To turn on live captions and subtitles: Select *Captions/Subtitles On* in your video controls.

To change the caption language: Select Settings > Captions / Subtitles, and choose the language you want.

*A recording of this presentation* and the slide deck will be posted to [denvergov.org/buildingcode](http://denvergov.org/buildingcode)
Collaboration for Success

Denver Community Goals, Energy, Codes, + Tools

Christy Collins, AIA LEED AP BD+C, Engineer/Architect Specialist | Green Buildings
Keith Fox, Mechanical/Plumbing Plan Review Engineer | IECC
City and County of Denver: Community Planning + Development, Development Services
WHY?

Changing the Status Quo

Denver Community Climate Goals

Mandatory 2018 IECC 2019 DBCA

Voluntary Denver Green Code

I-Code Amendment Community Engagement

Addressing Community Concerns
Climate Work in Denver
Uncertainty + Denver Development
Denver Community Goals + Priorities

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

- Economic
- Social
- Sustainable
  - Equitable
  - Viable
  - Affordable
- Environment
- Affordable
Supporting Denver Community Goals

Community speaks ->
City responds

Stakeholder Committees +
Community Engagement ->

Plans
- Denver 80x50 Plan
- Denver Climate Action
  2020 Recommendations
- Net Zero Energy New
  Buildings Implementation
  Plan
- Denver Electric Vehicles
  (EV) Action Plan

Code Amendments
Ordinances
Regulations
Policies
Guidelines
- Energize Denver
- Benchmarking Ordinance
- I-Code Amendments
- Green Buildings Ordinance
- Denver Green Code
- Executive Order 123

Tools
Market + Regulations

Accountability + defined responsibilities

Community / Market

Regulations
January 2020

12 people

Formerly Climate Action Team

Community + Mayor created

Direct report to the Mayor

Work = sales tax funded by 2020 vote

Climate Action, Sustainability & Resiliency

720-865-9028

sustainability@denvergov.org

Report a Problem | Ask a Question
Denver 80x50 Plan

GHG emissions
80% below
2005 levels by 2050
GHG Emissions: Transportation + Buildings

Homes + buildings = 63% of Denver’s GHG Emissions; 40% new by 2050
Transportation = 30% of Denver’s GHG Emissions

Electric vehicles = GHG emissions affected through regulations including building codes
Separate Efforts

60% renewably sourced grid 2030

100% 2050 with our help

Community stakeholders

Existing Buildings + Xcel Grid

Executive Order 123

City property requirements – new + existing

City leadership

Energize Denver Benchmarking Ordinance

Homes
December 2020

1. Energy efficiency
2. Renewables
3. Electrification
4. Grid Stabilization

Collectively

Denver 2035 Net Zero Energy New Building Implementation Plan

Site Energy Use Intensity (EUI)

MEASURED FOR 365 DAYS

- SPACE HEATING
- PUMPS & FANS
- SPACE COOLING
- LIGHTING
- HOT WATER
- OTHER LOADS

ENERGY CONSUMPTION

ON-SITE ENERGY PRODUCTION

(kBtu / YEAR)

FLOOR AREA (SQ. FT.)
Denver Climate Action 2020
Recommendations

Denver Climate Action 2020 Recommendations Report

Developed by the Denver Climate Action Task Force

with support by the Civic Consulting Collaborative operated by Wellstone Collaborative Strategies

Technical support by Group 14

Equity training and support by KAPWA Consulting

July 2020
GHG emissions
40% below 2005 levels by 2025
60% by 2030
100% by 2040
Denver Climate Action 2020
Recommendations

