2022 Building & Fire Code Adoption

Denver Community Planning and Development

November 8, 2022
Participating Tonight

- Everyone is welcome
- We will use breakout rooms for specific code questions
- Staff will call on participants to ask their question/comment live
- Type your question into the Chat box at the bottom of your screen
- We will have time for people who called in by phone to ask questions. If you called in by phone, press *6 to unmute.
- Please keep questions brief to allow more people time to speak (2-minute limit per speaker)
- Please be respectful of all opinions and avoid obscenities and hurtful language

A recording of tonight’s event will be posted on our website.
Agenda

I. Welcome
II. Energize Denver update
III. Overview of proposed code changes
IV. Breakout rooms organized by code for detailed questions
V. Next steps
VI. Open Q&A
Breakout Rooms

1. International Building Code (IBC)/Int'l Existing Building Code (IEBC)
2. Int'l Fire Code (IFC)
3. Int'l Residential Code (IRC)
4. Mechanical, Plumbing, Fuel Gas, Energy, and Denver Green Codes (IMC, IPC, IFGC, IECC, DGC)
5. Main lobby (not a breakout room) for general questions
Development Services Overview

Permit review times, backlog, and innovations
Plan Review
Backlog

• Sustained high volume of permit applications

• Staffing shortages (turnover + recruitment challenges)

This bar chart counts new residential and commercial building permit applications year-to-date as of Oct. 31.

2017: 4,212
2018: 4,758
2019: 4,660
2020: 5,569
2021: 6,233
2022: 6,333

Data does not include zoning or trade permits.
Initiatives Implemented

- Aggressive filling of open positions
- 100+ hires this year (includes promotions)
- CPD vacancy rate is now ~10%, down from ~16% in May 2022
Initiatives Implemented

• Overtime to plan reviewers in all groups, including commercial zoning, and building inspectors

• **Bureau Veritas:** Hired a third-party consultant to help perform residential building plan review
Initiatives Implemented

• Process innovations
  • Updated project assignment process
  • Implementing a minor resubmittal process

• Customer service
  • [Average Review Times dashboard](#) updated daily
  • Returning to in-person concept meetings
  • New call center to deliver faster customer service for simple questions – 720-865-2700
  • Customer service desk open Mon-Fri
Goals

- Significantly reduce the city’s building permit application review backlog by end of Q1 2023
- Provide improved customer service
- Keep pace with permit demand
Energize Denver Ordinance: Commercial and Multifamily Buildings

Office of Climate Action, Sustainability, and Resiliency
Buildings and Homes are responsible for 64% of Denver’s GHG Emissions

Denver has committed to eliminate greenhouse gas emissions by 2040. For buildings and homes, this means our goals are:

• All new buildings and homes “net zero energy” by 2030
• All existing buildings and homes “net zero energy” by 2040
Energize Denver Ordinance

Benchmarking
• Buildings 25K+ sq. ft. must submit energy benchmarking data through ENERGY STAR Portfolio Manager on an annual basis

Performance
• Site Energy Use Intensity energy requirements for 2030 for buildings 25K sq. ft. and larger
• Prescriptive Lighting or Solar Requirements for buildings 5,000 to under 25K sq. ft.

Electrification
• All commercial and multifamily buildings must partially electrify space and water heat equipment upon system replacement, when cost effective

Learn More at denvergov.org/EnergizeDenver
## Electrification Requirements Upon System Replacement

*Partial electrification of space and water heat when cost effective*

<table>
<thead>
<tr>
<th>Amending Denver Building and Fire Code</th>
<th>2023</th>
<th>2025</th>
<th>2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permit process changes to near parity in permitting between gas systems and electrification.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Heat pump required upon replacement of easy-to-electrify equipment when cost-effective (furnaces, roof top units, individual water heaters).</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Heat pump required upon replacement of hard-to-electrify equipment when cost-effective (PTACs, boilers, central hot water).</td>
<td></td>
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<td>X</td>
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High Impact Climate Benefits

- Energize Denver will reduce emissions from buildings 80% by 2040.
- Electrifying space and water heat reduces methane emissions, released when we use gas, which cause 80 times the amount of climate change as standard carbon dioxide emissions.

