City of Louisville
COLORADO • SINCE 1878

Sustainability Advisory Board

Agenda

May 17, 2023
Louisville Public Library, Second Floor Board Room
951 Spruce 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.

- *You can call in to +1 408 638 0968 or 833 548 0282 (Toll Free)*
  Meeting ID #829 8194 5389
  Meeting Password # 741017
- *You can log in via your computer. Please visit the City's website here to link to the meeting: www.louisvilleco.gov/sustainabilityboard.*

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

I. Call to Order
   - Dan is May secretary.

II. Roll Call

III. Approval of Agenda

IV. Approval of Minutes

V. Public Comments on Items Not on the Agenda (3 minutes per comment)

VI. Staff Updates

VII. Discussion Item: Dark Sky Lighting Ordinance Discussion

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.

- Staff Update and Discussion Questions – Amelia Brackett Hogstad, Historic Preservation Planner
- Public Comment (2 minutes per comment)
- LSAB Discussion

VIII. Discussion Item: Dark Sky Lighting Draft Memo Review

- Draft Memo Overview – Josh Cooperman
- Public Comment (2 minutes per comment)
- LSAB Discussion and Direction

IX. Discussion Item: Sustainability and LSAB Communications Plan

- Staff and Chair Update – Todd Budin
- Public Comment (2 minutes per comment)
- LSAB Discussion

X. Discussion Item: Board Purpose and Role (City Manager Request)

- Staff Update
- Public Comment (2 minutes per comment)
- LSAB Discussion

XI. Sub-Committee and Board Member Updates

XII. Administrative Tasks

- Kayla to write June Spotlight
- Tiffany is June secretary

XIII. Discussion Items for Next Meeting

- Internal Decarbonization Plan (McKinstry)

XIV. Adjourn

City of Louisville
COLORADO • SINCE 1878

Sustainability Advisory Board

Meeting Minutes

April 19, 2023
Louisville Public Library, Second Floor Board Room
951 Spruce Street
6:30 PM

Call to Order – Chairperson Todd Budin called the meeting to order at 6:33 pm.

Roll Call was taken and the following members were present:

Board Members Present: Tiffany Boyd, Todd Budin, Josh Cooperman, John Cowley, Dan Mellish and Megan Ottesen

Board Members Absent: Lev Szentkiralyi

Staff Members Present: Kayla Betzold

Approval of Agenda –
Dan moved to approve the agenda; Tiffany seconded the motion. The agenda was approved by all members.

Approval of Meeting Minutes –
Tiffany moved to approve last meeting's minutes; Dan seconded the motion. The minutes from the March 15, 2023 meeting were approved as written.

Public Comments –
RJ Harrington: The Colorado Air Quality Control Commission has voted to adopt California's rules regarding heavy-duty truck emissions, as well as

accommodations for hydrogen fuels. This regulation dovetails with Louisville's recent limits imposed on building new filling stations in the city.

Staff Update –

Kayla reported that May 8 – 12 is Drinking Water Week. In support, the North Water Treatment Plant will again host tours, this year on Wednesday, May 10th, from 3:30 to 5:30.

Josh reminded attendees that rebates are available from PACE for landscaping equipment. Kayla added that Louisville has funding for the city's handheld landscaping equipment, but that mowers are still too expensive.

Josh reported that an organization called Urban Climate Solutions is working on a number of programs locally. Kayla said that one goal is to increase the urban (tree) canopy via an "accelerator" program and is soliciting requests for grants. Kayla mentioned that "urban heat mapping" is another program goal. Tiffany and Josh added details. Kayla said that Boulder County is leading the way with these programs by, for example, pursuing the use of goats for weed control, expanding the heat-mapping accelerator, and looking for other specific areas for accelerator funding. Tiffany said that these programs would be a good subject for an upcoming Spotlight article.

Josh said that such nature-based climate programs were of personal importance to him. On this subject, Todd reminded the group that turf-replacement funds (incentives) are available. Kayla added that "median replacement" turfs were being considered, and that Louisville could expand this effort citywide to HOAs and commercial properties. Northern Water offers some funding for this.

Tiffany congratulated and thanked Kayla for all her work keeping these many climate-resiliency activities at the forefront of the City's sustainability concerns.

Kayla reported that state senators have submitted a bill which includes financial assistance for a majority of the electrification renovations for Louisville's Recreation Center. This could include ground-mounted solar arrays. (The building's roof is not suitable for a large number of solar panels.)

John asked about installing sectional roofed areas in the parking lot, supporting solar arrays, but was told they are too expensive.

Kayla answered Tiffany's questions about progress on hiring a Sustainability Specialist, noting that many applications have been received, leading to six upcoming virtual interviews.

Kayla noted that the Sustainability Division will be moving its office into the White House (the oldest building in Louisville), as will the Economic Vitality Department, after renovations are complete.

Discussion Item – Community Decarbonization Plan Introduction

Lynn Jemison, a Community Facilitator for Partners in Energy (an Xcel Energy Community Collaboration), presented an overview of the planning, engagement, and scope for creating a "Decarbonization Plan" for the city of Louisville. Sarah Kaye (a colleague of Lynn's) will be the lead facilitator for Louisville's planning. The overview by Ms. Jemison was summarized by her package of 17 presentation slides shown at the meeting. Following are some key items discussed:

The Decarbonization Plan will cover a two-year period and will be set up to have targets that are measurable and trackable. The Plan will focus on Buildings and Transportation at the local level. (These targets won't include "Scope 3 Emissions", which are secondary effects from carbon sources.)

Kayla explained that the goals for this effort will be developed by a "stakeholder group" to be recruited in June 2023. (A brief discussion included suggestions regarding who should be included to form a representative group.)

All Sustainability Advisory Board members agreed that it will be important to establish a "baseline" of present carbon-related emissions and presently-installed countermeasures (e.g., heat pumps) so that outcomes of this upcoming Community Decarbonization Plan can be judged based on pre-established metrics.

Public Comment

RJ Harrington: He was part of the 2017 Task Force (Partnership in Energy), whose concluding Plan called for a 1% annual reduction in Louisville's local greenhouse-gas (GHG) emissions. However, the outcome led to no reductions [not including Xcel Energy's own reduction in emissions from electricity generation].He also asked if we can take advantage of any results from McKinstry's (consultants) ongoing review of Louisville municipal buildings' energy use. And, four years from now, the Franchise Agreement with Xcel Energy will conclude – will this allow the City any new options for clean-energy actions?

Cali (student visitor): What is the way to get a refund on a gasoline vehicle trade-in to buy an EV? RJ Harrington: Information about this exchange/refund can be found by searching for the Colorado Vehicle Exchange Program.

LSAB Discussion

Tiffany asked Lynn to address RJ's questions. Lynn said the Energy Action Plan, in conjunction with Partners in Energy, was published in 2017 and included a two year plan to meet its goals, ending in 2019. A group called the "Energy Futures Collaborative" consisting of mayors, the PUC, and other managers is tasked to produce "higher level goals". Kayla mentioned that Louisville has regular coordination with Xcel.

John asked Lynn whether Xcel Energy will be able to deliver all the new electric-power required to meet goals and targets that a serious Decarbonization Plan

might require, such as enough extra power to charge a large increase in electric vehicles. He also asked if such a Plan should intentionally limit some of its near-term goals knowing that Xcel will not be in a position to permit those goals, such as a large increase in solar roofs. Lynn responded, absolutely not. The goals should be presented, whether or not they are practical to achieve.

Josh asked whether the stakeholder group would include non-Louisville residents, such as by allowing commuters coming in from other towns to charge their EVs in Louisville? Kayla responded that the stakeholder group would not be limited to Louisville residents, but interested individuals would need to have a connection to the city, such as commuting to Louisville for work.

Tiffany began the discussion of how people would be selected to be on the stakeholder group, to include "stakeholder" representatives from many walks of life. John asked Lynn what she envisions as "measurable goals". Lynn responded that it would be important to track data. Megan suggested that additional questions be added to the questionnaire for the Comprehensive Plan.

Discussion Item – Solar United Neighbors

Kayla described the Solar United Neighbors Co-op as an organization that combines the bargaining power of 50 to 100 homeowners who are interested in installing rooftop solar. They initially planned to organize in Louisville in May but are now delaying until sometime in the fall. This is because Xcel is reevaluating its electricity capacity for Louisville (and Superior).

A new bill evolving in the statehouse on Utility Regulations puts a cap on a homeowner's costs for upgrading area electrical equipment to enable a rooftop solar installation. The City of Louisville may want to support residents in getting relief from such potential costs. Xcel appears to be motivated to help homeowners redeveloping in the Marshall fire's burn area. (Xcel is reviewing its $200 fee.) Also, because of the issues around Xcel's electricity-distribution

limitations, the release of Louisville's Clean Energy Portfolio is being postponed until 2024.

Public Comment

Laura (remote access): Where are the builds happening for the solar farms for US Solar?

RJ: With my company, I have installed all the EV chargers within Louisville. I was on the Partners in Energy task Force and involved in the electric municipalization effort in the city of Boulder. There continue to be unknowns regarding the limitations of Xcel's distribution grid and unknown blockages to understanding Xcel's plans to overcome these limitations.

LSAB Discussion

Kayla explained that there are 14 locations (around the state) where US Solar is developing solar farms. Tiffany asked how we can work with Xcel to help residents resolve their issues regarding solar installations. Kayla responded that a group of regional staff are working with Xcel and solar companies to develop an agreed upon process for solar projects and installation. Megan added that there is a bill in the state legislature that would limit homeowners costs to upgrade needed electrical infrastructure.

John noted that a recent article in the Daily Camera [Feb 13, 2023] said that the PUC "...is looking at ways to speed up the process that likely will include penalties [on Xcel]."

Discussion Item – Dark Sky Lighting Ordinance

Josh Cooperman provided the board with an overview of the dark sky lighting project background and current ordinance. His presentation is summarized by the package of six slides presented at the meeting. The purpose of the presentation was to lead to a decision about whether the board would like to submit a memo to Council supporting this ordinance.

In general, Josh said such an ordinance should be “purposeful and targeted”. He summarized the benefits and goals, recognizing that any such ordinance would have to consider definitions of acceptable fixtures, holiday lighting, non-residential lighting, outdoor sports lighting, limits on compliance and enforcement, etc.

Public Comment
Cindy Bedell: Why would there be any opposition to this ordinance?
RJ Harrington: I support the Board in writing such a letter.

LSAB Discussion
Kayla answered Cindy’s question by listing some potential objections: Lessening of a deterrent to crime (even if not realistic) and residents’ costs for replacing existing outdoor fixtures.

John described a specific case of a local home’s backyard spotlight which illuminated a large extent of an adjacent multiuse path – suggesting that the homeowner probably thought he/she was providing a service to nighttime walkers, and would be offended if asked to remove the light. Josh added that such concerns are known to be overcome by choosing well-designed fixtures. Kayla added that police department sources have commented favorably regarding this ordnance. She also said that details regarding this ordinance are available on the city’s web site.

Todd asked if the ordinance imposed any time constraints on when residents would have to comply. Josh responded that there is no timeline for homeowners replacing existing, non-conforming outdoor fixtures

Dan asked if the ordinance would apply to people whose homes are being rebuilt because of the fire.

Todd inquired whether retailers carry a suitable supply of dark-sky qualified light fixtures, and whether they would eventually not carry non-compliant fixtures. Kayla said promotional programs could highlight compliant fixtures and where to purchase them. Megan asked if the city would create a grant program to help lower-income residents comply.

Megan made a motion that Josh be tasked to write a memo to Council from LSAB supporting the dark-sky ordinance. This memo should recommend including steps to educate residents about the ordinance's importance and safety aspects, as well as a program of rebates to ease the transition.
Dan seconded Megan's motion.
The Board voted on Megan's motion. All members in attendance voted in favor of the motion.

Sub-Committee and Board Member Updates –
None

Administrative Tasks –
Josh will write the May Sustainability Spotlight. Dan is the May secretary.

Discussion Items for Next Meeting –
Kayla said that the May meeting would include a discussion about the Sustainability/LSAB communications plan, board and commissions purpose and role (City Manager request) and dark sky lighting draft memo.

Adjourn –
Megan moved to adjourn the meeting and Josh seconded the motion. The meeting was adjourned at 8:17 p.m.

City of Louisville
City Manager's Office

Memorandum

To: **Louisville Sustainability Advisory Board**

From: **Kayla Betzold, Sustainability Coordinator**

Date: **May 17, 2023**

Re: **Staff Updates**

Resource Central Programs

- The Lawn Replacement Program and Garden in a Box program are sold out for the year.
- Free, online Waterwise Yard Seminars will be hosted by Resource Central and partner organizations throughout 2023 to educate residents about low-water landscaping. Find out more at https://resourcecentral.org/seminars/. The City of Louisville seminar will be held on Monday, July 10 from 6:00 – 8:00 p.m. and will be titled Firewise Landscaping: Methods and Design
- Slow the Flow sprinkler assessments and Rachio smart controller installations will start to be advertised in late May/early June. New this year, Louisville businesses can participate in the Slow the Flow program – spread the word!

Events

- The Spring Cleaning Event saw 80 vehicles over 3 hours with ~65 RAQC vouchers distributed, 2,858 lbs of e-waste and 7,760 lbs of scrap metal (mostly mowers) recycled. Metrics from hazardous waste not yet available.
- The virtual Sustainability Film Series will be hosted by Louisville, Lafayette, Superior and Broomfield and will be held April – July 2023 on the third Thursday of each month. Louisville's film is Ice on Fire and will be held on Thursday, May 18 on Zoom and Boulder County Senior Sustainability Strategist Tim Broderick will be available for a post-film discussion.
- The City's Summer Carnival is Wed., June 14 from 10:00 a.m. – 12:00 p.m. This event is promoted to families and usually sees 700+ attendees.
    - Does LSAB want to table at this event?

Grants

- The City has been awarded $23,875 for the Turf Replacement Program funding through the Colorado Water Conservation Board to expand the residential Lawn Replacement program through Resource Central. If funds remain, this grant may also fund the start of a commercial turf removal program in Louisville.
- Both Senator Hickenlooper and Senator Benet have submitted the Louisville Recreation & Senior Center Decarbonization Project to the Senate Appropriations Committee for funding consideration. The next update will be mid-to-late summer.
- The City, along with Boulder County and municipalities, applied for IRA Urban Forestry funding to conduct an urban heat mapping study and asset database, purchase 1,000+ trees for planting and train 25 tree tenders in each community to ensure longevity of newly planted trees.
- The City, along with Boulder County and municipalities, are applying for U.S. Department of Transportation (DOT) Federal Highway Adminstration (FHWA) and Fueling Infrastructure (CFI) Discretionary Grant program funding to expand publicly accessible electric vehicle charging in the county.

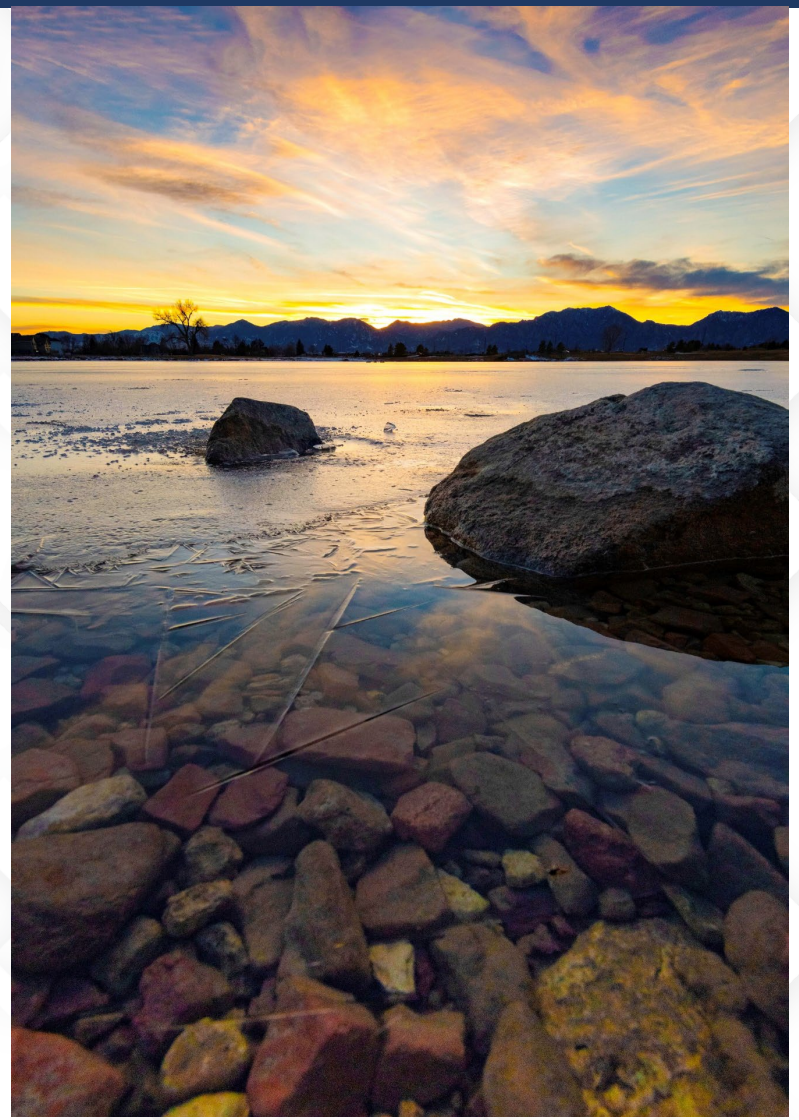
Staffing

- The City has made an offer to a candidate for the Sustainability Specialist position and the candidate has accepted the offer and will be starting on June 20, 2023. The Sustainability Specialist will focus on program development and management, sustainability events and communications.

Regional Collaborations

- The Front Range Sustainability Directors group met and discussed the $1M EPA funding for a regional climate action plan to be completed by the end of 2024. DRCOG will likely become the leading organization for this effort. If the regional climate action plan is created, the region then become eligible for $3B+ in funding to implement the plan in future years.
- The Colorado Communities for Climate Action policy retreat is in early June. The City's Sustainability division and Mayor Pro Tem will be representing Louisville at this event.
- Boulder County has created a nature-based solutions collaborative working group to discuss regional opportunities for nature-based climate solutions, such as expanded tree canopy and regenerative agriculture.
- The Boulder County Climate and Economy team met to learn about CoStar, a software platform that provides detailed commercial building information including square footage, age, heating system type, etc. The City of Louisville subscribes to this service and information from this platform could be used for commercial sustainability data collection and program development.

