These two were selected based on a balance of technical and practical implementability, simple code language, and sustainability impact.

No additional efficiency-strengthening amendments are proposed for residential buildings (beyond those in the electric preferred proposals). This is recognition of the already-decent efficiency improvements in the 2021 IECC, the current challenges with the cost of construction, and the general preferences for simplicity and focused impact.

**Horticulture lighting.** Energy consumption from lighting in marijuana grow facilities, as well as other indoor agricultural facilities, is staggering, and is projected to continue increasing. Lighting can account for 50% to 80% of an indoor facility's energy use and 30% of a greenhouse's energy use. Traditionally, grow facilities hadn't invested in efficient lighting because of uncertainty in their market and shifting legal policies. This proposal is cost-neutral for greenhouses and has a 3-year payback for indoor facilities. This proposal has been approved by the 2024 IECC Commercial Consensus Committee.

**Cool roofs.** Cool roofs are made of materials that reflect more sunlight and absorb less heat. They are usually, though not always, made of lighter-color materials. Cool roofs still allow the installation of solar panels, skylights, mechanical equipment, rooftop amenities, and/or vegetative roofs at the building owner's discretion. This only affects low-sloped (i.e. flat or nearly flat) roofs, and it doesn't apply to roof repairs or replacements. Cool roofs are already in the IECC, but this brings them into our climate zone (5B) in recognition of increased summer temperatures and the growing problem of the heat island effect. Higher urban temperatures also speed the formation of ground-level ozone, the primary component of smog. Costs for a cool roof are equivalent to costs for a black roof, and most suppliers and contractors supply both types. Energy costs are not notably impacted, because more recent energy codes have high amounts of insulation in the attic that limit the roof's impact on inside temperatures. Instead, as noted, the significant benefits here are for reducing heat island and improving air quality.

**Jurisdictions with Efficiency Amendments:** Denver requires a cool roof and has improved horticulture lighting. Other jurisdictions in the area have selected various other amendments to increase the efficiency of their homes and buildings, including Boulder, Boulder County, Breckenridge, Denver, Fort Collins, Frisco, Golden, Louisville, Summit County, and Superior.

**Mild/Medium/Aggressive Rating:** Medium. A "mild" rating would be just the 2021 IECC unamended. An "aggressive" rating would have prescriptive table updates, stricter performance path requirements (e.g. 10% more efficient), and/or more amendments approved for the 2024 IECC.

**ORDINANCE NO. 1845**
**SERIES 2022**

(Second reading amendments shown with deleted text in ~~**Bold Strikethrough**~~ and new text in **Bold Double Underline**.)

**AN ORDINANCE AMENDING CHAPTER 15.18.030 OF THE LOUISVILLE MUNICIPAL CODE CONCERNING AMENDMENTS AND DELETIONS TO THE 2021 INTERNATIONAL ENERGY CONSERVATION CODE TO INCLUDE REQUIREMENTS FOR COMMERCIAL ENERGY USE INTENSITY PERFORMANCE TARGETS AND RESTRICTIONS OF FOSSIL FUEL SPACE AND WATER HEATING EQUIPMENT**

**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 2021 edition of the International Energy Conservation Code; and

**WHEREAS,** the City of Louisville remains committed to its adopted goals to reduce energy consumption, increase clean energy sources, and support the transition to a low-carbon community as outlined in the Sustainability Action Plan and Resolution 25, Series 2019, "A Resolution Setting Clean Energy and Carbon Reduction Goals"; and

**WHEREAS,** reducing building energy consumption is an effective strategy to reduce community-wide energy consumption and increase long-term cost savings for businesses; and

**WHEREAS**, the City Council desires to add requirements for energy use intensity performance standards and building electrification to build a more resilient building stock and support future building electrification efforts pursued and businesses; 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 2021 edition of the International Energy Conservation Code, with amendments, has 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:**

Chapter, 15.18.030 of the Louisville Municipal Code, concerning amendments and deletions to the 2021 International Energy Conservation Code, is hereby amended to read as follows, with new text in underline:

1. Section C202 GENERAL DEFINITIONS is amended to add the following definitions in alphabetical order:

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 annual building site energy use per square foot of gross floor area in units of kBTU/sq ft.

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.

2. Section C401.2 Application is deleted in its entirely and replaced as follows:

**C401.2.** Commercial *buildings* and their building site shall comply with one of the following, as applicable:

**C401.2.1 Performance targets.** New commercial *building* types included in the scope of Appendix PT shall comply with Appendix PT and Sections C403.2.4 and C404.10.

**C401.2.2 Core and shell.** Core and shell buildings shall comply with the provisions of Section C402.1.3 through C402.5. When mechanical systems are installed, core and shell buildings shall also meet the provisions in **C403.2.4, C404.10, and** Section C408.

**C401.2.2.1** Core and shell buildings shall submit a letter of agreement to the City stating the tenant spaces included in the scope of Appendix PT shall meet the EUI target established in Table PT103, and shall include these requirements in their lease or purchase agreements.

**C401.2.3 Tenant finish.** Tenant finishes included in the scope of Appendix PT shall comply with Appendix PT **and C403.2.4 and C404.10**. All other tenant finishes shall comply with the Prescriptive Compliance option, which requires compliance with Sections C401.3, C401.4, C402 through C406, and C408.

**C401.2.4 Other commercial building types.** Commercial *building* types not included above shall comply with the Prescriptive Compliance option, which requires compliance with Sections C401.3, C401.4, C402 through C406, and C408.

Exception: Additions, alterations, repairs, and changes of occupancy to existing buildings complying with Chapter 5.

3. Section C403.2 System design is modified as follows:

**C403.2 System design.** Mechanical systems shall be designed to comply with Sections C403.2.1 through ~~C403.2.3~~ C403.2.4. Where elements of a building's mechanical systems are addressed in Sections C403 through C403.14, such elements shall comply with the applicable provisions of those sections.

4. Section C403.2.4 Space heating equipment is added as follows:

**C403.2.4 Space heating equipment.** Fossil-fuel ~~**warm-air furnaces**~~ **appliances** and electric resistance space heating equipment shall not be permitted for space heating.

Exceptions:

1. **Emergency backup.** Where it is required by an applicable law or regulation to provide space heating with an emergency power system or a standby power system.
2. ~~**Where cfm/sq. ft. ventilation requirements result in conditions where the Building Official determines that space heating requirements cannot reasonably be met without combustion space heating systems.**~~
2. ~~3.~~ **Certain make-up air systems.** Electric resistance in make-up air systems where energy recovery ventilation is prohibited by the International Mechanical Code.
3. ~~4.~~ **Supplementary heat.** Electric resistance heat used for supplementary heat in accordance with Section C403.4.1.1
4. ~~5.~~ **Electric resistance budget. In addition to any exceptions in this section, ~~Up~~ up** to 5 W of electric resistance space heating per square foot of *conditioned floor area* in the *building*, not including supplementary heat.
   Electric resistance heating elements integrated into heat pump equipment.
5. ~~6.~~ **Integrated units.** Electric resistance heating elements integrated into heat pump equipment.
6. ~~7.~~ **Heated plenums.** Electric resistance in heated plenums.
7. **Temporary systems. Temporary electric resistance heating systems are permitted where serving future tenant spaces that are unfinished and unoccupied, provided that the heating equipment is sized and controlled to**

**achieve interior space temperatures no higher than needed to prevent freezing.**

8. **Freeze protection.** ~~**Electric resistance for freeze protection elements.**~~ **Electric resistance in heating systems intended for freeze protection.**
9. **Outdoor systems.** Equipment used for outdoor heating.
10. **Specific conditions. Portions of buildings that require fossil fuel or electric resistance space heating for specific conditions approved by the Building Official for research, health care, process or other specific needs that cannot practicably be served by heat pump or other space heating systems. This does not constitute a blanket exception for any occupancy type.**
11. ~~**10.**~~ **Replacements.** Replacement fuel-fired ~~**furnace equipment**~~ **appliances**.

5. Section C404.10 Water heating equipment is added as follows:

**C404.10 Water heating equipment.** Fossil fuel and electric resistance instantaneous and storage water heaters shall not be used to provide hot water.