Zero Emission Electricity is Coming
Improved Equity and Safety

• In 30-40% of low-income homes in Denver, gas equipment fails carbon monoxide tests.
• Lower energy bills through energy efficiency reduce the energy burden.
Energize Denver Hub: Support and Resources

- Technical assistance
- How-to guides, check lists
- Additional assistance for under-resourced buildings

[denvergov.org/EnergizeDenver](http://denvergov.org/EnergizeDenver)

On December 1st join us for the Energize Denver Summit!
Existing Building Electrification Support

<table>
<thead>
<tr>
<th>Feasibility Reports</th>
<th>Pilots</th>
<th>Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Template designs</td>
<td>o Design pilot methods</td>
<td>o Lessons learned from pilots</td>
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<tr>
<td>o Education materials &amp; trainings</td>
<td>o Recruit projects</td>
<td>o Research incentive design</td>
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<td>o Review submissions</td>
<td>o Industry outreach</td>
<td>o Education and outreach</td>
</tr>
<tr>
<td>o Design standards for exemptions</td>
<td>o Pilot project implementation</td>
<td>o Administer incentives</td>
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<tr>
<td>o <strong>Goal:</strong> 1,200 per year</td>
<td>o <strong>Goal:</strong> 70 total sites in two phases</td>
<td>o 50% Under-resourced Buildings (URB)</td>
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<tr>
<td></td>
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<td>o <strong>Goal:</strong> 10% of easy-to-electrify buildings</td>
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Lessons learned from pilots
Research incentive design
Education and outreach
Administer incentives
50% Under-resourced Buildings (URB)
Incentives for New Buildings and Homes

**Design Incentives:** Partial funding for drawing sets and as-built drawings that can be reviewed by Denver builders to help inform how electrification can work for their projects.

**All-electric Pilot Projects:** Partial funding for builders or property owners interested in leveraging city funds to help a new building project be built all-electric.

**Equity and Local Focus:** 50% of the pilot project funds will be prioritized for affordable housing or otherwise serve or benefit under-resourced communities in Denver. Denver-based and/or MWBE firms and organizations are especially encouraged to apply for incentives.
2022 Denver Building & Fire Code
2022 Denver Green Code

Code adoption process overview and high-level code changes
Public Engagement & Background

• July – December 2021 – Amendment Proposal Drafting
• January – July 2022 – Formal Code Hearings for Six Committees

• Architects
• Engineers
• Contractors
• Energy Modelers
• Denver Building Owners and Managers Association (BOMA)
• Fire & Life Safety Consultants
• Denver Metro Homebuilders Association (HBA)
• Hospitality industry
• Denver Water
• Building operators/engineers
• Elevator industry
• Habitat for Humanity
• Xcel Energy
• Solar industry
• National Renewable Energy Laboratory (NREL)
• City staff from CPD, DFD, CASR, DHA, DOTI, HRCP, and Parks
Energy & Climate Action Focus

• Inaugural working group sessions for Energy Code and Green Code
• Over 60 formal energy code proposals from the public and city
• In-depth, real-time tracking of impacts of each proposal against goals
• Substantial progress toward Comprehensive Plan 2040 and Net Zero Energy Goals
• Intentional consideration of cost and time impacts of changes
Key Changes to Note by Code

• Building Code & Existing Building Code
• Residential Code
• Fire Code
• Mechanical, Plumbing, & Fuel Gas Codes
• Energy Code
• Green Code
International Building Code (IBC) & Existing Building Code (IEBC)

1. Advancing a 2024 code early regarding mass timber ceilings to allow greater use of wood construction, which is more affordable and more sustainable

2. Removing three less restrictive fire safety amendments to improve fire safety and ensure Denver remains in line with national codes

3. Universal parking spaces (which are sized to accommodate vehicles for people living with disabilities) at electric vehicle charging stations in addition to accessible spaces

4. Classifying distilleries and alcohol storage facilities as a high-hazard Group H occupancy if there are large quantities of hazardous material

5. Clarifying that IRC buildings are a Group R-3 occupancy in the IEBC
International Residential Code (IRC)

1. New requirements for Low VOC materials for improved indoor air quality

2. Adding Appendix AJ for repair, alteration, addition, change of occupancy and relocation of existing IRC buildings
   - Better addresses coordination between Landmark and IRC requirements