- The Front Range Beneficial Electrification Network has been created to accelerate the adoption of beneficial electrification technologies through regional collaboration (20+ Front Range communities). The group is currently focused on residential electrification and has created 4 sub-groups – scaling electrification/bulk purchasing, workforce development, funding, and standardized information.
- The Boulder County Regional Transportation Electrification team has been conducting multifamily property owner outreach to understand barriers of EV charging installation, conducting Xcel Energy pre-capacity checks on potential publicly owned sites to determine charging capabilities (1 Louisville location – Sweet Cow parking lot) and creating monthly residential and commercial newsletter text and graphics to inform and educate about transportation electrification. The group is also collaboratively applying for the CFI funding.
- Boulder County is presenting the 2021 Greenhouse Gas Inventory to the Boulder County Commissioners on May 31 and anticipates the interactive Storyboard will be available to the public in early June. This will be the first updated GHG inventory since 2018 (2016 data).
- The building code cohort work has resulted in the recent publication of the Northwest Metropolitan Regional Energy Code Cohort – Roadmap to Net Zero Energy New Construction, which recommends a regional approach to energy code adoption in 2024, 2027 and 2030 to achieve net-zero new construction standards. Report is included in packet for informational purposes.



City of Louisville

Sustainability Advisory Board

May 2023

Kayla Betzold, Sustainability Manager

Discussion Item: Dark Sky Lighting Ordinance

Overview

- Amelia Brackett Hogstad, Historic Preservation Planner

Public Comment

- 2 minutes/comment

LSAB Discussion

- Questions and discussion

Discussion Item: Dark Sky Lighting Draft Memo Review

Overview - Josh Cooperman

Public Comment

- 2 minutes/comment

LSAB Discussion and Direction

- Draft memo changes, comments, discussion
  - Motion
  - Seconded motion
  - LSAB vote
  - Record vote

Discussion Item: Sustainability and LSAB Communications Plan

Overview – Kayla Betzold and Todd Budin

- City's Sustainability Communications Plan
- LSAB's Partner Contacts Database (to be created)

Public Comment

- 2 minutes/comment

LSAB Discussion

- How can LSAB support the City's Sustainability Communications Plan?
- Who should be included in LSAB's Partner Contacts Database?
- How can LSAB creatively get the word out about sustainability offerings?

Discussion Item: Board Purpose and Role

Overview

- What do you consider to be the purpose and role of your body? Do you have suggestions on changing that role in the future?
- What have been your greatest successes? What about your greatest failures?
- How is your process to develop your annual work plan? How does it align with Council's work plan?
- If Council will be considering changes, what changes would you recommend?
- Do you feel that your body has been effective or ineffective? Why?
- 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 body in regards to agenda development, meeting duration, and meeting tempo?

Public Comment

- 2 minutes/comment

LSAB Discussion

LSAB May 2023 Meeting

Sub-Committee and Board Member Updates

Administrative Tasks

- Staff to write June Sustainability Spotlight
- Tiffany is June secretary

Discussion Items for Next Meeting

- Internal Decarbonization Plan (McKinstry)

Adjourn

City of Louisville
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Community Development Department

749 Main Street • Louisville CO 80027 • 303.335.4592 • www.louisvilleco.gov

MEMORANDUM

To: Louisville Sustainability Advisory Board Members

From: Community Development Department

Subject: Dark Sky Ordinance Update

Date: May 17, 2023

The City of Louisville is drafting a dark sky lighting ordinance to regulate outdoor lighting. The project was started in 2021 and put on hold in the aftermath of the Marshall Fire until City Council adopted the 2023 Work Plan, which included dark sky lighting.

A draft ordinance was published online in March 2023 (attached). Prior to the publication of the draft ordinance in March, multiple City departments collaborated or provided comments on the draft, including Planning, Police, Economic Vitality, and Open Space.

Staff is **currently updating the draft** ahead of the June Planning Commission hearing.

To date, **community engagement** for the project has included the following:

- Online surveys (commercial and residential) with over 200 respondents.
- Chamber of Commerce survey with 61 respondents.
- Open House on April 10, 2023 with approximately 20 online and in-person attendees.
    - Staff in attendance: Planning; Police; Sustainability; Economic Vitality; and Equity, Diversity, and Inclusion.
- First public draft ordinance posted online in late March/early April.
- Staff available for questions and with informational handouts at the Green Business Breakfast on April 18, 2023 and at the Louisville Business Forum on April 27.
- Open Space & Planning Presentation at the Open Space Stargazers – International Dark Sky Night event on April 30, 2023.
- Informal feedback on drafts from lighting professionals, including Colorado Chapter of the International Dark Sky Association.
- Information about the survey, open house, and draft ordinance was posted on the City website, included in the April update channels, and emailed

directly to over 100 people who had requested to be updated on the project.
- Louisville Historical Museum exhibit on historical lighting technologies and patterns, which included a section on dark skies and the ordinance project in 2021.
- Staff presentation to the Louisville Sustainability Advisory Board in 2021.
- City Council Study Sessions in 2019 and Discussion/Directions in 2021

Next steps for the project include taking an updated draft of the ordinance to Planning Commission in June with two new options for compliance, which could include provisions for an amortization period, as well as other changes aimed at clarity and effectiveness in response to community and departmental feedback. Staff plans to solicit additional community feedback on Planning Commission's compliance recommendation ahead of City Council.

Attachments

1. March 2023 Draft Ordinance
2. Examples of Acceptable/Unacceptable Lighting Fixtures Handout
3. Open House Slides on Draft Ordinance
4. Crime Prevention Through Environmental Design Handout
5. Examples of Before and After Dark Sky Lighting

City of Louisville
COLORADO • SINCE 1878

DRAFT Memorandum

To: **Louisville City Council Members**

From: **Louisville Sustainability Advisory Board**

Date: **July 25, 2023**

Re: **Dark Sky Lighting Ordinance**

Dear Louisville City Council members,

The Louisville Sustainability Advisory Board strongly supports the adoption of a dark night sky lighting ordinance. Such an ordinance would constitute a welcome advance for environmental sustainability in Louisville.

As the Board previously noted, a dark night sky lighting ordinance would reduce the City's light pollution. Light pollution adversely affects many forms of wildlife endemic to and migrating through Louisville including pollinating insects, migratory birds, and nocturnal mammals; light pollution harms the health of Louisville's residents, for instance, by disrupting sleep patterns; and light pollution denies our community a vital part of our natural environment, the night sky. A dark night sky lighting ordinance would help to remediate these negative effects of light pollution. While the City's Comprehensive Plan and Sustainability Action Plan do not specifically address light pollution, these Plans do call for the protection and restoration of Louisville's natural environment. Moreover, curbing light pollution represents a clear extension of the goals enunciated in the Sustainability Action Plan, which we hope to update to explicitly address light pollution.

As the Board also previously noted, a dark night sky lighting ordinance would enhance the City's energy efficiency. Light fixtures compliant with a dark night sky lighting ordinance would not waste energy illuminating areas that do not require illumination; lighting plans compliant with a dark night sky lighting ordinance would not over illuminate areas that do require illumination; and the replacement of light

fixtures not compliant with a dark night sky ordinance would make the City's lighting more energy efficient as modern fixtures typically have higher intrinsic efficiencies.

The Board encourages the City to further educate its residents and business owners about the benefits and intents of dark night sky lighting, to offer its residents and business owners incentives and rebates to install dark night sky lighting, and to advance regional alignment on outdoor lighting standards.

Thank you for considering our recommendation.

Best regards,

The Louisville Sustainability Advisory Board

DRAFT LIGHTING ORDINANCE – MARCH 2023

ORDINANCE NO. XXXX
SERIES XXXX

AN ORDINANCE ADOPTING A NEW OUTDOOR LIGHTING CODE FOR THE CITY OF LOUISVILLE

WHEREAS, the City of Louisville is a Colorado home rule municipal corporation duly organized and existing under laws of the State of Colorado and the City Charter; and

WHEREAS, pursuant to such home rule authority and state law, including but not limited to C.R.S. § 31-23-301 et seq., the City has adopted procedures and standards pertaining to the regulation of outdoor lighting within the City, which are set forth in Chapter 17.24 of the Louisville Municipal Code; the Design Handbook for Downtown Louisville; and the City of Louisville Mixed Use, Commercial and Industrial Development Design Standards and Guidelines; and

WHEREAS, the City Council desires to adopt and incorporate into the Louisville Municipal Code a new Outdoor Lighting Code for the City of Louisville (the "Lighting Code"), which Lighting Code includes standards and guidelines for all outdoor lights in the City; and

WHEREAS, in connection therewith, the City Council desires to make corresponding amendments to Chapter 17.24 of the Louisville Municipal Code, the Design Handbook for Downtown Louisville and the City of Louisville Mixed Use, Commercial and Industrial Development Design Standards and Guidelines; and

WHEREAS, the City has held public workshops to discuss and gather feedback and comments on the Lighting Code; and

WHEREAS, after a duly noticed public hearing, where evidence and testimony were entered into the record, the Louisville Planning Commission has recommended the City Council adopt the Lighting Code and this ordinance; and

WHEREAS, the City Council has reviewed the recommendation of the Louisville Planning Commission and desires to adopt the Lighting Code and this ordinance; and

WHEREAS, City Council has provided notice of a public hearing on said ordinance by publication as provided by law and held a public hearing as provided in said notice.

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

Section 1. The foregoing recitals are hereby affirmed and incorporated herein by this reference as findings of the City Council.

Section 2. Title 17 of the Louisville Municipal Code is hereby amended by the addition of a new Chapter 17.26 to read as follows:

Title 17 – Zoning

Chapter 17.26
Outdoor Lighting

Chapter 17.26 – Outdoor Lighting

Sec. 17.26.010. Purpose.

The purpose of this ordinance is to provide regulations for outdoor lighting that will:

A. Protect and enhance human and environmental health;
B. Promote nighttime safety and visibility through purposeful and directed lighting;
C. Increase the effectiveness of natural areas in providing sanctuary for wildlife;
D. Support citywide sustainability efforts by limiting the use of energy resources to the greatest extent possible;
E. Minimize the adverse impacts of lighting, such as light trespass, glare, artificial night glow, and obtrusive light;
F. Encourage quality lighting design and implementation;
G. Effectively manage lighting throughout the city; and
H. Increase access to and enjoyment of the night sky.

Sec. 17.26.020. Definitions.

The following definitions shall apply to this ordinance:

Agricultural. The Agricultural (A) district as defined in Sec. 17.12.010 of the Louisville Municipal Code (LMC).

Backlighting. Lighting directed behind the luminaire.

Correlated Color Temperature (CCT). A metric to evaluate the color appearance of a light source, as measured by the absolute temperature of a blackbody whose chromaticity most nearly resembles that of the light source.

Downtown. The area encompassing properties with Commercial Community zoning that are located on the west side of the railroad tracks within the downtown, as defined in Sec. 17.08.113 of the LMC.

Footcandle. The unit of measure expressing the quantity of light received on a surface. One footcandle is calculated as the illuminance produced by a candle on a surface one foot square from a distance of one foot.

Fully-shielded. A luminaire constructed and installed in such a manner that all light emitted by the luminaire, either directly from the lamp or a diffusing element, or indirectly by reflection or refraction from any part of the luminaire, is projected below the horizontal plane through the lowest light-emitting part. The primary intent of fully-shielded fixtures is to eliminate uplighting and limit, to the extent possible, the visibility of the light source to

reduce glare and impacts on adjacent properties. A luminaire that is full cutoff meets the fully-shielded requirement.
Glare. Lighting entering the eye directly from luminaires or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.
Installation. Art, monuments, or any other outdoor features, whether owned publicly or privately, that are meant for public enjoyment and are visible from a public right-of-way or public access easement.
Light trespass (or "trespass"). Light that falls beyond the property it is intended to illuminate.
Lighting. Electric, man-made, or artificial lighting.
Lighting plan. A document(s) (site plan, schedule, et cetera) and accessory materials (specification sheet(s), night view site plan, et cetera) that contains sufficient evidence demonstrating compliance with all of the relevant provisions of this ordinance.
Lumen. The unit of measure used to quantify the amount of light produced by a lamp or emitted from a luminaire (as distinct from "watt," a measure of power consumption). Lumens have watt equivalencies, to be verified by the Director as needed.
Luminaire. A term to refer to a single unit containing all of the elements that combine to produce lighting. A luminaire consists of the complete lighting unit (fixture), consisting of a lamp, or lamps and ballast(s) (when applicable), together with the parts designed to distribute the light (reflector, lens, diffuser), to position and protect the lamps, and to connect the lamps to the power supply.
Luminous elements. The lamp (light bulb), any diffusing elements, and surfaces intended to reflect or refract light emitted from the lamp individually or collectively comprise the luminous elements of a luminaire.
Nonconforming. Existing lighting that does not conform to the specific provisions of this ordinance.
Nonresidential. Properties with commercial, industrial, mixed-use, and/or multi-family buildings of seven (7) dwellings or more.
Open Space (OS). The Open space (OS) district as defined in Sec. 17.12.010 of the LMC.
Open space. Privately-owned land that is undeveloped or developed that can support plant materials and that may be used for recreation, circulation, or may be viewed by them; and that preserve natural features and provide recreation, views, and density relief.
Outdoor lighting. See also "lighting." Lighting equipment installed within the property line and outside the building envelopes, whether attached to poles, building structures, the earth, or any other location; and any associated lighting control equipment.
Outdoor recreation facilities. Outdoor areas with playing surfaces that are accessible to the public or are used for private commercial purposes.
Pedestrian hardscape. Stone, brick, concrete, asphalt, or other similar finished surfaces intended primarily for walking, such as sidewalks and pathways.
Residential. Single-family homes, duplexes, row houses, and multi-family buildings of six (6) dwellings or fewer.
Uplighting. Lighting element which directs light above a horizontal plane running through the lowest point of the luminous elements.
Warmth. See also "Correlated Color Temperature (CCT)". Warm lighting, warmer temperature ratings, and similar language refers to lighting that is lower on the CCT scale

and produces a warmer, softer, or more orange glow as opposed to a cooler or brighter glow.

Sec. 17.26.030. Applicability & Scope.

A. The provisions of this ordinance are applicable to all outdoor lighting except streetlights within public right of way owned by a local government or utility.
B. ***New and replacement lighting.*** Except as described below, all outdoor lighting installed after _____ (the date of the effect of this ordinance) shall comply with these requirements. This includes, but is not limited to, new lighting, replacement lighting, or any other lighting whether attached to structures, poles, the earth, or any other location, including lighting installed by any third party.
C. ***Nonconforming status.*** All existing outdoor lighting that was legally installed before the passing of this ordinance, that does not conform to the standards specified within, shall be considered nonconforming. Nonconforming outdoor lighting is allowed to remain until required to be replaced pursuant to the terms of this ordinance.
    1. Nonconforming outdoor lighting may remain in use and maintained in reasonable repair, but shall not be replaced with luminaires that exceed the maximum CCT.
    2. Whenever there is a new use of a property or the use on the property is changed, such as through a Special Review Use (SRU) or a General Development Plan (GDP) Amendment, all outdoor lighting shall be brought into compliance with this ordinance before the new or changed use commences.
    3. If a substantial addition or remodel occurs on a property, lighting for the entire property shall comply with the requirements of this ordinance. Substantial additions and remodels are defined as changes to twenty-five percent (25%) or more in terms of additional dwellings, gross floor area, seating capacity, or parking spaces, either with a single addition or remodel or with cumulative additions or remodels.
    4. Destruction and Abandonment
        1) If more than fifty percent (50%) of the total appraised value of a structure (as determined from the records of the county assessor) has been destroyed, the nonconforming status expires and the structure's previously nonconforming outdoor lighting must be removed and may only be replaced in conformance with the standards of this ordinance.
        2) A nonconforming structure shall be deemed abandoned if the structure does not have an active lease or business license registered for any period greater than six (6) months. In that instance, the nonconforming status expires and the structure's previously nonconforming outdoor lighting must be removed and may only be replaced in conformance with the standards of this ordinance.
    2. It is unlawful to expand, repair, or replace outdoor lighting that was

previously nonconforming, but for which the prior nonconforming status has expired, been forfeited, or otherwise abandoned.

D. ***Waiver Criteria for Nonresidential Uses*****.** Any request for a waiver from the standards of this ordinance shall follow the procedures and considerations set forth in Title 17 of the LMC for approval of a Planned United Development (Sec. 17.28.110 and Sec. 17.28.120).

1. In addition to the criteria outlined in that section, the City may grant a waiver only if it makes findings that all of the following requirements, insofar as applicable, have been satisfied:
    1) That there is a specific need for illumination that cannot be achieved through compliance with this ordinance or through non-illuminated design elements.
    2) That the waiver, if granted, is a minimum waiver that will afford relief and is the least modification of the provisions of this ordinance.
    3) That the proposed lighting encourages excellence in design and is appropriate with the character of the area.
    4) That the waiver will not result in an increase to the restrictions on light trespass in Sec. 17.26.070.
2. Any request for a waiver shall include a lighting plan. The plans shall clearly identify and discuss the proposed alternatives and display compliance with the waiver criteria, including the exhaustion of feasible, compliant alternatives.

E. Variance Criteria for Residential Uses. Any request for a variance from the standards of this ordinance shall follow the procedures and considerations set forth in Title 17 of the LMC for the granting of a variance by the Board of Adjustment (Sec. 17.48.110).

1. In addition to the criteria outlined in that section, the City may grant a variance only if it makes findings that all of the following requirements, insofar as applicable, have been satisfied:
    1) That there is a specific need for illumination that cannot be achieved through compliance with this ordinance or through non-illuminated design elements.
    2) That the variance, if granted, is a minimum waiver that will afford relief and is the least modification of the provisions of this ordinance.
    3) That the variance will not result in an increase to the restrictions on light trespass in Sec. 17.26.070.
2. Any request for a variance shall include a lighting plan. The plans shall clearly identify and discuss the proposed alternatives and display compliance with the variance criteria, including the exhaustion of feasible, compliant alternatives.

Sec. 17.26.040. General Regulations.

All outdoor lighting is subject to the general regulations below except where stated otherwise in the ordinance.

