Boulder City Council
STUDY SESSION

Tuesday
July 30, 2013
EARLY START

5-7 PM
Civic Area – Preliminary Draft Plan

7-9 PM
Boulder's Climate Commitment, Energy Efficiency Programs and Market Innovation Program Updates

1777 Broadway
Municipal Building
City Council Chambers

Submit Written Comments to City Council
ATTN: Alisa Lewis, City Clerk
1777 Broadway, 2nd Floor
P.O. Box 791
Boulder, CO 80306
or Fax to 303-441-4478
or E-mail: council@bouldercolorado.gov

MEMORANDUM

TO: Members of City Council

FROM: Jane S. Brautigam, City Manager
Paul J. Fetherston, Deputy City Manager
Bob Eichem, Chief Financial Officer
David Driskell, Executive Director, Community Planning and Sustainability (CP&S)
Maureen Rait, Executive Director of Public Works
Jeff Arthur, Director of Public Works for Utilities
Tracy Winfree, Director of Public Works for Transportation
Molly Winter, Director of Downtown and University Hill Management Division and Parking Services
Kirk Kincannon, Director of Parks and Recreation
Jeff Dillon, Parks and Planning Superintendent
Patrick Von Keyserling, Communications Manager
Valerie Maginnis, Director of Library and Arts
Karen Rahn, Director of Human Services
Sam Assefa, Senior Urban Designer, Project Coordinator
Lesli Ellis, Comprehensive Planning Manager, Project Coordinator

DATE: July 30, 2013

SUBJECT: **Study Session on Boulder Civic Area: Preliminary Draft Plan**

I. Purpose

The purpose of this study session is to:

1. provide City Council an overview of the preliminary draft Plan for the Boulder Civic Area (**Attachment A**) and get feedback;
2. share recent public input (**Attachment C**); and
3. provide technical memos and analysis (**Attachment D**).

II. Questions

Does City Council have feedback on the following components of the preliminary draft:

1. **Civic Area's Future** (overall illustrative plan, park plan, and access and mobility plan (previously "Public Realm Diagram" and accompanying maps)) (memo page 5 and **Attachment A**, pages 27 to 38);
2. **West and East Ends** – Possible Program and Performance Criteria (memo page 9and **Attachment A**, pages 39 to 43);
3. **Implementation and Phasing** (memo page 11 and **Attachment A**, pages 45 to 52); and

4. **Overall Comments**—regarding plan organization or contents.

III. Background: A Community-Driven Plan

Input to Date

From the Past Year of Outreach

The Civic Area Future plan reflects over 5,000 ideas and a year-long collaboration of the Boulder community, boards and commission, and City Council. Over that period, Boulder came together at events and online to define the future—one that reaffirms shared values and provides a path for engagement and addressing change over time. Reflecting back to the beginning, the community considered a series of questions: What if the area could be a transformative place for gatherings, recreation, and dialogue and innovation? What if it could showcase sustainability values? What if it could have a farmers' market and provide space for arts, culture, education and other events?

A year later, Boulder has answered these questions and provided ideas for how the Civic Area can transform into an even more unique place—to become a set of special spaces that reflect the community's commonalities and differences and allow gathering. The plan maintains beloved features—the Dushanbe Teahouse, the Boulder Public Library, the Farmers' Market, and others. Most importantly, it is a plan for all the people who have been involved and who will spend time in the area, as demonstrated through a video about the year-long process. (See Boulder Civic area video: http://vimeo.com/70053104) Staff is compiling all additional input from the website, Inspire Boulder, and other individuals and will post it on the Boulder Civic Area website.

July 11, 2013 Open House at Boulder Library North Gallery and Theater

It is estimated that 150 people attended the July 11 open house and provided comments on the preliminary draft materials. In general, most attendees were supportive of and excited about the draft plan. They also posed questions about specific program elements and functions such as parking, role of the library and senior center, outdoor cinema, performance space, and bicycle and pedestrian connections, and mature trees. **Attachment C** provides a summary of the written comments from the meeting.

July 11 public open house

City Boards and Commissions (July)

The project team met with many of the city's boards and commissions in May and June and provided a summary to council. Additionally in July, staff briefed the Library Commission, Transportation Advisory Board, Parks and Recreation Advisory Board, Boulder Design Advisory Board, Planning Board, and Arts Commission.

Other Organizations (June and July)

The project team has continued to engage with other organizations including the Farmers' Market, BMoCA, Boulder Housing Partners (BHP) Board, the Boulder Chamber of Commerce, Boulder Center for Performing Arts, Bridge House staff and clients, Homelessness Planning Group, and businesses in the area such as Mustard's Last Stand and Alfalfa's.

June 11 Council Direction

On June 11, council reviewed preliminary recommendations for the Civic Area (i.e., Draft Public Realm Plan, Access and Mobility Diagram, and Civic Park Improvements) and directed staff to begin development of a preliminary plan for the Civic Area based on those recommendations. Big ideas that have carried through to the preliminary draft in **Attachment A** include:

1. Retaining Boulder Creek and the cottonwoods along it as a natural corridor and protecting and restoring it as a linear focus for the park and outdoor space;
2. Creating a cohesive and expanded central park at the core—bookended by existing and future mixed-use blocks;
3. Removing existing buildings (New Britain and Park Central) from the high hazard flood zone (HHZ) to improve life and property safety and expand the core park;
4. Relocating surface parking from the HHZ to wrapped and/or underground structures on the east and west ends to expand the core park and improve life and property safety; and
5. Transforming Canyon Boulevard into a complete street and reducing its barrier effect to downtown.

Additionally, council provided direction to:

6. Carry on the Farmers' Market on 13th Street and allow it to expand to the east and west;
7. Include a public market hall as a desired used in or near the 13th Street block, subject to further analysis and coordination with the Farmers' Market in the implementation phase;
8. Continue to explore a mixed-use community services/innovation center with events space and performance space on the 13th/14th Street block; and
9. Incorporate public art throughout the Civic Area.

Finally, council gave direction to continue analysis of: the 13th and 14th Street functions, the West Senior Center, feasibility of relocating the bandshell within the Civic Area or to other locations, feasibility and location of different types of performing arts centers, and the expanded role of arts/culture/science. Highlights of the directions and choices for further analysis are in the summary sheet: **Attachment B.** On July 16, 2013, council adopted the June 11 minutes.

IV. Plan Components

What will be in the Plan?

The **Plan for the Civic Area** will be a slightly new type of plan in the City of Boulder. It will illustrate future prospects for the largest publicly-owned place in the heart of Boulder's downtown that is flanked by private ownership. Like an area plan, it is consistent with the Boulder Valley Comprehensive Plan and provides direction for a specific geographic area. However, it is most similar to a Master Plan in providing policies, priorities, and facility needs and budgeting. It is unique because it will:

1. be produced in multiple accessible forms (e.g., web-based, poster, booklet);
2. be flexible and expected to change with new analysis and information;
3. set forth an illustrative future plan for mostly-publically owned land and guide decision making, coordination, and detailed site design for the public land;
4. give direction for the future of adjacent private lands to achieve consistency with the intent of the Civic Area plan;
5. continue to be coordinated interdepartmentally; and
6. require a comprehensive and multi-faceted financing strategy, including capital budgeting for facilities and multiple types of financing sources—public, private, non-profit, grants, and others. Implementation of the plan is dependent on funding—available and newly identified sources.

Details of the plan will change, especially because of its dependence on funding and coordination with multiple parties. It will not be necessary for the city to formally amend the plan as long as the overall outcomes adhere to the vision statement, guiding principles, and illustrative future plan. Annually, the city will revisit the work program and implementation schedule to determine what progress has been made.

Plan Contents—What to Expect:

The plan will contain three major parts, with background information in the appendices.

- Part 1: Overview, Vision, and Guiding Principles
- Part 2: The Plan for the People and Place
- Part 3: Implementation and Phasing
- Appendices will address: Plan Process (timeline, public involvement, Ideas Competition, NAIOP, etc.), the Resource Inventory, and Technical Analysis

The Overall Vision—A Safe and Inclusive Place for People

Vision

In November of 2012, council defined a vision and guiding principles, and the preliminary plan largely reflects that council-approved version. It tells a more expansive story about transformation of the place—what the Civic Area will become and what kinds of activities and people will connect with and visit it as it converts to an exciting and safe destination for locals and visitors.

Guiding Principles

Additionally, in late 2012, council approved seven guiding principles which have channeled ideas for the plan and now appear in the draft. They address the following themes:

1 – The Civic Heart of Boulder
2 – Life and Property Safety
3 – Outdoor Culture and Nature
4 – Celebration of History and Existing Assets
5 – Enhanced Access and Connections
6 – A Place for new Community Activity and Arts
7 – A Viable and Sustainable Future

The Civic Area's Future

Illustrative Future for Boulder Civic Area (Russell + Mills Studios)

The illustrative plan builds from the previous public realm diagram (June 11, 2013). It shows and describes the major elements of the Civic Area, taking direction from the council discussion. The implementation section and phasing section addresses timing of the transformative changes. Themes are described below.

Life Safety for People

The plan removes/relocates buildings and parking from the high hazard flood zone and replaces the space with park amenities and an active, safe, and welcoming park for all people. Parking is relocated to new wrapped and/or underground structures on either end of Civic Area, as illustrated in the Access and Mobility diagram. Replaced city buildings will be either in the civic area or nearby downtown. Personal safety and the role of transients in the space will continue

to get attention through enforcement and partnerships to engage the community, including homeless people, in maintaining and taking pride in the space.

Great Downtown Park at the Core

The park diagrams show illustrative/design development for the physical improvements within different spaces of the park and potential activities that may take place:

- **The Creek** – a place for splashing, contemplating, floating, and protecting ecology;
- **The Civic Front Door**, a place for eating, relaxing, viewing art;
- **Nature in the City**, a place to explore and observe; and
- **Central Park**, a place for performance and the expanded market.

Concept for nature play space along Boulder Creek (all sketches by Russell + Mills Studios)

Concept for sculpted park and performance space

Food and Farmers

The plan expands the outdoor Boulder County Farmers' Market on 13th Street. The Farmers' Market is interested in exploring expansion of physical space and possibly hours of operation to address different needs of customers and venders, as well as access and functionality. The plan illustrates the concept of an adjacent small Public Market Hall (either on 13th Street block or the Central Park side) to provide year-round community access to shop, eat, and learn about local foods and for local farmers to sell produce.

Concept for the Farmers' Market on 13th Street and expanding into the plaza

Mixed-Use Services and Innovation

The plan explores the concept of a mixed-use services and innovation center at the East End, including flexible community meeting space and events center and/or possible performing arts center structured parking, possible night-time uses (hotel and/or residential) and outdoor plazas for outdoor cinema and market space, and other activities. City services, as part of a vertically-integrated mix of uses above the market hall and mixed with centers for innovation, could be included in this block.

Concept for a mixed-use facility with public market space on the ground level (looking west along Canyon Blvd.)

Access & Mobility

The Access and Mobility Plan has not changed since the June council meeting. It includes all existing and future proposed transportation modes, parking, b-cycle stations, transit stations, and other proposed transportation-related enhancements to better connect the area. Additionally, it identifies locations for future parking structures to accommodate relocated parking and future new programs.

Arts, Culture and Science

Arts, culture, history, science, and the uniqueness of Boulder will be woven throughout the plan. The arts, culture, and science components need further exploration regarding feasibility, partnerships, and funding. The feasibility, need, and impact of different sized performing arts centers will require ongoing analysis for the Civic Area (including review of forthcoming Boulder Center for Performing Arts study in fall 2013). Any performing arts center will need to address long-term operational expenses, capital expenses.

Concept for an events or performance space taking advantage of the unique setting of the Civic Area (on the west end)

Other Possible Programs and Criteria

East End

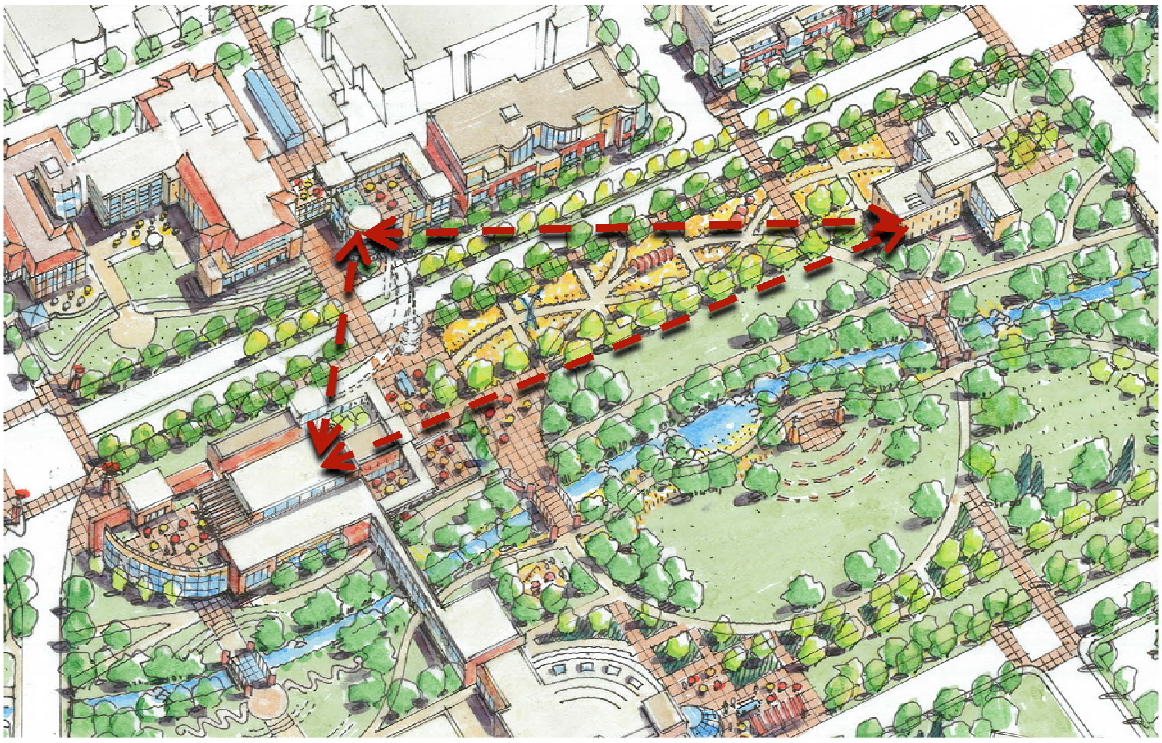
The project team is continuing to explore the concept of a mixed-use service/innovation center that would allow for a rich, varied, well designed combination of uses to better accommodate the community and customers ("productive collisions," highly interactive, place for problem-solving and visioning, space for education and outreach, meeting space, possibly with visitor center and chamber services and other everyday services, like café, food, etc.) as well as events and performance space. In addition to public land, the East End includes adjacent private properties which provide an opportunity to create a rich mix of public/private uses including private incubator, office, residential or hotel space.