Exceptions:

1. **Emergency backup. Where it is required by an applicable law or regulation to provide water heating with an emergency power system or a standby power system.**
2. ~~**1.**~~ **Integrated units.** Resistance heating elements integrated into heat pump water heating equipment.
3. ~~**2.**~~ **Recirculation loops.** Electric resistance elements used for recirculation loop temperature maintenance.
4. ~~**3.**~~ **Small systems.** Electric storage water heaters with a rated water storage volume no greater than 20 gallons.
5. ~~**4.**~~ **Point-of-use systems.** Instantaneous electric water heaters located within 10 feet of the point of use.
6. ~~**5.**~~ **Renewable electricity.** Electric resistance equipment where not less than 100 percent of the annual service water-heating requirement is provided by an *on-site renewable energy system* not used to meet any other provision of this code.
7. ~~**6.**~~ **Renewable or waste thermal energy.** Electric resistance storage water heating equipment in *buildings* where not less than 75% of the annual service water heating requirement is met by a solar thermal system or other renewable thermal system.
8. ~~**7.**~~ **High-temperature requirements.** Water heating systems that serve end-uses or have a storage requirement that necessitates a water temperature of 141°F (55°C) or hotter.
9. **Electric resistance budget. In addition to any exceptions in this section, a budget of 24 kW plus 0.1 watts per square foot of building area of electric resistance service water heating capacity per building.**
10. **Commercial kitchens. Electric booster-heaters serving commercial dishwashers, commercial food service equipment, and other approved**

**process equipment that require supply water temperatures of 120°F (49°C) or higher.**

11. ~~8.~~ **Replacements.** Replacement of gas-fired storage water heaters or instantaneous water heaters.

## APPENDIX PT
## MODELING TO A PERFORMANCE TARGET

**PT101 Scope.** This section establishes criteria for demonstrating compliance with a performance target, and is required for new multifamily (occupancy R-2), offices greater than 5,000 $ft^2$, primary and secondary schools, parking garages, and warehouses. All end use load components within and associated with the building and their building sites shall be modeled.

**PT102 Mandatory requirements.** The requirements in this section are mandatory requirements and shall be required in addition to the provisions of ASHRAE 90.1 Appendix G.

**PT103 Performance target.** Projects of the types listed in Table PT103 shall demonstrate that the proposed design reaches a fixed energy use intensity (EUI) less than or equal to the values in Table PT103, calculated utilizing the energy modeling procedures of Appendix G of ASHRAE 90.1. For *buildings* with multiple occupancy types, the modeled performance target shall be a weighted average of the floor area of each occupancy type.

> **Exception:** Energy used for electric vehicle charging, data centers, and process loads shall be excluded from compliance modeling.

### TABLE PT103
### PERFORMANCE TARGETS

| BUILDING TYPE | PERFORMANCE TARGET (kBTU/ft2) |
|---|---|
| Multifamily (Occupancy R-2) | 32 |
| Office, small (>5,000 ft2) | 19 |
| Office, medium (5,000 – 50,000 ft2) | 23 |
| Office, large (>50,000 ft2) | 28 |
| School, primary | 34 |
| School, secondary | 31 |
| Warehouse | 11 |

**PT104 Renewable Energy.** On-site renewable energy generated by a system installed as part of this project that is used by the building shall be subtracted from the proposed design energy consumption prior to calculating the proposed building performance.

**PT105 Performance documentation.** Documentation to verify compliance with this section shall be provided to the code official.

**PT105.1 Projected compliance report.** Permit submittals shall include a report documenting the proposed design is projected to meet the EUI target. The compliance report shall include the following specific information beyond the information required in ASHRAE 90.1 Appendix G:

1. Address of the building.
2. An inspection checklist documenting the building component characteristics of the proposed design.
3. Name of individual completing the report.
4. Name and version of compliance software tool.
5. Documentation of the reduction in energy use associated with on-site energy.

**PT105.2 Construction plan requirements.** Construction plans shall depict all component characteristics of the proposed design utilized for the EUI in accordance with ASHRAE 90.1 Appendix G.

**PT105.3 Measured performance report.** Projects shall demonstrate compliance with this code by documenting that the building has achieved the EUI performance calculated based on 12 months of metered energy use after occupancy.

**PT105.3.1 Demonstration of operating energy use.** Metered energy data demonstrating compliance with the EUI target shall be reported to the building official using Energy Star Portfolio Manager and adjusted for the percentage of floor area occupied. While at least 75 percent occupied, the building shall operate at or below its assigned energy use target established in Section PT103 for any recording period of 12 consecutive months that is completed within three years of the date of the Certificate of Occupancy. The owner shall notify the building official when this 12-month period has been successfully completed.

**PT106 Energy metering and monitoring.** All projects must install submetering or monitoring capabilities to support building energy performance analysis. The project must include capabilities to store and access a 24-month continuous data set on an ongoing basis.

**PT106.1 End-use monitoring.** Measurement devices shall be installed in new *buildings* to monitor the electric energy use of each of the following separately:

1. Total electric energy.
2. HVAC systems energy use.
3. Interior lighting.
4. Exterior lighting.
5. Receptacle circuits.
6. Data centers representing over 10 percent of total building load or 5 percent of building floor area.
7. Other process loads that represent 10 percent or more of total building energy use based on building energy use modeling.

**PT106.2 Independent metering.** The following items shall be independently metered. Individual meters used to comply with this section may not serve multiple *buildings*.

1. All fuel sources serving the building.
2. Energy production from on-site renewable energy systems.
3. Electric vehicle (EV) supply equipment.
4. Data centers representing over 10 percent of total building load or 5 percent of building floor area.
5. Other process loads that represent 10 percent or more of total building energy use based on building energy use modeling.
6. Individual tenant energy loads.

6. Section R202 GENERAL DEFINITIONS is amended as follows:

RESIDENTIAL BUILDING. For this code, includes detached one- and two-family dwellings and townhouses, as well as Group R-2 other than for *multifamily*, R-3, and R-4 buildings three stories or less in height above grade plane with separate means of egress.

MULTIFAMILY. Apartments, condominiums, and other similar-type buildings regardless of the number of stories.

**INTRODUCED, READ, PASSED ON FIRST READING, AND ORDERED PUBLISHED** this 15th day of November, 2022.

Ashley Stolzmann, Mayor

ATTEST:

Meredyth Muth, City Clerk

APPROVED AS TO FORM:

Kelly PC, City Attorney

**PASSED AND ADOPTED ON SECOND AND FINAL READING,** this 20th day of December, 2022.

Ashley Stolzmann, Mayor

ATTEST:

Meredyth Muth, City Clerk

**MOTION**: Councilmember Dickinson moved to approve Resolution No. 54, Series 2022; seconded by Councilmember Most.

**VOTE:** Motion passed by unanimous roll call vote.

**ORDINANCE NO. 1845, SERIES 2022 – AN ORDINANCE AMENDING CHAPTER 15.18.030 OF THE LOUISVILLE MUNICIPAL CODE CONCERNING AMENDMENTS AND DELETIONS TO THE 2021 INTERNATIONAL ENERGY CONSERVATION CODE TO INCLUDE REQUIREMENTS FOR COMMERCIAL ENERGY USE INTENSITY PERFORMANCE TARGETS AND RESTRICTIONS OF FOSSIL FUEL SPACE AND WATER HEATING EQUIPMENT – 2nd READING, PUBLIC HEARING (advertised *Daily Camera* 12/2/22) *continued from 12/6/22***

Mayor Stolzmann introduced the item and opened the public hearing.

Community Development Director Zuccaro stated this ordinance would amend chapter 15.18.030 of the Louisville Municipal Code concerning amendments and deletions to the 2021 International Energy Conservation Code. It includes requirements for commercial energy use intensity (EUI) performance targets for specific building types; restricts fossil fuel space and water heating equipment; and applies only to new commercial construction.

This item is a part of the City's Sustainability Action Plan and the City Council's 2023 work plan. He reviewed the work done on energy modeling, policy research, and reviewed the public engagement process.

Director Zuccaro reviewed the proposed ordinance noting it includes energy use intensity (EUI) performance based targets for seven building types; other building types would be required to meet a prescriptive commercial base energy code (IECC 2021 + strengthening amendments); and all building types must meet space and water heating equipment requirements (all-electric). He reviewed the energy use performance targets and the space and water heating exemptions. He reviewed cost comparisons for electric versus mixed fuel uses.

Sustainability Coordinator Kayla Betzold reported on the regional building code cohort (which includes municipalities from across the region) which has completed its phase 2 planning meetings to develop the net zero new construction roadmap. A draft roadmap is currently under review with a final roadmap to be published in early 2023. Plans include stricter EUI targets and demand response capability by 2027 as well as stricter EUI targets and energy storage required by 2030.