A. ***Fully shielded.*** All outdoor lighting shall be fully shielded, as defined in Sec. 17.26.020.
B. ***Color.*** All outdoor lighting shall have a Correlated Color Temperature (CCT) of 3000 Kelvin or lower, or lighting rated as soft white.
C. ***Prohibitions.*** The following lighting is prohibited:
    1. Uplighting as defined in Sec. 17.26.020 and except as allowed in Sec. 17.26.080.
    2. Lighting that may be confused with warning, emergency, or traffic signals.
    3. Mercury vapor lamps.
    4. Aerial lasers, such as are intended to be directed upward or for extended distances.
    5. Blinking or flashing lights except as allowed in Sec. 17.26.080.
    6. Searchlights, floodlights, or spotlights, except as required by county, state, or federal law; or as used for police, firefighting, emergency management, or medical personnel at their discretion as long as the emergency exists.
D. ***Criteria for Planned Unit Developments (PUDs)***. In addition to the requirements of this ordinance, the city council must be satisfied that the lighting plan in the PUD meets each of the following criteria or can demonstrate that one or more of them is not applicable, or receives a waiver pursuant to Sec. 17.26.030 and that a practicable solution with public interest has been achieved for each of these elements:
    1. Multi-family residential developments with seven dwellings or more and mixed-use developments containing residential shall limit the impact of unhealthy nighttime lighting on residents to the extent possible, through such means as height limitations, low CCT, shielding, and dimming, above and beyond the scope required by this ordinance.
    2. Developments containing open space as defined in the Commercial Development Design Standards and Guidelines (CDDSG) and in Sec. 17.28.080 of the LMC, of .5 acres or larger, and that is meant to preserve natural features and provide recreation, views, and density relief shall enhance the ability of that land to meet those purposes by limiting, to the extent possible, internal light trespass onto that land and by employing low CCT.

Sec. 17.26.050. Residential Uses.

Regulations for residential uses in this section apply to single-family homes, duplexes, row houses, and low rise multi-family buildings of six (6) dwellings or fewer. Multi-family buildings with more than six (6) dwellings are regulated under Sec. 17.26.060.

A. All outdoor lighting for residential uses are subject to Sec. 17.26.040.
B. ***Lumens cap.*** All outdoor lighting shall have a cap of 850 lumens per luminaire.
C. ***Trespass.*** Outdoor lighting on properties adjacent to areas zoned Open Space (OS) or Agricultural (A) are subject to additional restrictions as outlined

in Sec. 17.26.070.

D. ***Height.*** Any luminaires at or above twenty (20) feet above grade or on a second story (whichever is lower) must use motion-activation unless above a second-story or higher deck.
E. ***Lighting plans***. New construction and substantial additions and remodels as defined in Sec. 17.26.030 are required to submit lighting plans. In addition, all replacement lighting, such as new bulbs and fixtures, must be compliant with the regulations in this ordinance.

Sec. 17.26.060. Nonresidential Uses.

Regulations in this section apply to all nonresidential uses, and for multiple residential properties of seven dwellings or more.

A. ***General regulations and exceptions.*** All outdoor lighting in nonresidential uses is subject to Sec. 17.26.040. Lighting solely for the purpose of signage is exempt from this ordinance, as stated in Sect. 17.26.080.
B. ***Lumens cap.*** All outdoor lighting shall have a cap of 20,000 lumens per luminaire, to be used as an upper limit and not as a typical or standard lumen level. Caps are meant as maximums to allow for a range of situations and are not meant to represent average or typical lighting levels for most sites.
C. ***Trespass.*** Outdoor lighting on properties adjacent to nonresidential areas or areas zoned Open Space (OS) or Agricultural (A) are subject to additional restrictions as outlined in Sec. 17.26.070.
D. ***Downtown.*** Downtown, as defined in Sec. 17.26.020, is limited to the following restrictions and exempt from the other restrictions in this section.
    1. All outdoor lighting in downtown is subject to Sec. 17.26.040.
    2. All outdoor lighting shall have a cap of 5000 lumens per luminaire excepting parking lot lights, which are capped at 20,000 lumens per luminaire. Caps are meant as maximums to allow for a range of situations and are not meant to represent average or typical lighting levels for most sites.
    3. Downtown properties are not subject to uniformity standards.

E. Uniformity

1. Nothing in this ordinance shall be construed as preventing the full shutting off of lighting regardless of changes to light uniformity measurements.
2. Outdoor lighting shall meet the following requirements for light levels when at 100% capacity:

Illuminated Surface	Min. Light Level	Max. Light Level
Auto Dealerships: Front Row & Featured Displays Other Merchandise Areas	 --- ---	 15.0 footcandles 10.0
Parking Lots	.2 footcandles	5.0
Vehicular Entrances from Right-of-Way	1	5.0
Automobile Service-Station Pumping Areas	--	15.0

Drive-In/Drive-Through Canopies	---	15.0
Building Entrance and Exit	1	5.0
Common areas		5.0
Automatic Teller Machines (ATMs)	--	15.0 footcandles[1]
Stairways and Steps	1	5.0
The maximum light levels in this table are meant as caps to allow for a range of situations and are not meant to represent average or typical lighting levels for most sites.		
The Director of Planning and Building Safety has the authority to assign a category if the correct category is not readily apparent.		

3. The minimum-to-maximum light level ratio shall not exceed four-to-one (4:1) anywhere on site when at 100% output.

Sec. 17.26.070. Light Trespass

Regulations in this section apply to outdoor lighting in all use zones.

A. Light emitted from outdoor lighting on any property shall not cause the light level along any property line, as measured at grade, to exceed the following limits:

Emitting Use	Impacted Use	Max. Light Level
Residential	Open Space (OS) and Agricultural (A) zone districts, and parks of .5 acres or larger	0.0 footcandles measured at the boundary line.
Nonresidential (except Downtown)	Residential uses and Open Space (OS and Agricultural (A) zone districts	
Downtown nonresidential	Residential	0.1 footcandles measured at five (5) feet beyond the emitting use property line.

Sec. 17.26.080. Exceptions.

Regulations for the following lighting applications are limited to the conditions of this section.

A. All lighting applications in this section are encouraged to be turned off when no one is present.

B. The following outdoor lighting applications are exempt from all requirements of this ordinance:

1. Decorative lighting provided by a flame source, except that gas-fired

[1] Within a 10-foot radius from the ATM, the maintained average should not exceed 15.0 footcandles. The ten (10)-foot radius is measured from the center face of the ATM and extends a total of 180 degrees. A pedestrian transition zone should be provided within thirty (30) feet of the ATM. A maintained average should not exceed 7.5 footcandles within the pedestrian transition zone. The thirty (30)-foot radius is measured from the center face of the ATM and extends for a total of 180 degrees. No part of this note may be construed to allow trespass from ATMs greater than what is allowed for all lighting in Section 17.26.070.

lighting appliances are prohibited.

2. Underwater lighting used for the illumination of swimming pools and other water features.
3. Lighting solely for the purpose of the internal or external lighting of signage. Signs are regulated by the Sign Code (Sec. 17.24.010).
4. Portable lighting temporarily used for maintenance or repair.
5. Temporary lighting for theatrical, television, and performance areas that is not deemed by the City to create a hazard or nuisance.
6. Emergency lighting used for police, firefighting, emergency management, or medical personnel at their discretion as long as the emergency exists.
7. Temporary lighting required for road construction or other public improvements.
8. Lighting within public right-of-way or public access easement for the principal purpose of illuminating streets or roads. No exemptions shall apply to any lighting within the public right-of-way or easement when the purpose of the luminaire is to illuminate areas outside the public right-of-way or easement, unless regulated with a street-lighting ordinance.
9. Lighting required by county, state, or federal law.

C. The following outdoor lighting applications are exempt from all requirements of this ordinance except as described in this section below:
    1. For residential uses, outdoor luminaires with a low maximum output of up to eighty (80) lumens per luminaire, regardless of the number of bulbs, may be left unshielded provided they are turned off by 11 PM. Luminaires of this type shall illuminate high-impact use areas, such as patios, decks, and similar gathering-spaces or seating-areas, and pedestrian hardscape as defined in this ordinance, and are discouraged as decorative lighting.
    2. For nonresidential uses, outdoor luminaires with a low maximum output of up to 180 lumens per luminaire, regardless of the number of bulbs, may be left unshielded provided they are turned off thirty (30) minutes after closing or the completion of activities. No part of this exception may be construed as applying to the illumination of surfaces primarily used for automobile uses, such as parking lots. The intent of this exception is to provide added safety and visibility for pedestrian pathways and enjoyment in outdoor gathering spaces, and is not meant to allow light trespass onto neighboring properties or to allow for the increase of overall lighting on a site.
    3. Lighting for temporary events such as carnivals, circuses, festivals, fairs, civic events, and exhibitions must be submitted for approval along with a Temporary Use Permit as described in chapter 17.60 and may be subject to conditions as determined by the Director, including but not limited to restrictions on shielding and uplighting and curfews. In addition, the Director of Planning and Building Safety shall consider restrictions that limit uplighting and require additional shielding during

peak migratory wildlife seasons, currently during the months of May and September, to prevent direct upward lighting such as can disrupt navigation and flight patterns.

4. Motion-activation lighting shall not be illuminated for more than five (5) minutes upon activation and shall not exceed 2000 lumens per luminaire.
5. Outdoor luminaires with a maximum of 180 lumens per luminaire for the purpose of seasonal décor may remain from October fifteenth (15^{th}) to January fifteenth (15^{th}) throughout the city. Blinking or flashing seasonal decorations are prohibited on nonresidential properties and discouraged on residential properties. No part of this exception may be construed to allow prohibited lighting types listed in Sec. 17.26.040, even for seasonal decorative purposes.
6. Lighting of up to a total of one (1) flag per property and lighting of up to (1) installation as defined in this ordinance is permitted with the following conditions:
    1) On all properties, the tradition of lowering flags at sunset is encouraged to avoid the need for lighting.
    2) If illuminated, flags and installations are to be illuminated with up to two (2) spot-type fixtures, shielded to the greatest extent possible, with a combined maximum lumen output of 2500 lumens.
7. Lighting for outdoor recreation facilities that are publicly-owned or for commercial purposes in nonresidential uses is exempted from restrictions elsewhere in this ordinance and shall meet the following requirements:
    1) Lighting shall be reviewed through a Planned Unit Development (PUD) process as described in Ch. 17.28.
    2) Only lighting used to illuminate a playing surface is governed by this subsection. All other lighting, such as for parking lots and auxiliary structures, is subject to all of the other relevant standards of this ordinance.
    3) If the luminaire(s) is not fully shielded, then the lighting must be shielded to the greatest extent practical to eliminate uplighting and limit illumination of all other non-targeted areas.
    4) Lighting is subject to trespass standards for Nonresidential in Sec. 17.26.070.
    5) Lighting shall have a nominal CCT of no greater than 5700 Kelvin.
    6) Lighting controls shall provide the following functions:
        a. Local or remote manual control with at least two (2) preset light levels.
        b. Lights shall be automatically extinguished by one (1) hour after the end of play or when not in use.

Section 3. Sections 8.1 to 8.7 of the City of Louisville Commercial Development Design Standards and Guidelines are hereby repealed and reenacted to read as follows:

8.1 Compliance with Outdoor Lighting Code.

Outdoor lighting shall comply with the Chapter 17.26 of the Louisville Municipal Code, as amended from time to time.

Section 4. Sections 8.1 to 8.5 of the City of Louisville Industrial Development Design Standards and Guidelines are hereby repealed and reenacted to read as follows:

8.1 Compliance with Outdoor Lighting Code

Outdoor lighting shall comply with the Chapter 17.26 of the Louisville Municipal Code, as amended from time to time.

Section 5. Any reference to outdoor lighting not in right-of-way is hereby repealed in the Design Handbook for Downtown Louisville. A new section L1 shall be added to Page 15 to read as follows:

L1. Compliance with Outdoor Lighting Code

Outdoor lighting shall comply with the Chapter 17.26 of the Louisville Municipal Code, as amended from time to time.

Section 6. Chapter 14. Exterior Site Lighting in the Mixed Use Development Design Standards and Guidelines is hereby repealed and reenacted to read as follows:

14. Compliance with Outdoor Lighting Code

Outdoor lighting shall comply with the Chapter 17.26 of the Louisville Municipal Code, as amended from time to time.

Section 8. If any portion of this ordinance is held to be invalid for any reason such decisions shall not affect the validity of the remaining portions of this ordinance The City Council hereby declares that it would have passed this ordinance and each part hereof irrespective of the fact that any one part be declared invalid.

Section 9. The repeal or modification of any provision of the Municipal Code of the City of Louisville 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 and all proper actions, suits, proceedings, and prosecutions for the enforcement of the penalty,

forfeiture, or liability, as well as 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 10. All other ordinances or portions thereof inconsistent or conflicting with this ordinance or any portions hereof are hereby repealed to the extent of such inconsistency or conflict.

INTRODUCED, READ, PASSED ON FIRST READING, AND ORDERED PUBLISHED this XX day of _____, 2023

_____, Mayor

ATTEST:

_____, City Clerk

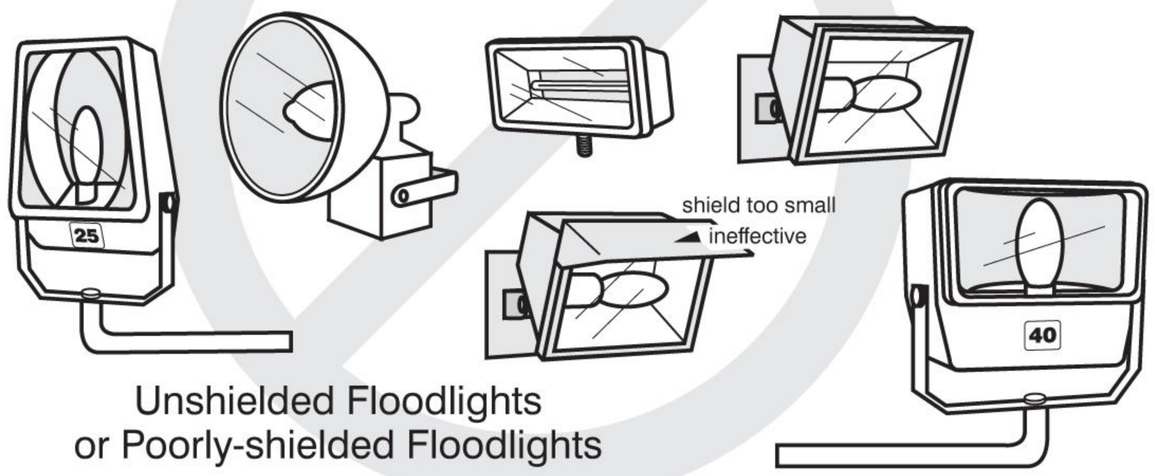
APPROVED AS TO FORM:

_____
City Attorney

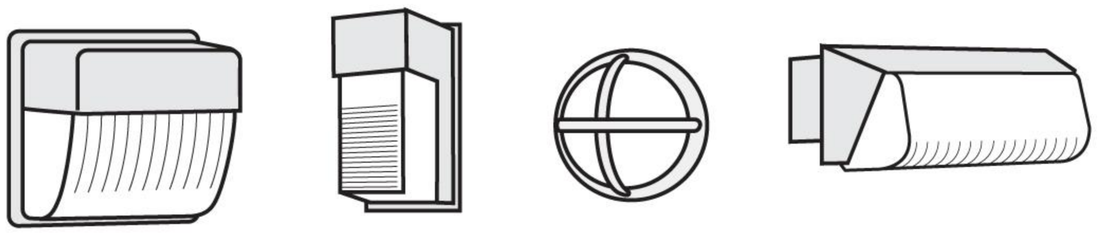
Examples of Acceptable / Unacceptable Lighting Fixtures

Unacceptable / Discouraged

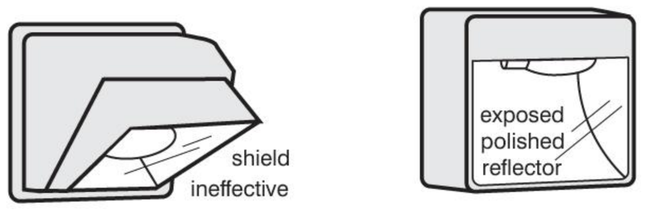
Fixtures that produce glare and light trespass

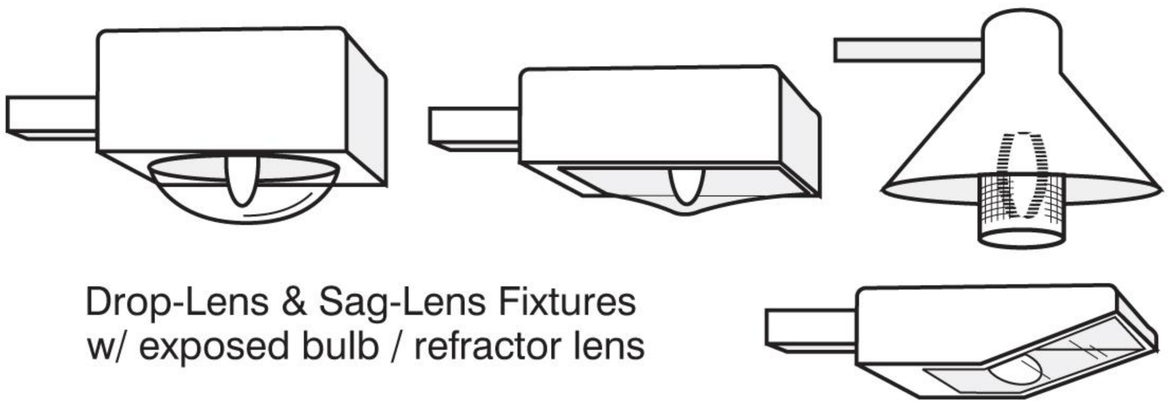


Unshielded Floodlights
or Poorly-shielded Floodlights

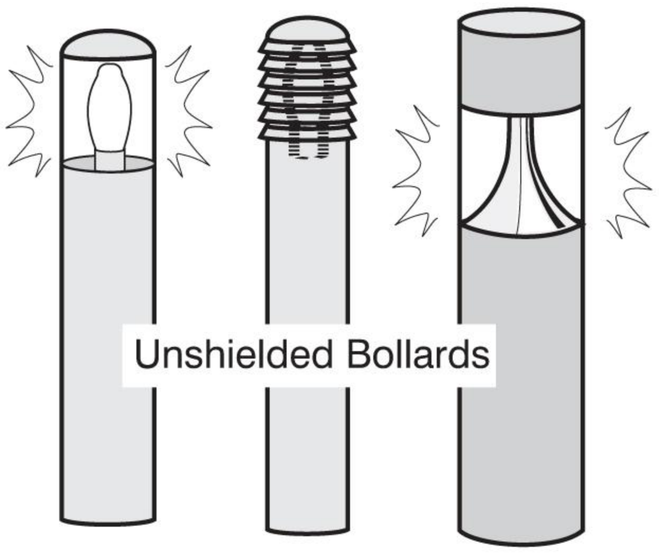


Unshielded Wallpacks
& Unshielded or
Poorly-shielded Wall
Mount Fixtures



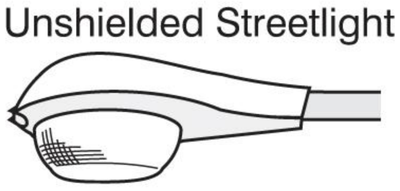


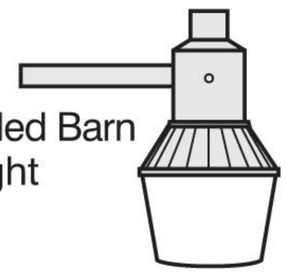
Drop-Lens & Sag-Lens Fixtures
w/ exposed bulb / refractor lens