3. Clarifying what is and is-not a “complete independent dwelling unit” for the purpose of applying IRC requirements for fire and life safety provisions

4. Updating the IRC to align with the “Group Living” zoning code amendments adopted in 2021

5. Regulating accessory structures with living spaces to ensure fire and life safety

6. New, prescriptive code language to allow for quick design specification for sheds, greenhouses, and other storage accessory structures, saving time and cost for engineering when not needed
International Fire Code (IFC)

1. (320) Accounting for hazards presented by (additive manufacturing) 3-D Printing
2. (501) Requirement for review/approval of site safety plans on construction sites
3. (903) Open garages exceeding 48,000 sq. ft. must be sprinklered
4. (903) “13R” systems only allowed for buildings less than 30' to occupied level
5. Ch. 12 heavily modified to account for new power technologies
IFC Continued – Denver Amendments

6. (105.6.21) Acknowledge & formalize phased occupancy of buildings (new policy)
7. (Ch. 5) Integrate DOTI Vision Zero design efforts for fire access roadways (radii & traffic calming)
8. (510) RES reconcile long time requirements with national approach (e.g., UL listings of equipment)
9. (903 & 907) Elevator emergency functions regarding FA technicians no longer accessing hoist ways for service
10. (915) CO reconcile long time requirements with national approach
11. (920.23) Require maps showing elevator power disconnects throughout building (scoped to elevator contractor)
International Mechanical, Plumbing, and Fuel Gas Codes (IMC, IPC, IFGC)

1. Updating mechanical ventilation requirements for R-2, R-3, & R-4 occupancies, which could encourage use of energy recovery units in dwelling units

2. Reducing maximum flow rates for plumbing fixtures to meet or exceed the EPA’s WaterSense requirements, which will reduce overall water consumption in Denver
International Energy Conservation Code (IECC)

1. Commercial Partial Electrification for Space Heating
2. Commercial Partial Electrification for Water Heating
3. Commercial pEUI Energy Modeling Metric
5. Commercial Appendix G Site Energy Metric
6. Commercial Prescriptive Path
7. Commercial Electric Vehicles Update
   • Aligns with national codes to reduce the % of spaces in multi-family buildings that are EV-capable from 80% to 40%. This reduces cost of compliance while still providing sufficient levels of future proofing for EV spots.

1-2: Aligned with Energize Denver

3-6: To aid electrification, ease of use, and align with the city’s Comprehensive Plan 2040
IECC Continued...


9. Residential Prescriptive Path: Incentivizes electrification by simplifying the code path for all-electric buildings. It provides flexibility for project teams to select their own credits.

10. Residential Minimum Renewables: Requires 50% of renewables on homes (with exceptions including: all-electric buildings, partial electrification of buildings, and for adding more efficiency in buildings).


12. Additional energy code amendments that advance the goals of Comprehensive Plan 2040 along with updates to coordinate with Energize Denver requirements.
Denver Green Code (DGC)

- The DGC addresses both climate change and biodiversity loss through mitigation, adaptation, and resiliency.

- It was a voluntary code in the 2019 code cycle, introducing new approaches to building design and construction in Denver.
  - Limited provisions will become mandatory in this code cycle.

- The DGC provides guidance for greener buildings through energy efficiency, resource conservation, sustainable materials, indoor environmental quality, water safety, site development, land use, and building performance.
DGC Continued...

• New in this code cycle:
  - *Limited*, mandatory use for all new commercial projects and major renovations
  - Projects can choose what code provisions they want to use – many options are available that will not increase development cost
  - Major renovations are those with > 50% addition or modification to the building area, or 100,000 ft², whichever is less.

• Key new amendments:
  - Ecological impact statement
  - Diverse, native and adapted, low water, pollinator supportive landscapes
  - Small site rainwater management; Embodied carbon limitations (concrete and steel)
  - Increased energy efficiency and storage, grid stability strategies, electrification
  - Deconstruction, reuse, recycling, composting, waste diversion
  - Outcome focused limits for resource use and indoor environmental quality thresholds
Timeline (Transition & Implementation)

Winter 2022/2023
- Legislative Consideration of Ordinances
  - Public briefing and review period for final proposed amendments
  - LUTI
  - Mayor Council
  - Full Council


- (Adoption by City Council) ~1/12/2023
  - All 2022 approved amendments become available for use in design

- 1/12/2023 - 5/1/2023
  - Transition Period when either the existing 2019 OR the 2022 codes can be used for design.