Table of Contents
Denver Climate Action 2020 Executive Summary ........................................ 1
Introduction ........................................................................................................ 2
Centering Climate Action in Equity ................................................................. 3
Impact and Benefits .......................................................................................... 5
Impact Analysis ................................................................................................ 5
Cost of Inaction / Return on Climate Investments ........................................... 7
Supporting Recovery .......................................................................................... 10
Goals and Policy Recommendations ............................................................. 12
Overarching Goal .............................................................................................. 12
Types of Recommendations ............................................................................. 12
Overarching Recommendations ... 13
Eliminate Greenhouse Gas Emissions .............................................................. 15
  Buildings and Homes Policy Recommendations & Supports .................... 15
  Transportation Recommendations .............................................................. 26
  Electricity Supply Policy Recommendations & Supports ......................... 47
  Consumption Emissions and Water Policy Recommendations & Supports 60
Adaptation and Resiliency ................................................................................. 68
Revenue and Investments ................................................................................ 74
Investments and Recommended Funding Options ......................................... 74
Investment Estimate Overview ........................................................................ 75
Phase 1 Revenue Package ............................................................................ 75
Phase 2 Revenue Options That Warrant Further Study .................................. 83
Phase 3 Revenue Options That Warrant Additional Study ......................... 86
Next Steps ......................................................................................................... 91
Appendices ....................................................................................................... 93
Appendix 1: Task Force Members ................................................................. 93
Appendix 2: Recommendations Process ...................................................... 93
Appendix 3: Issue Briefs (Fact Sheets) ......................................................... 93
Appendix 4: Public and Stakeholder Input ................................................. 93
Appendix 5: Revenue Subcommittee Criteria .............................................. 94

Eliminate GHG Emissions
1 Buildings + homes (new + existing)
2 Transportation
3 Electricity supply
4 Consumption emissions + waste

Adaptation + Resiliency
Denver Climate Action 2020

Recommendations: New Buildings

Green Code A: Create a new, more stringent, Denver Green Code, which will then become base code in the next code cycle. In 2023, the Denver Green Code should require:
- Net zero new homes (highly efficient, all electric, renewable energy, grid flexible).
- All-electric new buildings.
- Encourage use of less steel, concrete, and other carbon intensive materials where feasible.
- Encourage building reuse for lower emissions and better urban vitality and character. The City will develop a process for evaluating material use in buildings to determine the most appropriate and least impactful material selections for building types.

2024
Residential: ZNE designs
Commercial: all electric

2027
Commercial: ZNE designs

2030
Residential + Commercial: ZNE recorded outcomes
Plan → Implementation

Community priorities + goals

Plans

Broad communication

Code amendments, ordinances, policies, regulations, guidelines, incentives

Collaboration -> Support -> Success
Mandatory 2018 International Energy Conservation Code
2019 Denver Building Code Amendments
Mandatory **energy** requirements

**Enforcement** – plan reviews + inspections

**Checklist** for project teams

**Actual energy** use not cost

**Measured outcomes** not designs in isolation

Process + engagement
2018 IECC 2019 Denver Amendments

Residential
Commercial

2018 IECC 2019 Denver Amendments
1. Codes
2. Retrocommissioning (existing)
3. Disclosure (existing)
4. Solar incentives
5. Utility incentives
6. Municipal portfolio
7. On bill finance (PACE)
8. Permit incentives
9. Zero energy pilot
Building Energy Use Intensity: pEUI + EUI

Close the gap

- Energy modeler
- Architects + Engineers
- Owner
- Contractor
- Facilities team
- Occupants

- Modeling accuracy
- Modeling assumptions
- Detailing
- Controls
- Construction quality
- Operations + behaviors
- Hours
- Maintenance
2019 Denver Green Code - Basics

• Voluntary
• Five commercial projects
• Holistic sustainability; energy emphasis
• Achievable in Denver
• Leadership
• Incentives
• Preview
I-Code Amendment Process

**City + development community, together:**
Write amendment proposals to achieve goals

Community stakeholder committee review, vote

Present for public comment

City Council adoption

**Process Details:**

1. Community states goals to City (CASR) *(done, Climate Action Task Force, January – July 2020)*


3. CASR leads City staff, consultant(s) + community stakeholders to draft regulatory (IECC amendment + DGC) proposals to support goals + achieve plans *(in progress through end of 2020)*

4. CASR invites applicants for 2021 IECC + DGC City staff + development community stakeholder committees *(early 2021)*

5. CASR leads 2021 IECC + DGC City staff + development community stakeholder committees through evaluation of amendment proposals *(mid-late 2021)*

6. CPD DS publishes recommended 2021 IECC + DGC amendments for public comment + leads public discussion *(late 2021)*

7. CPD DS presents recommended 2021 IECC + DGC amendments to City Council for adoption *(EO 2021)*

8. CPD DS supports concerned development team members with navigation of 2018 IECC 2019 DBCA, 2019 DGC, 2021 IECC + DBCA, 2021 DGC *(ongoing)*
Track I-Code Denver amendment process + opportunities to engage