Councilmember Dickinson asked if upgrades would be required for remodels. Chad Root, Chief Building Official, stated if the existing systems can meet the needs of the remodel they can be maintained. If they can't meet those needs, new equipment that meets the current code would be required.

Councilmember Dickinson asked why Louisville is not a part of the Cohort. Christine Brinker, SWEEP, stated a group applied to DOLA for a grant for this project and during the time if took the grant to come through Louisville decided to move forward more quickly on its own. It will be a part of the cohort for the phase 2 process.

Public Comments

Christian Dino, Louisville, (pooled time with Peter Geise) stated he was concerned about the costs of these new requirements. He stated he has done a case study on his own home and has found the costs to be much higher than the current code. He stated the metering equipment is costly and hard to get. He added this code requires equipment that has not been proven and may have a long lead time to get. This will keep people from building here or renting vacant spaces if they can build more quickly and cheaper in neighboring communities. He urged a no vote.

Eric Lund, Louisville Chamber of Commerce, stated his restaurant members have many concerns about the cost of refurbishing properties and they have said that clarification on the rules would be helpful. He suggested postponing a decision until clarification can be made. He stated that for Louisville to be competitive with neighbors, our rules should align with the cohort and not be too far ahead.

Matt Berry, Louisville, stated this code is too far in advance to the current technology and will create waste as new technology arrives in just a couple of years. He does not want to have to dispose of technology when something better and easier to use arrives on the market in a few years. He urged a no vote.

Rick Kron, Downtown Business Association, urged a no vote on this ordinance. Louisville should not get ahead of the cohort but rather should act in line with the cohort so we are not ahead of them and businesses then choose to go elsewhere. We don't yet know the real costs or benefits of this change. This ordinance it is not clear what it does in some places and needs additional work.

Jeff Sheets, Koelbel and Company, stated in his other developments there are serious delays in getting equipment and asking for this type of specific equipment will make it even worse. We need to better understand what this ordinance does. It has flaws in how it calculates costs for owners and tenants. This ordinance will make Louisville less competitive for businesses. He urged a no vote.

Tiffany Boyd, Louisville, urged Council to approve this ordinance. She suggested waiting for the cohort is just waiting for the inevitable and Louisville should be at the forefront. We should not kick the can down the road. We need stringent greenhouse gas limits to be put in place.

Tess Weltzin, Lafayette, urged Council to approve the ordinance to address the climate crisis for the next generation. This ordinance will help drive the path for energy efficiency. She stated local action is what is needed.

Ilana Diddams, Louisville, urged a yes vote to support the goals of the City's Sustainability Plan. She stated voting against the ordinance would not be addressing the climate crisis and the sustainability goals.

Mayor Stolzmann ended the first round of public comments noting that she would not take online comments given earlier problems with the system. She noted that she already asked people to attend in person and as presiding officer she can make that determination. She asked the City Attorney to review the Rules of Procedure for this process.

City Attorney Kelly reviewed the Rules of Procedure noting the rules state that if there are technical problems that preclude electronic participation, the in person meeting shall continue if a quorum is present in the room. She added that the Rules state the chair has reasonable discretion to apply the meeting procedures subject to the right of any member of Council to appeal to the Council in which case the matter shall be resolved by a vote of the members.

**MOTION:** Councilmember Leh moved to override the Mayor's decision to not take electronic comments. He stated he wants to be sure to hear from those online if it is possible. Seconded by Mayor Pro Tem Maloney.

**VOTE:** Motion passed by 4-3 vote with Mayor Pro Tem Maloney and Councilmembers Fahey, Leh, and Dickinson voting yes.

Larry Donner, Louisville, stated he does not support this ordinance. He feels this ordinance will ensure vacant buildings won't get repurposed and more businesses will leave town. The codes are premature and we don't fully understand the impacts.

Susan Loo, Louisville, stated the previous cost estimates on residential net zero were not accurate and it is likely these estimates for commercial are not accurate as well. There hasn't been a full look at the details of what this ordinance will do.

Councilmember Brown stated this ordinance applies to new construction only. He noted that staff did a great deal of public outreach on this and people were able to give input.

Councilmember Leh asked if the business community was specifically asked for input on this ordinance as presented here. Director Zuccaro stated there was no specific outreach to the business community about the code as drafted and presented here.

Councilmember Leh reviewed the City's sustainability goals as set out in Resolution No. 25, Series 2019 and noted everyone on Council wants to meet those goals. It is just a matter of how we get there and the timing.

Public Comments

Jeff Sheets, Koelbel and Company, stated developers aren't opposed to this but would be looking for very specific costs to build. He suggested taking more time and meeting with developers to look at real costs and understand what this looks like to see it if achievable. He suggested that could be done quickly and brought back in first quarter of next year. He asked Council to delay this a bit.

Tamar Krantz, Louisville, stated she is happy Louisville is on the forefront of this issue. She urged approval to help meet the City's sustainability goals. She does not think it will prevent businesses from coming here. She urged approval.

Josh Cooperman, Louisville, urged approval as a way to reduce greenhouse gases. He stated he wants this in place for new construction, particularly any large projects that are coming through. This code is not a stretch and should be approved.

Rick Kron, Downtown Business Association, stated he is not convinced the cost estimates in the report are not accurate and the ROI on some items are very long. He stated he would have liked the draft ordinance available earlier so that people could have more time to read and understand it before this Council meeting. He stated there are some types of businesses could build here under this ordinance.

Tiffany Boyd, Louisville, stated these changes are inevitable to address the climate crisis. All buildings will need to retrofit when this becomes required so it makes sense to approve this now.

2:34

Councilmember Fahey stated she thinks this is a good compromise and will promote sustainable building in new construction. It does apply only to new construction and has exemptions for hospitals and restaurants. The State is going to be putting very similar regulations in place in a few months and the cohort will be considering even stricter regulations for surrounding communities.

**MOTION:** Councilmember Fahey moved to approve the ordinance; Councilmember Most seconded the motion.

Mayor Pro Tem Maloney stated he wants more information on the ordinance. He noted all members of council support the sustainability goals, however he has concerns about process and timing. There is a sense of urgency to do this we have to do it soon, however we need to know what is happening at the State and with the cohort.

**SUBSTITUTE MOTION:** Mayor Pro Tem Maloney moved to table the ordinance to a date uncertain but take action in Q1 or Q2 of 2023 when we have more information. Councilmember Leh seconded the motion.

Councilmember Leh stated everyone agrees we have a serious and urgent climate problem that needs to be addressed. We all agree on our sustainability goals. We all agree on the cohort process that will establish regional standards. He would like staff to get additional public input on this version of the ordinance given there have been so many changes since first reading. He would rather table this until staff could get additional public input and bring it back in first quarter of 2023.

Councilmember Leh made a friendly amendment to table the ordinance to February 21 to allow time for a roundtable with the business community to take input on the ordinance. Mayor Pro Tem Maloney accepted the amendment.

Councilmember Most stated she thinks there has been reasonable public input and additional time is not likely to change any minds or garner more support. She stated this is a good compromise so continuing to keep this open is not an effective use of everyone's time. She understands the desire for more engagement but there is a point we need take action and we can address problems if they arise.

Councilmember Fahey stated she is comfortable the Council took enough input from the two public meetings. Staff did incorporate comments from the business community to get to where we are and allowing specific exceptions. The Council can amend this if we need to and we can look at incentives for new buildings if we want to.

Councilmember Dickinson stated the City has been leading the way in code adoption. He is excited about the cohort bringing this to all communities. This will happen sooner than later regionally. He would prefer moving with the cohort rather than ahead of them. He stated he likes this code as presented but would prefer to do this in conjunction with the cohort or doing it in Q1.

Mayor Stolzmann closed the public hearing.

**VOTE ON SUBSTITUTE MOTION:** Motion failed on a 4-3 vote with Mayor Stolzmann, and Councilmembers Brown, Councilmember Fahey, Councilmember Most voting no.