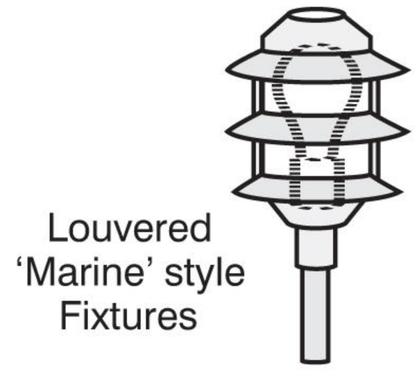
Unshielded Bollards

Unshielded Streetlight



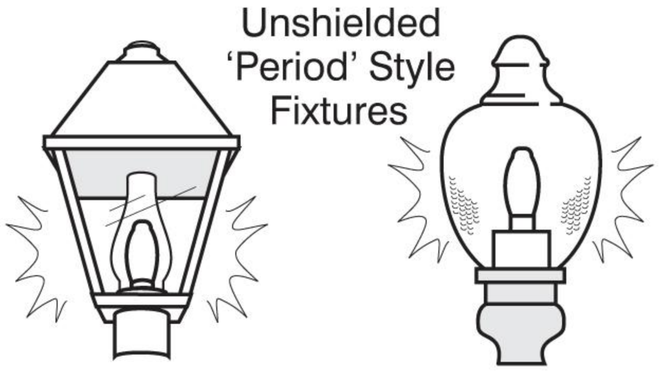


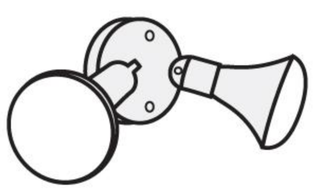
Unshielded Barn
Light



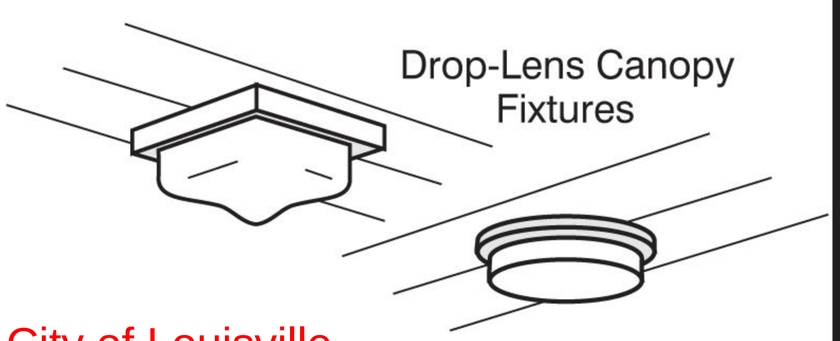
Louvered
‘Marine’ style
Fixtures

Unshielded
‘Period’ Style
Fixtures





Unshielded PAR
Floodlights

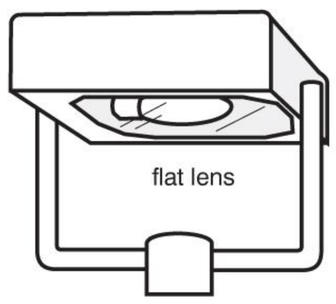


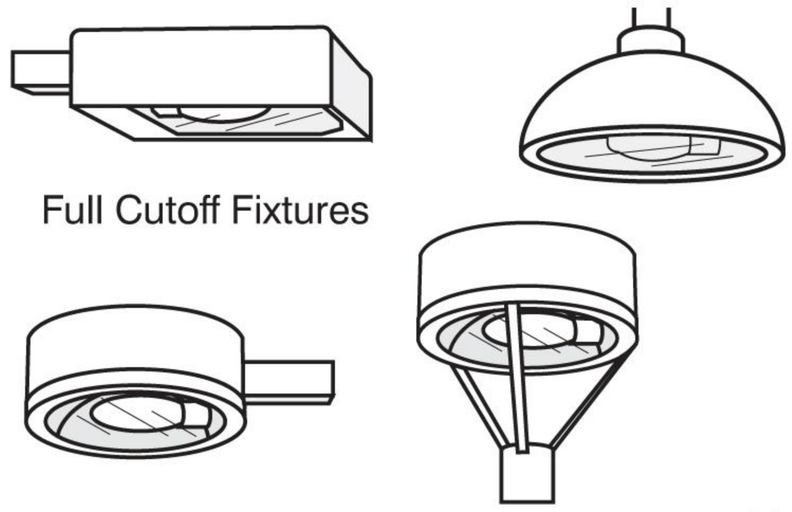
Drop-Lens Canopy
Fixtures

For reference only. City of Louisville
final regulations may differ.

Acceptable

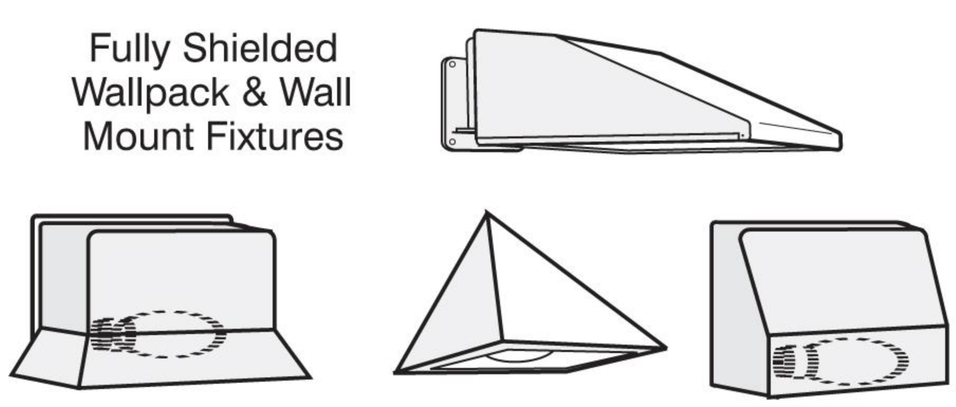
Fixtures that shield the light source to minimize glare and light trespass
and to facilitate better vision at night

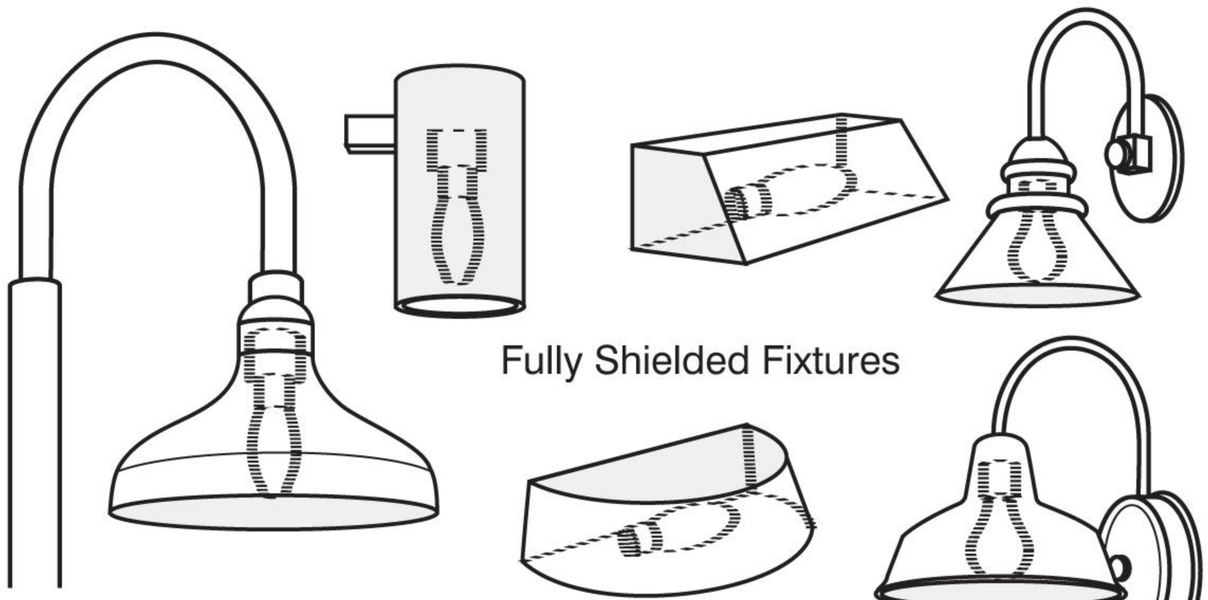




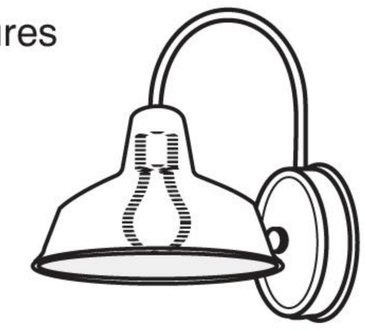
Full Cutoff Fixtures

Fully Shielded
Wallpack & Wall
Mount Fixtures

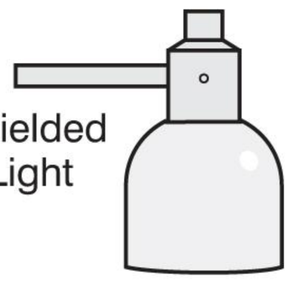




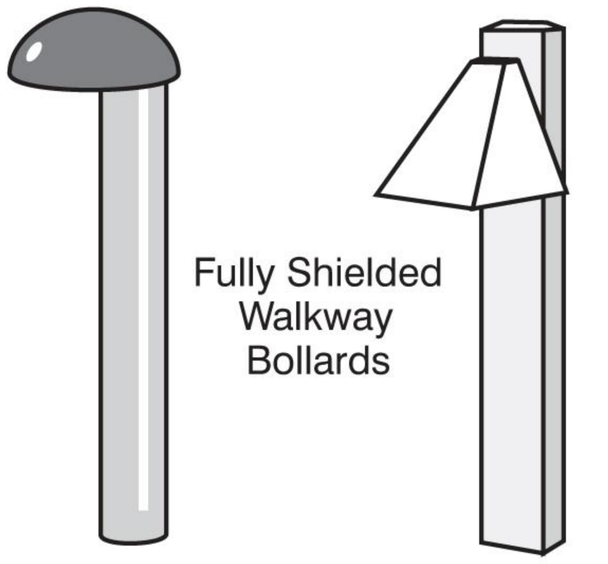
Fully Shielded Fixtures



Full Cutoff Streetlight



Fully Shielded
Barn Light



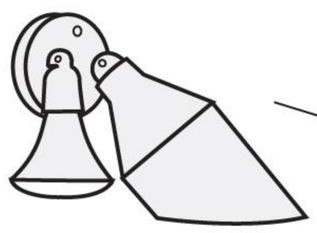
Fully Shielded
Walkway
Bollards

Fully Shielded
Decorative
Fixtures

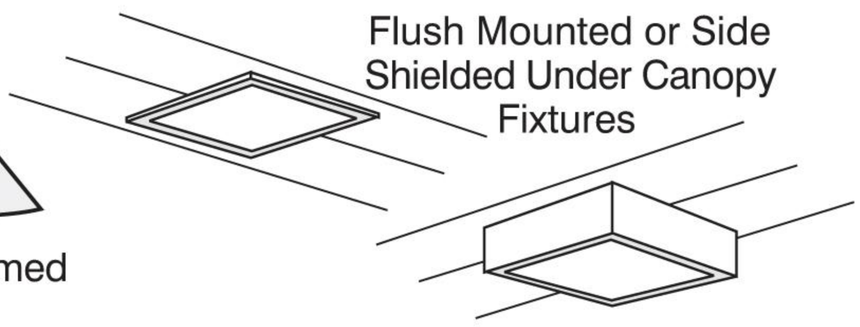
bulb shielded
in opaque top

Fully Shielded
‘Period’ Style
Fixtures

bulb shielded
in opaque top



Shielded / Properly-aimed
PAR Floodlights



Flush Mounted or Side
Shielded Under Canopy
Fixtures

“Dark Sky” = Purposeful Lighting

Useful

Warmer color spectrum

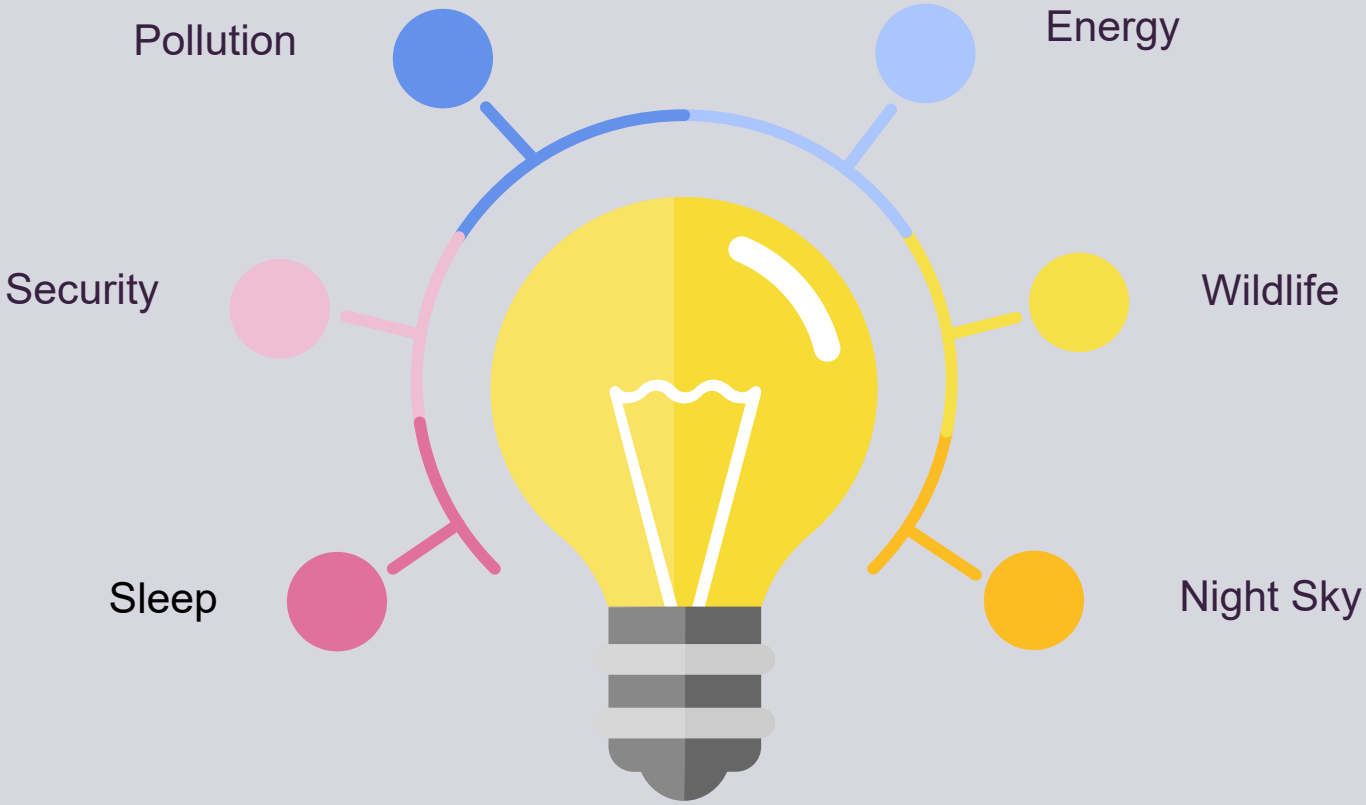
Intentional light levels

Targeted

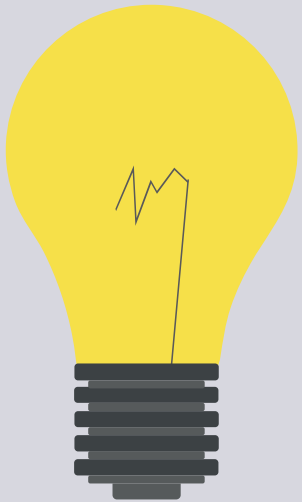
Why now?