New performance criteria for determining appropriate program in the area are also included in **Attachment A**, addressing selection of mix of uses, safety, and appearance through active street

level uses and design quality (e.g., articulated walls, transparent ground level, etc.). Performance criteria will preclude large, single use facilities.

West End

The West End, with the existing library, municipal building, and civic use pad have several possible programs to expand on the cultural and learning function of the area, shown in **Attachment A.** The north wing of the library could redevelop as a small to mid-sized performing arts facility. Its proximity to St Julien Hotel, a potential multi-use event space at the Civic Use Pad, and a potential repurposed Municipal Building for arts/museum related uses, would create a vibrant mix of synergetic public/private uses at the West End. Linking with the future public uses of the Civic Use Pad will be important to connecting the area as part of a cultural function.



Concept to link the West End cultural places

Concept for the library café

Attachment A also addresses the Senior Center, Performing Arts, Bandshell and other possible facilities.

Phasing and Implementation

Strategies that will lead to a highly effective and engaging Civic Area include: coordination and partnerships, phasing and prioritization, detailed planning and design and programming, construction, possible code updates, and a comprehensive portfolio of tools as part of a financial and investment strategy. Staff is currently exploring phasing of the plan vision and will be exploring the portfolio of possible financing tools to achieve phases of the vision, including possible new public financing such as a voter-approved bond. Initial phasing tables and graphics are included in **Attachment A** and tables are on the following pages.

Phase 1 (2013-2014)

Timing (beginning)	Category / Key Words	Strategy	Responsibility
PLANNING AND COORDINATION			
ongoing	**Safety**	Enforcement on parks grounds, around municipal building, and library	Parks and Police
	Flood Safety	Continually improve flood education and evacuation plans for New Britain and Park Central buildings and parking areas	Public Works / Utilities
	Food	Continue food truck pilot and allow existing food vendors to continue operations	City Manager's Office (CMO), Parks
2013 Q4	**Arts and Culture**	Review privately funded feasibility analysis for a performing arts center; determining the financial and operational needs for a self-sustaining entity and appropriate size and location; do additional analysis as needed.	Private non-profit (BCPA), Arts and Library
2014 Q1	**Coordina-tion**	Designate Civic Area implementation Coordinator to plan for later phases (2 and 3) and oversee improvements Finalize land use programs Explore land purchase, land swap, and assemblage options (city owned/private land) Identify utility needs and potential costs	CMO, planning team, utilities, FAM, coordinator
	Park	Develop detailed park plan for Phase 2	Parks
	Finance	Develop comprehensive investment strategy including potential financing tools and organizational structures; align with CIP and begin to estimate costs for Phase 2 and identify strategies	Planning team, finance, CMO
	Access and Mobility	Start feasibility plan for phasing parking and travel demand management programs, including city offices. Integrate with existing parking district.	Transportation, DUHMD, FAM,
IMPROVEMENTS			
2013 Q4	**Farmers' Market**	Conduct environmental mitigation for 13th Street Plaza (December 2013 to April 2014)	Facilities Asset Management (FAM) with Parks Design
2014	**Park**	Build children's play and nature exploration in park, south of Boulder Creek Make safety improvements, such as lighting and landscape shrub clearing near buildings	Parks
	Library / Food	Reinstate library café on bridge with adjacent outdoor seating area in the courtyard (coordinate with the north library plaza and flood proofing identified below) Rebuild Main Library North Plaza Complete south library play and reading areas	Library, Parks, FAM
	Flood safety	Build library flood protection	FAM

Phase 2 (2014-2019)

Category / Key Words	Strategy	Responsibility (General)*
PLANNING AND COORDINATION		
Finance	Develop comprehensive investment strategy for Phase 3 and align with CIP Coordinate with private land owners; demonstrate alternative ways for redevelopment and explore potential for land swaps Identify possible partnerships Identify next round of catalytic projects for Civic Area	Finance, Civic Area Coordinator*, non-profits, businesses, private landowners, etc.
Parks, Arts	Prepare detailed park site planning for Phase 3, landscape plan for shrub removal, and Boulder Creek restoration plan, public arts plan Prepare wayfinding plan and corridor plan: lighting and signage with art	Coordinator, parks planning
Access and mobility	Work with CDOT from conceptual through final design for Canyon Boulevard Plan for future Bus Rapid Transit service to the downtown Work on conceptual through final design of improvements for 13th and 14th and connections between Canyon Blvd. and Arapahoe St. Plan for additional bicycle improvements and amenities Continue design and feasibility studies for replacement and new parking facilities based on approved planned uses within the area and new development south of Canyon in conjunction with phased development. Integrate with TDM strategies. Construction of facilities depended on schedule for other projects.	Transportation, RTD, DUHMD
Historic Resources, Culture	Prepare analysis for bandshell relocation feasibility and optimal siting for acoustics, context, and usability; coordinate with historic preservation	Parks, Historic Preservation and Landmarks Board
Code update	Enable desired mix of uses and character on adjacent parcels	Planning
City offices	Conduct planning and feasibility for city building removal and replacement	FAM
Operations and Maintenance	Work with partners on long term maintenance, sponsorship, and partnering to address parks, plazas, and creek maintenance	City, non-profits, businesses, parks, etc.
IMPROVEMENTS		
Plaza / Farmers' Market	Rebuild 13th Street Plaza and access improvements for the Farmers' Market following environmental mitigation Build Public Market Hall	FAM, Parks, DUHMD
Flood Safety	Reduce some parking in HHZ, as appropriate based on parking feasibility analysis	Transportation, Parks, FAM,
Parks	Remove fencing and railroad tracks Complete Gilbert White Memorial Improve north side of Creek between library and Municipal Building and south creek side area near library	Parks
Art	Incorporate art and murals into park	Parks, Library and Arts
Access and Mobility	Improve bicycle and pedestrian connections, including along Farmers' Ditch Complete 13th Street improvements Start first phase of Canyon Boulevard (9th to 14th Streets) - complete street" improvements to include dedicated bike lanes, wider sidewalks and landscape strip, vehicle lanes, and pedestrian intersection improvements to reduce barrier effect	Transportation, DUHMD
Historic Structure	Relocate bandshell to allow for Canyon Boulevard complete street improvements	Parks, Historic Preservation
City offices	Remove New Britain and Park Central buildings and replace in area or nearby	FAM
Civic Use Pad	Develop civic use pad for combined public and hotel uses	DUHMD, Planning

** Civic Area Coordinator would be involved with and coordinate all tasks. Estimated costs and funding will be determined during the previous phase.*

Phase 3** (2019 and beyond)

Category / Key Words	Strategy
COORDINATION AND OPERATIONS	
Operations and Programming	Continue operations and maintenance and programming as determined through previous phases and with partners.
IMPROVEMENTS	
Creek	Restore Boulder Creek banks in park area
Arts	Continue to incorporate art and murals into parks, plazas, and creek enhancements
Park	Build pedestrian bridge connection to north library site across Boulder Creek Expand Civic Park improvements on south side of creek with relocation of city buildings (active spaces for performances, shade, arboretum, shade, art, etc.)
Library / Arts	Renovate and/or redevelop north library building
Senior Center	Renovate or redevelop Senior Center and BHP sites
Library / Parking	Relocate parking for library to wrapped structured parking to west side of library (in conjunction with Senior Center and Boulder Housing Partners) Build 13th Street mixed use project and parking, coordinated with CAGID
Park	Expand Civic Park improvements with relocation of parking
Access and Mobility	Build pedestrian bridge connecting civic use pad and library and civic park across Canyon Boulevard *(optional)* Construct remaining Canyon Boulevard "complete street" improvements to include dedicated bike lanes, pedestrian environments while still accommodating vehicles

*** Responsibility, estimated costs, and potential funding sources will be determined in earlier phases.*

Additional Technical Analysis

Previous memos have included summaries of technical analysis on city buildings, floodplain, and financial considerations. The project team sought additional input on floodplain and life safety considerations and parking implications and impacts of different program options for the West and East ends. **Attachment D** includes technical memos from Wright Water Engineering (WWE) on flood issues and water quality and creek restoration, and Fox Tuttle with preliminary findings on potential parking demand for future land uses.

Additional feasibility studies are still underway, including a privately-funded Performing Arts Center study, a market study for the Civic Use Pad, and Farmers' Market study of needs and opportunities to be completed fall 2013.

V. Next Steps

1. Council consideration of plan approval — September 2, 2013 (tent.)
2. Initiate Phase 1 implementation

VI. Attachments

- **Attachment A:** Preliminary Draft Plan
- **Attachment B:** June 11 council direction summary sheet and draft minutes
- **Attachment C:** Summary of Input
  - July 11, 2013 Public Open House
  - Homelessness planning group and Bridge House staff and clients
- **Attachment D:** Technical memos
  - Parking Analysis of Options
  - Flood Study White Paper

A Plan for the

BOULDER CIVIC AREA

COMMON GROUND. UNCOMMONLY INSPIRED.

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July 23, 2013

Acknowledgements

Special thanks to the people and organizations below who donated their time and ideas throughout the Civic Area planning process, and many other individuals.

City Council Members
Matt Appelbaum, Mayor
Suzy Ageton
KC Becker
Macon Cowles
Suzanne Jones
George Karakehian
Lisa Morzel, Mayor Pro Tem
Tim Plass
Ken Wilson

Boards and Commissions
Arts Commission
Boulder Design Advisory Board
Downtown Management Commission
Landmarks Board
Library Commission
Parks and Recreation Advisory Board
Planning Board
Transportation Advisory Board
Water Resources Advisory Board

Organizations
Boulder Bridge House
Boulder Center for the Performing Arts
Boulder County Farmers' Market
Boulder Housing Partners
Boulder Journey School
Boulder Museum of Contemporary Art
City Boards and Commissions
Coen + Partners
Downtown Boulder, Inc.
Dushanbe Tea House
Growing Up Boulder
Homelessness Planning Group
Hotel Boulderado
Mustard's Last Stand
PlanBoulder
St. Julien Hotel and Spa
Tesseract Productions
Urban Land Institute

Consultants
Russell Mills Studios
Fox Tuttle
WWE
Arland Economics
Studio Terra
Crowdbrite
Eco Arts Connections

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Jane Brautigam, *City Manager*
Jennifer Bray, *Communication Specialist*
Tina Briggs, *Landscape Designer II*
Katherine Buckley, *Comprehensive Planning Intern*
Joe Castro, *Facilities and Fleet Manager*
Bill Cowern, *Traffic Operation Engineer*
Jeff Dillon, *Parks and Planning Superintendent*
David Driskell, *Executive Director, Community Planning and Sustainability*
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Michael Sweeney

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Molly Winter, *Director of Downtown and University Hill Management Division & Parking Services*
Catherine Williams, *Parks Planner*
Tracy Winfree, *Director of Public Works for Transportation*
Marie Zuzack, *Planner I*

Ideas Competition Winners:
Andrew Knight
Juhee Oh
Burkart & Associates
Car A. Worthington & Associates
Entelechy Design
May Yin Architecture

Ideas Competition Jurors:
Ed Blakely
Rebecca Colbert
Andrew Earles
Ian Engle
Richard Epstein
Peter Park
Emily Patterson
Arleen Taniwaki

NAIOP Challenge Winners
Andrew Browning
Jason Elliott
Cody Kirkpatrick
Dan Konecny
Nathan Stern
Andrea Woodhams

And thanks for over 5,000 ideas submitted locally to internationally!!

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The Park at the Core: Activating It . . . . . .

Park Performance Guidelines . . . . . .

Access & Mobility. . . . . .

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The West End. . . . . .

East/West End Performance Guidelines . . . . . .

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Part 1:

Overview

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Just imagine… *It's 2025 and you're strolling through the heart of your community – the Civic Area – and see a variety of people and activities surrounding Boulder Creek and interspersed between timeless architecture and a great downtown park.*

Plan Introduction

This plan reflects over 5,000 ideas and a year-long Boulder collaboration. Over that period, the community came together to define a future for the Civic Area—one that reaffirms shared values and provides a path for engagement and addressing change over time. Reflecting back, Boulder began with series of questions: **What if**… the area could be a transformative place for gatherings, recreation, and dialogue and innovation? **What if**… it could showcase sustainability values? **What if**… it could have an expanded farmers' market and provide space for arts, culture, education and other events? The plan started with discussion of the ideal city – "the Fedora" and different forms of a city.

This plan demonstrates how successfully the community has answered these questions and provided ideas for how the Civic Area can transform into an even more extraordinary place that reflect the community's commonalities and differences. The plan maintains beloved places—the Dushanbe Teahouse, the Boulder Public Library, the Farmers' Market, Sister Cities plaza, and others—and views of the Flatirons and access to Boulder Creek. It also:

- identifies future facility needs;
- makes more space for art and culture; and
- provides a flexible vision that allows a creative and innovative city to maintain its sense of place in the heart of the Civic Area – while positioning it to be a model of future innovation.

Most importantly, this plan is for and about the people of Boulder – a plan for all who have been and will continue to be involved.

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What is the Plan?

This **Plan for the Civic Area** is a slightly new type of plan in the City of Boulder. It illustrates future prospects for the largest publicly-owned place in the heart of Boulder's civic area south of downtown and flanked by private properties. Like an area plan, this plan is consistent with the Boulder Valley Comprehensive Plan and provides direction for a specific geographic land use. However, it provides detailed policies, priorities, and facility needs and capital budgeting (as with a Master Plan). It is unique because it:

1. provides flexibility and is expected to change with new analysis and information;
2. sets forth an illustrative future plan for mostly-publically owned land and guides decision making, coordination, and detailed site design for the public land;
3. gives direction for the future of adjacent private lands, encourages coordinated planning and proposals that are consistent with the intent of this plan;
4. was created interdepartmentally and will continue to be coordinated for outcomes;
5. requires a comprehensive and multi-faceted financing strategy, including capital budgeting for facilities and multiple types of financing sources—public, private, non-profit, grants, and others—to accomplish the expressed vision. Implementation of the plan is dependent on funding—available and newly identified sources.

Details of the plan will change, especially because of its dependence on funding and coordination with multiple parties. As details change, it will not be necessary for the city to formally amend the plan, as long as the overall outcomes adhere to the vision statement, guiding principles, and illustrative future plan. Annually, the city will revisit the work program and implementation schedule to determine what progress has been made.

Plan Contents—What to Expect

This plan is divided into three parts which are:

Part 1: Overview, Vision and Guiding Principles
Part 2: The Plan for the People and Place
Part 3: Implementation and Phasing
Appendices:

- Plan Process (timeline, public involvement, Ideas Competition, NAIOP, etc.)
- Resource Inventory
- Technical Analysis

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The Vision

Imagine walking through the Civic Area in 2025... It will be the heart of Boulder with nature and a park for people at its core flanked by the east and west bookeneds.