**VOTE ON ORIGINAL MOTION:** Motion carried by unanimous roll call vote.

**RESOLUTION NO. 55, SERIES 2022 – A RESOLUTION AMENDING THE 2022 BUDGET BY AMENDING APPROPRIATIONS IN THE SOLID WASTE & RECYCLING FUND AND GOLF COURSE FUND FOR ADDITIONAL APPROPRIATIONS WITHIN SUCH FUNDS – PUBLIC HEARING (advertised *Daily Camera* 12/16/2022)**

# Open Government & Ethics Pamphlet 2024


*City Clerk's Office*
*749 Main Street*
*Louisville CO 80027*
*ClerksOffice@LouisvilleCO.gov*
*303.335.4536*


City of Louisville

# Table of Contents

# Citizen Participation in Government

The City of Louisville encourages citizen involvement and participation in its public policy process. There are many opportunities for citizens to be informed about and participate in City activities and decisions. All meetings of City Council, and of appointed Boards and Commissions, are open to the public and include an opportunity for public comments. No action or substantive discussion on an item may take place unless that item has been specifically listed as an agenda item for a regular or special meeting. Some opportunities for you to participate include:

**Reading and inquiring about City Council activities and agenda items, and attending and speaking on topics of interest at public meetings**

*City Council Meetings:*

- Regular meetings are generally held the first and third Tuesdays of each month at 6:00 PM in the City Council Chambers, located on the second floor of City Hall, 749 Main Street;
- Study sessions are generally held the second and fourth Tuesdays of each month at 6:00 PM in the Library Meeting Room, located on the first floor of the Library, 951 Spruce Street;
- Regular meetings include a remote participation option via Zoom, are broadcast live on Comcast Channel 8, and are available on demand on the City's website;
- Special meetings may be held occasionally on specific topics. Agendas are posted a minimum of 48 hours prior to the meeting.

*Meeting Agendas for City Council meetings, other than special meetings, are posted a minimum of 72 hours prior to the meeting at the following locations:*

- City Hall, 749 Main Street
- Police Department/Municipal Court, 992 West Via Appia
- Recreation/Senior Center, 900 West Via Appia
- Louisville Public Library, 951 Spruce Street
- City website at www.LouisvilleCO.gov

*Meeting packets with all agenda-related materials for regular meetings are available 72 hours prior to each meeting and may be found at these locations:*

- Louisville Public Library Reference Area,
- 951 Spruce Street,
- City Clerk's Office, City Hall, 749 Main Street,
- City website at www.LouisvilleCO.gov

You may receive eNotifications of City Council news as well as meeting agendas and summaries of City Council actions by registering for eNotifications on the City's web site at www.LouisvilleCO.gov.

Meeting minutes of all regular and special meetings are available in the City Clerk's office and on the City's website (www.LouisvilleCO.gov) once they are approved.

Information about City activities and projects, as well as City Council decisions, is included in the *Community Update* newsletter, mailed to all City residents and businesses. Information is also often included in the monthly eNewsletter.

**Communicating Directly with the Mayor and City Council Members**

Contact information for the Mayor and City Councilmembers is available at www.LouisvilleCO.gov, as well as at City Hall, the Louisville Public Library, and the Recreation/Senior Center. You may email the Mayor and City Council as a group at CityCouncil@LouisvilleCO.gov.

Mayor's Town Meetings and City Council Ward Meetings are scheduled periodically. These are informal meetings at which all residents, points of view, and issues are welcome. These meetings are advertised at City facilities and on the City's website (www.LouisvilleCO.gov).

**Mayor or City Council Elections**

City Council members are elected from three Wards within the City and serve staggered four-year terms. There are two Council representatives from each ward. The mayor is elected at-large and serves a four-year term. City Council elections are held in November of odd-numbered years. For information about City elections, including running for City Council, please contact the City Clerk's Office, at ClerksOffice@LouisvilleCO.gov or 303.335.4536.

### Serving as an Appointed Member on a City Board or Commission

The City Council makes Board and Commission appointments annually. Some of the City's Boards and Commissions are advisory, others have some decision-making powers. The City Council refers questions and issues to these appointed officials for input and advice. (Please note the Youth Advisory Board has a separate appointment process.)

The City's Boards and Commissions are:

- Arts & Culture Advisory Board
- Board of Adjustment
- Building Code Board of Appeals
- Historic Preservation Commission
- Historical Museum Advisory Board
- Library Board of Trustees
- Local Licensing Authority
- Open Space Advisory Board
- Parks & Public Landscaping Advisory Board
- Planning Commission
- Recreation Advisory Board
- Revitalization Commission
- Sustainability Advisory Board
- Youth Advisory Board

Board information, meeting agendas, and schedules are available on the City's website (www.LouisvilleCO.gov).

Agendas for all Board and Commission meetings are posted a minimum of 72 hours prior to each meeting at these locations:

- City Hall, 749 Main Street
- Police Department/Municipal Court, 992 West Via Appia
- Recreation/Senior Center, 900 West Via Appia
- Louisville Public Library, 951 Spruce Street
- City web site at www.LouisvilleCO.gov

Copies of meeting packets containing agenda-related materials are available at least 72 hours prior to each meeting and may be found at the following locations:

- Louisville Public Library Reference Area, 951 Spruce Street;
- City Clerk's Office, City Hall, 749 Main Street
- City web site at www.LouisvilleCO.gov

### Planning Commission

The Planning Commission evaluates land use proposals against zoning laws and holds public hearings as outlined in City codes. Following a public hearing, the Commission makes a recommendation of approval or denial to the City Council for all land use proposals.

- Regular Planning Commission meetings are held at 6:30 PM on the second Thursday of each month.
- Overflow meetings are scheduled for 6:30 PM on the 4th Thursday of the month as needed.
- Study Sessions are held occasionally as needed.
- Regular meetings include a remote participation option via Zoom, are broadcast live on Comcast Channel 8, and are available on demand on the City's website.

### Open Government Training

All City Council members and members of a permanent Board or Commission are required to participate in at least one City-sponsored open government-related seminar, workshop, or other training program at least once every two years.

## Open Meetings

The City follows the Colorado Open Meetings Law ("Sunshine Law") as well as additional open meetings requirements found in the City's Home Rule Charter. These rules and practices apply to the City Council and appointed Boards and Commissions (referred to as a "public bodies" for ease of reference). Important open meetings rules and practices include the following:

### Regular Meetings

All meetings of three or more members of a public body (or a quorum, whichever is fewer) are open to the public.

All meetings of public bodies must be held in public buildings and public facilities accessible to all members of the public. Meetings may be held electronically under specific circumstances.

All meetings must be preceded by proper notice. Agendas and agenda-related materials are posted

at least 72 hours in advance of the meeting at the following locations:

- City Hall, 749 Main Street
- Police Department/Municipal Court, 992 West Via Appia
- Recreation/Senior Center, 900 West Via Appia
- Louisville Public Library, 951 Spruce Street
- On the City web site at www.LouisvilleCO.gov

**Study Sessions**

Study sessions are also open to the public however, study sessions have a limited purpose:

- Study sessions are to obtain information and discuss matters in a less formal atmosphere;
- No preliminary or final decision or action may be made or taken at any study session; further, full debate and deliberation of a matter is to be reserved for formal meetings. If a person believes in good faith that a study session is proceeding contrary to these limitations, they may submit a written objection. The presiding officer will then review the objection and determine how the study session should proceed.
- A written summary of each study session is prepared and is available on the City's website.

## Executive Sessions

The City Charter also sets out specific procedures and limitations on the use of executive sessions. These rules, found in Article 5 of the Charter, are intended to further the City policy that the activities of City government be conducted in public to the greatest extent feasible, in order to assure public participation and enhance public accountability. The City's rules regarding executive sessions include the following:

**Timing and Procedures**

The City Council and City Boards and Commissions may hold an executive session only at a regular or special meeting. No formal action of any type, and no informal or "straw" vote, may occur at any executive session. Rather, formal actions, such as the adoption of a proposed policy, position, rule or other action, may only occur in open session.

Prior to holding an executive session, there must be a public announcement of the request and the legal authority for convening in closed session. There must be a detailed and specific statement as to the topics to be discussed and the reasons for requesting the session.

The request must be approved by a supermajority (two-thirds of the full Council, Board, or Commission). Prior to voting on the request, the clerk reads a statement of the rules pertaining to executive sessions. Once in executive session, the limitations on the session must be discussed and the propriety of the session confirmed. If there are objections and/or concerns over the propriety of the session, those are to be resolved in open session.

Once the session is over, an announcement is made of any procedures that will follow from the session.

Executive sessions are recorded, with access to those tapes limited as provided by state law. Those state laws allow a judge to review the propriety of a session if in a court filing it is shown that there is a reasonable belief that the executive session went beyond its permitted scope. Executive session records are not available outside of a court proceeding.

