2022 Denver Energy Code
A High-Level Overview

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

Denver will eliminate greenhouse gas emissions by 2040.

- All new buildings and homes “net zero energy” by 2030
- All existing buildings and homes “net zero energy” by 2040
Gas Use in Buildings

Space heating and water heating account for 97% of the GHG emissions in buildings and homes.
Xcel Energy Renewable Production

Low emissions electricity is coming fast!

Electric energy is the only path to zero emissions.

Figure 1: Our vision for the clean energy transition 2030 and 2050
Heat Pumps

• Heat pumps move heat instead of creating it achieving 200-400% efficiency
• Progress in heat pump technology
• Cold climate heat pumps maintain more than 70% of their capacity at outside temperatures as low as 5°F
• Many can operate effectively at -22 °F
• Heat pumps have been used since the 1800s in American refrigerators
• Used for decades to heat homes and buildings Asia and Europe.
Reasons to Electrify

- Reduces greenhouse gas emissions with on-site or off-site renewables
- Incentives and tax credits for heat pumps
- Provide heating and cooling in one system
- Increased safety from carbon monoxide and products of combustion
- Improves equity in Denver
- Simplifies 2022 Denver Energy Code prescriptive and performance paths
- Aligns with Green Buildings Ordinance paths using energy conservation
- Energize Denver gives 10% Performance Target Adjustment credit to buildings with 80% electric site energy
DENVER'S GRID

Xcel Energy committed to an 80% Renewable electricity Grid by 2030
Xcel Energy committed to an 100% Renewable electricity Grid by 2050

HOME PROJECTS

May 1st mandatory use of the 2022 Denver Energy Code
Goal: New Homes are designed Net Zero Energy
Goal: New Homes perform as Net Zero Energy

BUILDING PROJECTS

Residential Code Changes
Commercial and Multifamily Code Changes
Energize Denver Permit Changes
Energize Denver Equipment Replacement
Energize Denver Performance Targets for Buildings 25k+ SF
Energize Denver Performance for Buildings 5k-25k SF

EXISTING COMMERCIAL AND MULTIFAMILY BUILDINGS

March 1st permit process changes for gas furnaces, unitary AC/condensing units, gas water heaters
Permit process changes for PTACs, boilers, and central water systems
Heat pump installation required when replacing "easy to electrify" gas-fired equipment at end of system life
Heat pump installation required when replacing "hard to electrify" gas-fired equipment at end of system life

Energize Denver Performance Targets for Buildings 25k+ SF
Dec. 31: Compliance deadline for buildings 15,001-24,999 sq. ft.
Dec. 31: Compliance deadline for buildings 10,001-15,000 sq. ft.
Dec. 31: Compliance deadline for buildings 5,000-10,000 sq. ft.

Energize Denver Performance for Buildings 5k-25k SF
Dec. 31: Compliance deadline for buildings 15,001-24,999 sq. ft.
Dec. 31: Compliance deadline for buildings 10,001-15,000 sq. ft.
Dec. 31: Compliance deadline for buildings 5,000-10,000 sq. ft.

Energize Denver Permit Changes
Dec. 31: Compliance deadline for buildings 10,001-15,000 sq. ft.
Dec. 31: Compliance deadline for buildings 5,000-10,000 sq. ft.
2022 Denver Energy Code

• This is a high-level summary of the 2022 Denver Energy Code
• Does not include all changes to the 2022 Denver Energy Code. Please refer to the 2022 Denver Energy Code for specific code language.

Denvergov.org/BuildingCode
Tips for referencing code

2022 Denver Amendments
+ 
2021 International Energy Conservation Code (IECC)
= 
2022 Denver Energy Code (DEC)

Note: Chapter 11 in the Denver Residential Code is replaced in its entirety by the Residential Provisions of the 2022 Denver Energy Code
2022 Denver Energy Code – Accomplishments

* These charts show Carbon Emissions progress from the 2022 DEC with the goal that buildings are designed as NZE by 2027 and perform as NZE by 2030. The closer the 2022 Denver Energy Code is to the blue trajectory line, the closer we are to achieving our NZE goals.
Denver Energy Code Definition: Commercial vs Residential

Residential buildings are detached one- and two-family dwellings and multiple single-family dwellings (townhouses) and Group R-3 and R-4 buildings three stories or less in height above grade plane.

Commercial buildings are all other buildings
Denver Energy Code Definition: All-Electric Property

*All-Electric Property* is one that contains no permanently installed equipment or appliances that utilize *combustion*, plumbing for fuel gas or fuel oil or *fuel gas utility* connection, installed within the *building(s)* or site, except for *emergency power systems* and *standby power systems*. 
Residential Amendments

1. Residential Performance Path
2. Residential Prescriptive Path
3. Residential Minimum Renewables
4. Demand Load Management for Water Heaters
5. Electric Ready Infrastructure
6. Residential Electric Vehicle Charging
7. Solar-Ready Zones
8. Additional energy code amendments that advance the goals of Comprehensive Plan 2040

1-4: To aid electrification, ease of use, and align with the city’s Net Zero Energy Goals

5-7: To assist in future-proofing homes for electrification and renewables

Link to Residential Resources
Residential projects may select from **three compliance options:**

<table>
<thead>
<tr>
<th>Prescriptive</th>
<th>Total Building Performance</th>
<th>Energy Rating Index (ERI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each element of the building must meet a minimum standard defined in prescriptive provisions</td>
<td>Energy modeling analysis is used to show an annual energy cost savings for the proposed design over a baseline</td>
<td>Energy rating software is used to show the ERI of the proposed design is less than or equal to the code defined maximum</td>
</tr>
</tbody>
</table>
Commercial Amendments