Sign up
Addressing Community Concerns
Addressing Community Concerns

City may not change substance of current City Council adopted codes + amendments

Interpret

Work *with* property owners + developers

Welcome dialogue

2021 IECC DBCA

Opportunity to update Proposals

New amendments

Community Stakeholder Committee vote

Public meetings

Public comment
Top Take-aways

1. Amendments, requirements, tools support development community success achieving community’s goals
Top Take-aways

1. Amendments, requirements, tools support *development community success* achieving *community’s goals*

2. Voluntary Denver Green Code = *preview of future mandatory code priorities*
Top Take-aways

1. Amendments, requirements, tools support *development* *community success* achieving *
   *community’s goals*

2. Voluntary Denver Green Code = *preview* of future mandatory code priorities

3. Community leads regulations + work
Collaboration for Success

Denver Community Goals, Energy, Codes, + Tools

Christy Collins, AIA LEED AP BD+C, Engineer/Architect Specialist | Green Buildings
Keith Fox, Mechanical/Plumbing Plan Review Engineer | IECC
City and County of Denver: Community Planning + Development, Development Services
<table>
<thead>
<tr>
<th><strong>University of Wyoming</strong></th>
<th>Cator Ruma Consulting Engineers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990-1995</td>
<td></td>
</tr>
<tr>
<td>BS</td>
<td>2005-2006</td>
</tr>
<tr>
<td>Architectural Engineer, Mechanical Emphasis</td>
<td>Mechanical Engineer</td>
</tr>
<tr>
<td>MKK Consulting Engineers</td>
<td>Project manager</td>
</tr>
<tr>
<td>1995-2005</td>
<td></td>
</tr>
<tr>
<td>Mechanical Engineer</td>
<td>2006-present</td>
</tr>
<tr>
<td>Associate, project manager</td>
<td>Community Planning + Development – Development Services</td>
</tr>
<tr>
<td></td>
<td>Mechanical/Plumbing Plan Review Engineer</td>
</tr>
<tr>
<td></td>
<td>IECC Lead Engineer</td>
</tr>
</tbody>
</table>
January 4, 2021

1. New Commercial Building

Commercial Projects requiring the IECC Checklist

1. New Commercial Building
2. New Multi-Family Residential Buildings
3. Commercial Tenant Finish projects with area of work over 10,000 square foot
denvergov.org/buildingcode

New IECC checklist for all development projects

Working hand in hand with the Denver community, the city has defined and adopted bold climate goals. Adoption of more stringent building codes to achieve higher building performance is integral to attaining these goals. CPD’s new International Energy Conservation Code (IECC) checklist is designed to support project teams in navigating complexities of the IECC section of Denver’s 2019 Building and Fire Code, and succeeding in delivering projects that support our community’s expressed priorities.

Starting on January 4, 2021, this checklist will be required for all new commercial and multi-family residential construction projects; commercial tenant finish projects over 10,000 square feet; and single-family/duplex projects with new conditioned space or additions over 30% square feet.

Download the appropriate checklist based on your project type (all files open in Excel):

- Commercial IECC Prescriptive Checklist
- Commercial IECC Performance Checklist
- Commercial ASHRAE Prescriptive Checklist
- Commercial ASHRAE Performance Checklist
- Commercial Energy Modeling Report
- Residential IECC Prescriptive Checklist
- Residential IECC Performance Checklist

We’re here to help you learn how to fill out and submit the new IECC checklist. Join IECC specialist Keith Fox for a lunch-and-learn session Dec. 14 or 15 at noon. He’ll provide a brief overview of the checklist, walk you through filling it out, and answer any questions you may have. Learn more >>
Denver Amendments have been incorporated into COMcheck
Why the Checklist and Energy Modeling Report

- Support the Community Goals
- First step in moving to outcome based buildings
- Evolving IECC – Help City stay in alignment with the IECC
- Help design teams navigate the complexities of the IECC
- Increase the communication between the design team, energy modeling team, development team, and plan review team.
- Increase the communication between design team members
- Increase transparency between design teams and plan review team
- Help plan review teams better understand your project
- Allow plan review teams to provide a more in depth review
- Close gap between the predicted EUI and actual EUI
Addressing Community Concerns

Open Door Policy
• Hear all Concerns
• Answer all Questions
• Open Dialogue is Welcome and Encouraged

Keith Fox, P.E.
IECC Lead Engineer
• (720) 865-2816
• keith.fox@denvergov.org