**Authorized Topics**

For City Council, an executive session may be held only for discussion of the following topics:

- Matters where the information being discussed is required to be kept confidential by federal or state law;
- Certain personnel matters relating to employees directly appointed by the Council, and other personnel matters only upon request of the City Manager or Mayor for informational purposes only;
- Consideration of water rights and real property acquisitions and dispositions, but only as to appraisals and other value estimates and strategy for the acquisition or disposition; and

- Consultation with an attorney representing the City with respect to pending litigation. This includes cases that are actually filed as well as situations where the person requesting the executive session believes in good faith that a lawsuit may result, and allows for discussion of settlement strategies.

The City's Boards and Commissions may only hold an executive session for consultation with its attorney regarding pending litigation.

## Ethics

Ethics are the foundation of good government. Louisville has adopted its own Code of Ethics, which is found in the City Charter and which applies to elected officials, public body members, and employees. The Louisville Code of Ethics applies in addition to any higher standards in state law. Louisville's position on ethics is perhaps best summarized in the following statement taken from the City Charter:

> *Those entrusted with positions in the City government must commit to adhering to the letter and spirit of the Code of Ethics. Only when the people are confident that those in positions of public responsibility are committed to high levels of ethical and moral conduct, will they have faith that their government is acting for the good of the public. This faith in the motives of officers, public body members, and employees is critical for a harmonious and trusting relationship between the City government and the people it serves.*

The City's Code of Ethics (Sections 5-6 through 5-17 of the Charter) is summarized in the following paragraphs. While the focus is to provide a general overview of the rules, it is important to note that all persons subject to the Code of Ethics must strive to follow both the letter and the spirit of the Code, so as to avoid not only actual violations, but public perceptions of violations. Indeed, perceptions of violations can have the same negative impact on public trust as actual violations.

**Conflicts of Interest**

One of the most common ethical rules visited in the local government arena is the "conflict of interest rule." While some technical aspects of the rule are discussed below, the general rule under the Code of Ethics is that if a Council, Board, or Commission member has an "interest" that will be affected by his or her "official action," then there is a conflict of interest and the member must:

- Disclose the conflict, on the record and with particularity;
- Not participate in the discussion;
- Leave the room; and
- Not attempt to influence others.

An "interest" is a pecuniary, property, or commercial benefit, or any other benefit the primary significance of which is economic gain or the avoidance of economic loss. However, an "interest" does not include any matter conferring similar benefits on all property or persons similarly situated. (Therefore, a City Council member is not prohibited from voting on a sales tax increase or decrease if the member's only interest is that he or she, like other residents, will be subject to the higher or lower tax.) Additionally, an "interest" does not include a stock interest of less than one percent of the company's outstanding shares.

The Code of Ethics extends the concept of prohibited interest to persons or entities with whom the member is associated. In particular, an interest of the following persons and entities is also an interest of the member: relatives (including persons related by blood or marriage to certain degrees, and others); a business in which the member is an officer, director, employee, partner, principal, member, or owner; and a business in which member owns more than one percent of outstanding shares.

The concept of an interest in a business applies to profit and nonprofit corporations, and applies in situations in which the official action would affect a business competitor. Additionally, an interest is deemed to continue for one year after the interest has ceased. Finally, "official action" for purposes of the conflict of interest rule, includes not only legislative actions, but also administrative actions and "quasi-judicial" proceedings where the entity is acting like a judge in applying rules to the specific

rights of individuals (such as a variance request or liquor license). Thus, the conflict rules apply essentially to all types of actions a member may take.

**Conflicts**

In addition to its purchasing policies and other rules intended to secure contracts that are in the best interest of the City, the Code of Ethics prohibits various actions regarding contracts. For example, no public body member who has decision-making authority or influence over a City contract can have an interest in the contract, unless the member has complied with the disclosure and recusal rules. Further, members are not to appear before the City on behalf of other entities that hold a City contract, nor are they to solicit or accept employment from a contracting entity if it is related to the member's action on a contract with that entity.

**Gifts and Nepotism**

The Code of Ethics, as well as state law, regulates the receipt of gifts. City officials and employees may not solicit or accept a present or future gift, favor, discount, service or other thing of value from a party to a City contract, or from a person seeking to influence an official action. There is an exception for the "occasional nonpecuniary gift" of $15 or less, but this exception does not apply if the gift, no matter how small, may be associated with the official's or employee's official action, whether concerning a contract or some other matter. The gift ban also extends to independent contractors who may exercise official actions on behalf of the City.

The Code of Ethics also prohibits common forms of nepotism. For example, no officer, public body member, or employee shall be responsible for employment matters concerning a relative. Nor can they influence compensation paid to a relative, and a relative of a current officer, public body member or employee cannot be hired unless certain personnel rules are followed.

**Other Ethics Rules of Interest**

Like state law, Louisville's Code of Ethics prohibits the use of non-public information for personal or private gain. It also prohibits acts of advantage or favoritism and, in that regard, prohibits special considerations, use of employee time for personal or private reasons, and use of City vehicles or equipment, except in same manner as available to any other person (or in manner that will substantially benefit City). The City also has a "revolving door" rule that prohibits elected officials from becoming City employees either during their time in office or for two years after leaving office. These and other rules of conduct are found in Section 5-9 of the Code of Ethics.

**Disclosure, Enforcement, and Advisory Opinions**

The Code of Ethics requires that those holding or running for City Council file a financial disclosure statement with the City Clerk. The statement must include, among other information, the person's employer and occupation, sources of income, and a list of business and property holdings.

The Code of Ethics provides fair and certain procedures for its enforcement. Complaints of violations may be filed with the City prosecutor; the complaint must be a detailed written and verified statement. If the complaint is against an elected or appointed official, it is forwarded to an independent judge who appoints a special, independent prosecutor for purposes of investigation and appropriate action. If against an employee, the City prosecutor will investigate the complaint and take appropriate action. In all cases, the person who is subject to the complaint is given the opportunity to provide information concerning the complaint.

Finally, the Code allows persons who are subject to the Code to request an advisory opinion if they are uncertain as to applicability of the Code to a particular situation, or as to the definition of terms used in the Code. Such requests are handled by an advisory judge, selected from a panel of independent, disinterested judges who have agreed to provide their services. This device allows persons who are subject to the Code to resolve uncertainty before acting, so that a proper course of conduct may be identified. Any person who requests and acts in accordance with an advisory opinion issued by an advisory judge is not subject to City penalty, unless material facts were omitted or misstated in the request. Advisory opinions are posted for public

inspection; the advisory judge may order a delay in posting if the judge determines the delay is in the City's best interest.

Citizens are encouraged to contact the City Clerk's Office with any questions about the City's Code of Ethics or to request a copy. A copy of the Code is also available at the City's website (www.LouisvilleCO.gov).

## Other Laws on Citizen Participation in Government

Preceding sections of this pamphlet describe Louisville's practices intended to further citizen participation in government. Those practices are intended to further dissemination of information and participation in the governing process. Some other laws of interest regarding citizen participation include:

### Initiative and Referendum

The right to petition for municipal legislation is reserved to the citizens by the Colorado Constitution and the City Charter. An initiative is a petition for legislation brought directly by the citizens; a referendum is a petition brought by the citizens to refer to the voters a piece of legislation that has been approved by the City Council. In addition to these two petitioning procedures, the City Council may refer matters directly to the voters in the absence of any petition. Initiative and referendum petitions must concern municipal legislation—as opposed to administrative or other non-legislative matters. By law the City Clerk is the official responsible for many of the activities related to a petition process, such as approval of the petition forms, review of the signed petitions, and consideration of protests and other matters. There are minimum signature requirements for petitions to be moved to the ballot; in Louisville, an initiative petition must be signed by at least five percent of the total number of registered electors. A referendum petition must be signed by at least two and one-half percent of the registered electors.

### Public Hearings

In addition to the opportunity afforded at each regular City Council meeting to comment on items not on the agenda, most City Council actions provide opportunity for public comment through a public hearing process. For example, the City Charter provides that a public hearing shall be held on every ordinance before its adoption. This includes opportunities for public comment prior to initial City Council discussion of the ordinance, as well as after Council's initial discussion but before action. Many actions of the City are required to be taken by ordinance, and thus this device allows for citizen public hearing comments on matters ranging from zoning ordinances to ordinances establishing offenses that are subject to enforcement through the municipal court.

Additionally, federal, state, and/or local law requires a public hearing on a number of matters irrespective of whether an ordinance is involved. For example, a public hearing is held on the City budget, the City Comprehensive Plan and similar plans, and a variety of site-specific or person-specific activities, such as annexations of land into the city, rezonings, special use permits, variances, and new liquor licenses. Anyone may provide comments during these hearings.