Boulder's Civic Area will be a place for everyone—a lively and distinct destination that reflects our community's values, where people of all ages, abilities, backgrounds and incomes feel welcome to recreate, socialize, deliberate, learn and access city services. The green space and beauty along Boulder Creek will provide significant open space and parkland and will be the spine of a unifying design that weaves existing and new facilities with a rich diversity of civic, commercial, recreational, artistic, cultural and educational amenities and programs. The Civic Area also will continue to be the service center for Boulder municipal government and a new center for innovation, where community members, officials, and partners can meet, interact, and deliberate, and innovate. All together, these elements create a true civic heart for the Boulder community.

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Guiding Principles

The seven guiding principles will help the vision.

The Civic Heart of Boulder

The Boulder Civic Area has symbolic, geographic, and functional importance and should serve as an inclusive place for people to interact with each other and with government. The area should be complementary to Pearl Street (the commercial heart) and downtown. In the future, the Civic Area will adhere to the following principles:

City Center
Serve as the primary location for city management and government, including functional and interactive places for the community to interface and conduct city business and be creative;

Diversity
Represent the cultural richness, history, and diversity of our community;

Art Center
Continue to be one of the major centers for art in Boulder;

Phasing
Allow for phasing, with flexibility for new ideas to be ever-evolving and incorporated over time;

Unified Public Space
Be maintained as the largest thematically cohesive, unified public outdoor space in Central Boulder;

Design Excellence
Be a model of design excellence with compelling architecture and design reflecting forward thinking;

Destination
Be an enjoyable destination for the community and visitors; Be an integrated place that blends "natural" and "built" environments;

Welcoming and Safe
Be designed to be welcoming, accessible, comfortable, clean and safe;

Space for All
Foster programming and design of spaces and facilities to encourage use and participation by all age groups, income levels, and visitors and locals, avoiding the predominance of any one group of people;

Linking Areas
Complement and link with surrounding neighborhoods and destinations, including downtown, Goss-Grove, CU and University Hill, and Boulder High School; and

Canyon Boulevard as Complete Street
Include a new urban design and streetscape character for Canyon Boulevard – to make it more of a "boulevard" with attractive landscaping that is comfortable for pedestrians, bicycles, and accessible by transit.

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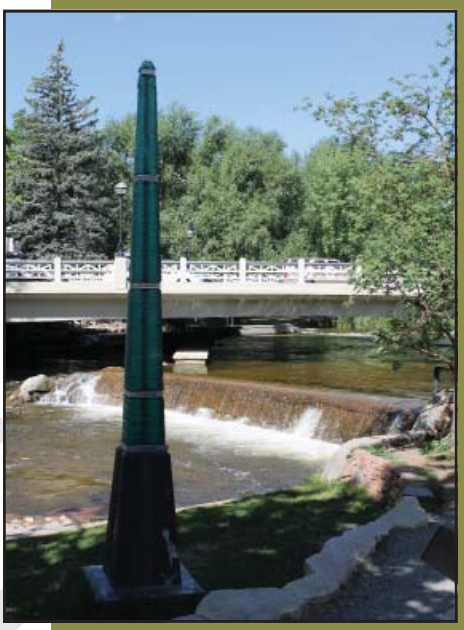
Life & Property Safety

The Boulder Civic Area is located within the 100-year floodplain, and much of the land lies within the High Hazard Zone (HHZ). The city will meet or exceed existing flood standards, including avoiding placing new structures and parking in the HHZ and will be proactive about planning for and educating about floods. Specifically, the city will:



Flood Regulations
Ensure any proposal meets or exceeds all current flood-related codes and regulations, which prohibit new development and substantial improvement to existing facilities in the HHZ;

Parking and Structures Relocation
Proactively develop a plan for removal of surface parking and structures that are in the HHZ and plan how to relocate facilities and uses after a flood;

Flood Safety Education
Educate the public and Civic Area and building users about safety and risks associated with flooding and natural and public values of water (e.g., through public art, landscape elements, and interpretive signage);

Landscape Plans
Create future landscape plans that enhance public safety and orientation of visitors to flood egress routes, while also enhancing the aesthetic or artistic character of the area; and

Critical Facilities
Ensure that any new facilities (e.g., residential, lodging, public assembly, emergency services, and critical government operations) will be in compliance with a potential Critical Facilities ordinance, if adopted.

Outdoor Culture & Nature

The Boulder Civic Area is a central place to enjoy the outdoors in the middle of the city. The linear "green" along Boulder Creek will be a unifying focus, providing natural beauty, ecological function, flood safety, recreational, art, and cultural opportunities. The city will:

Maintain/Expand Green
Maintain or expand the green, open space (no net loss), particularly in the High Hazard Flood Zone – as a blend of natural, restored creek, urban parks and playgrounds, and community gardens;

Cohesive Green Space
Create a unifying "linear green" theme and cohesive outdoor spaces – uniting the parks south of downtown as a significant asset to the city's overall park system;

Protect Significant Trees
Protect existing significant trees and shrubs (taking into consideration their anticipated lifespan) and maintain an ecologically healthy creek channel;

Public Art
Blend public art into outdoor spaces to attract, inspire, educate, and encourage exploration and play;

Boulder Creek
Allow safe access to Boulder Creek in locations that will not damage ecological value;

Views
Provide and maintain views and breathing room;

Farmer's Ditch
Improve the park-like quality and linear connections along the Farmers Ditch; and

Welcoming Space
Make outdoor spaces feel safe and welcoming (e.g., through lighting, seating, strategic landscape and design, programs and activity, and enforcement).

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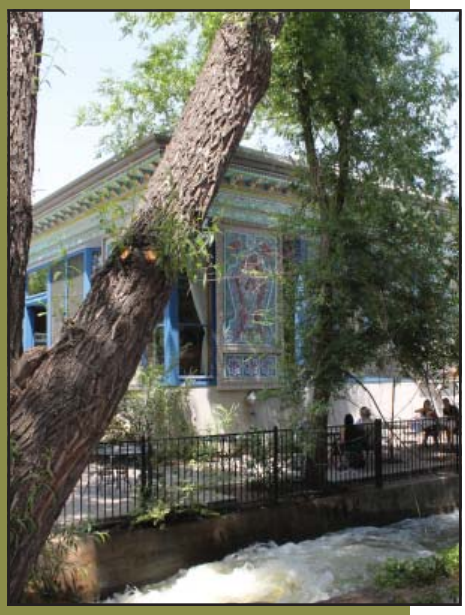
Celebration of History & Assets

The Boulder Civic Area has a historical focus and many long-standing functions and facilities highly valued by the community, such as the library, Sister City Plaza, Farmers' Market and teahouse. Existing community assets will continue to play a vital role in the area. The community will:



Farmers' Market
Continue and expand the Farmers' Market as a vital component of the area, source of community pride and economic benefit, and source for local and healthy food. Partner to expand the Farmers' Market extent and function as an outdoor market, and possibly expand it as a year-round (or extended season) local foods marketplace;

Local Food and Farms
Encourage sharing of information about local food and farms and regional relations (e.g., Farmers Ditch);

Inclusive History
Preserve, reflect and celebrate the area's fully inclusive history (e.g., indigenous populations, mining, the railroad, Olmsted's linear park and landmarked structures);

Historic Structures
Preserve historic structures in accordance with city policies and regulations;

Integration of History
Integrate history with arts, culture, local food, and any new structures or designs; and

Existing Assets
Ensure that existing assets contribute positively to the area and are vital and useful (e.g., address Bandshell use, access and delivery/noise; increase enjoyment of Sister City Plaza).

Enhanced Access & Connections

The Boulder Civic Area has well-used bicycle and pedestrian amenities and convenient transit connections, serving as both an important destination and connector. Travel and access to the area will continue to be improved. The city will:

Improvements
Continue to improve the pedestrian and bicycle experience and amenities;

Wayfinding
Continue to improve connections and wayfinding to/from downtown for those on foot or bike or using transit;

Parking
Explore replacement of surface lots with structured parking; d. Assess the parking needs for proposed new uses to address the carrying capacity for all modal access and potential for shared parking;

Boulder Creek Path
Address conflicts and connectivity along the Boulder Creek Path, which is a significant transportation route and recreational amenity (in and through the area);

Thoroughfares
Reduce the barrier-effect of major thoroughfares (e.g., Canyon Boulevard, Arapahoe Avenue and Broadway) and improve their aesthetic quality; and

13th Street
Explore feasibility of shared, closed, or events street(s) (e.g., 13th Street).

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Place for Community Activity & Arts

The Boulder Civic Area offers potential to expand civic services or cultural, arts, science, educational or entertainment amenities that are otherwise lacking in the community. Any new facilities will provide a high level of public benefit and will:

Architecture & Design
Increase the area's potential for great beauty and attention through artistically compelling architecture and site design;

Indoor & Outdoor Space
Elegantly blend indoor and outdoor spaces to encourage movement and gathering;

Mixed-Use
Provide a vibrant mix of uses and design to encourage activity and inclusiveness throughout daytime and evening hours and around the year; and

Harmonious with Downtown
Fit the area's overall public purpose and be harmonious with (but not a replication of) activity on Pearl Street and downtown.

Sustainable & Viable Future

All future uses and changes in the Boulder Civic Area's public properties will exemplify the community's sustainability values (i.e., economic, social and environmental) and will:

Partnerships
Rely on and encourage partnerships in which key roles, such as administrative, maintenance operations, financial and program services, are collaboratively but formally shared between the city and other entities;

Financial Analysis
Demonstrate consideration of sound financial analysis, including likely capital and ongoing operations and maintenance costs for public and private uses;

Community Benefits
Prove community and social benefit, increase inclusiveness, and minimize impact to like-uses, venues and nearby neighborhoods;

Environmental Considerations
Conserve energy, consider the use of renewable energy, minimize waste and carbon emissions, conserve water and improve water and air quality; and

Experiential
Provide educational and experiential components.

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Part 2:

The Plan for People and Place

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The plan graphics and drawings shown here are intended to illustrate the concepts and principles contained in the plan. They are not meant to prescribe the exact location, type or size of future buildings or amenities. The actual physical form of the area will evolve over 10 or more years and will likely be different from these illustrations.

The Civic Area's Future

Boulder's Civic Area will be a place for everyone—a lively and distinct destination that reflects our community's values, where people of all ages, abilities, backgrounds and incomes feel welcome to recreate, socialize, deliberate, learn and access city services. The green space and beauty along Boulder Creek will provide significant open space and parkland and will be the spine of a unifying design that weaves existing and new facilities with a rich diversity of civic, commercial, recreational, artistic, cultural and educational amenities and programs. The Civic Area also will continue to be the service center for Boulder municipal government and a new center for innovation, where community members, officials, and partners can meet, interact, and deliberate, and innovate. All together, these elements create a true civic heart for the Boulder community.

CIVIC HEART

City services embody the civic nature of the area and will continue to be housed within the Civic Area or nearby. New community meeting space and gathering places will engender even more civic involvement.

CANYON BOULEVARD

Canyon Boulevard will be transformed into a true boulevard, with enhanced biking and walking environments and more attractive landscaping.

FARMER'S DITCH

Farmer's Ditch provides a linear water amenity to walk, bike and relax along and continues into the Goss/Grove neighborhood.

BOULDER LIBRARY

The Boulder Public Library is a popular community asset that contributes to the vitality of the area. It is and will continue to be accessible and welcominges a diverse population of all ages, incomes, ethnicities and interests.

FARMERS' MARKET

The tradition and exuberance of the outdoor Farmers' Market along 13th Street will be maintained and expanded to keep pace with the market's popularity. It will be supplemented by a new public market hall, a year-round venue for local food and goods.

PLACE FOR ARTS

Additional outdoor art – sculpture, plazas and gathering spaces – will complement existing art to bring more beauty and interest to the area.

LIFE SAFETY

Life and property safety will be improved by removing existing buildings (New Britain and Park Central) and surface parking from the High Hazard Flood Zone (HHZ). The underlying land will be developed as park space.

BOULDER CREEK

Boulder Creek will remain a unifying focal feature for Civic Park and the entire area. It will continue to be a natural corridor with trees and creekside vegetation, interspersed with access points to the water.

PARK

Civic Park and Central Park are downtown's most expansive public open spaces and provide ample room to gather, recreate and enjoy being outdoors in the middle of the city.

RICH HISTORY

Designated and eligible landmarks – the Municipal Building, the City Moving and Storage Building (BMoCA), the Teahouse and the Bandshell – enrich the area and reflect its history.

Program Elements

A Park at the Core

The Idea: The green space and beauty along Boulder Creek will provide significant natural and programmed park spaces and will be the spine of a unifying design theme that weaves existing and potential new parks facilities. The park will be active and safe, with a rich diversity of civic, recreational, artistic and cultural amenities and programs, creating a true civic heart for the Boulder community. The four major focus areas are:

- ***The Creek*:** Boulder Creek will continue to be a focal point and unifying element running through the park. The creek will be enhanced by creating opportunities for access, designing viewpoints along the side, maintaining the riparian planting, and varying the shoreline treatment with vegetation in some areas and terraced rock shores in others.
- ***The Civic Front Door*:** Civic Park north of the creek will remain a open, sunny space, with today's Great Lawn for gathering and unstructured sport, but also newly activated with outdoor dining, musical and dance performances, yoga and exercise classes, and other events, such as "Picnic in the Park." Seating for a new library café will spill out onto adjacent terraces. Food trucks and carts will add culinary diversity, while folks enjoy live music and games, like ping-pong and chess, and browse demonstration gardens and sculpture displays.
- ***Nature in the City*:** Civic Park south of the creek will be a soft, naturalistic, shady refuge that relates to the library and Boulder Creek will be designed with children and families in mind. Features may include a nature play tot lot, a children's reading garden, a water play sculpture, intimate picnic and seating areas among shade trees and along the creek, and themed gardens, such as edible, shade or xeric/low water.
- ***Central Park*:** Central Park currently accommodates the historic bandshell and several majestic State Champion trees, and also provides grassy seating for the Farmers' Market. Bandshell programming will be intensified, with, for example, summer youth drama camp, open mic night and puppet theater. The Farmers' Market will expand into the park, with additional vendor and/or performer space and new paving and picnic tables. The bandshell may be relocated later to improve its functionality and accommodate enhancements along Canyon Boulevard. In its place could be a new park pavilion, such as a horticultural conservatory, or year-round market hall.

Concept for central park and water feature

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Farmers' Market

The Idea: The Farmers' Market will continue to operate on 13th Street and expand to the west and into the plaza, improve access and function, and possibly extend days or hours of operation.

In 2012, the Farmers' Market celebrated 25 years of operation, and it is one of the most notable draws in the Civic Area. It operates on 13th Street on Wednesday afternoons and Saturday mornings from April to October. The locally grown fresh produce fits Boulder's values for healthy living, eating fresh, and supporting local businesses and farmers.