1. Commercial Partial Electrification for Space Heating
2. Commercial Partial Electrification for Water Heating
3. Commercial Prescriptive Path
5. Commercial Appendix G Site Energy Use Modeling Metric
6. Commercial Performance Target Energy Modeling Metric
7. Commercial Electric Vehicles Update
8. Demand Load Management for Water Heaters
9. Additional energy code amendments that advance the goals of Comprehensive Plan 2040 along with updates to coordinate with Energize Denver requirements

1-2: Aligned with Energize Denver
3-6: To aid electrification, ease of use, and align with the city’s Comprehensive Plan 2040

Link to Commercial Resources
Commercial Compliance Pathways

• Prescriptive

• Performance – Three options:
  - Compliance by Energy Cost (C407)
  - Compliance by Site Energy (Appendix SE)
  - Compliance by fixed energy Performance Target (Appendix PT)
Commercial Compliance Process

• Choose Compliance Pathway – Prescriptive or Performance
• Meet requirements for all paths – partial list:
  - HVAC/DHW/Lighting Commissioning
  - Envelope Verification and Air Leakage Testing
  - Checklist for Mandatory requirements (differs by path)
    - Report your Energize Denver Ordinance 2030 EUI Target here!
• Related
  - Denver Green Buildings Ordinance – denvergov.org/Greenroofs
  - Denver Green Code – denvergov.org/Greencode
What is the Denver Green Code?

• The Denver Green Code (DGC) addresses both climate change and biodiversity loss through mitigation, adaptation, and resiliency.

• First adopted in 2019 as a voluntary code, introducing less familiar and integrated approaches to building design and construction.

• Starting May 1st, 2023, the city requires commercial and multifamily development to meet some provisions from this code, while allowing projects the flexibility to choose which specific provisions to implement.

The DGC provides guidance for greener buildings through provisions targeting:

» Energy efficiency
» Resource conservation
» Sustainable materials
» Indoor environmental quality
» Water safety
» Ecologically beneficial site development and land use
» Improved building and landscape performance
Limited mandatory use for new and major renovation commercial projects

Denver.gov/GreenCode

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Description</th>
<th>New Construction</th>
<th>Major Renovation</th>
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<tbody>
<tr>
<td>Chapter 1</td>
<td>Scope and Administration: Ecological Impact Statement (EIS)*</td>
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<tr>
<td>Chapter 4</td>
<td>Residential Energy [RE]</td>
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<td>Site Sustainability</td>
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<td>Chapter 6</td>
<td>Water Use Efficiency [WE]</td>
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<td>Chapter 7</td>
<td>Commercial Energy</td>
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<td>Chapter 8</td>
<td>Indoor Environmental Quality [EQ]</td>
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<td>Chapter 9</td>
<td>Materials and Resources [MR]</td>
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<tr>
<td>Chapter 10</td>
<td>Construction and Plans for Operation [CX]</td>
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*The EIS can be used as a substitute for any one required provision*
Established in 2018, Denver’s Green Buildings Ordinance (GBO) requires project teams to select from a menu of strategies for more sustainable development.
- Applies to buildings 25,000 square feet or larger

The DGC and GBO are separate, but complementary.
- GBO designed to layer over mandatory codes and regulations
- Projects must meet the requirements of both, as applicable

Double dipping not allowed: provisions selected to meet DGC requirements cannot be used to satisfy GBO.
Commercial - Energize Denver Ordinance
Reduces emissions from buildings 80% by 2040

Applies to all commercial, multifamily, institutional, municipal, manufacturing, agricultural, and industrial buildings

**Electrification**
- Applicable to all buildings, no matter the size
- Partial electrification of space and water heat and cooling equipment upon system replacement, when cost effective

**Benchmarking**
- Buildings 25,000 sq. ft. and larger
- Submit energy data annually

**Performance**
- Minimum energy efficiency requirements for buildings 25,000 sq. ft. and larger
- LED or Renewable requirements for buildings 5,000 - 24,999 sq. ft.
- Focused on improvements to energy efficiency and increasing renewables
## Existing Building Electrification Requirements

Commercial and multifamily buildings: Partial electrification of space and water heating and cooling equipment upon system replacement when cost-effective

<table>
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<tr>
<th>Amending Denver Building and Fire Code</th>
<th>2023</th>
<th>2025</th>
<th>2027</th>
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Existing Building Support and Resources

Resources and technical assistance available through the Electrification Program website:

denvergov.org/BuildingElectrification

Or contact us!

For Electrification Feasibility Reports and incentives:
electrification@denvergov.org

For permitting and code compliance:
mechplumb.review@denvergov.org
Net Zero Energy Hub – Codes and Resources

Denvergov.org/EnergyCode

• Learn about changes in the 2022 Denver Building and Fire Code and the 2022 Denver Green Code
• Understand the importance of building electrification and energy efficiency
• See examples of successful Net Zero Energy building projects in a variety of building types and uses
• Navigate new regulations and requirements with confidence!
Net Zero Energy Hub – Codes and Resources

Overview

Design Phase

Construction Phase

Operations & Maintenance

Alterations & Additions

New Building Electrification Rebates
Resources for the 2022 Denver Energy Code

The Denver Energy Code is a section of the Denver Commercial Building Code. It lays out requirements for buildings to comply with for Denver to meet or exceed its climate action goals. There are several compliance pathways for the Denver Energy Code. These resources will help you understand what you are required to do. The Denver Energy Code will be updated during every code cycle to maintain the path Denver needs to meet the goal of all new buildings and homes achieving Net Zero Energy by 2030.

See the Denver Energy Code Resources
Thank you!

For more information, visit:
Denvergov.org/EnergyCode
Denvergov.org/BuildingCode

Contact us:
Questions about energy code: energy.review@denvergov.org
Questions about programs & resources: sustainability@denvergov.org