### Public Records

Access to public records is an important aspect of citizen participation in government. Louisville follows the Colorado Open Records Act (CORA) and the additional public records provisions in the City Charter. In particular, the Charter promotes the liberal construction of public records law, so as to promote the prompt disclosure of City records to citizens at no cost or no greater cost than the actual costs to the City.

The City Clerk is the custodian of the City's public records, except for police records which are handled by the Police Department. The City maintains a public policy on access to public records, which includes a records request form, a statement of fees, and other guidelines. No fee is charged for the inspection of records or for locating or making records available for copying, except in cases of voluminous requests or dated records, or when the

time spent in locating records exceeds two hours. No fees are charged for the first 25 copies requested or for electronic records.

Many records, particularly those related to agenda items for City Council and current Board and Commission meetings, are available directly on the City's website (www.LouisvilleCO.gov). In addition to posting agenda-related material, the City maintains a communication file (email) for the City Council which is available on the City's website (www.LouisvilleCO.gov).

CORA lists the categories of public records that are not generally open to public inspection. These include, for example, certain personnel records and information, financial and other information about users of City facilities, privileged information, medical records, letters of reference, and other items listed in detail in CORA. When public records are not made available, the custodian will specifically advise the requestor of the reason.

Citizens are encouraged to review the City's website (www.LousivilleCo.gov) for information, and to contact the City with any questions regarding City records.

## Public Involvement Policy

Public participation is an essential element of the City's representative form of government. To promote effective public participation City officials, advisory board members, staff and participants should all observe the following guiding principles, roles and responsibilities:

**Guiding Principles for Public Involvement**

Inclusive not Exclusive - Everyone's participation is welcome. Anyone with a known interest in the issue will be identified, invited and encouraged to be involved early in the process.

*Voluntary Participation* - The process will seek the support of those participants willing to invest the time necessary to make it work.

*Purpose Driven* - The process will be clearly linked to when and how decisions are made. These links will be communicated to participants.

*Time, Financial and Legal Constraints* - The process will operate within an appropriate time frame and budget and observe existing legal and regulatory requirements.

*Communication* - The process and its progress will be communicated to participants and the community at-large using appropriate methods and technologies.

*Adaptability* - The process will be adaptable so that the level of public involvement is reflective of the magnitude of the issue and the needs of the participants.

*Access to Information* -The process will provide participants with timely access to all relevant information in an understandable and user-friendly way. Education and training requirements will be considered.

*Access to Decision Making* - The process will give participants the opportunity to influence decision making.

*Respect for Diverse Interests* - The process will foster respect for the diverse values, interests and knowledge of those involved.

*Accountability* - The process will reflect that participants are accountable to both their constituents and to the success of the process.

*Evaluation* - The success and results of the process will be measured and evaluated.

**Roles and Responsibilities - City Council**

City Council is ultimately responsible to all the citizens of Louisville and must weigh each of its decisions accordingly. Councilors are responsible to their local constituents under the ward system; however they must carefully consider the concerns expressed by all parties. Council must ultimately meet the needs of the entire community—including current and future generations—and act in the best interests of the City as a whole.

During its review and decision-making process, Council has an obligation to recognize the efforts and activities that have preceded its deliberations. Council should have regard for the public involvement processes that have been completed in support or opposition of projects.

**Roles and Responsibilities - City Staff and Advisory Boards**

The City should be designed and run to meet the needs and priorities of its citizens. Staff and advisory boards must ensure the Guiding Principles direct their work. In addition to the Guiding Principles, staff and advisory boards are responsible for:

- ensuring that decisions and recommendations reflect the needs and desires of the community as a whole;
- pursuing public involvement with a positive spirit because it helps clarify those needs and desires and also adds value to projects;
- fostering long-term relationships based on respect and trust in all public involvement activities;
- encouraging positive working partnerships;
- ensuring that no participant or group is marginalized or ignored;
- drawing out the silent majority, the voiceless and the disempowered; and being familiar with a variety of public involvement techniques and the strengths and weaknesses of various approaches.

**All Participants**

The public is also accountable for the public involvement process and for the results it produces. All parties (including Council, advisory boards, staff, proponents, opponents and the public) are responsible for:

- working within the process in a cooperative and civil manner;
- focusing on real issues and not on furthering personal agendas;
- balancing personal concerns with the needs of the community as a whole;
- having realistic expectations;
- participating openly, honestly and constructively,
- offering ideas, suggestions and alternatives;
- listening carefully and actively considering everyone's perspectives;
- identifying their concerns and issues early in the process;
- providing their names and contact information if they want direct feedback;
- remembering that no single voice is more important than all others, and that there are diverse opinions to be considered;
- making every effort to work within the project schedule and if this is not possible, discussing this with the proponent without delay;
- recognizing that process schedules may be constrained by external factors such as limited funding, broader project schedules or legislative requirements;
- accepting some responsibility for keeping themselves aware of current issues, making others aware of project activities and soliciting their involvement and input; and
- considering that the quality of the outcome and how that outcome is achieved are both important.

*Updated December 2023*

This pamphlet is prepared pursuant to the Home Rule Charter of the City of Louisville.

This is a compilation of Articles 4 and 5 of the Charter of the City of Louisville and is available at all times in the City Clerk's Office, 749 Main Street, Louisville, Colorado, and on the City's web site at www.LouisvilleCO.gov.

This pamphlet is also provided to every member of a public body (board or commission) at that body's first meeting each year.

City of Louisville
COLORADO • SINCE 1878

# BOARD & COMMISSION

# RULES OF PROCEDURE

*Adopted November 6, 2023 – by Resolution No. 66, Series 2023*

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# RULES OF PROCEDURE FOR THE BOARDS AND COMMISSIONS OF LOUISVILLE, COLORADO

## I. DEFINITIONS

"Advisory Board" means all of the following boards which are tasked with giving advice to the City Council as specified in their formation documents:

- Arts & Culture Advisory Board
- Historical Museum Advisory Board
- Library Board of Trustees
- Open Space Advisory Board
- Parks & Public Landscaping Advisory Board
- Recreation Advisory Board
- Revitalization Commission
- Sustainability Advisory Board
- Youth Advisory Board

"Charter" means the Home Rule Charter of the City of Louisville, Colorado.

"Chair" means the member of the Board who presides over a meeting subject to Rule VII.B below.

"City" means the City of Louisville, Colorado.

"Code" means the Louisville Municipal Code.

"Board" means any of the following bodies:

- Arts & Culture Advisory Board
- Board of Adjustment
- Building Code Board of Appeals
- Historic Preservation Commission
- Historical Museum Advisory Board
- Library Board of Trustees
- Local Licensing Authority
- Open Space Advisory Board
- Parks & Public Landscaping Advisory Board
- Planning Commission
- Recreation Advisory Board
- Revitalization Commission
- Sustainability Advisory Board
- Youth Advisory Board

"Board Member" means each member of a City board.

"Electronic Participation" means attendance at a meeting by computer, telephone, or other electronic means.

"Entire Board" means all current members of a board.

"Member of the Board" means each board member.

"Quasi-Judicial Board" means any of the following boards which have specific legal decision-making authority under the Charter or Code:

- Board of Adjustment
- Building Code Board of Appeals
- Historic Preservation Commission
- Local Licensing Authority
- Planning Commission

"Rules" means the Board & Commission Rules of Procedure.

"Staff Liaison" means the City staff member assigned by the City Manager to assist the board and to ensure all rules and regulations are met.

## II. AUTHORITY

The following Rules shall be in effect upon their adoption by the City Council until such time as they are amended or new Rules adopted.

In order to efficiently and effectively complete City business facing a Board, all meetings must be conducted in an orderly and respectful manner. These Rules are intended to provide guidelines for the procedures to be followed for the conduct of all Board meetings.

If any Rule, on its face or as applied, conflicts with applicable provisions of the Home Rule Charter of the City of Louisville or ordinances, those provisions shall apply and that Rule shall not. Nothing herein shall prevent a Board from adopting its own rules of procedure specific to its roles and responsibilities so long as they do not conflict with these Rules.

## III. MEETING CIVILITY

A. CIVILITY AMONG MEMBERS OF THE BOARD: The Board shall preserve reasonable order and decorum and confine members of the public to discussion of the questions under consideration.