The city has invested in improvements along 13th Street to provide better space for the market stalls. The Farmers' Market, working with the city, is exploring how to better provide drop-off/pick-up access for customers and easier access for vendors and closer and more accessible parking and what type of market model is most appropriate for its future It is also exploring how a year-round "public market hall" would complement its mission to provide a marketplace for local and Colorado agriculture producers.

Food Hall

Reading Market Hall

The Idea: The public market hall, or food hall, will supplement (not replace) the outdoor seasonal market on 13th Street – either on 13th Street block or adjacent, subject to further coordination with the Farmers' Market and analysis. It could be a new vertically mixed-use structure or repurposed Atrium building.

A public market hall would provide a year-round venue for local food and other locally produced goods and provide additional space for the Farmers' Market to expand during the peak season. A new building would be in the 13th/14th Street block or expanded into Central Park. On 13th Street, it will ideally be mixed vertically with other uses. A new building could be designed for specific market needs. If the market hall were to be located in the Atrium building, city offices would have to be relocated, and the functionality of the market would be limited by the building configuration and size. Other considerations include Farmers' Market analysis; cost; prospective tenant interest; usability on non-market days; suitability of adjunct uses; synergy with adjacent uses; and access and parking.

Mixed-Use Community Services/Innovation Center and Events

The idea: Create a mixed-use community services/innovation and events center (one or several buildings on the 13th/14th Street block) as a space for public, private collaboration, gathering, and celebration through events. Buildings will integrate well with outdoor plazas, theatre, etc. and exemplify the community's sustainability values. The building may accommodate replacement of city functions removed from the HHZ, other city functions, and/or other community needs.

To optimize day/night uses, any new building should be part of a mix of uses, including possibly a vertical mix with the public market hall, other small restaurants or cafes, community event space, and plazas and outdoor spaces. More than 25,000 customers are served each year in seven city buildings in

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the Civic Area (excluding the Library and Senior Center), and multiple events and meetings occur. A center with private incubator space could accommodate multiple community needs.

Ferry Building vertical mixed uses

West Senior Center

The Idea: Continue to explore creation of a 21st Century Senior Center consistent with best practices and modes providing a wider range of services for older adults to recreate, socialize, and learn. Explore co-location of the center with other services, activities, and amenities–either in its current location (redeveloping existing center) or elsewhere outside the Civic Area close to other human services.

The West Senior Center, west of the library and south of Boulder Creek was built in 1974 and is 16,200 square feet. It serves 56,400 customers a year, including Meals on Wheels and offers many other senior programs. The Human Services Division soon will do a plan to explore the senior center's future, consistent with 21st Century best practices and models. Often, newer centers are co-located with other services (such as children, youth, and family) to be convenient for customers and providers. Additionally, they provide both dedicated space for senior adults and flexible, intergenerational community space such as classrooms. They are also often paired with offices, arts and culture, and recreation facilities.

Bandshell

The Idea: Explore feasibility of relocating the bandshell within the Civic Area or outside to a location that allows increased usefulness as an outdoor theater. In the near term, maintain the bandshell and increase its programming for performances.

The Glen Huntington Bandshell, built in 1938, is a local historic landmark and protected under the city's Historic Preservation Ordinance. It is architecturally significant as an example of Art Deco architecture in Boulder and has been a visual landmark for over 75 years. Today, it faces challenges, including limited programming, worn appearance, uncomfortable seating, frequent transient occupation, and traffic noise and access challenges for performances, and the context has changed significantly from the 1930s. The north end of the bandshell is within the Canyon Boulevard future right-of-way, which could pose a problem for creating a "complete street."

Public input has been mixed about whether the bandshell could remain in Central park and see increased performance programming, rehabilitation, and improved function or be relocated. The city generally discourages relocation of historic resources and Landmarks Board approval would be required for relocation. Additional analysis is needed on the feasibility and implications of moving the bandshell.

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Performing Arts Center

The Idea: Continue to explore feasibility of a performing arts center—either as an addition to or redevelopment of the north wing of the Main Library or on 13th Street as part of a mixed-use complex. A facility may generate excitement and should reflect emerging trends in arts facility programming and usage. But it would also need to be sited such as its size, impacts on downtown and other venues, and operating costs would meet the intent of the Guiding Principles and performance criteria of this Plan.

Place for performances, meetings, etc. (NAIOP)

A nonprofit group, The Boulder Center for the Performing Arts, is promoting the idea and is conducting a feasibility study for a performing arts center. The group has expressed preference for a mid-sized performing arts center (800-1,200 fixed seats) that would be built through a private/public partnership on city-owned land. Various community groups and the Arts Commission have questioned demand for a larger facility but have noted possible community interest for a smaller performance venue (approx 500 seats). Furthermore, a flexible space venue, rather than fixed seat auditorium, is of interest to many in boulder. A larger facility with a sizable footprint may create an inactive zone downtown when it is not in use.

Arts/Culture/Science

The idea: Continue to explore a blend of indoor and outdoor facilities and spaces as an integral and important component of new programs for the Civic Area, including:

- Programming parks for permanent and temporary art installations or as outdoor cultural, arts, and science displays;
- Designing the Civic Use Pad to house art/cultural and/or community event facilities;
- Housing the Boulder Museum of Contemporary Art (BMoCA) either at a new facility at the Civic Use Pad, in a re-purposed municipal building, or as an expansion of its existing space. The landmarked building where it is currently located will be preserved.
- Possible repurposing of the Municipal Building
- (if city facilities are consolidated in new building(s)) for art, cultural related uses; and
- New facilities as an addition to (or as a redevelopment of) the north wing of the library.

Energy Garden – Outdoor science, Miami Science Museum

The community wants new arts, culture, and science in the Civic Area and has expressed interest for community events venue for meetings, banquets, reception dinners, charitable events, etc. BMoCA is exploring expansion of its facility, either at its current location on 13th Street or moving to a new facility within the Civic Area. Additionally, outdoor arts and science are ideas that resonate with the community.

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Structured Parking

The idea: Relocate most surface parking in the Civic Area to wrapped parking on the west and east ends. Some handicapped spaces and spaces for seniors may remain near building entrances; however most parking would be in structures designed for appropriate number of spaces (to be determined through further analysis), to be convenient and attractive, and include a mix of uses on the outside of the structure, as with other downtown parking.

Ways to Approach Future Partnerships and Social Networks

Integrated Spaces

In all programming or built spaces, ensure there are options for people of all incomes and abilities to use the space or participate in events together.

Maintenance and Operations

Develop on-going community-oriented maintenance activities for the Civic Area. Develop regular ways to involve community members in clean-up and maintenance, to build civic pride and cooperation. Engender a different way of thinking about this area throughout the community. For example, have an on-going clean up paid program for low-income or homeless residents, possibly sponsored by business community, and also structure regular times for full community projects.

Cooperation

Cooperate with non-profit and service organizations in public buildings and spaces. As spaces are redeveloped or reprogrammed enable ways to create space for service provision even if it is not a direct city-provided service.

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Just imagine what it could become

Park at the Core: Improving It

Over half of the 27 acres – and the heart -- of the Civic Area is Civic and Central parks with Boulder Creek flowing through, a green spine that unifies spaces and provides natural beauty, ecological richness, shade, recreation, art and places to gather. Park amenities and activities, such as kiosks, food and seating, lighting, and cohesive signage will be added throughout for a consistent look and feel, and green space will expand through the relocation of parking and structures from the High Hazard Zone (HHZ) to other places. Adjacent buildings will create "eyes on the park" and make the area feel more inclusive, safe and family-friendly.

CENTRAL PARK

Music – Performances – Market:
Central Park currently accommodates the historic bandshell and several majestic State Champion trees, and also provides grassy seating for the Farmers' Market. Bandshell programming will be intensified, with, for example, summer youth drama camp, open mic night and puppet theater. The Farmers' Market will expand into the park, with additional vendor and/or performer space and new paving and picnic tables. The bandshell may be relocated later to improve its functionality and accommodate enhancements along Canyon Boulevard. In its place could be a new park pavilion, such as a horticultural conservatory, or year-round market hall.

CIVIC FRONT DOOR

Eat – Relax – Gather:
Civic Park north of the creek will remain a open, sunny space, with today's Great Lawn for gathering and unstructured sport, but also newly activated with outdoor dining, musical and dance performances, yoga and exercise classes, and other events, such as "Picnic in the Park." Seating for a new library café will spill out onto adjacent terraces. Food trucks and carts will add culinary diversity, while folks enjoy live music and games, like ping-pong and chess, and browse demonstration gardens and sculpture displays.

THE CREEK

Splash – Contemplate – Float:
Boulder Creek will continue to be a focal point and unifying element running through the park. The creek will be enhanced by creating opportunities for access, designing viewpoints along the side, maintaining the riparian planting, and varying the shoreline treatment with vegetation in some areas and terraced rock shores in others.

NATURE IN THE CITY

Nature – Play – Water:
Civic Park south of the creek will be a soft, naturalistic, shady refuge that relates to the library and Boulder Creek will be designed with children and families in mind. Features may include a nature play tot lot, a children's reading garden, a water play sculpture, intimate picnic and seating areas among shade trees and along the creek, and themed gardens, such as edible, shade or xeric/low water.

New RM Sketch Coming Soon...

Just imagine what people will be doing

Park at the Core: Activating It

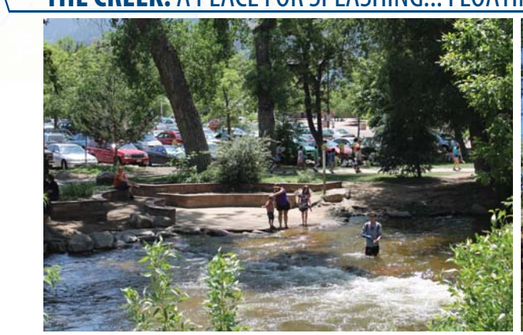
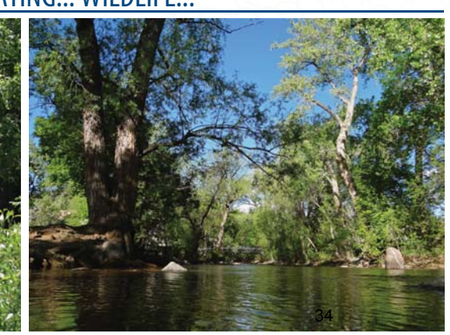
The Civic Area is bustling with activity as you go for a bike ride along the creek path. Children are splashing in the water and climbing on rocks as parents relax and watch nearby. Cycling on, you see a ballet performance with a captivated audience sprawled across a grassy slope. You see a small yoga class in an intimate space learning a new pose and a small group of people nestled in the vegetation by the creek simply enjoying the nature. People are sitting and laughing in a café and soaking up the sun.

CENTRAL PARK: A PLACE FOR MUSIC... PERFORMANCES... THE MARKET...

CIVIC FRONT DOOR: A PLACE FOR EATING... RELAXING... VIEWING ART...

NATURE IN THE CITY: A PLACE FOR EXPLORING... OBSERVING... PLAYING...

THE CREEK: A PLACE FOR SPLASHING... FLOATING... WILDLIFE...

Park Performance Criteria

The overall land use vision for the Civic Area is for a vibrant mix of civic, retail, residential and cultural land uses organized around a public park. This Performance Criteria establishes program and design standards for new land uses and parks within the Civic Area, and serves as the initial filter for decisions on preferred mix of uses, their locations and is a precursor to more detailed design standards. The sections that follow provide an overview of the key design and performance concepts related to land use, buildings, streets, parks and plazas that will guide program choices and site planning.

The green space and beauty along Boulder Creek will provide significant open space and park spaces and will be the spine of a unifying design theme that weaves existing and potential new facilities with a rich diversity of civic, recreational, artistic and cultural amenities and programs, creating a true civic heart for the Boulder community.

Generally, large open spaces should be spatially defined into smaller, more easily identifiable and relatable areas. People commonly gather at articulated edges in or around a plaza. A distinct sense of place can be achieved by defining edges and establishing a sense of enclosure through the use of canopies, trees, shrub plantings, arcades, and trellises, which must be balanced with visibility and defensibility. For plazas, small parks, and portions of larger parks, peripheral uses that generate activity, such as eating and drinking outlets, small retail, and music performances are particularly important to the park's attractiveness and liveliness.

Access and Green Streets

The Boulder Civic Area has well-used bicycle and pedestrian amenities and convenient transit connections, serving as both an important destination and connector. Travel and access to the area will continue to be improved with enhanced pedestrian and bike as well as limited vehicular access.

- Traffic calming features and pedestrian-oriented streetscape amenities for all streets surrounding and intersecting the park, including: Canyon Street, Arapahoe Avenue, 9th Street, Broadway and 11th, 13th, 14th and 15th Streets.
- Pedestrian access across Canyon Boulevard should be improved at key crossing points.
- Establish a hierarchy of types of paths that includes: commuter biking paths, children's biking paths, soft (unpaved) walking paths and health paths (perhaps incorporating stone inlays or other interactive art).
- Pathways should provide safe, protected pedestrian links from the park to adjacent uses, such as transit stops and the breezeway to the downtown core.
- Pathways should consider those park users who may wish to meander through or around the park as well as those who wish to move efficiently from point to point.

Plaza Size

Urban plazas will generally have a "human scale" if they are less than 60 feet across. Avoid large, unarticulated areas, except for those intended for public gathering.

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Art Park

Encourage visual and performance arts by integrating art and opportunities for art to take place throughout the park. Visual art may include earthworks, temporary or permanent sculptures, lighting installations, murals, etc. Visual art may also be incorporated into park fixtures and furnishings such as park signage, gateway markers, pedestrian light posts, banners brackets, pavement, seating, tree grates and guards, bike corrals, etc. Performance art spaces may include multiple performance venues of different types, including a stage with an amphitheatre as well as open plazas.

Food and Entertainment

Incorporate access to a variety of existing and new food establishments and vendors in the park, including permanent and temporary seasonal outdoor and indoor facilities. Recognize the community values of existing food establishments such as the Dushanbe Tea House, the Boulder Farmers' Market, and Mustard's Last Stand, and provide opportunities for enhancing their social and economic viability in the area. When Park Central Building is relocated from the High Hazard Area, consider opportunities for Mustard's to continue to be part of the future development of the Civic Area.

- Provide café seating opportunities with flexible furniture, including permanent, fixed picnic seating at appropriate locations.
- Expand outdoor seating and café opportunities at the North Library garden, including outdoor access to the library café.
- Provide opportunities for an ice cream cone vendor and food trucks.

Views and Viewpoints

Design park and site to take advantage of views to mountains, the creek and other amenities. Use vegetation and path orientation to frame and direct views. Incorporate park edge vegetation to screen views of surrounding roadways and parking, to create a sense of place and enclosure. Plan for views into the park from access points.

Noise

Mitigate and detract attention from traffic and other ambient noise, in strategic locations for performance spaces as well quiet contemplative places, by using elements such as fountains, waterfalls and vegetation.