- 2023 City Council Work Plan (revived from 2021)

Balanced Benefits & Goals

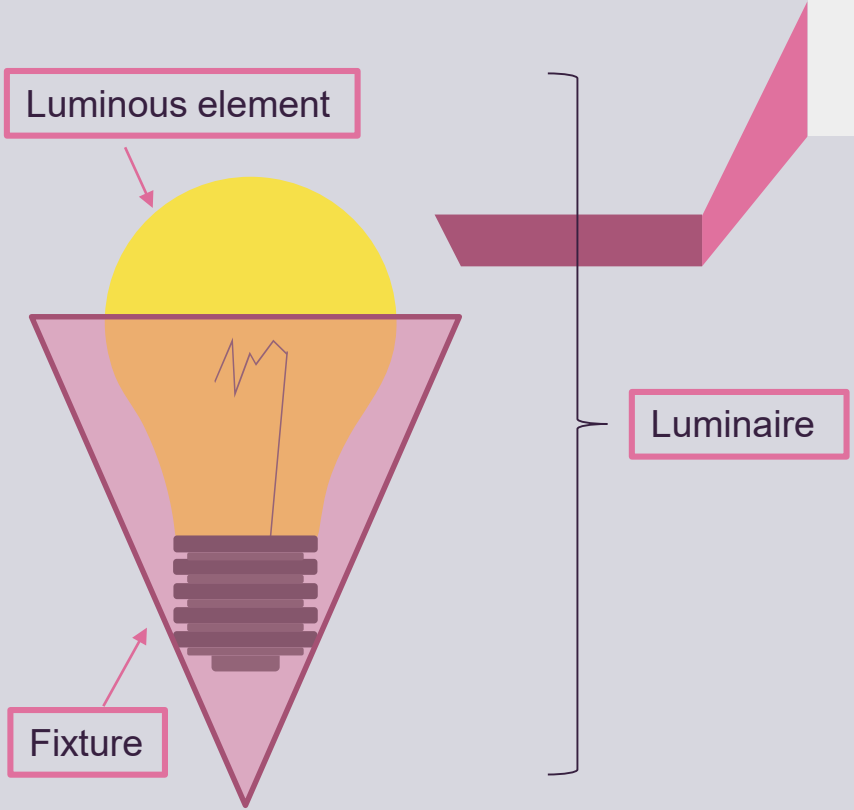


General Regulations in Draft Ordinance



- What does compliant lighting look like?
- What kind of lighting is prohibited?
- What about holiday lighting and other decorative lighting?
- Residential & Nonresidential Lighting

General Regulations

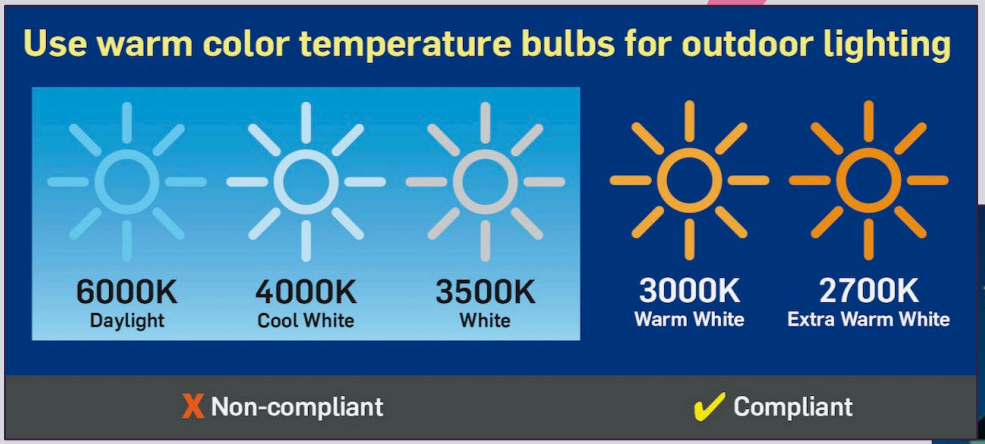


What does compliant lighting look like?

Fully shielded

General Regulations

What does compliant lighting look like?

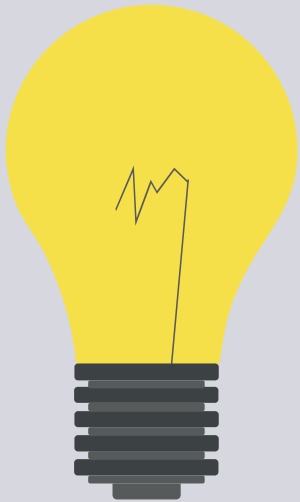


Correlated Color Temperature / Kelvin

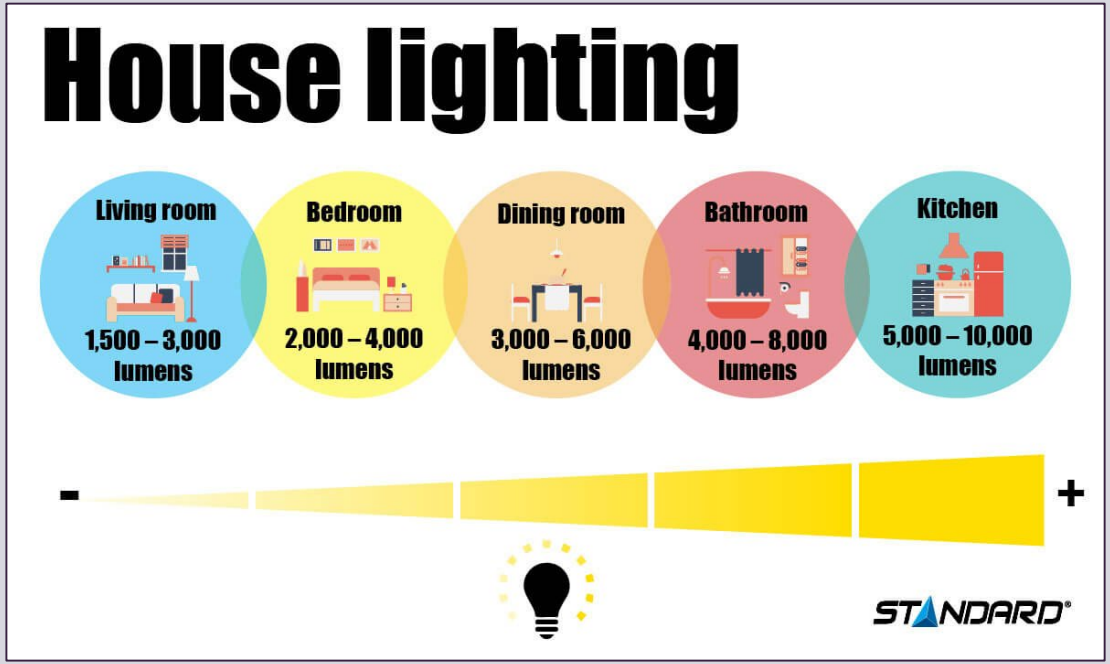
Trespass

General Regulations

What does compliant lighting look like?

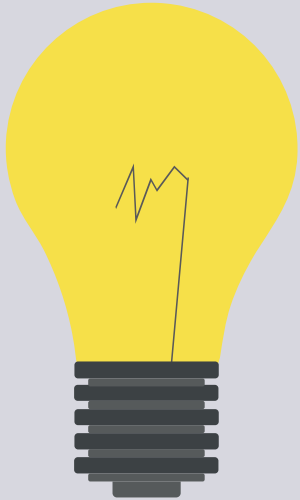


Lumens / brightness



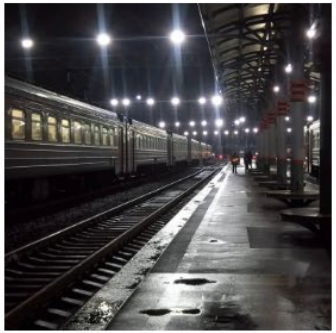
General Regulations

What does compliant lighting look like?



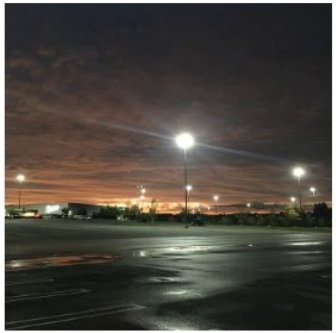
2-10 Foot Candles

Walkway



Train Station

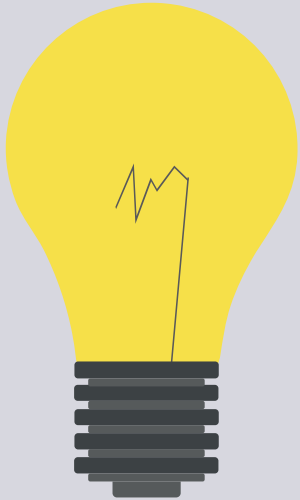
Parking Garage



Parking Lot

Footcandles

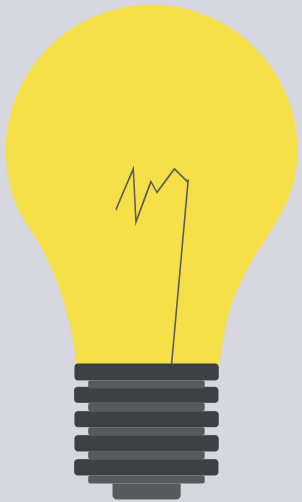
General Regulations



What kind of lighting is prohibited?

- Lighting that may be confused with emergency, traffic lighting
- Mercury vapor lamps
- Aerial lasers
- Blinking or flashing lights (with exceptions)
- Searchlights, floodlights, spotlights (with exceptions)

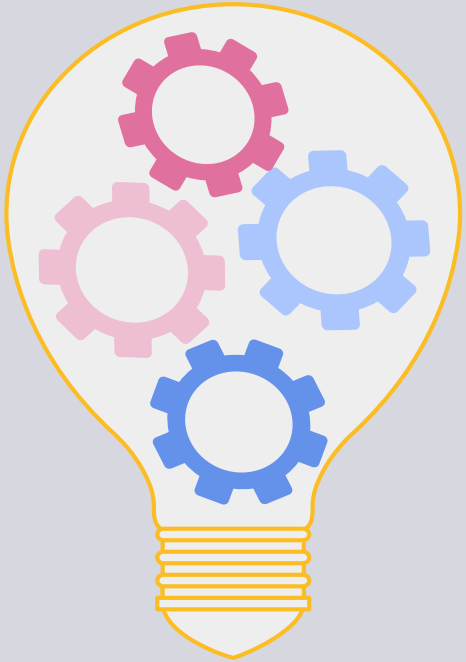
General Regulations



- Low-lumen output luminaires | curfew
- Temporary event lighting
- Holiday lighting on between October 15th and January 15th
- Uplighting for flags, art with regulations

What about holiday lighting and other decorative lighting?

Community Input



190 responses to residential
12 responses to commercial

Commercial **compliance** triggers
Downtown commercial - trespass

General, majority **support**

Safety & dark sky

Clarify, tighten language

As of April 10, 2023

Crime Prevention Through Environmental Design

Proper lighting is one of the most effective crime deterrents. When used properly, lighting discourages criminal activity and enhances surveillance, and reduces fear. Proper lighting that directs light where it will be most useful can help you achieve a balance between safety and starlight. “Dark sky” does not mean dark ground, so you do not have to choose between security and a natural night sky.

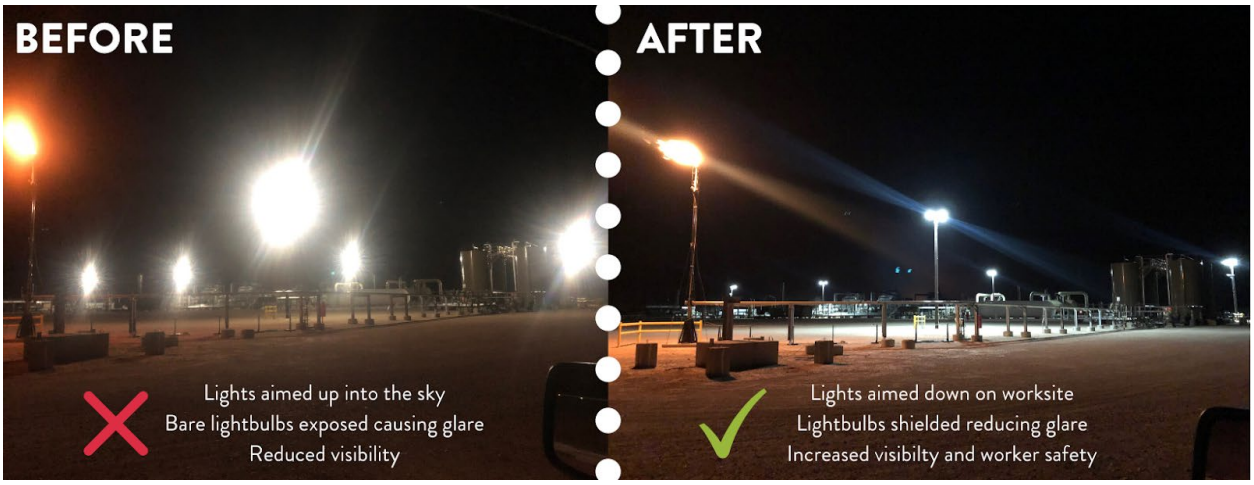
Another concern with too much lighting is that it will ‘trespass’ onto other properties.
To address the issues of glare and trespass, a shield or cut-off can be used on the light fixture. What these items do is aim or direct the light to the intended area. The photos below show the danger of light trespass and glare.

Crime Prevention Recommendatuions:

- Put light where it is needed, and at the levels that enhance visibility.
- Shield lights to reduce glare and harsh shadows.
- Consistent nighttime lighting
- Effective lighting that helps people be safe, not just feel safe, is a win-win situation for everyone.
- Create a safer environment while keeping the night natural.
- Proper lighting will allow for an individual to be recognized 25 feet away.

Scott Moore, Crime Prevention Specialist
303-335-4688
SMoore@LousivilleCO.gov

Before & after photographs different elements of dark sky lighting implementation.

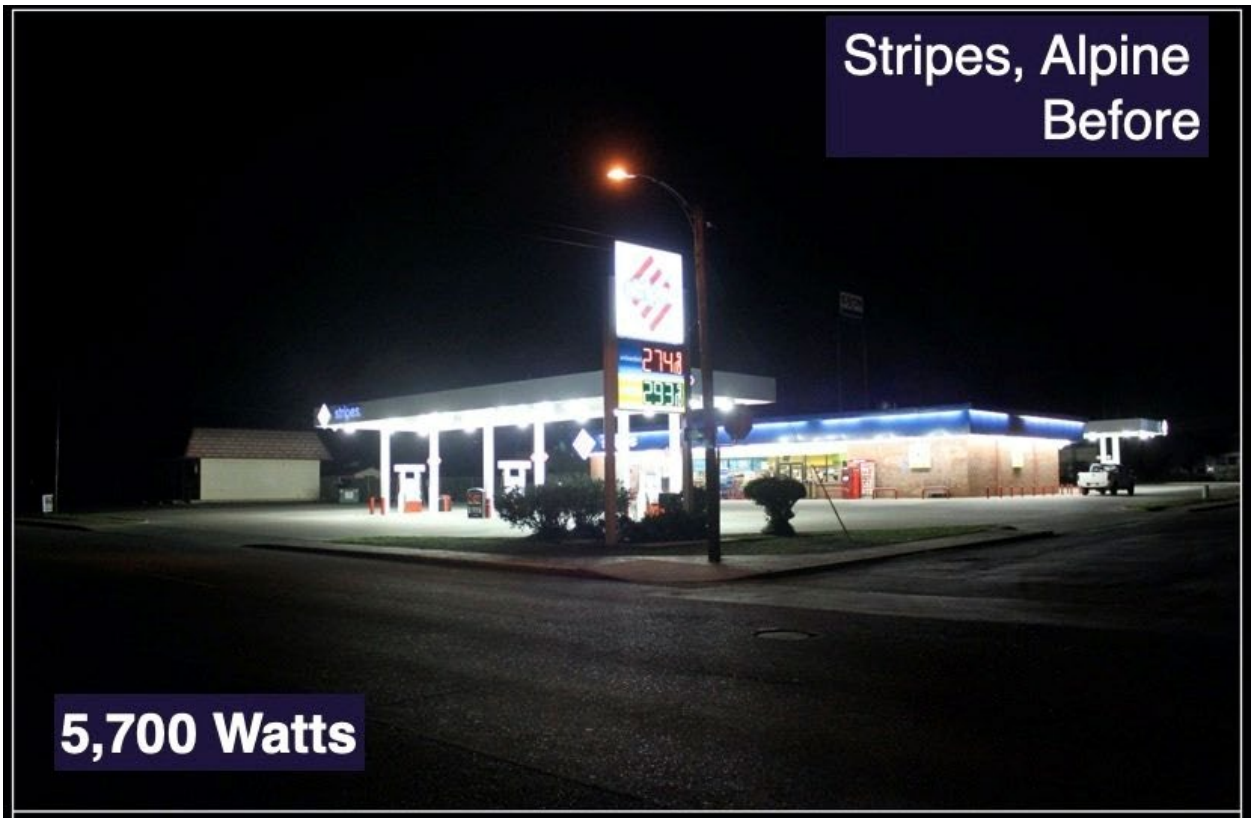

BEFORE
AFTER
Lights aimed up into the sky
Bare lightbulbs exposed causing glare
Reduced visibility
Lights aimed down on worksite
Lightbulbs shielded reducing glare
Increased visibilty and worker safety

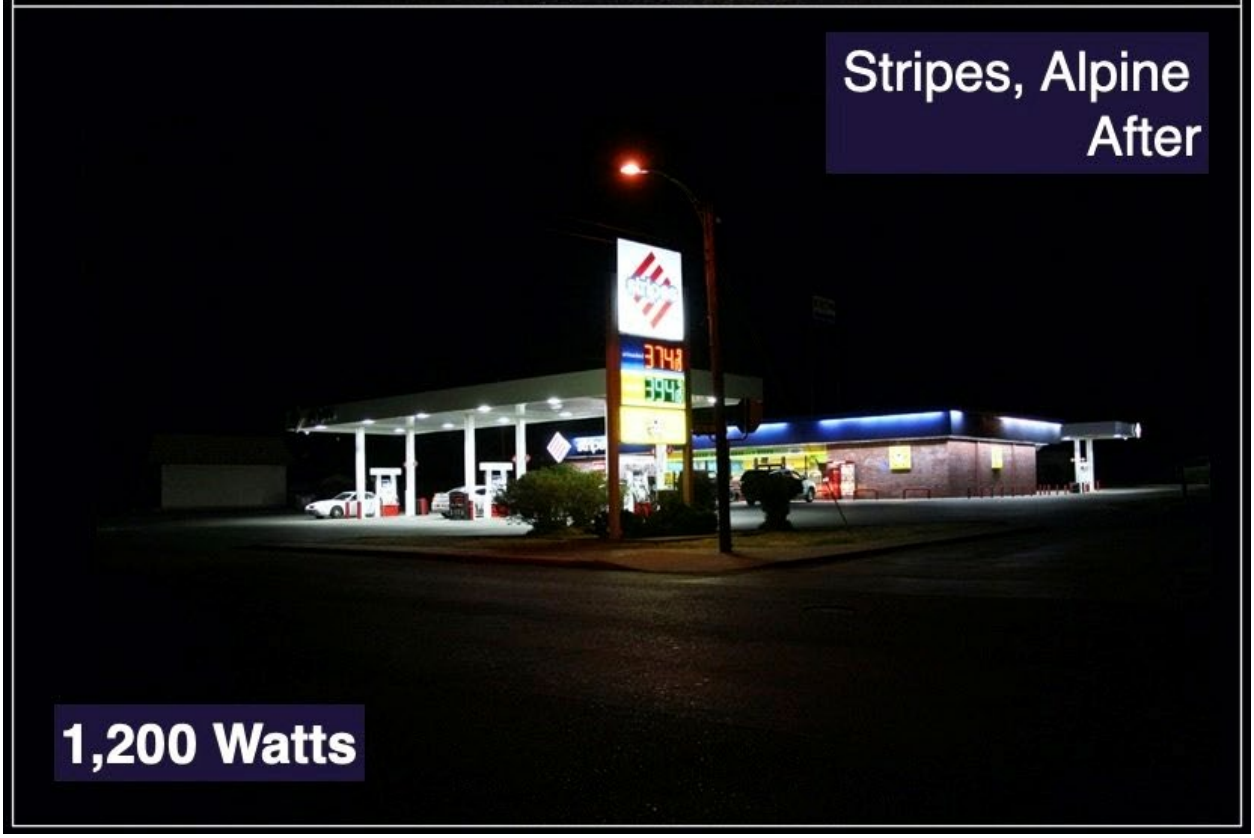

Before
After


VS


Before
After


Dark Sky Friendly Oilfield Lighting
Apache Corporation Tank Battery


Stripes, Alpine
Before
5,700 Watts


Stripes, Alpine
After
1,200 Watts


Before
After


Can you see *both* children in the shadows?
Dark-sky-compliant light
Dark-sky-erasing light
www.SunAndShadeHarvesting.com


George Fleenor


George Fleenor

Before Relighting.

