Denver Community Goals,
Green Buildings Ordinance,
Existing Building Requirements

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Agenda

Green Buildings Ordinance: *Existing Buildings*

Denver Community Goals

1. GBO – overview
2. GBO – project requirements
3. GBO – *submittal* requirements
4. GBO – process timeline
Denver Community Goals
Denver Community Goals + Priorities

- Equity
- Respond to Climate Change
- Affordability
- Resiliency
- Health
- Inclusive
- Connected
- Safe
- Accessible
- Economically vibrant
- Active
- Authentic neighborhoods
Denver’s Long Term Viability

- Economic
- Social
- Sustainable
  - Equitable
  - Viable
  - Affordable
- Environment
  - Viable
  - Affordable
Resiliency: What is this for Denver?

What are Denver’s vulnerabilities + threats?

- Air quality / pollution
- Drought
- Heat
- Fire
- Ecosystem instability

Affordability
- Loss of equity + gentrification
- Loss of inspiration, beauty + health
Denver 80x50 Plan

GHG emissions 80% below 2005 levels by 2050
Denver 2035 NZE New Buildings

- Five code cycles
- Implementation plan 2020
- IECC amendments
- Green Code, Green Buildings Ordinance
- Community stakeholders
GHG Emissions + Buildings

Homes + buildings = **63%** of Denver’s GHG Emissions

40% new by 2050

12% GHG

51% GHG
Separate Efforts

60% renewably sourced grid 2030

100% 2050 with our help

Community stakeholders
Green Buildings Ordinance: Project Requirements
Green Buildings Ordinance: Essentials

Mandatory

New + existing buildings 25,000GSF+

20 page document

Mainstream: Achievable for mainstream today
Green Buildings Ordinance: Essentials

Stakeholders, DDPHE, CPD

Voter initiated

Shaped Green Roof Initiative to fit Denver community goals

Informs where base code can go
Green Buildings Ordinance: Essentials

Compliance options (9)

Focus:
- Holistic:
  LEEDv4 Silver
- Energy efficiency (10-15%)
- Renewables
- Green space
Goal
- honor the Green Roof Initiative vote
- modestly exceed code
- prioritize design goals
- address urban heat island, rain water management, green experiences, GHG emissions
Support our Denver community’s goals
+ the health + welfare of Denver’s citizens

Honor the vote
Green Buildings Ordinance: Essentials

- Mandatory if 25,000 GSF+
- Existing buildings
- New buildings
- Additions
- Campuses

- 1 Cool roof +
- 2 Additional green building options

- Denver specific
- November 2, 2018

- Modest improvements over base code through:
  - green space
  - energy efficiency
  - renewables
  - broad sustainability
Green Buildings Ordinance: 1. Cool Roof

- **Mandatory**
- **Solar reflectance** (white, tan, gray)
- **Covering, pavers,** (Membrane, metal, rock, concrete, clay, ceramic, glass)
- **Condensation**
  - air barrier
  - vapor retarder
  - ventilation
- **Exceptions**
GBO Existing Buildings: 2. Options

a. Green space: at grade or vegetated roof
b. On-site renewables
c. Building certification
d. Energy Program
   1. Energy Star 85
   2. Building certification
   3. On-site renewables
   4. Off-site renewables
   5. Energy efficiency
e. Off site green space
GBO Exceptions

Full
- < 25,000 GSF
- One + two family IRC
- 3+3 story dwellings
- Temporary, air supported, greenhouses

Cool roof
- Recover maybe
- Character defining
- Covered or shaded
- Ballast
- Visible

Options
- Recover
- 5 story 62.5’ residential
- Wind/fire emergency
- Hail – no longer
- Ext’g vegetated roof
Ordinance, Rules + Regulations
Policies, Forms, Guides

- 50 pages
- Legal verbiage
- Enforcement
- Exemptions
- Appeals
- Procedures
- CPD + CASR formal collaboration
- Technical Advisory Committee
Details: GBO

At-Grade Green + Vegetated Roofs

Existing

• 2% GFA
• 18% total roof area
• All available roof
Details: GBO Vegetated Roofs

- Irrigation
- 80% coverage
- Plant selections
- Trees + groundcover
- Maintenance plan
- 4” growing media

- Landscape architect
- Licensed green roof contractor
Details: GBO Vegetated Roofs

- IBC, IFC, IPC, Denver amendments
- Standpipes
- Fire zones
- Fire clearances
- Exit stairs
- Wind + Gravity loads
Details: GBO At-grade green space

- Trees + groundcover
- Zoning
- Water quality treatment
- Right of way
- Must be new
- Soil quality
- Drainage
- Tree standards
- Turfgrass
- Urban agriculture
Details: GBO On-site renewables

Existing
- 5% GFA
- 42% total roof
- 100% energy

- 16% efficiency – update GBO as required
- Energy model
- Other renewables
- Clearances
Details: GBO Off-site renewables

Existing
- 100% energy
- 25,000-50,000 GFA:
  - 10% energy + 5% decreased energy
- 50,000+ GFA
  - 15% energy + 7.5% decreased energy

Energy model
- Five year contracts
- 20 years / roof replacement (ext’g)
- Available programs limited
- Zero net energy
Details: GBO Building Certification

Existing
- LEED BD+C or O+M Silver
- Enterprise Green Communities
- National Green Building Standard Silver
- Green Globes Three Globes
- Other with approval
Details: GBO Reduced energy consumption

Existing
• >25,000SF
  <50,000SF
  10% decrease
• >50,000SF
  15% decrease
Green Buildings Ordinance: Approval!