Public Amenities

- Provide site furniture and amenities, such as waste receptacles, bicycle racks, drinking fountains, game tables, kiosks, children's play equipment and artwork at key locations within the park.
- Provide restrooms that are accessible from outdoors within existing buildings, such as the library, and in future new buildings.
- Wayfinding elements, such as signage, lighting, entry gateways and pavement treatment, should be designed to provide a unified look to the park.

Build Green

- Exceed minimum energy performance and take advantage of renewable resources.
- Conserve water for landscaping.
- Mitigate urban heat island and stormwater runoff.

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Services Extending the Range of Uses

At plazas and performance spaces, provide secure electrical outlets, water spigots, restrooms, and other services that will encourage a greater range of uses.

Safety and Security (CPTED)

Crime Prevention through Environmental Design (CPTED) refers to a group of strategies intended to reduce the fear of crime and the opportunities to commit crime.

I. **Natural Surveillance**
This type of "passive surveillance" occurs when areas of the park are open to view by the public and neighbors and is a major crime deterrent. Maximize the number of "eyes on the park." Ensure that an officer driving by or through the park can see the facilities that might be targeted by offenders. Orient restrooms, shelters, and other structures so that they are easily visible from the roadways and parking areas.

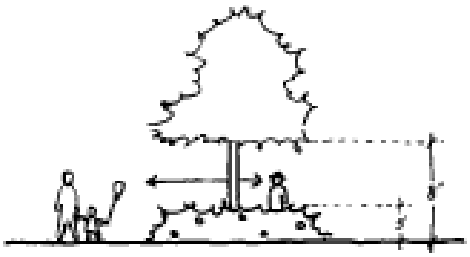
II. **Defensible Space**
Design parks so that potential perpetrators cannot lurk or commit a crime and then flee via a convenient escape route.

III. **Lighting**
Lighting along pathways, plazas, entrances, parking structures, play areas, etc., should reflect the intended hours of operation and level of activity, and should not create glare and deep shadows.

IV. **Windows**
Encourage windows and adjacent uses that look out onto parks and provide good natural surveillance to discourage criminal activity.

V. **Landscaping**
Landscaping that is open and allows visibility and natural surveillance and doesn't allow places to hide. Hedges should be no higher than 3 feet and tree canopies should start no lower than 8 feet. This is especially important around entryways and windows.

VI. **Territoriality**
Visual cues show that the community "owns" its parks. Good maintenance and seasonal displays send a clear message that people care and won't tolerate crime in the area.



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Access and Mobility

Access and mobility are important to the vitality of the Civic Area. People using all transportation modes - whether on foot, bicycle, bus or car - need to be able to get around easily. People also need to be able to connect to surrounding destinations safely and conveniently. The Civic Area and Downtown already have well-used multi-modal amenities and connections including the 13th Street contra-flow bike lanes, local and regional transit services and the Transit Center, bike parking, Boulder Creek Path, Pearl Street Mall, and a parking district (CAGID). However, improvements throughout the area could still be made.

13TH STREET

13th Street could be kept as is which is open to vehicular traffic except during the Farmers' Market or could be transformed into an urban plaza with bike access and a stronger connection to Pearl Street Mall.

14TH STREET

14th Street could be kept as is, converted to transit-only while maintaining bike and pedestrian access or could be converted to a transit and general use street.

GOSS/GROVE ACCESS

Create an east-west bike/pedestrian corridor through the Goss/Grove neighborhood starting at 14th Street and continuing to 17th Street.

CANYON BOULEVARD

Canyon Boulevard will be enhanced from 9th to 17th Street to become a complete street, incorporating dedicated bike lanes, safe pedestrian environments and more street trees and landscaping while still accommodating cars and buses.

PUBLIC TRANSIT

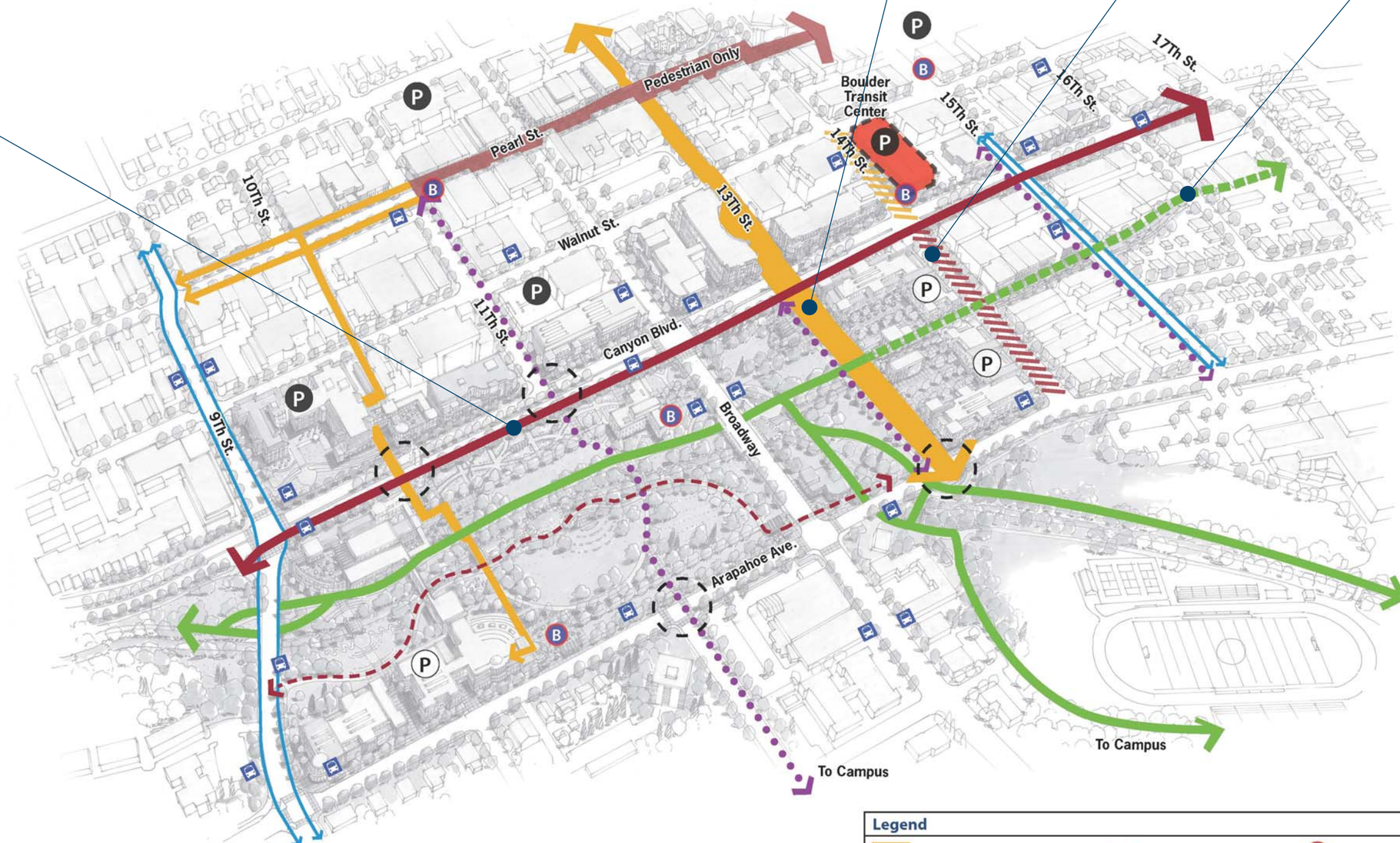
Continue to enable local and regional public transportation services including the HOP, SKIP, BX and AB in the Civic Area to accommodate accessibility for downtown park users.

BICYCLE / PEDESTRIAN

Maintain and expand current bicycle and pedestrian pathways to facilitate better circulation as well as connections to nearby areas including Pearl Steet Mall, Goss/Grove, CU and University Hill.

PARKING

Overtime, the surface parking will be removed to improve life safety and to open up more parkland; however, these spaces will be replaced with CAGID parking structures on either or both the west and east end of the Civic Area.



Legend

- Major Ped/Bike Connection
- New Ped/Bike Connection - Canyon Blvd.
- Ped/Bike Connection
- Boulder Creek Trail - Ped/Bike
- New Ped/Bike Connection - Goss/Grove Access
- Internal East/West Connection
- Bike Lane
- Existing Parking Structure
- Future Parking Structure
- Enhanced Ped Crossing
- B-Cycle Station
- Transit Station and/or Stop
- Boulder Transit Center
- Transit Corridor
- Potential Transit Corridor

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The East End: A place to deliberate, enjoy art, gather, eat, shop, and innovate

Picture This! *It is 2025, and you are sitting on a rooftop patio, sipping a cool drink, overlooking a plaza abuzz with farmers' market. People are spilling in and out of the market hall with their local food purchases. A business person walks by, having just completed her meeting at the service center; she's on her way to the transit center. A local entrepreneur rides away from a discussion about a new program from the bicycle parking facility while people arrive for a music performance in the events center that will bring in people from around Boulder. Outside, the theater brings in families with picnic blankets to enjoy a movie. Earlier that day, a group of volunteers cleaned up the creek, sponsored by the business community that provided a lunchtime meal in exchange for work. In the evening, five and six year olds are playing in the plaza fountain, their parents watching over are enjoying wine and cheese from the food market hall, while boos and cheers are uttered from the packed audience upstairs in the Council Chambers where a ballot measure is being debated by City Council.*

Possible Program Elements

- **Farmers' Market:** The market will expand on 13th Street with a Saturday market fulfilling the market's original mission as a local Colorado agricultural producers market where people can shop for produce and a Sunday festival market with fresh and prepared foods and local arts and crafts.
- **Market Hall:** A small 10,000 square foot public market hall with specialty vendors and artisans selling local foods and products will be a hub of activity. The market hall could be on 13th Street or in Central Park.
- **Service/Innovation Center:** Day and evenings, during the week, Boulder residents, business owners, and government officials gather, deliberate, conduct business, and work with partnering non-profit organizations in a mixed-use facility for creative innovation.
- **Events:** An events center offers opportunity for non-profits, businesses, and community members to convene. On the weekend and evenings, the center is a place for weddings, receptions and parties, and performances and art shows.
- **Performing Arts:** A performing arts center offers opportunities for music and theater.
- **Night time uses:** Residential or hotel.
- **Structured Parking:** For the market and other uses on the site.
- **Outdoor space and parks:** (See the park plan.)

For Continued Consideration...

The block will include the existing farmers' market (expanded), Teahouse, storage and transit building (BMoCA), a 10,000-15,000 square foot market hall, and structured parking. With futher analysis, any of the above possible program elements could also occur here, provided they meet the design guidelines and criteria. Some possible options may include:

A: MIXED-USE (FOOD AND CULTURE)

Includes a mid-sized (up to 1,200 seats) performing arts center, some private offices (up to 100,000 sf), and small unit residential or hotel (up to 200 keys). The market hall could be located in Central Park.

B: MIXED-USE (FOOD, EVENTS, AND SERVICE)

Includes a smaller events center (up to 500 seats)/flexible performance space service center. The service center would include public and private offices and city hall functions (up to 110,000 sf), and community meeting space. This would be above the market hall that includes local food and cafes, etc.

The West End: A place to learn, play, create, and relax

Picture This! *The year is 2025, and you are visiting Boulder's main library to do research and check out e-books for your upcoming international trip. You peruse the collection, enjoying a coffee at the library café, and stroll through the park to the former Municipal Building to meet your daughter and grandchild to create a new painting. Afterward, you'll visit the creekside play area near the library to watch the children climb the rocks, splash in the water, and feed the ducks and to watch people stroll along the park promenade.*

Possible Program Elements

- **Boulder's Main Library (existing):** The new south wing of the library will remain in its current location with functions. The north library may remain or redevelop to accommodate more arts and cultural facilities.
- **Multi-purpose Senior Center (redeveloped):** The Senior Center either will be redeveloped or relocated as a multi-generational facility offering more services for seniors and others and tied with arts and recreation.
- **Café:** At library and kiosks in the park.
- **Municipal Building (existing):** The 24,000 square foot building remains.
- **Arts and Performance Space:** Includes a smaller performing arts facility (less than 800 seats) on the site of the north library wing – either as redeveloped space or renovation.
- **Civic Use Pad:** Includes multi-use facility for events (10,000 square feet) and upper level hotel rooms.
- **Night time uses:** Residential.
- **Structured Parking:** For the library and park (replacing surface parking lots) and other uses on the site.
- **Outdoor space and parks:** (See the park plan.)

For Continued Consideration...

The West End will include the existing south wing of the library as it is today. With further analysis, any of the above possible program elements could also occur here, provided they meet the design guidelines and criteria. Some possible options may include:

A: CITY SERVICES AND LIBRARY

Includes north library much as it is today and the Municipal Building continuing to operate as city hall. The Senior Center site may redevelop as municipal services (with Senior Center relocating downtown) or redevelop onsite as a multi-purpose senior center facility.

B: ARTS AND CULTURE FOCUS

Includes redeveloped north library site to accommodate a small performing arts facility and museum, and repurposed Municipal Building as a hands-on arts center. The Senior Center is redeveloped as a multi-purpose facility, possibly including some housing.

East/West Performance Criteria

EAST END (13th/14th Street Block)

The East End is envisioned as a mixed-use block that incorporates a variety of uses in existing buildings and future new developments. A vibrant mix of land uses in which civic functions could be integrated with private uses such as a center for innovation, incubator offices, residential/hotel and commercial uses, are desired for this area. The area's proximity and link to the Pearl Street Mall via 13th Street, as well as access to transit services make this block specifically conducive to maximizing synergy with existing public and private amenities. As the site with most potential for new developments, special attention is required for a careful mix of uses and their design in order to achieve the Civic Area plan objectives. Since all desired uses may not fit within the block, all efforts should be made to make sure there is a balance in the type, mix, and scale of uses to achieve the desired performance. The following performance objectives will guide program choices and site planning.

Performance Related to Specific Land Uses

- *Service Center Performance:* Develop civic uses such as municipal services as part of a mixed-use development vertically and/or horizontally integrated to other uses to encourage innovation and creative collaboration. Day and evenings, during the week, Boulder residents, business owners and government officials gather to meet and deliberate over local choices and policies, and conduct business and work with partnering non-profit organizations.
- *Events/Performing Arts:* If a performing arts center is included, consider flexibility to include events and meeting space (e.g., for non-profits and businesses). On the weekend and evenings, the center could be a place for weddings, receptions and parties, and performances and art shows. A center should not be unused during the day or multiple nights of the week.
- *Day and Night time uses:* Integrate uses that generate 24-hour activities such as residential or hotel.
- *Pubic Plaza* - Develop an urban plaza space to serve as an organizing feature within the site and to provide a variety of public and outdoor functions as a complement to the more "green" park spaces to the west.
- ***Structured Parking:* Provide appropriate amount of parking, balanced with area wide TDM, to provide adequate and convenient access to existing and future uses. Located structures above grade or below grade, and wrapped with active uses to avoid visibility and degradation of the pedestrian environment. Structure should be well lit easy to navigate in the interior.