During Board meetings, members shall preserve reasonable order and decorum and shall not delay or interrupt the proceedings or refuse to obey

the order of the Chair or the Rules. Every member of the Board desiring to speak shall address the Chair, and upon recognition by the Chair, shall confine themselves to the questions under debate. Once recognized, no member of the Board shall be interrupted while speaking unless called to order by the Chair or unless a point of order is raised by another member.

B. MEMBERS OF THE PUBLIC: Members of the public desiring to address the Board on any item on the agenda shall be recognized by the Chair, state their names, and are requested to state their place of residence (by city, town, or county of residence). Each member of the public shall speak in an audible tone for the record.

## IV. GENERAL RULES

A. LOCATION: All in-person Board meetings shall take place in a public building that is accessible to members of the public, with or without reasonable accommodation in accordance with applicable law.

B. OPEN TO THE PUBLIC: All meetings, including those conducted by Electronic Participation pursuant to Section V.F, shall be open to the public. A Board may conduct executive sessions only in accordance with the Charter, Code, and applicable provisions of the Colorado Open Meetings Law.

C. MEETING NOTICE: Notice for all meetings sessions shall be given as required by the Charter and as set by administrative rule. At the first regular meeting of every year, each Board shall designate the locations for posting of notices of its meetings.

D. MINUTES: Minutes of each regular and special meeting shall be taken and retained permanently in the records of the City.

E. QUORUM: A quorum is needed for the transaction of business at each meeting of a Board. A quorum shall be defined as a majority of the members of the Board holding office at the time of the meeting.

F. ABSENCES: No member of the Board shall miss more than twenty-five percent (25%) of regular Board meetings during any calendar year. Missing more than twenty-five percent (25%) of meetings shall be cause for removal.

G. APPLICABILITY OF THE OPEN GOVERNMENT POLICIES AND CODE OF ETHICS: Each member of the Board shall adhere to the City's Open

Government Rules and the Code of Ethics (Charter Section 5-6).

H. DISCLOSURE OF INTEREST AND RECUSAL: Any member of the Board who has an interest in, or whose interest would be affected by, any proposed official action before the Board shall immediately and publicly disclose the nature and extent of the interest; shall not participate in any discussion or decision concerning the proposed action; shall not attempt to publicly or privately influence the Board, any public body, or any employee in connection with the action; and shall leave the room where the discussion or decision is taking place during the time the proposed action is being discussed and the decision is being made.

I. CHAIR: The Chair is the member of the Board who presides over a Board meeting and shall do so according to these Rules and applicable law. The Chair serves as Chair of all Board meetings at which the Chair is present. In the Chair's absence, the Vice-Chair will serve as Chair. In the absence of the Chair and Vice-Chair, Board members will appoint one member to act as Chair for that meeting.

## V. MEETINGS

A. REGULAR MEETINGS: Each Board shall set a regular meeting schedule at the first meeting of each year identifying the date, time, and location of meetings.

B. COMMITTEE MEETINGS: A committee meeting may be called if it can be properly noticed a minimum of 72 hours in advance. Committee meetings must meet all the same rules as a regular meeting.

C. EXECUTIVE SESSIONS: A board may hold an executive session only for pending litigation and only with the City Attorney present.

D. RESCHEDULING: A Board may reschedule meetings for dates and times outside its annual meeting schedule to avoid holidays, elections, and other matters, to achieve a quorum, or to allow for additional time for a meeting. To reschedule such meetings, the Board first must provide notice and approve of the proposal to reschedule.

E. CANCELLATION: Any scheduled meeting may be cancelled by members or the Staff Liaison in the event there are no items for the board to discuss or in the event unforeseen emergent conditions exist which make conduct of the meeting impractical (for example, in the case of power outage) or travel to the meeting unduly hazardous (for example, in the case of blizzard conditions).

F. ELECTRONIC PARTICIPATION: When it is feasible, an electronic attendance option shall be available for Board members, applicants, and members of the public including for quasi-judicial hearings. If it is not feasible due to technological or other reasons, the in person meeting shall continue if a quorum is present.

1. All meetings that have a remote attendance option will note that on the agenda and include information on the agenda about how to join the meeting electronically.

2. Board members and members of the public attending electronically shall participate in the meeting under the same rules as those in the room.

3. Public hearings on quasi-judicial matters may be taken during a meeting with Electronic Participation.

G. FULLY REMOTE MEETINGS: The Staff Liaison with input from the board members may, in their discretion, change board meetings to a fully remote setting if needed. If a fully remote meeting is scheduled, it must be properly noticed as such and public access options must be provided on the meeting agenda.

## VI. CHAIR AND VICE-CHAIR

A. Each Board will elect a Chair and Vice-Chair at the first meeting of the year. The City recommends the Chair and Vice-Chair be rotated among Board members each year.

B. The Chair shall preside over meetings of the Board when present and able to perform these responsibilities. The Chair shall have the same voting powers as any Board member.

C. The Vice-Chair shall assume the duties of Chair when the Chair is absent or otherwise unable to perform the responsibilities of Chair.

D. In the absence of the Chair and Vice-Chair, Board members will appoint one member to act as Chair for that meeting.

## VII. MEETING PROCEDURE

A. PREAMBLE

1. A bedrock principle of a representative democracy is notice of impending governmental action and an opportunity for members of the public and their representatives to be heard. Principles of good government include deep respect for citizens; prudent stewardship of public resources, including the time of its citizens, staff members and appointed officials; direction that is clear and decisive; and decision making that is reasonably consistent, equitable, flexible, and transparent.

2. Through the application of these Rules, the City intends to ensure that it balances the principles described in the previous section in a way that ensures robust debate and accountability of City government to its residents. To that end, these procedures are not meant to be employed for the purpose of unreasonable rigidity, surprise, suppression of competing views, or needless prolonging of action.

B. CHAIR'S DISCRETION & RIGHT OF APPEAL The Chair shall have reasonable discretion in the application of these procedures subject to section XI.A.

C. AGENDAS: Each board will have a formal agenda for each meeting. The agenda will be set by staff for quasi-judicial boards and set by the chair in conjunction with the staff liaison for advisory boards. Each agenda will be posted as required prior to the meeting. Items cannot be added to the agenda at the meeting.

D. PUBLIC COMMENTS AT MEETINGS: All Board meetings, including Committee meetings, shall be open to the public. Members of the public shall have a reasonable opportunity to be heard at Board meetings.

The following provisions apply to any section of the agenda where public comments are allowed.

1. Members of the public desiring to address the Board on any item on the agenda shall be recognized by the Chair, state their name, and are requested to state their place of residence (by city, town, or county of residence).

2. Each board will have a section on its agenda for “Public Comments on Items Not on the Agenda.” Each speaker shall be limited to three (3) minutes.

3. Each Board will permit public comment on any item at the time such item is being discussed by the Board. Each speaker shall be limited to three (3) minutes.

4. Multiple citizens may designate someone to speak for them and aggregate their three-minute limit time up to a maximum of six (6) minutes of speaking time for their designated spokesperson. Those pooling their time must be physically present, identify themselves, and designate their spokesperson. A designated spokesperson may not speak for more than one group.

5. The Chair, the Staff Liaison, or a designated board member shall enforce compliance with the time limits, and time shall be kept on a public comment clock.

E. WRITTEN COMMUNICATIONS: Interested parties, or their authorized representatives, may address the Board by submitting written communication concerning any matter on the Board agenda. Such a written communication may be submitted by electronic mail or by addressing the communication to the Staff Liaison who will distribute copies to the Board. The communication will be entered into the record without the necessity of reading. A copy of the communication shall be posted at the meeting for the public to review. Anonymous written communications will not be accepted into the record.

F. VOTING: For a motion to pass it requires the affirmative vote of a majority of the members of the Board present.

## VIII. EXPECTATIONS OF STAFF LIAISON

A. COMMUNICATION:

1. The Staff Liaison will provide Board members with direct, open, and transparent communication about city priorities, projects, and budget.

2. The Staff Liaison will act as the conduit of information from the Board to City Council and from City Council to the board.

3. The Staff Liaison will respond to emails, phone calls, and text messages from Board members within two (2) business days and will

communicate with the Board members if a response will take more than two (2) business days.

B. ADVOCACY: The Staff Liaison will advocate ideas to City staff and leadership on the Board's behalf. The Staff Liaison will advocate for budget requests and CIP requests from the Board through the City's established budget process.

C. MEETINGS:

1. The Staff Liaison with input from the Board chair will create and publish meeting agendas and packets in accordance with bylaws, rules, and schedule established by the City Clerk's Office.