- 5/1/2023
  - Mandatory use of 2022 Amended Codes for design.
  - Note: Limited exceptions are available for very large projects that cannot pivot to new codes during approximately 4-month transition period.
Breakout Rooms

Ask specific code questions
Format & Logistics

- Self-select your own breakout room
- Move about freely – select "leave breakout room" NOT leave meeting
- Teams will give a short intro, repeated at the 15-minute mark
- The Main Lobby is for general questions and discussion not related to a specific code

Breakout Rooms:
1. IBC/IEBC
2. IFC
3. IRC
4. IMC/IPC/IFGC/IECC/DGC
IBC/IEBC

Allen Yanong
IFC

Tony Caro
IRC

Mikaela Firnhaber
International Residential Code (IRC)

Appendix AJ for repair, alteration, addition, change of occupancy and relocation of *existing* IRC buildings/structures

1. Appendix AJ is revised in its entirety and is modeled after the prescriptive requirements in the IEBC.

2. Provides clarity on which code requirements are applicable to existing buildings and structures.

3. Applicants have the option to comply with the provisions of the IRC for new construction, the IEBC, or Appendix AJ.
Updated IRC Administrative Sections and Definitions:

1. Clarify what is and is-not a “complete independent dwelling unit” for the purpose of applying IRC requirements for fire and life safety provisions

2. Updating the IRC to align with the “Group Living” zoning code amendments adopted in 2021

3. Regulating accessory structures with living spaces to ensure fire and life safety
1. Commercial Partial Electrification for Space Heating
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3. Commercial pEUI Energy Modeling Metric
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   • Aligns with national codes to reduce the % of spaces in multi-family buildings that are EV-capable from 80% to 40%. This reduces cost of compliance while still providing sufficient levels of future proofing for EV spots.
8. Residential Energy Modeling Metric: Aligns energy modeling to Denver's goals, allowing for easy calibration and incentivizes all-electric buildings

9. Residential Prescriptive Path: Incentivizes electrification by simplifying the code path for all-electric buildings. It provides flexibility for project teams to select their own credits.

10. Residential Minimum Renewables: Requires 50% of renewables on homes (with exceptions including: all-electric buildings, partial electrification of buildings, and for adding more efficiency in buildings)

11. Residential Electric Vehicles Update: Aligns language and definitions with national codes

12. Additional energy code amendments that advance the goals of Comprehensive Plan 2040 along with updates to coordinate with Energize Denver requirements
Energize Denver Building Electrification provisions are effective March 1, 2023

- Code Amendments will apply to equipment replacements for gas furnaces, gas water heaters, and air conditioners.
- Permitting process changes
Energize Denver permitting process changes

Beginning March 1, 2023, "like for like" replacement of gas furnaces, gas water heaters, and air conditioners will no longer be eligible for a Quick Permit, unless it is an Emergency Replacement.

EMERGENCY EQUIPMENT REPLACEMENT. Where only one piece of heating equipment, cooling equipment, ventilation system, or service water heating equipment is failing and is replaced by another having the same heating or cooling capacity, and no other alterations are made to the central HVAC system or central water heating system.
Energize Denver amendments to the IECC

Where a gas-fired warm-air furnace is replaced with a gas-fired warm-air furnace, two of the following are required; when a unitary air conditioner or condensing unit serving a heated space is replaced with another unitary air conditioner or condensing unit, one of the following is required:

• An Electrification Retrofit Feasibility Report.
• The equipment shall be sized per Section C403.3.1.
• All gas piping connected to the gas meter serving the replaced warm-air furnace shall be tested per Section 406 of the IFGC.

Exceptions:
• This section shall not apply when equipment is replaced as an emergency equipment replacement.
• This section shall not apply to the replacement of gas-fired boilers used for space heating.
Energize Denver amendments to the IECC

Where a gas-fired storage water heater or instantaneous water heater is replaced with another gas-fired storage water heater or instantaneous water heater, one of the following is required:

• Provide an *Electrification Retrofit Feasibility Report*.
• All gas piping connected to the gas meter serving the replaced gas-fired water heater shall be tested per Section 406 of the IFGC.