If new structures are proposed with below grade parking, the hydrologic impacts on the creek and riparian areas should be carefully considered.

Building Forms and Massing

- Building heights generally range from two to four stories in general. Along Canyon, provide up to 4 stories to help create a more urban character along this wide public right of way, while buildings closer to Arapahoe should help transition to a relatively lower height.
- At the ground level, buildings should have permeability and transparency with visual and physical connections to indoor/outdoor views and public spaces
- At least 60% of the ground floor area should be visually transparent along all major public streets and plazas, including Canyon Boulevard, Arapahoe Ave., 13th and 14th Streets as well as the public plaza.

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- Use high quality, durable materials which enhance the building and convey a sense of permanence.
- Employ sustainable green building standards.
- To extent possible, include active market hall and food-related uses along Canyon Boulevard, 13th and 14th Streets, and facing new plazas.
- Consider the effect of building height on shading and views.
- Building orientation should enhance the opportunity for views of the Flatirons, including opportunities for publicly accessible roof-tops.
- Building entrances should be clear, direct, and welcoming and orient to public areas – streets, plazas, and parks

Don't do this,

or this,

or this,

Do this instead,

or this

WEST END (Library & Senior Center Block)

The West End is envisioned as a cultural/arts core within the Civic area that builds on the existing civic and cultural functions including the Main Boulder Library and the West Senior Center. Building on this site provides opportunity to enhance both the indoor and outdoor functions of the existing amenities, as well as redevelopment and/or new development opportunities. North of the Creek, the north wing of the library has a potential for redevelopment as a state-of-the art facility for performing arts, taking advantage of its location with the expansive view of the Flatirons to the west and hotel and downtown amenities directly across Canyon Boulevard. The consideration of the Civic Use Pad for a mix of public and private uses provides a potential synergetic relationship of land uses throughout the West End. In addition, a potential repurposed Municipal Building to the east, and the park in-between, provide further opportunity to create a unique and vibrant mix of outdoor/indoor uses primarily focused on arts and cultural uses.

(Performance Criteria for the West End to be added)

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Part 3:

Implementation and Phasing

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Draft Implementation Strategies and Phasing

What might it take to accomplish the plan for the Civic Area?
The following strategies will help accomplish the visionary plan.

1—Phasing/Prioritization "Roadmap." Identify key steps and phasing necessary to sequentially and systematically work toward the vision in the near-term and over time. (See phasing table and graphics that follow for initial prioritization and phasing.)

2—Coordination/Partnerships. Designate a staff coordinator and other staff within the city to work across city departments and with community partners to carry out the plan (e.g., nonprofit organizations, such as the Farmers' Market and BMoCA, private land owners and developers, and others, such as the Ocean Coalition and Bridge House).

3—Detailed Planning and Design. Develop detailed site plans for certain parts of the Civic Area (e.g., master plan for the core park, for the East and West end blocks and for the future Canyon Boulevard). Further engage the community and boards and commissions to review and give feedback ondetailed plans. Develop cost estimates for infrastructure and improvements.

4—Investment Strategy. Identify a comprehensive portfolio of financing tools and development structures to pay for capital improvements through phases and identify ongoing operations and maintenance funds. The financial and investment strategy could include any combination of:

- public financing through voter-approved bonds or sales tax
- private financing
- districts such as general improvement districts, metropolitan districts and others
- endowments
- certificates of participation (COPs)
- general fund and Capital Improvement Program (CIP) alignment of priorities
- public improvements fees
- state and federal grants leveraged (e.g., state Great Outdoors Colorado funds for parks and open space, or National Endowment for the Arts)
- urban renewal financing
- crowd source funding

The proposed land uses and ownership (e.g., private or public) to some degree determine what kind of financing strategies (financing tools and organizational structures) might be applicable. A mix of uses will take a mix of strategies. For example some options may be:

- Arts/Culture/Parks: private/public shared financing, supplemented with grants
- City facilities: public financing supplemented with private funds

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- Offices or retail: private/public partnership, city lease or sale
- Parking Structure: Central Area General Improvement District (CAGID) and user fees
- Housing: private, public-private partnership, possible trust, lease/sale by city

5—Land Use Code Update. If the Land Use Code is inconsistent with the desired plan, update standards as necessary to incentivize or limit certain types of development.

6—Programs. Work with or identify partners to collaborate on existing or expand new programs (e.g., programming for activity in the area, expansion of flood education, or work programs for homeless).

7—Construction. Following detailed site planning and engineering, construct infrastructure, street improvements, art, informational pieces, park improvements or structures, and buildings.

Phasing Plan to implement the Civic Area Plan:

The tables on the pages that follow identify the likely phasing and timing to implement the plan. This phasing plan is preliminary and depends on approval of a coordinator position for the project and availability of funding sources (public, private and other) over coming years:

- Phase 1 (2013 - 2014)
- Phase 2 (2014 - 2019); and
- Phase 3 (2019 and beyond)

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Civic Area Phasing Plan

Phase 1 (2013-2014)

Timing (beginning)	Category / Key Words	Strategy	Responsibility
PLANNING AND COORDINATION			
ongoing	**Safety**	• Enforcement on parks grounds, around municipal building, and library	Parks and Police
	Flood Safety	• Continually improve flood education and evacuation plans for New Britain and Park Central buildings and parking areas	Public Works / Utilities
	Food	• Continue food truck pilot and allow existing food vendors to continue operations	City Manager's Office (CMO), Parks
2013 Q4	**Arts and Culture**	• Review privately funded feasibility analysis for a performing arts center; determining the financial and operational needs for a self-sustaining entity and appropriate size and location; do additional analysis as needed.	Private non-profit (BCPA), Arts and Library
2014 Q1	**Coordina-tion**	• Designate Civic Area implementation Coordinator to plan for later phases (2 and 3) and oversee improvements • Finalize land use programs • Explore land purchase, land swap, and assemblage options (city owned/private land) • Identify utility needs and potential costs	CMO, planning team, utilities, FAM, coordinator
	Park	• Develop detailed park plan for Phase 2	Parks
	Finance	• Develop comprehensive investment strategy including potential financing tools and organizational structures; align with CIP and begin to estimate costs for Phase 2 and identify strategies	Planning team, finance, CMO
	Access and Mobility	• Start feasibility plan for phasing parking and travel demand management programs, including city offices. Integrate with existing parking district.	Transportation, DUHMD, FAM,
IMPROVEMENTS			
2013 Q4	**Farmers' Market**	• Conduct environmental mitigation for 13th Street Plaza (December 2013 to April 2014)	Facilities Asset Management (FAM) with Parks Design
2014	**Park**	• Build children's play and nature exploration in park, south of Boulder Creek • Make safety improvements, such as lighting and landscape shrub clearing near buildings	Parks
	Library / Food	• Reinstate library café on bridge with adjacent outdoor seating area in the courtyard (coordinate with the north library plaza and flood proofing identified below) • Rebuild Main Library North Plaza • Complete south library play and reading areas	Library, Parks, FAM
	Flood safety	• Build library flood protection	FAM

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Phase 2: (2014 - 2019)

Category / Key Words	Strategy	Responsibility (General)*
PLANNING AND COORDINATION		
Finance	• Develop comprehensive investment strategy for Phase 3 and align with CIP • Coordinate with private land owners; demonstrate alternative ways for redevelopment and explore potential for land swaps • Identify possible partnerships • Identify next round of catalytic projects for Civic Area	Finance, Civic Area Coordinator*, non-profits, businesses, private landowners, etc.
Parks, Arts	• Prepare detailed park site planning for Phase 3, landscape plan for shrub removal, and Boulder Creek restoration plan, public arts plan • Prepare wayfinding plan and corridor plan: lighting and signage with art	Coordinator, parks planning
Access and mobility	• Work with CDOT from conceptual through final design for Canyon Boulevard • Plan for future Bus Rapid Transit service to the downtown • Work on conceptual through final design of improvements for 13th and 14th and connections between Canyon Blvd. and Arapahoe St. • Plan for additional bicycle improvements and amenities • Continue design and feasibility studies for replacement and new parking facilities based on approved planned uses within the area and new development south of Canyon in conjunction with phased development. Integrate with TDM strategies. Construction of facilities depended on schedule for other projects.	Transportation, RTD, DUHMD
Historic Resources, Culture	• Prepare analysis for bandshell relocation feasibility and optimal siting for acoustics, context, and usability; coordinate with historic preservation	Parks, Historic Preservation and Landmarks Board
Code update	• Enable desired mix of uses and character on adjacent parcels	Planning
City offices	• Conduct planning and feasibility for city building removal and replacement	FAM
Operations and Maintenance	• Work with partners on long term maintenance, sponsorship, and partnering to address parks, plazas, and creek maintenance	City, non-profits, businesses, parks, etc.
IMPROVEMENTS		
Plaza / Farmers' Market	• Rebuild 13th Street Plaza and access improvements for the Farmers' Market following environmental mitigation • Build Public Market Hall	FAM, Parks, DUHMD
Flood Safety	• Reduce some parking in HHZ, as appropriate based on parking feasibility analysis	Transportation, Parks, FAM,
Parks	• Remove fencing and railroad tracks • Complete Gilbert White Memorial • Improve north side of Creek between library and Municipal Building and south creek side area near library	Parks
Art	• Incorporate art and murals into park	Parks, Library and Arts
Access and Mobility	• Improve bicycle and pedestrian connections, including along Farmers' Ditch • Complete 13th Street improvements • Start first phase of Canyon Boulevard (9th to 14th Streets) - complete street" improvements to include dedicated bike lanes, wider sidewalks and landscape strip, vehicle lanes, and pedestrian intersection improvements to reduce barrier effect	Transportation, DUHMD
Historic Structure	• Relocate bandshell to allow for Canyon Boulevard complete street improvements	Parks, Historic Preservation
City offices	• Remove New Britain and Park Central buildings and replace in area or nearby	FAM
Civic Use Pad	• Develop civic use pad for combined public and hotel uses	DUHMD, Planning

** Civic Area Coordinator would be involved with and coordinate all tasks. Estimated costs and funding will be determined during the previous phase.*

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Phase 3** (2019 and beyond)

Category / Key Words	Strategy
COORDINATION AND OPERATIONS	
Operations and Programming	• Continue operations and maintenance and programming as determined through previous phases and with partners.
IMPROVEMENTS	
Creek	• Restore Boulder Creek banks in park area
Arts	• Continue to incorporate art and murals into parks, plazas, and creek enhancements
Park	• Build pedestrian bridge connection to north library site across Boulder Creek • Expand Civic Park improvements on south side of creek with relocation of city buildings (active spaces for performances, shade, arboretum, shade, art, etc.)
Library / Arts	• Renovate and/or redevelop north library building
Senior Center	• Renovate or redevelop Senior Center and BHP sites
Library / Parking	• Relocate parking for library to wrapped structured parking to west side of library (in conjunction with Senior Center and Boulder Housing Partners) • Build 13th Street mixed use project and parking, coordinated with CAGID
Park	• Expand Civic Park improvements with relocation of parking
Access and Mobility	• Build pedestrian bridge connecting civic use pad and library and civic park across Canyon Boulevard *(optional)* • Construct remaining Canyon Boulevard "complete street" improvements to include dedicated bike lanes, pedestrian environments while still accommodating vehicles

*** Responsibility, estimated costs, and potential funding sources will be determined in earlier phases.*

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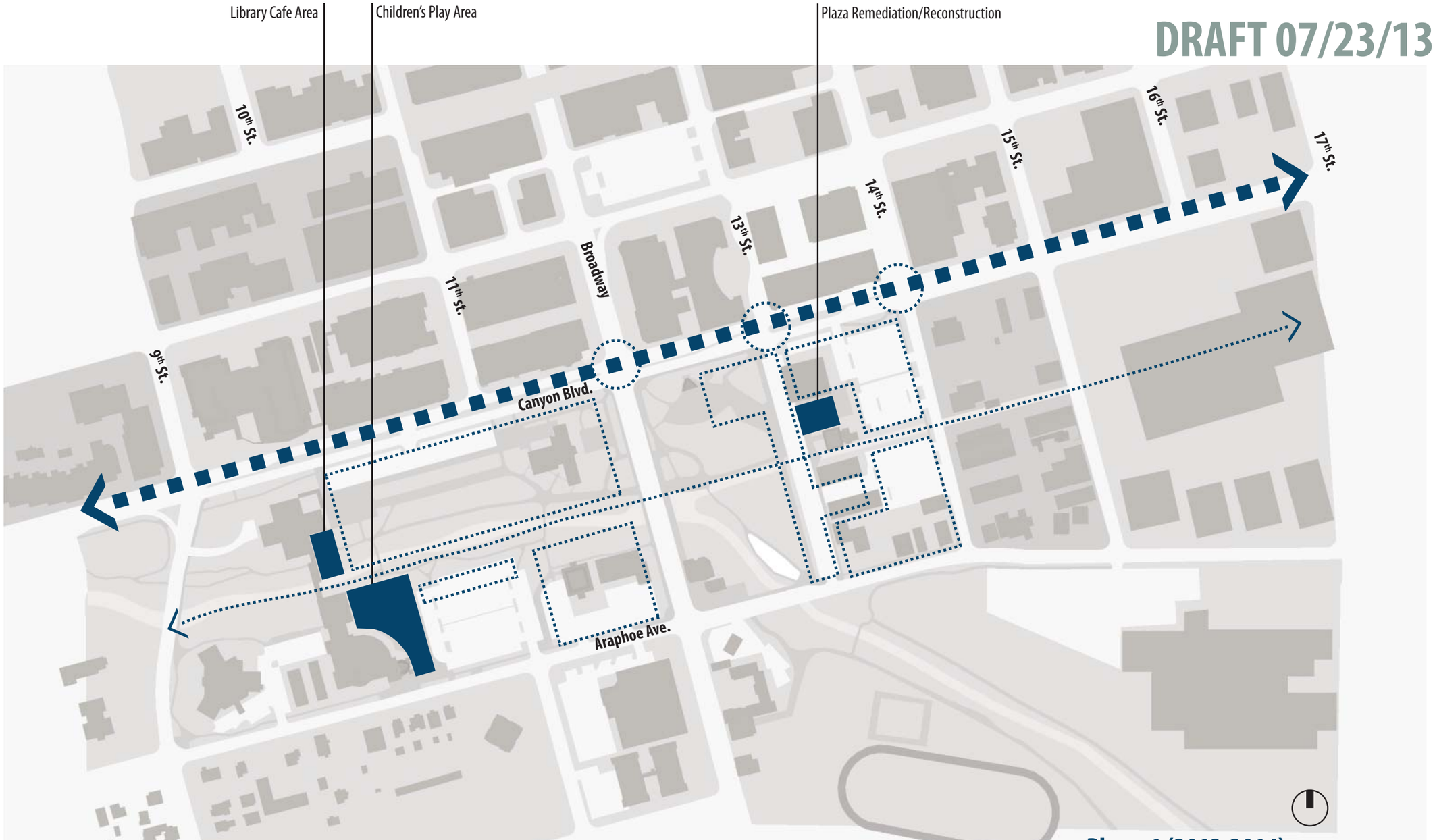