After LED Lights Installed


www.flagstaffdarkskies.org


MAVERIK
MAVERIK
MAVERIK
www.flagstaffdarkskies.org


EXPRESS STOP
www.flagstaffdarkskies.org

LIGHT POLLUTION

Is the brightening of the night sky caused by street lights and other man-made sources, which has a disruptive effect on natural cycles and inhibits the observation of stars and planets.

During the 2003 Northeast blackout, a massive power outage affected 55 million people.

WHAT COULD THEY SEE FOR THE FIRST TIME?

http://darksky.org/light-pollution/
Photo by of Todd Carlson

Sustainability Communications Plan

Updated 3/1/2023

Purpose

The purpose of the Sustainability Communications Plan is to outline the City's role, responsibilities, procedures and resources available to share information about sustainability news, programs and events with audiences.

Objectives

Objectives of sustainability outreach and communications include:

- Support sustainable practices by educating the community about sustainability.
- Educate on the City's sustainability goals as outlined in the Climate Action Goals, Sustainability Action Plan and performance measures.
- Reinforce the concept of the three pillars of sustainability (environmental stewardship, social equity and economic vitality).
- Share information on available programs and resources in an effort to increase participation from the residential, commercial and industrial sectors.
- Develop relationships with all audiences and encourage engagement.
- Collaborate regionally to leverage resources and broaden reach of communications.
- Efficiently utilize City resources and staff time.

Roles & Responsibilities

City staff is responsible for approving and developing programs, approving and creating marketing collateral and distributing communications/marketing collateral through City of Louisville communications channels.

Audiences

Key audiences for sustainability related information include:

- Residents
- Neighborhood groups
- City staff
- Business owners
- Business associations
- Employees
- Visitors
- Volunteers
- Elected officials & boards/commissions
- Partner agencies

- Local organizations
- News media

Channels/Tools

Communications channels and tools available include:

External

- City website – The City's website contains information on news items, meetings, special events, departments, programs, and job opportunities. The website also allows visitors to sign up for eNotifications. For eNotifications, subscribers must opt-in to receive communications.
- Community Update newsletter – The print newsletter is mailed to residents quarterly and posted on the City's website. It contains information on City projects/initiatives, news, meetings, special events, and programs. All homes in Louisville with a mailing address receive the newsletter via USPS bulk mail.
- Monthly Community Update eNewsletter – Staff has also developed a monthly e-newsletter to complement the quarterly print newsletter. It is emailed via MailChimp. Subscribers must opt-in to receive this communication.
- Monthly Economic Vitality eNewsletter – Monthly e-newsletter to businesses from Community Development Department. Topics generally include: commercial programs, projects or initiatives, business news, policy updates, resources/support, etc. Subscribers must opt-in to receive this communication.
- Social media – The City uses Facebook (City, Coal Creek Golf Course, Fans of Louisville Open Space, Louisville Public Library, Louisville Recreation/Senior Center), Twitter (City), Instagram (City) and NextDoor (City) to share news and advertise programs and events. Staff uses HootSuite to post to multiple accounts at one time. Followers/subscribers must follow/subscribe to City pages to receive notifications.
- Utility bill inserts – Utility inserts are mailed/emailed to City water customers on a monthly basis. Inserts should highlight City services, programs and events. Limited text on the bill can also be added. All City utility billing customers receive either a hard or an electronic copy of the insert based on their billing communication preferences. Availability of inserts varies throughout the year and depends on City priorities.
- Press releases – The City issues press releases for news/updates as needed and shares local news with media outlets, neighboring jurisdictions, hospitals, schools and other organizations.
- Direct mailer – The City occasionally develops a direct mailer to be delivered via USPS bulk mail. The cost to do a bulk mailer is around $6,000 for printing and postage. Direct mailers used when there is important news/information to be shared communitywide and timing with existing channels does not align.
- Print materials – The City produces assorted print materials as needed. These can be distributed at City facilities or at programs/events.

Internal

- Weekly City of Louisville Roundup eNewsletter - The weekly update is emailed to City employees and City Council from the City Manager's Office. It is a weekly digest of what we're doing as an organization and how we're accomplishing our mission and vision and seeing our values in action. All full and part-time staff receive this communication.

- The Resource - Monthly internal eNewsletter that features news and information on internal services like Human Resources, Finance, IT and Communications. All full and part-time staff receive this communication.

Engagement channels and tools available include:

- Engage Louisville – The Bang the Table site enables staff to share information, invite input through feedback tools, and analyze and report on stakeholder needs. Subscribers must opt-in to receive updates on projects. Users do not need to be a registered user to participate via engagement tools.
- Public meeting/open house – The City will host a public meeting or open house as needed.

Strategies

Communication and engagement strategies will vary based on each program, project or initiative. Some topics will involve multiple strategies while others may focus on one. Examples of strategies include:

Short-term

- Utilize existing communication channels – Maintain communications with existing audiences. Existing communication channels include the City website, eNotifications, Community Update newsletter, eNewsletters, social media and utility inserts.
- Develop outreach campaign – Determine purpose of campaign, goals and resources for specific program, project or initiative. Identify communication channels, a primary contact for each channel and schedule of activities. Draft content and finalize materials. Evaluate outcomes of campaign to inform future activities.
- Leverage public relations opportunities – Draft a press release and send to media contacts. Follow-up with media outlets to answer follow-up questions and offer interviews with City staff.
- Develop yearlong schedule of outreach opportunities – Assign communication coordinator for each event or program. Develop tabletop display and handouts. Consider opportunities to collaborate with partners and leverage resources.

Long-term

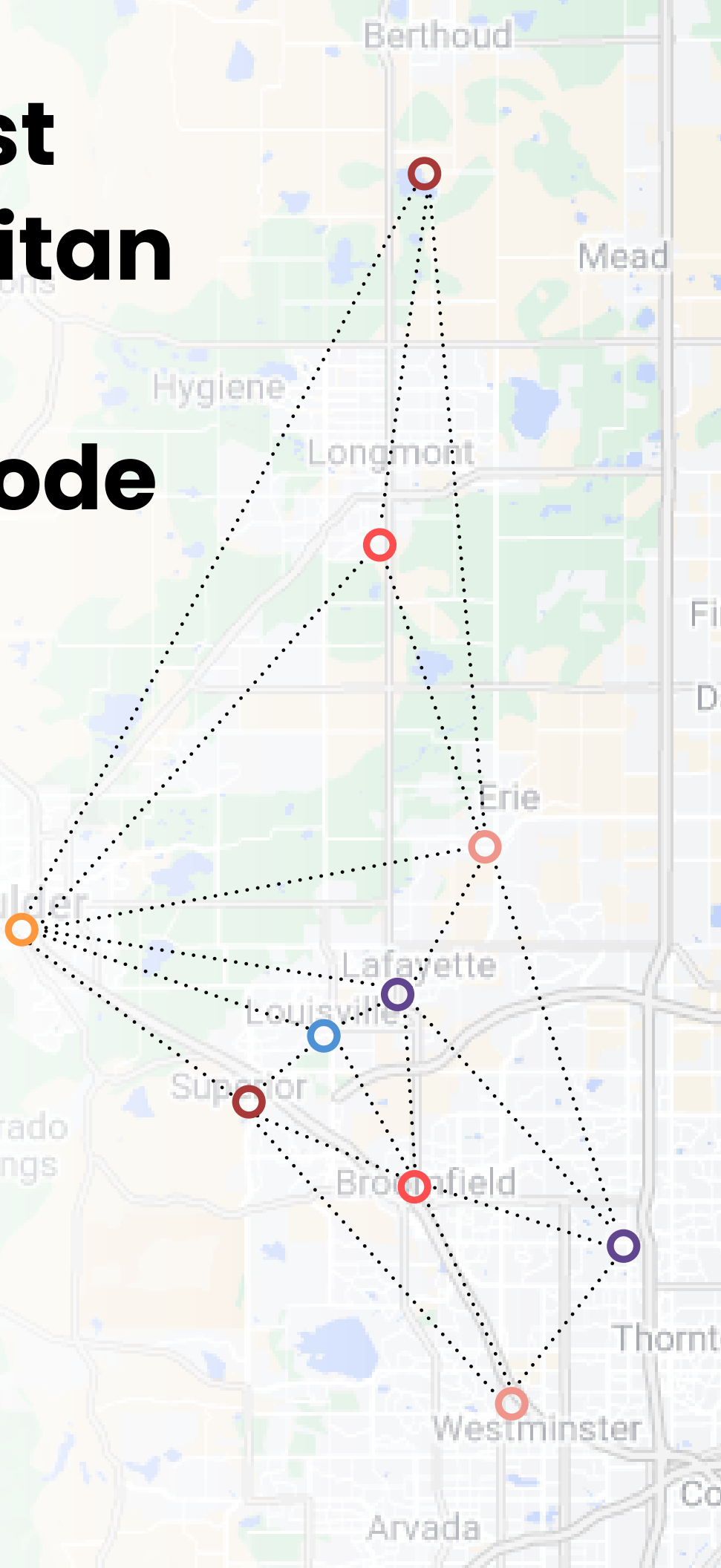
- Efficiently utilize City resources and staff time – City staff has a limited amount of time to dedicate to communications and engagement. Consider the best use of resources for the maximum impact. Evaluate quality and quantity of activities and measure results to inform future use of resources.
- Consider high impact and/or low staff effort activities – Focus on programs, projects or initiatives that offer a high impact in regards to furthering the City's progress in achieving its sustainability goals or low staff effort that can be achieved relatively quickly with few resources dedicated.
- Identify opportunities to develop new relationships with audiences – Work with City staff and partners to identify opportunities for developing new relationships within the community, especially those considered hard to reach. Evaluate barriers and resources needed to remove those.

- Evaluate new communication channels – Other communication/engagement channels that could be developed include: phone tree, text group/tree, signage, door-to-door, e-vite, direct mailer and posters/flyers. Any costs associated with these activities should be evaluated and considered within the Sustainability budget.
- Leverage partnerships – Develop comprehensive list of partners and contact information. Regularly coordinate with partners to determine if there is overlap among objectives. Brainstorm ideas for regional communication. Track and report progress of education initiatives shared by partners.

Attachments

- Partner Contacts Database

Northwest Metropolitan Regional Energy Code Cohort



Roadmap to Net Zero Energy New Construction

April 2023

LOTUS
Engineering & Sustainability

Table of Contents

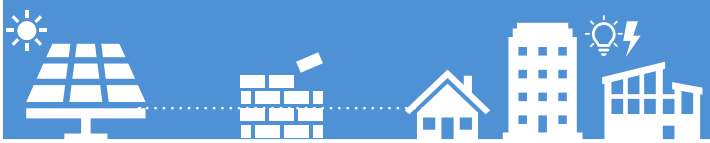
Executive Summary

Neighboring communities in the area northwest of Denver convened an Energy Code Cohort (the Cohort) to collaborate on strengthening and adopting energy codes for new construction of residential and commercial buildings. The regional energy cohort work consisted of two phases. During Phase 1 of the Cohort work, participating communities worked together to review and adopt the 2021 International Energy Conservation Code (IECC) along with supporting amendments including electric vehicle readiness, solar energy readiness, electrification readiness, and enhanced energy efficiency. This regional energy code collaboration laid a foundation for Phase 2, during which the Cohort convened to develop a regional roadmap to achieve net zero codes in new construction by the end of 2030. The Roadmap to Net Zero Energy New Construction (Roadmap) lays out a stepped approach for communities to utilize during future energy code update cycles. While the goal of the Cohort is regional collaboration and coordination on future energy code updates, it is also recognized that jurisdictions may move on faster or slower timelines within the Roadmap steps.

The Roadmap includes five core elements of energy codes that address the operational carbon footprint of new buildings and phase out fossil fuels. The scope of the codes may, over time, broaden to include additional provisions which aim to reduce the life-cycle carbon emissions of newly constructed buildings. These provisions, while not summarized in the executive summary, have been included in the Roadmap as additional considerations for each jurisdiction as they update their energy codes.

Cohort Definition of Net Zero

By the end of 2030, newly constructed homes and buildings will be net zero with regards to operational energy. This will be accomplished through a combination of highly energy efficient construction and equipment, renewable energy systems, grid-interactive demand flexibility, and the elimination of fossil fuel combustion onsite.



RESIDENTIAL Net Zero New Construction Roadmap

	2024	2027	2030
Efficiency Verified Compliance Pathways	All code compliance pathways included in the 2021 IECC are allowed.	Continued from 2024.	Only the ERI/HERS and prescriptive pathways are allowed.
Renewable Energy	Onsite solar photovoltaics (PV) or a fee-in-lieu is required to offset exterior energy uses (pools, spas, snowmelt, etc.).	Onsite PV is required to offset any onsite fossil fuel use, including exterior energy uses. Any exterior energy use still allows for a fee-in-lieu of the PV offset.	Continued from 2027.
Electrification	Electrification of space and water heating is required.	All-electric requirements are put into place with broad exceptions.	All-electric requirements are put into place with rare exceptions.
Energy Storage	Energy storage-ready is not required.	Energy storage-ready is required.	Energy storage installation is required.
Demand Flexibility Integration	Demand flexibility capability is not required.	Demand flexibility capability for water heaters and HVAC is required.	Continued from 2027.

COMMERCIAL Net Zero New Construction Roadmap

	2024	2027	2030
Efficiency Verified Compliance Pathways	Energy Use Intensity (EUI) Performance Standards are set for common building types.	EUI Performance Standards increase in stringency from 2024.	EUI Performance Standards increase in stringency from 2027.
Renewable Energy	Onsite PV installation is required, either maximizing available roof space or meeting 50% of expected energy load; whichever is less.	Continued from 2024.	Continued from 2027.
Electrification	Electrification of space and water heating is required.	Continued from 2024.	Continued from 2027.
Energy Storage	Energy storage-ready is required.	Continued from 2024.	Energy storage installation is required.
Demand Flexibility Integration	Demand flexibility capability is not required.	Demand flexibility capability for water heaters and HVAC is required.	Continued from 2027.

Equity

Building codes are a crucial policy mechanism for achieving reductions in building energy use and greenhouse gas emissions. While working to refine and revise energy codes for building decarbonization, jurisdictions must also address broader racial equity and affordability challenges to ensure all community members reap the benefits of improved energy performance in buildings. The Roadmap examines equity benefits, challenges, and potential solutions, for jurisdictions to consider. Fully implementing equity in adopted building codes requires ongoing community engagement and regional coordination throughout implementation.

Identified Challenges	Identified Solutions
Maintaining overall housing affordability (note that housing markets, more than upfront or operating costs, determine home prices).	• Reference or conduct robust, credible, and unbiased analysis of both the upfront and lifecycle cost impacts and benefits of new codes. • Provide additional support to low-income communities and smaller buildings. • Help connect builders to available financial incentives, prioritizing small businesses and those of color. • Reference or provide robust training for developers and building code officials on upcoming code updates; allow a phase-in period for new requirements. • Ensure renters and community groups groups serving disproportionately impacted communities are engaged in stakeholder processes related to energy code advancements.
Ensuring rural communities and essential services have reliable electric grid connections as electrification requirements become more stringent.	• Include early and consistent communication with electricity providers. • Consider alternatives or exemptions for certain homes or buildings in rural areas that may have unreliable electricity service. • Provide appropriate compliance options for essential services (healthcare, water and sanitation, etc.) that have strict energy reliability needs.
Supporting construction-related firms in complying with new building codes.	• Conduct educational outreach and engagement with stakeholders involved in each stage of construction including designers, contractors, and other relevant trade professionals. Prioritize dediated engagement of small businesses and businesses employing or serving communities of color. • Incentivize certification programs and trainings related to building codes. • Continuously monitor municipal staff and capacity needs.

Future Work

1. The Cohort should continue to **collaborate** prior to and during each code update cycle.

2. Future discussions should include a **variety of stakeholders** to incorporate perspectives from those involved in, or affected by, energy codes. These stakeholders may include tradespersons, local non-profits, regional groups, equity-focused groups, waste haulers, utilities, and other organizations working in related fields.

3. There is immense opportunity for future collaboration on **studies** that create a more accurate decision-making platform. Potential studies may include energy modeling to inform EUI targets, case studies, cost studies, and market analyses.

Introduction & Background

Introduction & Background

Buildings are one of Colorado's four major sources of greenhouse gas pollution, as recognized in the State of Colorado's Greenhouse Gas (GHG) Pollution Reduction Roadmap.[1] Building codes are a principal policy mechanism for governments to reduce energy use and carbon emissions in new construction (and, to a lesser degree, in retrofits of existing buildings). In particular, the International Energy Conservation Code (IECC, or energy code), published by the International Code Council, is the most common energy policy adopted by state and local governments nationwide. The most recent edition of the energy code, the 2021 IECC, reduces energy use and carbon emissions in buildings compared to previous editions. However, since future editions of the code are not yet developed and their impact on energy use and carbon emissions is therefore still uncertain, local governments have expressed an interest in purposefully setting a trajectory for further reducing carbon emissions from buildings and planning how to reach those targets.