- Consider all options early
- Owner engaged
- GBO, Rules + Regs
- Communication within team
- Communication with City
- Familiarity
Green Buildings Ordinance: Submittals

Information provided is a high level summary and not fully complete and comprehensive. Submittals must include all information required to illustrate full compliance with all applicable provisions of the Green Buildings Ordinance and Rules and Regulations.
Existing Buildings!

Part 1a  General
Part 1b  Cool Roof
Part 2   Additional Green Buildings Options
GBO Submittals: Existing Buildings:
Part 1a: General

For roof permit

- Green Building Declaration Form
- Roof plan with area indicated on it
- Roof assembly / detailed scope description
- Exemptions: substantiation
- Show compliance

Include this form with permit applications for a roof replacement/recover on buildings of 25,000 square feet or more in gross floor area (GFA) and for additions of 25,000 — 49,999 square feet to an existing building. For additions of 50,000 square feet or more, use the “New Buildings” form available at www.denvergov.org/greenroofs.

Log number: __________________________

I. Project Description

☐ Roof recover only  ☐ Roof replacement  ☐ Addition (25,000 - 49,999 ft² of GFA)

Address: ________________________________

II. Cool Roof Requirement

Submit all requirements for cool roofs, character-defining roofs, and condensation analyses are listed in the Rules and Regulations at www.denvergov.org/greenroofs. Include that documentation with this application to ensure a timely start to your review. Attach additional pages if more space is needed.

☐ Exempt: This is a roof recover only, and an analysis of the roof system shows a cool roof will cause condensation.
☐ Exempt: This roof replacement/recover is for 5% or less of the total roof area or section in any calendar year.
☐ Other exemption as listed in Article III of the Rules and Regulations. List and submit appropriate documentation:
For roof permit

- Cool roof covering + paver product data with solar reflectance value identified
- Air barrier + vapor retarder product data when applicable
- Steep sloped roof ventilation detailing when applicable
- Condensation considerations:
  - prescriptive assembly / details, or
  - dewpoint analysis by registered professional, or
  - note stating replacing existing cool roof
- Partial exemption(s): substantiation
- Show compliance
GBO Submittals: Existing Buildings:
Part 2: Additional Green Buildings Options

a. Green space

All requirements from Part 1a General + Part 1b Cool Roof, plus:

For roof permit:
- Site Development Plan minor modification
  - If at-grade green space, maintenance note per GBO R+Rs Section 4.02(b)(v)
  - Statement signed by landscape architect stating design is per GBO
  - Required green space calculations + diagrammatic plan (identical to landscape CDs)
- Landscape Construction Documents by a licensed landscape architect
  - Detailed calculations of green space required including dimensioned roof plan(s) if applicable
  - If at-grade green space: dimensioned site plan illustrating green space + detailed calculations outlining what’s taken credit for
  - General note underscoring applicability of GBO landscape requirements
  - If vegetated roof: roof plan identifying + dimensioning all GBO R+Rs required clearances
  - If vegetated roof: details + system specification or manufacturer’s product data
  - Additional materials as required to illustrate compliance with GBO R+Rs Section 4.02(a) through (e)
  - Irrigation, plumbing + fire protection plans
- Separate CD submittals / permits when applicable
  - Fire protection systems
  - Plumbing / backflow preventer
  - Irrigation system
  - Zoning
  - Vegetated roof system – include a maintenance plan
b. On-site solar

All requirements from Part 1a General + Part 1b Cool Roof, plus:

For roof permit
- SDP minor modification
  - Required PV coverage calculations + diagrammatic site and/or roof plan (identical to CDs)
  - Last year's energy use data if applicable
- Construction Documents
  - Detailed calculations of PV coverage required including dimensioned roof plan(s) and last year’s energy use data if applicable
  - Dimensioned roof plan illustrating PV coverage provided + detailed calculations
  - Roof plan identifying + dimensioning all GBO R+Rs required clearances
  - PV panel product data including efficiency rating + system capacity (kW)
  - Additional materials as required to illustrate compliance with GBO R+Rs Section 4.03(a)(ii) through (v) + (viii)
- Separate CD submittals / permits
  - Fire protection systems
  - Photovoltaic system
  - Zoning

System must be installed and inspected within 12 months of roof final inspection.
Building certification

All requirements from Part 1a General + Part 1b Cool Roof, plus:

For roof permit
- USGBC documentation (LEED BD+C Silver or O+M Silver or higher) or
- Enterprise documentation (Enterprise Green Communities certification) or
- Home Innovation Research Labs documentation (National Green Building Standard Silver or higher) or
- Third party certification documentation (Building official approved LEED equivalent)
GBO Submittals: Existing Buildings:
Part 2: Additional Green Buildings Options

d-1. Energy Program: Energy Star Score 85+

All requirements from Part 1a General + Part 1b Cool Roof, plus:

For roof permit:
• Enrollment using the Green Building Declaration Form

Within five years + annually for 20 years or until next roof replacement:
• Denver benchmarking data in Energy Star Portfolio Manager proving compliance
• If Energy Star score of 85+ cannot be maintained every year, annual submittal showing compliance with one of the other four Energy Program options
d-2. Energy Program: Building Certification

All requirements from Part 1a General + Part 1b Cool Roof, plus:

For roof permit:
• Enrollment using the Green Building Declaration Form

Within five years
• USGBC documentation *(LEED BD+C Silver or O+M Silver or higher)* or
• Enterprise documentation *(Enterprise Green Communities certification)* or
• Home Innovation Research Labs documentation *(National Green Building Standard Silver or higher)*
• Third party certification documentation *(Building official approved LEED equivalent)*
d-3. Energy Program: On-site solar

All requirements from Part 1a General + Part 1b Cool Roof, plus:

For roof permit:

• Enrollment using the Green Building Declaration Form

Within five years

• Documentation meeting CASR Energy Program requirements. Coordinate directly with Energy Program lead to define precise submittal requirements, which will be similar to those for option b. on-site solar.
• If on-site solar system is removed, annual submittal showing compliance with one of the other four Energy Program options thereafter
d-4. Energy Program: Off-site solar

All requirements from Part 1a General + Part 1b Cool Roof, plus:

For roof permit:
• Enrollment using the Green Building Declaration Form

Within five years + maintained for 20 years or until next roof replacement:
• Copy of 5 year+ contract, renewed + resubmitted upon expiration and/or building sale
• If off-site solar contract is terminated, annual submittal showing compliance with one of the other four Energy Program options
d-5. **Energy Program: Energy Use Reduction**

All requirements from Part 1a General + Part 1b Cool Roof, plus:

**For roof permit:**
- Enrollment using the Green Building Declaration Form

**Within five years + maintained for 20 years or until next roof replacement:**
- Denver benchmarking data in Energy Star Portfolio Manager proving required energy savings, or
- **Proof of completion of energy efficiency improvements** with estimated energy savings + **proof of** savings within two years. Coordinate directly with Energy Program lead to define precise submittal requirements, or
- If decreased energy consumption cannot be maintained, **annual submittal showing compliance with any Energy Program option**
GBO Submittals: Existing Buildings:

Part 2: Additional Green Buildings Options

e. Payment into green building fund

All requirements from Part 1a General + Part 1b Cool Roof, plus:

For roof permit

• Detailed calculations of green space required including dimensioned roof plan(s) if applicable
• Payment when roof permit is pulled
Green Buildings Ordinance
Review Timeline + Process
Yes, Denver is enforcing the Green Buildings Ordinance!

- Plans review (Community Planning + Development)
- Inspections (Community Planning + Development)
- Post occupancy (Office of Climate Action, Sustainability and Resiliency)
GBO Review Timeline: Existing Buildings

1. **Intake**
   - Project team defines
   - 2 days
   - First review+ comments
   - Project team defines
   - 10 days
   - Project team prepares submittal for permit
   - if needed

2. **First review+ comments**
   - Project team defines
   - 2 days
   - Re-review+ comments if needed
   - Project team defines
   - 5 days
   - Re-review+ comments if needed
   - Project team defines
   - 2 days
   - Re-review+ comments if needed
   - Project team defines
   - 5 days
   - Re-review+ comments if needed
   - Project team defines
   - 2 days
   - Roof permit

*“days”=business days

Permit conveys key facets to inspections team.
C503.3.1 Exception: Roof Replacements

Where increasing the thickness of above deck insulation to meet current code would result in existing exterior wall openings becoming less compliant with the IBC, insulation should increase to the maximum extent feasible.
DENVER'S GREEN BUILDING ORDINANCE

A Green Buildings Ordinance was approved by Denver City Council and took effect Friday, November 2, 2018. On November 16, 2018, Community Planning and Development held an open house discussing the flexible options available for buildings under the new ordinance.

Helpful resources?
Successes?
Challenges?
Suggestions?
Comments?

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Download the ordinance
Download the rules and regulations

Building Permits for Projects under the Green Buildings Ordinance
- Download GBO overview slide deck (PDF)
- Download GBO project & submittal requirements slide deck (PDF)
- Download summary sheet (PDF)

Questions? Contact Christy Collins at (720) 865-2766 or christy.collins@denvergov.org

Learn more about the origins of Denver’s innovative green buildings ordinance >>