**Exception:**
• *This section shall not apply when equipment is replaced as an emergency equipment replacement.*
• This section shall not apply to the replacement of gas-fired boilers used for water heating.
2022 Denver Green Code
Content, Applicability + Purpose
Denver Green Code: Organization

**Topic specific chapters**
- Climate change mitigation
- Resource balance
- Community resilience

2022 DGC chapters
- Energy
- Site Sustainability
- Water Use
- Indoor Environmental Quality
- Materials and Resources
- Construction and Plans for Operation

Future expanded focus
- Ecological Health + Biodiversity Support
- District Measures
- Embodied Carbon
- Positive Net Energy
- Air Quality Restoration
- One Water
- “Zero” (90%) Waste
- Community Adaptation + Resiliency
- Equity + Affordability
- Beauty
- Occupant Health + Wellness
- Regional Leadership
- Occupant Engagement
- Education

- Sustainable ecosystem
  - equitable
  - viable
  - affordable
  - sustain life

- Economic

- Social

- Environment
2022 Denver Green Code: Format

Easier to Read and Use

NEW: 119 Provisions

Chapters by Focus

Requirements by Chapter

EQU1: BUILDING ENTRANCES

2022 Denver Green Code: Format

EQQ2: THERMAL ENVIRONMENTAL CONDITIONS FOR HUMAN OCCUPANCY

EQQ3: ACOUSTICAL CONTROL

EQQ4: SOIL-GAS CONTROL

EQQ5: CONSTRUCTION ACTIVITY POLLUTION PREVENTION (PROTECTION OF OCCUPIED AREAS)

EQQ6: CONSTRUCTION WASTE MANAGEMENT PLAN

CONNECT WITH US 311 | POCKETGOV | DENVERGOV.ORG | DENVER 8 TV

THE MILE HIGH CITY
**NEW: Limited Mandatory Use**

All new commercial projects + major renovations*

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Choose of Provisions</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>0 of 1</td>
<td>Ecological Impact Statement = optional wildcard provision</td>
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<tr>
<td>2.</td>
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<td>Reserved</td>
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<tr>
<td>3.</td>
<td>0 of 0</td>
<td>Definitions</td>
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<td>Residential Energy</td>
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<td>5.</td>
<td>4/2* of 19</td>
<td>Site Sustainability</td>
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<td>6.</td>
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<td>Water Use Efficiency</td>
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<td>8.</td>
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<td>Indoor Environmental Quality</td>
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<td>9.</td>
<td>3/1* of 10</td>
<td>Materials and Resources</td>
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<tr>
<td>10.</td>
<td>2 of 16</td>
<td>Construction and Plans for Operation</td>
</tr>
</tbody>
</table>

Total  12/8* of 119 All Chapters
Chapter 1: Scope + Administration

1. **NEW:** Limited Mandatory Use
   - All new commercial projects + major renovations*
   - Choose provisions
   - Gain familiarity

2. **Voluntary Enhanced Use**
   - Facilitated review processes
   - Four options:
     1. As-Written
     2. Zero Net Energy, All Electric
     3. LEED Platinum
     4. Passive House + Non-Energy As-Written

**NEW:** Ecological Impact Statement

Read + Familiarize
Choose 12/8* of 119 provisions
Denver Green Code: Purpose

Conventional regulations are not moving fast enough to address the community’s needs.

DGC operates differently.

Goal: socialize different ways of approaching development, so that they can be made mandatory without duress.
Denver Green Code: Purpose

Why?

Support Denver community

future:

viability

+ livability
Help realign Denver development with residents’ Comp Plan 2040 vision

Live in balance with resources
Support positive ecological evolution

Cross agency integration
Across City teams + external collaborating organizations

Increase stringency of mandatory regulations
More rapidly + expansively through familiarity

Change process + thinking
Affect awareness, priorities, preferences, choices: development and broader community

Community integration
Stakeholders in what a project becomes, and, what the project could become (potential)

Regulatory bridge
Ease the path from visionary wish to required reality

Address multiple scales of influence
project, district, neighborhood, city, region, greater
Next Steps
Timeline (Transition & Implementation)

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denvergov.org/cpd

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