In Colorado, efforts are underway to update both building codes and planning efforts to reflect community-specific decarbonization strategies. To supplement and accelerate community-led action, the State passed the Building Greenhouse Gas Emissions Bill[2] in June 2022, which sets new minimum energy code requirements for Colorado. Specifically, the bill requires any Colorado jurisdiction that updates its building codes between July 1, 2023, and June 30, 2026, to, at a minimum, adopt the 2021 IECC along with solar-ready and electric-ready (including electric vehicle [EV]-ready) standards. Then, the bill requires any jurisdiction that updates its building codes on or after July 1, 2026, to, at a minimum, adopt a low energy carbon code at least as strong as a forthcoming model code that is to be developed by the state's Energy Code Board facilitated by the Colorado Energy Office.

In addition to the policy mechanisms geared at low-carbon building codes, other decarbonization efforts in the state are an important consideration for net zero code development. Colorado utilities continue to grow their renewable energy portfolios[3] and electricity generation has become cleaner with carbon emissions from electricity use steadily decreasing in line with the increase in renewable generation. Because of this, local governments have an opportunity to take advantage of an increasingly decarbonized electric grid to power appliances and other building needs that previously used fossil fuels (e.g., heating, water heating, cooking, and clothes drying) – a strategy known as "electrification." Recent advances in highly-efficient, all-electric technologies like heat pumps, combined with the cleaner grid, have brought electrification to the forefront.

Capitalizing on a cleaner grid through electrification also requires consideration of strategies to balance the anticipated increase in energy demand and available supply. Energy storage provides a way to capture excess energy when supply is high and demand is low, as well as a way to put power back on the grid when supply is low and demand is high. Additionally, integrating demand flexibility programs and technology for equipment and systems will be critical to improving grid efficacy, helping to control peak time use of electricity.

In an effort to advance building codes in alignment with the Colorado GHG Pollution Reduction Roadmap, the State of Colorado legislation, and an evolving electric grid, jurisdictions in the Northwest Metropolitan region of the Front Range worked collaboratively to develop a regional roadmap to a net zero code by the end of 2030.

Code Cohort Background

The Colorado Department of Local Affairs awarded a grant to neighboring communities in the area northwest of Denver to support regional collaboration in energy code updates that would achieve consistency and strengthen energy codes across the region. The project consisted of two phases. The first phase was the adoption of the 2021 IECC with supporting amendments and the second phase was the development of a regional roadmap for a net zero energy, new construction code.

An Energy Code Cohort (the Cohort) was convened with participation from seven communities; however, as the work progressed, other nearby jurisdictions joined the Cohort to collaborate on energy code work. The following communities participated in Phase 2, the Roadmap to Net Zero Energy New Construction.

- Boulder County (lead community)
- City of Lafayette
- Town of Erie
- City of Northglenn
- City of Louisville
- Town of Superior
- City and County of Broomfield
- City of Longmont
- City of Boulder
- Town of Berthoud (observing)
- City of Westminster (observing)

Phase 1 Summary

The goal of Phase 1 was regional collaboration on strengthening, updating, and adopting energy codes for residential and commercial buildings. In a series of five facilitated meetings, representatives from the building and sustainability departments of each community reviewed and discussed widely adopted and trending amendments to the 2021 IECC, opportunities for calibration with state legislation, and individual community goals. Code language and other adoption resources will be distributed in a publicly available energy code support package upon request.

Phase 1 Results

The Cohort ended Phase 1 by moving forward with the following for residential and commercial buildings:

1. **2021 IECC Adoption**
2. **Supporting Amendments**
   - EV-Ready
   - Solar-Ready
   - Electric-Preferred
   - Cool Roofs
   - Horticulture Lighting Efficiency

Phase 2 Summary

Phase 2 commenced in August 2022. Like Phase 1, the communities listed above participated in another series of five facilitated sessions to determine the specific pathways and code elements necessary to achieve a net zero new construction code for the region by the end of 2030. Phase 2 results are outlined in the following sections. This Roadmap is intended to lay out a pathway of code elements with a flexible timetable. Jurisdictions will move at their own pace along the stepped pathway.

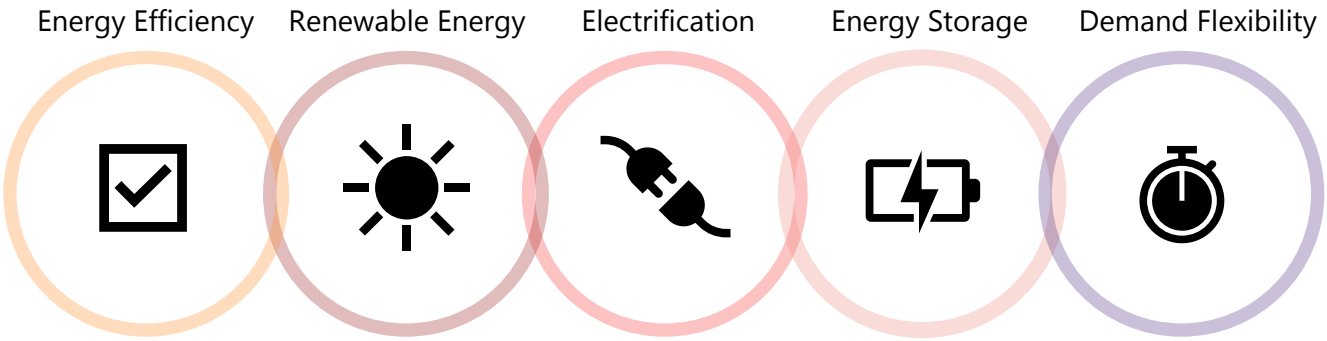
Elements of the Net Zero New Construction Roadmap

The Roadmap was developed based on participating jurisdictions having laid an energy code foundation in Phase 1 with the 2021 IECC adoption, including supporting amendments that better prepare a building for future installations of rooftop solar, electric vehicles, electric appliances, and electric space and water heating systems. Each component of the Roadmap builds upon those foundational elements through updates in the next three forthcoming code cycles in 2024, 2027, and 2030. Additional elements that took into consideration emerging technology, feasibility, and equity are also included. Equity considerations played a key role in determining the Net Zero Roadmap elements.

Defining Net Zero

The Cohort began the Roadmap discussion by defining what "net zero" means in the context of building codes. With grid decarbonization efforts in the State of Colorado, the Cohort determined the traditional definition of net zero—a building that produces as much energy as consumed onsite—needed to be reconsidered as the electric grid would soon supply a low-carbon power source. Grid decarbonization also encouraged the Cohort to consider non-traditional elements that could support net zero such as electrification, energy storage, and demand flexibility. The Cohort finalized a definition for net zero that included the elements detailed below.

By the end of 2030, newly constructed homes and buildings will be net zero with regards to operational energy. This will be accomplished through a combination of highly energy efficient construction and equipment, renewable energy systems, grid-interactive demand flexibility, and the elimination of fossil fuel combustion onsite.

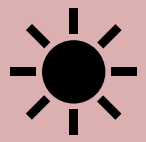


Helps reach 100% decarbonized electric grid.

Takes advantage of decarbonized grid.

Supports a decarbonized grid.

Elements of Net Zero Code

 **Efficiency Verified with Compliance Pathways**	The energy code includes many different compliance pathways. The "prescriptive path" includes efficiency levels for each individual building component. Several different "performance paths" allow for design flexibility and consideration of system relationships necessary to maximize efficiency. Increased use of certain performance paths (Energy Rating Index [ERI] or Home Energy Rating System [HERS] for residential, and energy use intensity (EUI) for commercial) speeds up approvals by building departments and makes it easier for elected officials to set the appropriate stringency levels.
 **Renewable Energy**	Onsite renewable energy through photovoltaics (PV) can play a key role in supporting building decarbonization. However, with more carbon-free electricity being delivered by the grid, onsite PV may not be as crucial for achieving a carbon-neutral building. In this Roadmap, onsite PV is used in residential buildings primarily to "offset" fossil fuel consumption in buildings, specifically for exterior energy uses such as pools, snowmelt, and fireplaces. (Onsite PV leads to emission reductions on the electric grid, rather than a direct offset of the emissions from fossil fuel use.) For commercial properties, an onsite PV requirement is recommended to support clean electricity goals for participating communities and to help offset the electricity load from commercial buildings.
 **Electrification**	As electric utilities progress toward their renewable energy goals, the electric grid gets cleaner. To capitalize on the emissions reduction potential from renewably sourced electricity generation, the Roadmap increases the degree of building system electrification, requiring efficient electric equipment rather than equipment that burns fossil fuels. Electrification will create a higher electricity demand, a need for energy storage, and demand flexibility.
 **Energy Storage**	With increasing deployment of renewable energy, energy storage becomes crucial to electric grid efficacy. Batteries can store excess energy and provide backup power by releasing that energy when renewable energy sources are not producing enough power. If configured to do so, energy storage also helps improve community resilience by providing an energy source during natural disasters and outages.
 **Demand Flexibility Integration**	Demand flexibility is another method of improving electric grid efficacy as renewable energy deployment and distributed energy resources increase. Balancing electricity supply and demand can be done by shifting equipment and/or system energy use away from peak periods, with little to no impact on the end-user. Some utilities already have demand flexibility programs in place, but automatic control technology continues to improve. The Roadmap does not require homes or business to participate in demand flexibility, but ensures they have the capability to do so.

Residential

Net Zero New Construction Roadmap

Residential
Net Zero New Construction Roadmap

2024

All code compliance pathways are allowed.	All the code pathways in the 2021 IECC are still allowed, including Prescriptive, U/A Trade-off (RESCheck), Simulated Performance, and ERI pathways.
Onsite PV or a fee-in-lieu is required to offset exterior energy uses (pools, spas, snowmelt, etc.).	For all fossil-fueled exterior energy use (not including electricity), a home must offset the energy consumption of the exterior energy use with onsite PV or through paying a fee-in-lieu. Fees collected may be used by jurisdictions to incentivize additional electrification, efficiency, or renewable energy projects in their communities.
Electrification of space and water heating is required.	All space and water heating shall be provided by high-efficiency all-electric appliances. **Equity and affordability:** Some all-electric appliances can cost more than gas appliances, however all-electric new construction is more affordable than gas, and much more affordable than retrofitting electrification. All-electric operating costs are increasingly competitive with gas, except for high-cost, fixed-rate electricity. Community-led incentive programs should provide support to energy-burdened households. Homes with unreliable electric service may experience outages, though electric outages also prevent most fossil-fueled appliances from running. Finally, some existing electric lines out to very rural areas may not be well-serviced or sufficient for increased electric loads and may need to be upgraded through assertive engagement with local utilities.

Residential
Net Zero New Construction Roadmap

2027

All code compliance pathways are allowed.	Continued from 2024.
Onsite PV is required to offset any onsite fossil fuel use, including exterior energy uses. Any exterior energy use still allows for a fee-in-lieu of the PV offset.	This PV requirement only applies to residential buildings eligible for an exception to the all-electric requirement and/or if the building has fossil-fueled exterior energy use. **Equity and affordability:** Onsite PV may warrant incentives for affordable housing.
All-electric requirements are put into place with broad exceptions.	Criteria for exceptions can be decided within a jurisdiction, based on examples from other jurisdictions.
Energy storage-ready is required.	This requirement mandates space availability and electrical service routes for future energy storage systems.
Demand flexibility.	Water heaters and HVAC systems shall include the technical ability to connect to utility demand response programs. **Equity and affordability:** Potential cost increases for grid-interactive efficient building technologies should be addressed through financial assistance and/or programs.

Residential
Net Zero New Construction Roadmap

2030

Only ERI/HERS and prescriptive pathways are available.	Compliance pathways are limited to the ERI pathway for new construction and the prescriptive pathway for remodels and renovations.
Onsite PV is required to offset any onsite fossil fuel use, including exterior energy uses. Any exterior energy use still allows for a fee-in-lieu of the PV offset.	Continued from 2027.
All-electric requirements are put into place with rare exceptions.	Exceptions may be applied in rare cases, as defined by the jurisdiction.
Energy storage installation is required.	Electrical energy storage system installation is required in new construction. **Equity and affordability:** Cost of energy storage equipment should be addressed through incentives or subsidies.
Demand flexibility.	Continued from 2027.

Commercial

Net Zero New Construction Roadmap

2024

Commercial
Net Zero New Construction Roadmap

Energy Use Intensity (EUI) Performance Standards are set for common building types.	Most new buildings must achieve a property-type-specific EUI target. Backstop prescriptive requirements may be considered by each jurisdiction to encourage minimum energy efficiency levels for certain building components. **Equity and affordability:** Common building types covered will need to verify energy performance with energy modeling, which may warrant incentives or programming to address cost burden. Incentives and programs to address cost burden are already provided by Xcel Energy and some other local utilities.
Onsite PV installation either maximizing available roof space or meeting 50% of expected energy load; whichever is less.	Available roof space is determined by sizing protocol in adopted solar-ready code language. Expected energy load will be determined by energy modeling. PV cannot contribute to a building's EUI score (see row above).
Electrification of space and water heating is required.	Space and water heating shall be provided by high-efficiency all-electric appliances (e.g., heat pumps). Fossil fuel powered cooking appliances, dryers, and process loads are still allowed, as well as certain technical situations where high-efficiency electric systems are not feasible. A limited amount of electric resistance is also allowed. **Equity and affordability:** Financial assistance may be warranted to support under-resourced buildings and communities in electrification. Dedicated engagement is needed to assess and address needs in disproportionately impacted communities.
Energy storage-ready spaces are required.	These requirements are outlined in Appendix CB of the 2021 IECC and will already be implemented in participating jurisdictions through Phase 1.

2027

Commercial
Net Zero New Construction Roadmap

Energy Use Intensity (EUI) Performance Standards are lowered from 2024.	This step increases the stringency of EUI performance standards from the 2024 code cycle. Backstop prescriptive requirements are maintained and strengthened.
Onsite PV installation either maximizing available roof space or meeting 50% of expected energy load; whichever is less.	Continued from 2024.
Electrification of space and water heating is required.	Continued from 2024.
Energy storage-ready spaces are required.	Continued from 2024.
Demand flexibility.	Water heating systems and HVAC systems shall include the technical ability to connect to utility demand response programs. Improvements and cost decreases in this technology are predicted in this time frame. **Equity and affordability:** Potential cost increases for grid-interactive efficient building technologies should be addressed through financial assistance and/or programs. Dedicated engagement is needed to assess and address needs in disproportionately impacted communities.

2030

Commercial
Net Zero New Construction Roadmap

Energy Use Intensity (EUI) Performance Standards are lowered from 2027.	This step tightens the stringency of EUI performance standards from the 2027 code cycle. Backstop prescriptive requirements are maintained.
Onsite PV installation either maximizing available roof space or meeting 50% of expected energy load; whichever is less.	Continued from 2024.
Electrification of space and water heating is required	Continued from 2024.
Energy storage installation is required.	Electrical energy storage system installation is required in new construction. **Equity and affordability:** Increased cost for energy storage equipment should be addressed through incentives or subsidies.
Demand flexibility.	Continued from 2027.

Additional Non-Energy Code Elements

Additional Non-Energy Code Elements

From design to demolition, the lifecycle of a building provides many opportunities for policy mechanisms to lessen impacts on carbon emissions, resource use, and occupant health. Energy codes can ensure efficiency and electrification, but additional provisions can mitigate emissions from waste created at the construction site from building materials and from modifications to existing buildings.

The Cohort discussed code requirements that widened the scope of the Roadmap to address embodied carbon, operational and construction-based waste, existing building updates, and water use.

Embodied Carbon

Embodied carbon encompasses all anthropogenic GHG emissions from building material extraction through the end of that material's useful life. These emissions may come from sourcing raw materials, manufacturing, transporting materials, construction and/or installation of that material, ongoing use, maintenance and repairs, and disposal. Strategies for addressing embodied carbon continue to evolve, but existing policy typically uses Environmental Product Declarations (EPDs), which identify life cycle emissions of different products and carbon limits for specific materials.

Waste: Construction-Based and Operational

Of all the waste that goes to a landfill, 20-40% is generated from construction and demolition (C&D) of buildings.[4] Many of these materials can be reused or recycled, but with current practices and landfill rates, contractors often do not have an incentive to do so. This Roadmap outlines policy mechanisms that, when paired with intentional community organizing, can effectively reduce the amount of construction-based waste going to disposal facilities. Success of C&D waste diversion may depend on the availability and accessibility of recycling infrastructure, which may improve on the path to 2030.

Operational waste in a building is often overlooked in initial building design, but ensuring proper infrastructure is a low-cost and feasible strategy for waste diversion and curbing landfill emissions. This can be as simple as making certain a building has enough space to include appropriately sized receptacles for trash, recycling, compost, and any other waste stream relevant to the occupancy use type (i.e., electronic waste, durable goods).

Existing Buildings: Renovations, Additions, Alterations, and Changes in Occupancy

Though the primary focus of this Roadmap is new construction, existing building modifications are leverage points for decarbonization. Renovations, additions, alterations, and changes of occupancy present occasions for requiring energy improvements and are feasible first steps for jurisdictions to address existing building stock. Specific policy mechanisms could be discussed in a separate regional effort.

Water

Colorado is an arid environment in which climate change exacerbates existing drought and water supply issues. Addressing both indoor and outdoor water use efficiency is an important opportunity for climate change mitigation and community resilience.

Additional
Non-Energy Code Elements Roadmap

2024

Collect EPDs for specific materials (align with State tax rebates).	An EPD is a way for building planners and designers to assess the impact of the materials they're using. The State of Colorado offers tax rebates for certain construction materials through Senate Bill 22-051 Policies to Reduce Emissions from Built Environment, and EPDs are used to apply for the rebate.[5] **Equity and affordability:** Collection of EPDs may impose administrative burdens on purchasers and limit available building products that can be used, while the investment into developing EPDs may burden small manufacturers. Incentives are important tools to develop the market and support a transition to low embodied carbon materials.
Provide adequate space for waste receptacles.	Building design should accommodate collection for trash, recyclables, durable goods (for multifamily buildings), and compost.
Permit applications for new construction must include a plan for C&D waste.	A C&D plan must identify materials to be diverted or deconstructed, a plan for separating those materials onsite, where those materials will go, and how the project team will track them. **Equity and affordability:** Processing planning documentation may stretch existing staff resources and slow permitting; funding should be sought to add staff capacity.