2. The Staff Liaison will work with the Chair to ensure meetings are concise and do not run exceedingly long and to ensure the discussion is limited to those items on the agenda.

3. The Staff Liaison will attend all meetings, to the best of their ability. If the Staff Liaison cannot attend a Board meeting, an alternate staff liaison will be appointed and the Chair will be notified in advance.

D. COLLABORATION:

1. The Staff Liaison will include Board members, when appropriate, in relevant projects and planning processes.

2. The Staff Liaison will include Board members on relevant communications, when appropriate, with outside organizations and individuals.

## IX. EXPECTATIONS OF BOARD MEMBERS

A. COMMUNICATION:

1. There will be open and consistent communication between Board members and the Staff Liaison.

2. Board members will not speak on behalf of the Board unless specifically appointed to do so by the Board. Board members will include the Staff Liaison on all communications with outside organizations.

3. The Staff Liaison is the point of contact for all City operations related to the Board. The Staff Liaison will bring in any additional City staff as necessary for Board projects.

4. The Staff Liaison or the City's Communications Division will create all memos, marketing, and outreach materials for the Board. Board members shall not use City logos or letterhead without City approval.

5. Board members shall not create social media accounts on behalf of the Board or speak on social media on behalf of the Board or City.

6. Board members will only contact their Staff Liaison through a dedicated City email address, office phone, or cell phone (including texting) and will not contact the Staff Liaison through their personal emails, social media, or personal cell phones.

B. ADVOCACY:

1. Board members will go through proper channels when advocating for Board projects.

2. Board members will adhere to all regulations of the Fair Campaign Practices Act as they relate to City elections.

C. MEETINGS:

1. Board members will attend all meetings, to the best of their ability. If a Board member cannot attend a meeting, the member will send communication via email to the Staff Liaison with as much advance notice as possible.

2. If a Board member would like an item on an agenda, the member will reach out in advance to the Staff Liaison and the Chair. Topics not included on the agenda may not be discussed at a meeting per the City Charter.

3. Board members will meet all packet deadlines as established by the Staff Liaison and the City Clerk's Office. Items that are late may be postponed to a later meeting.

## X. QUASI-JUDICIAL ACTIONS

A. PROCESS:

1. Quasi-judicial decisions are a determination of the rights, duties or obligations of a specific individual or entity. Board members making quasi-judicial decisions must do so based on the facts developed at a public hearing and through the application of presently existing legal standards of policy considerations of the facts.

2. Legally reversible decisions are almost always based on a lack of due process or procedural irregularities

B. DUE PROCESS: A quasi-judicial public hearing must include property public notice, a meaningful opportunity for interested parties to be heard, and basic fairness in procedure.

C. PREPARATION: Board members will review the meeting packet prepared by staff, understand the scope of the hearing, and be familiar with the relevant decision criteria in a case. Board members must act as impartial decision makers

D. EX PARTE CONVERSATIONS: Board members will not speak with one side or the other before or outside of the hearing process. This includes via email. Board members will disclose any unavoidable “ex parte” conversations and participate only if they are sure they can still make an unbiased decision.

E. CONDUCTING THE HEARING: Follow uniform/consistent steps for all hearings.

- Introduce Item
- Call for Disclosures
- Open Public Hearing
- Staff Report
- Applicant Presentation
- Public Comment
- Questions by Board members
- Close Public Hearing
- Deliberations
- Action

Once a hearing is closed the Board will not re-open it to hear only certain individuals, if a hearing is re-opened anyone who has not already spoken

may have the opportunity to speak.

If the Board holds and closes a hearing at one meeting and deliberates at the next, the Board cannot reopen the hearing without providing additional notice.

F. MAKING THE DECISION

1. Board members shall not make their decision on the basis of irrelevant criteria. Board members shall not base a decision on things a member "knows" but did not "learn" at the hearing. Board members will not participate in the decision if they cannot be fair and unbiased.

2. A Board members shall not participate in the decision if they did not participate in the entire hearing.

   If a public hearing is opened and then continued to a later meeting, a member who missed the first meeting may review the video and all materials from the first meeting and then participate in the next one. This should be disclosed at the hearing.

3. Board members should ask for staff advice if they are unsure of the decision they are being asked to make or if they are unsure of the applicable legal criteria.

4. If appropriate, a Board may make a tentative decision and direct staff to prepare a draft written decision.

## XI. PARLIAMENTARY PROCEDURE

A. POINTS OF ORDER: The Chair shall determine all points of order, subject to the rights of any member of the Board to appeal to the Board, in which case the point of order shall be resolved by vote of a majority of the members of Board present.

B. RIGHT OF THE FLOOR: Any member of the Board desiring to speak shall be recognized by the Chair.

C. MOTIONS: Motions may be made by any member of the Board, including the Chair, provided that before the Chair offers a motion, the opportunity for making a motion should be offered to other members of the Board. Any member of the Board, other than the person offering the motion, may second a motion.

D. PROCEDURES FOR MOTIONS: The following is the general procedure for making motions:

1. Before a motion can be considered or debated it must be seconded; however, no action taken shall be invalidated simply because a motion was not properly made, seconded or recorded.

2. Once the matter has been discussed and the Chair calls for a vote, no further discussion will be allowed; provided, however, that members of the Board may be allowed to explain their votes.

E. DISCUSSION: Board members shall confine themselves to the question under discussion. All discussion must be germane to the agenda item.

F. MOTION TO END DEBATE: Any member of the Board may make a motion to end debate (also known as "calling the question"). If such a motion is made and seconded, the Chair shall immediately call for a vote on the motion. If the motion is not approved by 2/3 of the members of the Board present and voting, the Chair shall allow for debate to continue. If the motion is approved, the Chair shall call for a motion on the matter under consideration.

G. ALL MEMBERS MAY SPEAK: Each member of the Board shall have the right to speak and ask questions prior to a vote.

H. AFTER VOTING: Once a vote has been taken on a motion, there shall be no further discussion on that motion unless a motion to reconsider is properly made, seconded, and adopted.

## XII. REMOVAL FROM BOARD

(City Council Resolutions No. 16, Series 2009 & No. 59, Series 2016)

A. The City Council greatly appreciates the contributions made by City residents who volunteer their time to serve on the City's various boards and commissions. In order to help encourage citizens to volunteer and to promote an environment in which participation is productive and rewarding, the Council expects all board and commission members to work in a cooperative, constructive and civil manner.

B. To help maintain this environment the City Council has established that, during the term of office, a board member shall be removed only for cause. Cause shall include but not be limited to:

1. Violation of city or state ethics laws;

2. Conviction of a felony or of any other crime involving moral turpitude;

3. Absence from more than 25 percent of the regular meetings in any 12-month period;

4. Inefficiency, neglect of duty or malfeasance in office;

5. Knowing violation of any statute, ordinance, resolution, rule, policy or bylaw applicable to the board or commission;

6. Physical or mental disability rendering the board or commission member unable to perform his or her duties;

7. Knowing disclosure of confidential information, which is defined to mean information which is not available to the general public under applicable laws, ordinances and regulations, and which is obtained by reason of the board or commission member's position with the City;

8. Failure to maintain the qualifications of a board or commission member for the board or commission on which the member serves;

9. Behaving in a harassing, hostile, threatening or otherwise inappropriate manner, or unreasonably disrupting or interfering with the conduct of any meeting of a board or commission; or

10. Other grounds constituting cause as established by law.

C. The procedure for removal of a member of a City board or commission shall be as follows:

1. Any person who believes that there is cause to remove a member of a City board or commission as provided above shall present the evidence of such cause to the City Manager.

2. The City Manager (or their designee) shall review the evidence presented and conduct additional investigations as the City Manager deems necessary. If the City Manager determines there is sufficient evidence supporting further action, the City Manager shall contact the board or commission member who is the subject of the allegation, outline the allegation against the member and provide the member with an opportunity to respond to the allegation. After considering all information received, the City Manager shall make a

determination as to whether removal or other action is warranted.

3. If the City Manager determines there are grounds for removal, the City Manager shall present a proposed resolution for removal to the City Council for its consideration and action. The member shall be provided written notice of the grounds for removal and the time and place of the City Council's consideration of the matter, at which time the member may address the City Council regarding the grounds for removal. Removal of a member shall require the affirmative vote of a majority of the entire City Council.

4. A member may resign from a board or commission at any time by providing a written resignation letter to the Mayor or City Manager. A resignation is effective upon submission or such later date as stated in the resignation letter, without requirement for acceptance thereof.