Phase 1 (2013-2014)

Legend
Implemented
Planning

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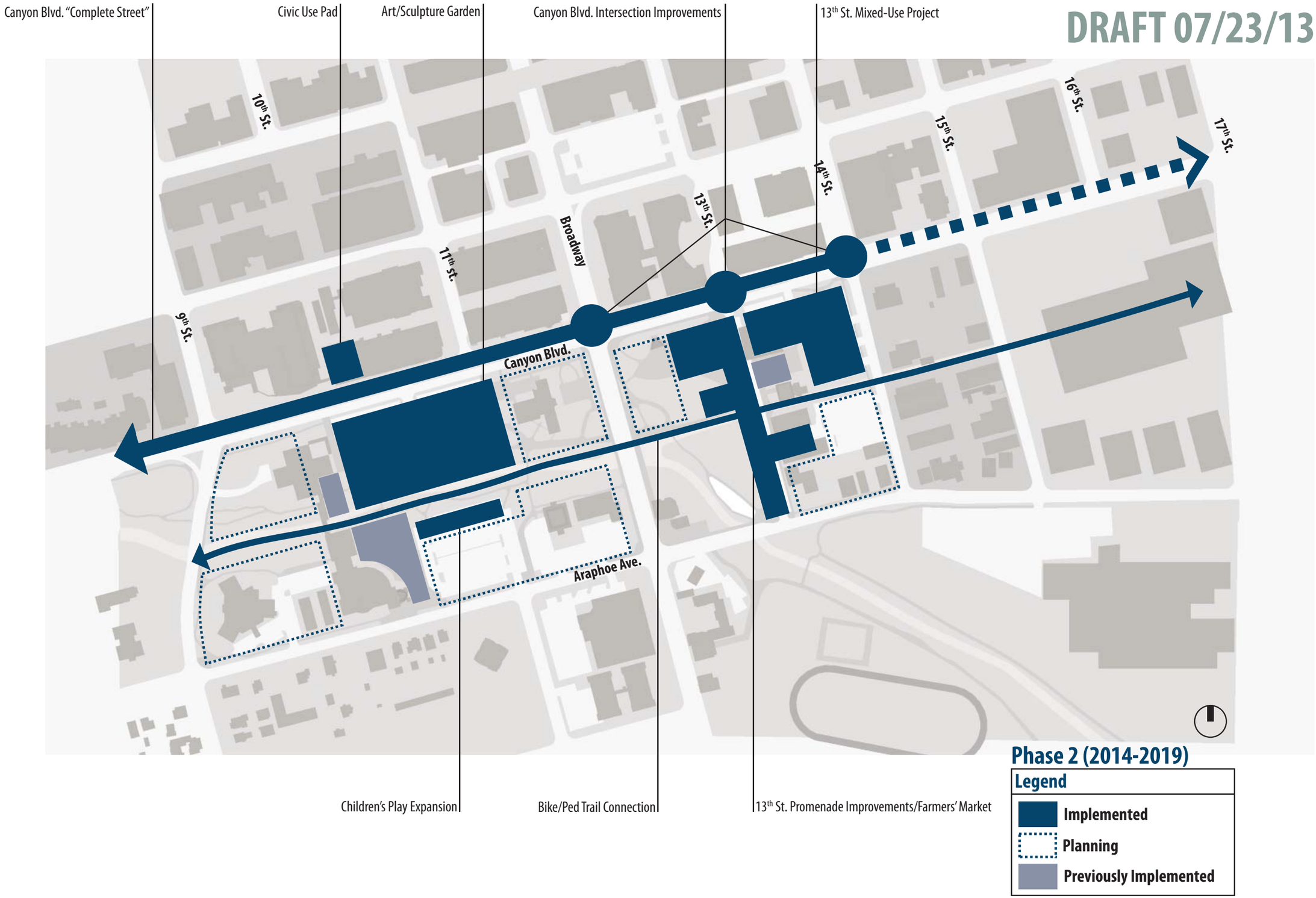

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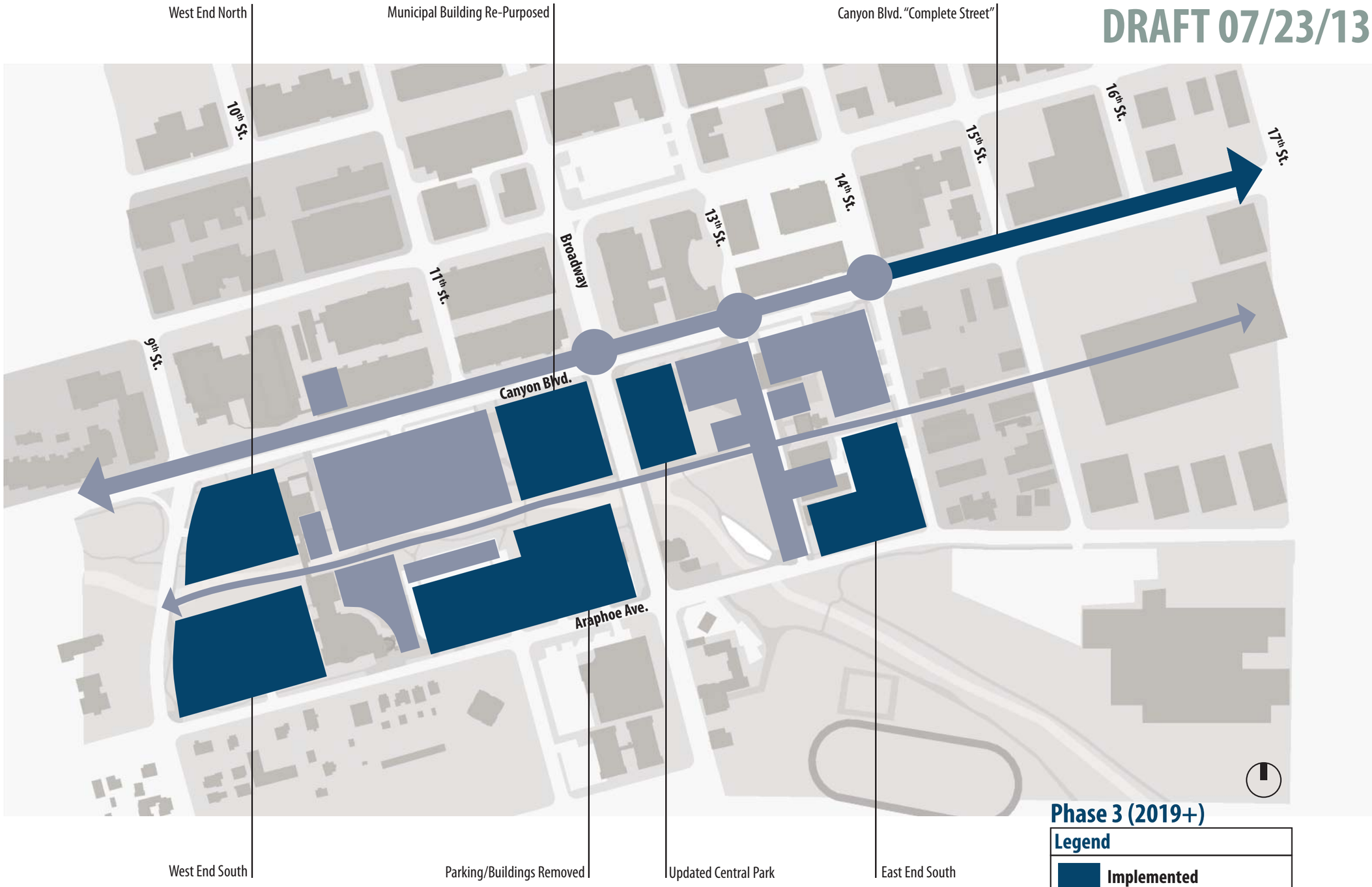

Phase 3 (2019+)

Legend

- Implemented
- Planning
- Previously Implemented

CITY COUNCIL MEETING DATE: June 11, 2013
Civic Area Summary Sheet

Council gave direction to staff on the first-tier recommendations.*

Public Realm Diagram, Access and Mobility Diagram, and Civic Park Improvements

Begin development of the Conceptual Plan containing elements of the Draft Public Realm Diagram, Access and Mobility Diagram, and Civic Park Improvements.

Some elements of the diagram include:

1. Boulder Creek and the cottonwoods along it remain a natural corridor and central focus for the park and outdoor space;
2. Existing buildings (New Britain and Park Central) are removed from the High Hazard Flood Zone (HHZ) to improve life and property safety;
3. Most of the surface parking in HHZ and 100-year floodplain is relocated to wrapped and/or underground structures at either end of the civic area, also to improve life and property safety and create new parkland;
4. A cohesive and expanded central park at the core, bookended by current and future mixed-use buildings; and
5. Canyon Boulevard becomes a complete street to reduce barriers to downtown and create more space and amenities for pedestrians, bicycles, and transit.

First-Tier Choices

1. Farmers' Market

Keep the Farmers' Market on 13th Street and expand to the east and west, to the extent possible.

2. Public Market Hall

Identify the public market hall as a desired use in the 13th Street block, subject to further analysis and coordination with Farmers' Market in the Implementation Phase.

3. Mixed-Use Community Services Building /Community Events Center

Develop a mixed-use community services center and events center (one or several buildings on the 13th/14th Street block) that provide offices, flexible community meeting space, and other activities. The building(s) should represent the cultural richness, history, and diversity of Boulder and be a model of design excellence. They also should integrate well with outdoor spaces and exemplify the community's sustainability values.

Council gave staff direction to continue to analyze the second-tier choices on this page.

Second-Tier Choices

4. 13th/14th Street

Further analyze and consider 13th and 14th Streets in the Implementation Phase, in conjunction with Canyon Boulevard planning and design.

5. West Senior Center

Continue to explore co-location of the center with other services, activities, and amenities –either in its current location (redeveloping existing center) or elsewhere outside the Civic Area close to other human services. The 13th/14th block would offer proximity to municipal services and other uses, as well as good access to the Transit Center, but may not provide adequate space given the other uses being considered for that block.

6. Bandshell

Explore feasibility of relocating the bandshell within the Civic Area and rehabilitating it to improve its usefulness as an outdoor theater. However, in the near term, maintain the bandshell to enhance appearance and increase programs. If programming proves to be feasible and successful, there is no immediate need for relocation until Canyon Boulevard improvements are designed.

7. Performing Arts Center

First, explore provision of a small (less than 800 seat) performing arts center or flexible events center as an addition to or redevelopment of the north wing of the Main Library or on 13th Street as part of a mixed-use complex. Second, further study feasibility and need for a mid-sized facility, and determine if the facility could be developed and managed in a manner that meets the intent of all the Guiding Principles and minimizes opportunity costs for other community needs.

8. Arts/Cultural/Science

Continue to explore the potential for a blend of indoor and outdoor facilities and spaces as an integral and important component of new programs for the Civic Area. Spaces and locations for achieving this goal include:
(a) Additional park spaces gained as a result of removing Park Central, New Britain and surface parking in the HHZ, could be programmed for permanent and temporary art installations or as outdoor cultural and science museums;
(b) Atrium and/or the Municipal building (if city facilities are consolidated in new building(s)) could be repurposed for art, cultural related uses;
(c) New facilities as an addition to (or as a redevelopment of) the north wing of the library and/or the Civic Use Pad could house art/cultural and/or community event facilities; and
(d) BMoCA could be housed either at a new facility at the Civic Use Pad, in a re-purposed municipal building, or as an expansion of its existing space if this could adequately address and preserve the land marked building where it is currently located.

***Full minutes from the meeting will be available soon.**

Presentation and Public Open House
July 11, 2013

Public Feedback & Comments

Close to 150 people attended the open house at the Boulder Main Library Gallery and Theater, where they listened to a presentation and then took a self-guided tour of two stations and discussed their questions and concerns with staff. This open house:

- Provided an update on the Civic Area future draft plan; and
- Elicited comments and feedback for the overall draft plan, continuing options for the East and West ends, access and mobility, park improvements, and implementation and phasing.

Attendees wrote comments on post-its on boards, and they completed a comment form. Comments are summarized below by topic.

Comments on Boards:

The Civic Area's Future

- Location for Bandshell? It is cherished!
- Trees: what happens to mature trees?
- Rehab and rededicate peace garden
- Looking for a food hall with artesian stalls
- Think about sustainability (Oberlin project)
- Where will Boulder Outdoor Cinema be accommodated?

The West End

- Keep senior center downtown please

13th Street Block

- Expand BMoCA
- Cabaret space? Small museums?

Access & Mobility

- Have we thought of skywalks at the major intersections?
- Architecture: the well established stonework themes as demonstrated in this building (library), City Hal, BHS, and others should be signature look
- Density: don't "overengineer" this. Leave some "randomness"… rocks, crannies and places that have a sense of a sense of distinct place. "Little places"
- Parking: unless it is <u>convenient</u> and well designed with <u>easy</u> ingress/egress the project is compromised.
- Colors on maps should be more distinct from one another for people with visual impairments

- The Interfaith AIDS Coalition which works with the Boulder County AIDS Project, hopes the AIDS Mem. "Garden" on the south bank of the creek near Arapahoe and Broadway will not disapper. It needs cleaning up and beautification. We hold a memorial service their each May.
- Expand our architectural horizons by building "signature" buildings instead.
- Ped/Bike connection to "Yokum" parcel across creek?
- Stair from sidewalk north side Arapahoe to ped underpass

Comment Forms

Preliminary Draft Plan: Do you have comments about the preliminary draft plan, future connections and/or future civic park improvements?

- I'm so glad the city is thoroughly thinking about what our Civic Center's role will be in the future
- Atrium building is also a potential historical landmark
- This looks wells thought out. With so many moving pieces and so many special interest groups vying for a piece – I wish you good luck!!
- The big picture is the importance (illegible word) – what do we want in Boulder's downtown years from now?
- Parking: Garages <u>must</u> be well designed with <u>multiple</u> and easy ingress/egress and large spaces. Please don't "design conflict" into the structures by making them inconvenient.
- I sense that city staff is thinking about creating a corridor in the heart of town that would combine function with beauty. So much of the core area seems designed for function and with no thought for how to elevate – to give opportunity for the spaces that encourage a sense of common good, community and creativity – those elements that define the quality of a society. What will last? Park areas – yes! A place for local food? Yes! A performance hall that makes it possible to create and enjoy whatever (illegible word) performance (illegible words) in the future. We're still a (illegible word) new Western town and we have a moment in time to think beyond function and need. Doesn't it strike you in all these images of how visually exciting – even iconic – the library is? Think grand. You will be thinking for those here 100 years from now.
- I'd like to make sure Boulder Outdoor Cinema is accommodated somewhere. Please consider reaching out to them to explore their needs and ideas. To date, they've been missed in the process.