Additional
Non-Energy Code Elements Roadmap

2024
continued

Energy code updates for renovations, additions, alterations, and changes in certificates of occupancy.	Jurisdictions can set specifications for which energy improvements must be made and project thresholds that trigger those improvements. **Equity and affordability:** Increasing the energy performance of existing residential buildings can increase the habitability and reduce the energy cost burden for residents. Provisions should be considered to ensure costs for upgrades are not disproportionately placed on tenants in residential and commercial spaces.
Indoor water efficiency requirements.	These requirements are to be determined per jurisdiction. Note: Colorado law already requires WaterSense plumbing fixtures.[6]
Outdoor water efficiency requirements.	These requirements are to be determined by jurisdiction in accordance with state statute. Note: Regulation 86 in the Code of Colorado Regulations, which addresses the use of greywater, is being updated in 2023.[7]
Effective stormwater management.	These requirements are to be determined per jurisdiction. Stormwater management addresses water quality issues by mitigating sediment and pollutants from runoff of construction projects and existing buildings.

Additional
Non-Energy Code Elements Roadmap

2027

Apply low carbon limits for specific materials (align with State tax rebates).	Set low carbon limits for one or more of the eligible materials in Senate Bill 22-051.[8] **Equity and affordability:** Low carbon limits for specific materials may pose a challenge for small builders in meeting requirements. Equity-targeted incentives should play a role.
Provide adequate space for waste receptacles.	Continued from 2024.
Permit applications for new construction must include a plan for C&D waste and must reach a minimum diversion rate of 25%.	The next step in stringency after requiring a C&D plan is establishing a minimum percentage of diversion that a project must achieve. A jurisdiction can opt to apply penalties to projects that do not reach this requirement. **Equity and affordability:** Waste diversion may be difficult for small sites and small contractors. Recycling may pose a higher cost than landfilling construction and demolition waste. Incentives and program assistance should be directed to these projects.
Energy code updates for renovations, additions, alterations, and changes in certificates of occupancy.	Continued from 2024.
Indoor water efficiency requirements.	Continued from 2024.
Outdoor water efficiency requirements.	Continued from 2024.
Effective stormwater management.	Continued from 2024.
Apply requirements that address healthy indoor spaces.	Improving healthy indoor spaces can be done by addressing emissions of materials (i.e., paints, adhesives, flooring).

Additional
Non-Energy Code Elements Roadmap

2030

Apply low carbon limits for specific materials (align with State tax rebates).	Continued from 2027.
Provide adequate space for waste receptacles.	Continued from 2027.
Permit applications for new construction must include a plan for C&D waste and must deconstruct the building.	In addition to a C&D plan, the permit will not be issued unless the old building is deconstructed as required. **Equity and affordability:** Deconstruction may be difficult for small sites and small contractors. Deconstruction may pose a higher cost than demolition and landfilling construction and demolition waste. Incentives and program assistance should be directed to these projects.
Energy code updates for renovations, additions, alterations, and changes in certificates of occupancy.	Continued from 2027.
Indoor water efficiency requirements.	Continued from 2027.
Outdoor water efficiency requirements.	Continued from 2027.
Effective stormwater management.	Continued from 2027.
Apply requirements that address healthy indoor spaces.	Continued from 2027.

Affordability, Racial Equity, and Implementation

Affordability, Racial Equity, and Implementation

Advanced energy codes present more benefits than challenges to affordability and to addressing the needs of communities disproportionately impacted by racial injustice and climate change. New construction presents the one-time opportunity to eliminate the cost of fossil fuel infrastructure, establish building envelopes that are highly efficient, and tie building energy use to an electric grid that is increasingly decarbonized and cost-competitive with gas. As building technology electrifies, it's important that lower-income residents and historically excluded communities not be stranded on less efficient and fossil fuel technology.

It should also be noted that additional equity benefits may be reaped by addressing existing building stock through renovations, additions, alterations, and changes in occupancy, as many disproportionately impacted residents rent or own older building stock. We intend that this new construction Roadmap supports durable and resilient construction that measures up to building performance standards addressing existing buildings.

How Do Building Codes Support Equity?

Climate change disproportionately impacts communities that have already been subjected to systemic injustice.* Lower-income communities and communities of color in Colorado are more likely to live in neighborhoods and homes with:

- Less tree cover, creating heat islands;
- Greater proximity to sources of air pollution and inadequate access to air filtration, leading to higher rates of indoor air pollution;
- Inefficient building envelopes and equipment, subjecting residents to heat, cold, high energy bills, and safety concerns; and
- Higher percentages of renters, who have little control over these built environment factors while landlords have little financial incentive to invest in upgrades.

Building codes that ensure high energy performance, especially for affordable housing, play a crucial role in securing habitable and affordable living conditions for residents while ensuring a just transition toward a climate-resilient future for all Coloradans.

* Colorado HB21-1266 and Environmental Justice Task Force Recommendations.

Affordability

The availability of affordable and attainable housing presents a major challenge to many communities in the Cohort. Design, permitting, construction, and furnishing costs associated with advanced codes may aggregate to raise first costs for some home builders and developers or in some cases could slow the construction of much-needed affordable housing; however market rates, not relatively marginal construction cost differences, determine the majority of home prices.

High energy performance comes with its own affordability implications. More energy efficient construction and appliances may impose some higher upfront costs but will save occupants money through lower utility bills. Loosening standards for affordable housing would result in lower-performing homes and technologies for lower-income households, along with higher exposure to heat, cold, and air pollution with attendant health effects, which risks further entrenching historic economic and racial inequities in building stock.

Finally, considerations of energy code costs and benefits must be put into broader context of the full costs and benefits of new construction, including land costs, school quality (and other similar factors that influence land and home costs), density, home size, connection fees, desired home and community amenities.

Potential Solutions: Homeowners and Businesses

Communities should invest in outreach and engagement in advance of code adoption cycles to identify, implement, and publicize programs, incentives, or other support mechanisms that offset the increased cost to build to higher standards. Robust and impartial analysis is critical to public information as well as decision-making on codes. First-cost and operating cost analyses should be updated periodically to reflect evolving construction, equipment, and fuel costs, as well as financial assistance. Community engagement should involve culturally competent and language-accessible education on the benefits of higher standards. This Code Cohort should reconvene to coordinate on deeper engagement that prioritizes communities and businesses of color. This process should include impacted stakeholders to best understand the barriers and opportunities to affordable housing including potential homeowners, developers, designers, builders, and renters.

Ultimately, communities should consider strategies that achieve equity by providing additional support to disproportionately impacted communities, lower-income households, and builders of smaller or affordable homes in meeting code requirements. Developing creative financial assistance and local financing mechanisms ahead of code updates will supplement existing and incoming State or federal programs to help lower-income households and small homes take advantage of cost savings from efficient and low-carbon products. For example, the Roadmap currently does not differentiate between large and small houses, although large homes typically consume more energy and impose a greater burden on the grid than smaller homes. Placing additional requirements for larger homes to conserve energy or to pay fees for excess energy use would help disincentivize excessive energy use while providing a funding source for financial assistance.

Communities could consider the following ideas to help address affordability:

- Increasingly stringent requirements can be implemented based on **square footage**, requiring larger homes to meet the highest energy improvement standards, and thereby incentivizing smaller homes with smaller energy loads.
- An **electrical grid impact fee** could be assessed based on square footage, starting at a specified size. These fees can fund incentives or financial assistance for smaller homes or lower-income households to purchase high-efficiency equipment. Similar to the mechanism above, this may also serve as a disincentive to larger homes.
- Publicize existing tax credits, utility rebates, and other **financing mechanisms** that can be leveraged to help pay down upfront costs.
- Work with existing **direct service organizations**, such as affordable housing, weatherization, community health, community assistance, and aging services, to ensure that support and financial assistance reach those who need them.
- Communities may wish to **reevaluate zoning laws** to incentivize density and/or smaller homes, such as raising height limits for multifamily proposals and allowing construction of accessory dwelling units (ADUs), while protecting solar access with solar setbacks. Another option includes incentivizing or pre-approving models like ENERGYSTAR manufactured homes to improve affordability and incentivize construction.

Potential Solutions: Developers

Strengthening the codes will increase the responsibilities of developers who specialize in some classes of affordable housing. Working with developers on code rationale and compliance will help smooth the path for future projects that will increase available affordable housing stock.

Communities could consider the following ideas to help encourage the development of affordable housing:

- Building officials should develop **communication strategies** that clarify when codes will be implemented and what will be required of developers.
    - An example of an effective communication strategy that building departments can employ is a fact sheet or business case that explains the return on investment of the advanced codes for building owners and developers. Cases should highlight the marketability of the long-term benefits of the code requirements.
- Providing **process incentives** for affordable housing developers will ease their burden. Municipal permitting processes can cause significant delays; providing trade-offs or incentives can reduce barriers to development.
- For existing buildings needing retrofits, incentivizing the use of an **energy performance improvement calculator** and providing **rebates** upfront, can support project evaluations and encourage integration of high efficiency appliances into existing building upgrades.

Finally, renters face a unique challenge, as they are often times barred from upgrading rental units and/or equipment. Furthermore, renters have historically been excluded from a role in developing policies governing the built environment. As the Cohort seeks to expand the availability of affordable rental units, communities should consider renters a key equity stakeholder for engagement and prioritization for investment through incentives, financial assistance, and programmatic support.

Resiliency

Some homes in the Cohort communities, especially in Boulder County, are situated in rural communities around the mountains where grid connectivity remains inconsistent and poses safety concerns during the hottest and coldest times of the year. Electrification may present a challenge for new homes in certain locations. Conversations with electricity providers should continue to strengthen distribution networks and avoid stranding homes at the edges of the grid.

Similarly, some critical infrastructure facility types have different energy use profiles and demands than typical commercial buildings. Healthcare facilities and water and sanitation facilities, for example, are required to have backup generation to cover essential loads in the case of a grid outage, and such backup generators may not be sized for full electrification. Additional conversations with facility managers and community leaders can help determine which critical infrastructure may qualify for special considerations under the Roadmap codes.

Finally, based on Cohort insights, the agricultural industry in Boulder County may struggle with meeting commercial building codes due to their unique energy use profiles. Small agricultural businesses often require large investments into expensive equipment to grow, process, and deliver their products. Engagement with industry stakeholders can inform a decarbonization approach that addresses these concerns in the codes.

Support For Code Implementation

New construction projects undergo a long process from design through permitting and construction to commissioning. Stakeholders during each stage of construction must be able to understand and adhere to the new construction standards. Changes to the building code will impact the professionals who make up this ecosystem, particularly those in small, local firms.

Communities could consider the following ideas to help support local construction-related firms in complying with new building codes:

- Communities can conduct **educational outreach and engagement** with local design professionals, construction companies, and contractors to ensure these small firms access the available resources to implement and integrate the new codes into their work.
- Communities may consider working through trade organizations and state agencies to incentivize or facilitate access to **certification programs and trainings** that support new technologies and techniques required by the new codes. This will support small firms and increase the supply of certified professionals, making them more accessible for homeowners, builders, and developers.
- Compliance and enforcement of some aspects in new codes may increase the demand on municipal staff time and resources. As communities plan to adopt future code cycles, they may benefit from **reassessing staff capacity and needs**.

Future Recommendations

The purpose of the Cohort is to **maintain consistency and collaboration** as communities work to combat climate change with building codes. In an ever-evolving policy environment, the Cohort must continue to coordinate on updates, convening again prior to each code cycle, to ensure there is consistent alignment. The Net Zero Roadmap can serve as a launching point for discussion and jurisdictions can work together to decide how to implement each element to achieve climate goals and net zero new construction.

Deeper involvement of a variety of stakeholders will also be essential to energy code progression in Cohort communities. Local decision makers need to hear perspectives and insight from those involved in energy code implementation and compliance. These stakeholders include building and planning department staff, builders and developers, suppliers, realtors, utilities, and trades.

Stakeholders outside of the energy code realm are also essential to integration of more holistic sustainability initiatives within the built environment. These include community members affected by the built environment such as homeowners, renters, and community support providers. Many of these voices also come from non-profits like Eco-Cycle and the Colorado Green Building Guild, regional groups such as Resource Central and Boulder County Resource Conservation Advisory Board, waste haulers and collection facilities, water utilities, affordable housing organizations, and other groups that work in fields related to the additional consideration elements of the Roadmap.

Opportunities for Future Collaboration

To create the most accurate platform for decision making, jurisdictions involved in the Cohort need to collaborate on future work. There has been an expressed need from participating communities for studies that investigate topics outlined in the next steps below.

Immediate Opportunities for 2024 Code Update:

1. EUI targets developed through robust modeling that are specific to common building types and achieve regional energy improvement goals.

2. Residential and commercial case studies for electrification in new construction with an emphasis on cost.

3. Cost studies of code update impacts on residential and commercial buildings, especially examining cost impacts on disproportionately impacted and low-income communities.

For 2027 Code Updates & Beyond:

4. Market study of life-cycle analysis tools such as Environmental Product Declarations and modeling software, to align life-cycle requirements with market-readiness.

5. Regional coordination among jurisdictions, landfill operators, waste haulers, and others to ensure construction & demolition recycling programs are supported by lower landfill fees and infrastructure for waste collection and sorting.

For maximum implementation success of the Net Zero New Construction Roadmap, Cohort communities should convene prior to each code cycle update, collaborate on regional study opportunities, and involve a variety of stakeholders to incorporate necessary perspectives on all stages of building code development.

Glossary

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

Building Types:

Commercial: For building code purposes, all buildings that are not included in the definition of "Residential" below.

Multifamily: A property that includes multiple separate housing units within one building or set of buildings. Multifamily buildings with more than three stories must comply with the commercial chapter of the energy code, and multifamily buildings with three stories or less must comply with the residential chapter of the energy code.

Residential: Includes detached one- and two-family dwellings and multiple single-family dwellings (townhouses) and residential multifamily buildings three stories or less in height above grade plane.

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

Decarbonization: The reduction of GHG emissions through a combination of no-carbon energy sources, energy efficiency and conservation, and resource conservation.

Demand Flexibility: The process of using communication and control technology to shift electricity use across hours of the day while delivering end-use services (e.g., air conditioning, domestic hot water, electric vehicle charging) at the same or better quality but lower cost. This occurs by applying automatic control to reshape a customer's demand profile continuously in ways that either are invisible to or minimally affect the customer, and by leveraging more-granular rate structures that monetize demand flexibilities capability to reduce costs for both customers and the grid.[9]

Electrification: The process of replacing equipment that is traditionally powered with fossil fuels to that which is powered by electricity.

Beneficial Electrification: Per CRS 40-1-102,[10] converting the energy source of a customer's end use from a non-electric fuel source to a high-efficiency electric source, or avoiding the use of non-electric fuel sources in new construction or industrial applications, if the result of the conversion or avoidance is to:

- Reduce new GHG emissions over the lifetime of the conversion or avoidance.
- Reduce societal costs or provide for more efficient utilization of grid resources.

Electric-Ready: A residential home or commercial building that uses fossil fuels for space heating, water heating, cooking, clothes drying, and/or vehicles and that has pre-wiring, a a dedicated circuit, panel space, and sufficient physical space for future all-electric equipment, or as otherwise specified by code

Electric-Preferred: A new building that meets the electric ready standard and requires extra efficiency or renewable energy if the building systems use fossil fuels.

Electric Vehicle (EV)-Ready: Preparing parking spaces for the future installation of EV chargers. There are three levels of EV-ready:

EV-Capable: A designated parking space that includes electric panel capacity, a dedicated branch circuit, and raceway for eventual installation of an EV charger.

EV-Ready: A designated parking space that is EV-capable and has a 240-volt receptacle installed for an EV charger, or as otherwise specified by code.

EV Supply Equipment (EVSE)-Installed: A designated parking space that has a minimum Level 2 charging station installed.

Glossary

Energy Burden: The amount of household income spent on energy costs. An energy-burdened household spends at least 10% of their household income on energy costs, while the average Colorado household spends about 2%.[11]

Energy Use intensity (EUI): A metric for measuring a building's energy use as it relates to building size. An EUI is calculated by dividing the total amount of energy the building consumes in one year by the total square footage of the building.

Environmental Product Declaration (EPD): A document that details the lifecycle analysis of a product, as well as the carbon dioxide equivalent emissions impact (represented as global warming potential) of that product.

EV Supply Equipment (EVSE): The electrical conductors and associated equipment external to the electric vehicle that provide a connection between the premise's wiring and the electric vehicle to provide electric vehicle charging.

Exterior Energy Use: Energy consumed by equipment for outdoor amenities, including but not limited to snowmelt systems, spas, pools, and outdoor fireplaces.

International Energy Conservation Code (IECC): Part of a suite of building codes published by the International Code Council, updated in an extensive process every three years, and adopted at the state or local level. The energy code has a chapter focused on commercial buildings and a chapter on residential buildings, each offering several flexible methodologies for builders to reach specific energy targets.

Net Zero: By the end of 2030, newly constructed homes and buildings will be net zero with regards to operational energy. This will be accomplished through a combination of highly energy efficient construction, renewable energy systems, grid-interactive demand flexibility, and the elimination of fossil fuel combustion on-site.

Solar-Ready: Designating and reserving roof space, identifying location for conduit, and providing sufficient panel capacity in preparation for a future installation of solar photovoltaic (PV) system, or as otherwise specified by code.

Endnotes

1 "GHG Pollution Reduction Roadmap." Colorado Energy Office, https://energyoffice.colorado.gov/climate-energy/ghg-pollution-reduction-roadmap

2 "Building Greenhouse Gas Emissions." Building Greenhouse Gas Emissions, Colorado General Assembly, 2 June 2022, https://leg.colorado.gov/bills/hb22-1362

3 Xcel Energy has a goal to achieve 100% carbon-free electricity by 2050. Additionally, investor owned utilities in the state must reach 80% renewable electricity by 2030, as directed by state statute.

"Net-Zero Energy Provider by 2050." Xcel Energy, https://co.my.xcelenergy.com/s/our-commitment/carbon-reduction-plan

"Sunset Public Utilities Commission." Sunset Public Utilities Commission, Colorado General Assembly, 30 May 2019, https://leg.colorado.gov/bills/sb19-236

4 UHG Consulting. Boulder County Construction And Demolition Infrastructure Study, Materials Generation Estimate And Market Analysis. 2011, https://assets.bouldercounty.gov/wp-content/uploads/2018/05/constdemoltionrpt2011.pdf.

5 "Policies to Reduce Emissions from Built Environment." Policies To Reduce Emissions From Built Environment, Colorado General Assembly, 30 May 2019, https://leg.colorado.gov/bills/sb22-051

6 "New Appliance Energy And Water Efficiency Standards." New Appliance Energy And Water Efficiency Standards, Colorado General Assembly, 30 May 2019, https://leg.colorado.gov/bills/hb19-1231

7 Department of Public Health and Environment Water Quality Control. https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=6527&%2CfileName=5%20CCR%201002-86

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