Remaining Options: Do you have preferences or suggestions for further analysis on the remaining options for east and west ends of the Civic Area, including the 13th Street block and West end near the library?

- I favor options A
- I support a Performing Arts Center on Canyon between 13th and 14th with underground parking.
- Re: intensified development at West end

- Please analyze the potential traffic impacts (predominantly at residential neighborhood) on 9th street (from Baseline to Canyon)
    - Is this going to increase traffic on 9th?
    - Principle should be no traffic impacts on 9th (already heavily impacted)
- We believe putting the Performing Arts Center on Canyon between 13th and 14th would be an excellent plan! It would be a beautiful and exciting entry to the Civic Area!
- The city staff wants office buildings – but the public would prefer a more and better public use – it should be the performing arts/cultural/events center. Offices can be anywhere
- The performing arts center (Canyon Theater) and museum (Canyon Gallery) work very well though their signage is (illegible word). The free programming they provide would be a shame to lose. A mid-sized performing arts center (500 seats, maybe 750) would draw a whole new audience to the downtown area.
- Financing: Tax Increment Financing is a disaster. It will draw opposition.
- Options are so similar – hard to comment at this scale/time
    - Let's make this something the world is proud of!

Access and Mobility: Do you have comments?

- Skywalks at major intersections?
- Underground parking, even at high cost
- I am worried about parking for families and elderly, especially for library. Wondering where the cars go?
- Flood Hazard: overlay some 100/500 years event maps over the concept designs

Parks: Do you have comments?

- More is better!
- Like moving the bandshell away from Canyon
- Open, but active – attract children – water features, lights…
- Please take the homeless and street people into consideration
- Existing Mature Trees: Respect and keep
- Design vocabulary should push the boundaries and seek ways to play up the (illegible word) of Boulder, the innovative spirit of our citizens, and our commitment to sustainability and local energy generation. For example: what about play structures that generate electricity?

Phasing: Do you have comments?

- Explore private/public financing options whenever they are available!
- That the city council won't make a decision on where and what in August – too soon.
- Cost: better to discuss the potential money costs up front even as a "range" of given options
- Presentation went through this quickly so I don't have a great sense of what's being phased and when. What informed the priorities?

Other Comments

- Public restrooms associated with farmers' market?
- Please give the homeless a city owned farm to work on, benefit from, and discourage them from downtown/core Boulder
- Question to be thought about in depth:
    - What does the Farmer's Market want? They don't want to have to pay for "improvements"
    - How would a small performing arts center be sustainable?

Notes from Homelessness Planning Group

April 10, 2013 meeting

Members present Isabel McDevitt, Bridge House
Nancy Brinks, BOHO
Greg Harms, Shelter for the Homeless
George Epp, Bridge House
Terry Benjamin, EFAA
Anne Doyle, GUIDE POST r
Ken Miller, faith community representative
Janet Michels, City Attorney's Office
Karen Rahn, City of Boulder HS
Wendy Schwartz, City of Boulder HS
Valerie Watson, City of Boulder HS
Kelly Shanahan Marshall, Facilitator, Engaged Public

Question 1: Programming and physical elements – impact – positive & negative on homeless or transient individuals

- Public spaces become default places for people to be because services and organizations don't have enough program space.
- Indoor space for homeless people during the day to facilitate engagement with services is needed.
- The process should recognize that public areas will always attract people to gather and "hang out" which results in the issue of provision of public restrooms.
- We like the description in the guiding principles about "blending uses" – it seems less exclusive.
- Consider ways to help homeless people blend into other uses in the area (e.g. consider the location of rest rooms and that people are usually carrying a lot of belongings).
- Consider use of spaces equally – seek ways to bring people together (not just planning a space for gathering and spaces for other uses – better to mix it up).
- Consider the affordability of new programming to ensure it is affordable to more people.
- Consider a campground in the Civic Area
- The issues and potential solutions around homelessness and gathering in public spaces have to be considered comprehensively – affordable housing, employment options, are there land use regulation or zoning barriers to implementing social programs or solutions?
- Changes should not relocate "the problem" to other areas.

Question 2: Partnerships and organizations for consideration in Civic Area Plan?

- Partnering with Boulder Shelter's transition program and Bridge House's Ready to Work Program to help generate activities for people during the day.
- Work with key members of the homeless community to monitor or "police" behavior.
- Work with police to develop "relationship building" focus for directing to services in addition to the "enforcement" focus.

Question 3: Input to evaluate options – criteria?

- Find select individuals “long timers” to get input (Isabel offered to help schedule a focus group with Bridge House clients).
- Issues won’t be “solved” with any one option or plan but process should recognize that these are issues that will continue to be considered over the long term.
- Recognize there is significant intolerance of “poor people” with some Boulder residents, businesses owners.
- Consider how changes to the area will impact law enforcement.
- Address issues of activity that isn’t homeless individuals but is perceived to be.

Discussion with Bridge House Clients and Staff

June 12, 2013; City Staff: Sam Assefa, Lesli Ellis, Jean Gatza, Wendy Schwartz; Bridge House Staff: Isabel McDermot, Sarah, Bridge House Clients: Samantha, James, Suzanne, Kevin, Feather

Notes and Themes from discussion

As the Civic Area changes the following were recommendations:

Integrated spaces (controlled integration)

In all programming or built spaces, ensure there are options for people of all incomes and abilities to use the space or participate in events together. While some members of the homeless community seek a separate space to "just be by themselves, or with others like them", the prevailing view was to not have segregated areas, to provide a range of places with security to integrate, give people reasons to go to each place, help lower-income people be "part of this world" and affordable (dignified options such as sliding scale).

As places change, redevelop or re-program, consider range of options for people of all incomes in each. For example – if and when the senior center is revised – consider it more as a 'multi-cultural, multi-age center where there could be space for service provision to a range of populations, showers and/or lockers. Same with library, many use the library as day shelter but could there be reprogrammed space for a service organization?

Improve sense of civic pride through maintenance

Paid day crew of regular residents to keep areas clean. Currently there is little incentive for people staying in the area to keep it clean but there would be support and participation by "regulars" to uphold a better standard if there were a structured program for daily paid work to keep the area clean and maintained. This idea shouldn't just apply for the homeless or transients using the area but the thinking should involve the entire community to have responsibility in "keeping our civic area clean".

Capture revenue benefits from private development to help offset costs for public development needs.

There will be significant financial benefit to area property owners or developers with public improvements to the area; find ways to offset public costs through private cooperation or other programs.

Consider barriers from zoning or other regulations – Review allowed uses (e.g. "day shelter") to allow more or different options for service provision.

Consider more education in the wider community to eliminate prejudices around poverty and homelessness. Programmatic, enforcement or physical changes may reduce bad behavior, but the behavior of a few will continue to re-enforce fear and prejudice toward many.

Input from Boulder Dinner Theater

- Have been operating the facility for 37 years. It seats 284. A for-profit theater that operates 6-7 shows per week, Wednesday through Sunday.
- Not keen about a new venue in town and unconvinced it is necessary.
- The city will have to subsidize a performing arts facility.
- Boulder Philharmonic uses Macky for several performances throughout the year and has not expressed need for a facility.
- Support the uses around town in Macky, churches, etc. They make performances unique and local.
- It will take a lot of money to build and operate a new facility. All organizations are looking for financial support right now, and a new venue could potential dilute existing non-profit funding, which diminishes each year. Current Boulder venues face competition not only from Denver, Arvada, and other theaters, but also from other events (sports, festivals, etc.) People have only so much entertainment budget.
- Recommended we also talk with Boulder Symphony, Dairy Center, and other organizations.

FOX TUTTLE
TRANSPORTATION GROUP

MEMORANDUM

To: Civic Area Team

From: Bill Fox

Date: July 23, 2013

Project: Boulder Civic Area Plan

Subject: Automobile Parking Evaluation

We have completed a preliminary evaluation of automobile parking for the Boulder Civic Area that incorporates the current planning options. Our findings are summarized as follows:

The Automobile Parking Puzzle

In addition to enhancing existing multi-modal systems, providing appropriate amount of parking within the Civic Area is an integral part of the Access and Mobility Plan, but it presents a number of challenging issues. Key land use factors include the type and location of uses, the amount and timing of their parking demand, how well the various uses can share the same parking supply, and the potential to coordinate parking supply and demand with the land area around the Civic Area (including CAGID and the downtown). Site issues include the influence of the floodplain, how the parking will fit within the site, what type of parking to provide (surface v. structured), and how the parking supply will be accessed from the surrounding street network. How the parking will be financed and managed are also key issues in the puzzle. Programs that encourage multi-modal uses are part of reducing the demand for parking and will be important considerations. At the end of the day, the automobile parking that is provided in and around the Civic Area will need to be "just enough" while still encouraging access by alternative travel modes, consistent with city-wide transportation goals. More analysis is ongoing to determine how much parking, what configuration, and whether it can be financed and co-managed within the Central Area General Improvement District (CAGID).

Existing Parking Supply and the Floodplain

- The Civic Area has 674 parking spaces in surface lots and additional on-street spaces. All of these spaces are in the 100-year floodplain, and over 300 are located in the High Hazard Zone (HHZ).
- Vehicles can become buoyant in as little as 18-inches of water and can create a significant hazard as they become floating debris and block waterways. Over 350 of the parking spaces are also located in the HHZ, meaning that people attempting to reach their vehicles would risk being swept away by flood waters.

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- The plan recommends removing most of the existing surface parking for life safety reasons, and instead relocates them into above grade and/or below grade structures, wrapped with active uses to avoid visibility and degradation of the pedestrian environment. In addition to gaining additional park space and recreational uses near the creek, this will also help mitigate environmental issues such as storm water runoff and urban heat island effects.
- Existing parking lots and structures around the Civic Area (such as CAGID's RTD, Randolph, and St. Julien parking structures, and the Boulder High School surface lot) often serve as overflow parking for events such as the Saturday farmer's market when those lots and structures are "off peak" relative to their typical weekday use. There are over 1,000 parking spaces within a block or two of the Civic Area that may serve as overflow parking during "off peak" use periods that are outside of the typical weekday peak parking demand in the downtown area.

Existing Parking Demand in the Civic Area

- The demand for parking varies by location and function, and by time of day, day of the week, and season.
- The Civic Area currently includes 3 CAGID surface lots along 14th Street that include just over 200 permit parking spaces for downtown employees. These lots are full during weekdays.
- Lots around existing civic buildings also include 177 city employee parking spaces that are highly utilized on weekdays.
- Weekday demand is highest during the mid-day when employee lots are full, demand at the library is high, and the activity at civic buildings is also high.
- Warm weather increases the seasonal demand for parking along Boulder Creek as recreational activity increases.
- Events, such as the Saturday farmer's market generate high demand for parking in the east end of the Civic Area, when employee demand is not high. Based on recent observations of parking occupancy (on-street and off-street) in the area surrounding the farmer's market, it is estimated that the market may generate the demand for approximately 950 parking spaces during late morning and early afternoon hours on Saturdays in the summer. CAGID employee lots, the RTD structure, existing civic lots, and the Boulder High School lots serve much of the parking demand.

Type of Future Uses and How They Mesh From a Parking Perspective

- New uses in the Civic Area, such as a Performing Arts Center or an Art Museum will generate additional parking demand.
- A key consideration is how well the various uses can "share" parking with each other and the existing parking users. For example, a performing arts center that has most events during the evening may be able to share parking with existing downtown employees who typically vacate parking spaces in the evening. On the other hand, a museum that typically has peak activity mid-day during the week will be in competition with the employee spaces and will not share well with the existing parking supply.
- Additional office and/or commercial uses will add to the peak weekday parking demand in the area.
- While the Civic Area is at a walkable scale (both internally and with much of the CAGID area to the north and east), users or visitors at nighttime events may be less likely to walk as far to find parking as users during the daytime. And while all parts of the civic area are served by some level of bus transit, the east end of the area has much higher transit service than the west end.

Providing Parking in the Future: Range of Potential Demand and How to Accommodate It

- Downtown University Hill Management Division and Parking Services (CAGID) has been very successful in encouraging employees and visitors to utilize alternative modes of travel for access, and this has resulted in very low CAGID parking demand rates. In this context, it is projected that many of the new or expanded uses in the Civic Area will be able to operate with less parking than would be predicted using "national" parking supply and demand rates. The attached **Table C** details the assumed parking supply rates and assumptions that have been utilized in the Civic Area parking evaluation. In nearly all cases, these rates have been aggressively lowered (relative to national parking rates) to acknowledge the progress that Boulder has made in encouraging alternative travel mode use. In fact, where appropriate, aggregate CAGID area parking rates have been utilized, which already include a reduction for alternative mode use of over 60%. In a few cases, these aggressive CAGID parking rates have been further reduced in anticipation of increased TDM efforts in the area over time.
- When planning/locating new Civic Area uses, it will be very important to consider where the facilities will be located, what other uses are in or around that area, and how well can the new parking demand share spaces with the existing or reconfigured parking supply in that area.
- At this point, two main land use options have been tested in terms of needed parking supply (Options A and B for the east and west ends), and each includes a range of land use intensity (low and high) for each given use. An evaluation of needed parking supply has been prepared for each. This evaluation has attempted to identify and take credit for the potential for shared parking within the east and west ends of the Civic Area. **Table A** includes a summary of the parking supply needed for land use Option A, and **Table B** includes a summary of the parking supply needed for land use Option B.
- Given the potential for shared parking between uses, and the size range of each use, Option A would generate the need for between 820 and 1,235 parking spaces in the Civic Area (a net increase of 146 to 561 spaces (22% to 83% increase)). Land use Option B would generate the need for between 895 and 1,490 parking spaces in the Civic Area (a net increase of 221 to 816 spaces (33% to 121% increase). It is important to note that these parking totals include the replacement of the 200 CAGID permit parking spaces that currently exist along 14th Street in the Civic Area, but each represent increased parking quantities over what is in the area today.
- It should be noted that these potential parking supply increases are based on projected demand, but it is acknowledged that the City should also consider what level of additional parking is appropriate given sustainability goals, vision for the area, and ongoing AMPS project that will be addressing pricing, technology, and additional TDM measures.
- Parking will be configured to allow easy access for older adults and disabled people and patrons to facilities such as the library and senior center.
- When considering needed parking supply and the potential for shared parking with the adjacent CAGID area, it is important to keep in mind that there currently are peak periods when adjacent portions of the CAGID supply are 100% occupied, and would not be able to serve in a shared parking capacity. It is also important to note that CAGID's parking model predicts that CAGID will also need to find ways to expand its parking supply significantly over time as downtown Boulder builds out. CAGID's projections include expected increases in alternative mode use as well as changes in management of existing supply as the first options prior to creating additional supply. It is acknowledged that CAGID's current parking management strategies and their parking model assumptions will also be revisited as part of the AMPS project.

- The parking projections include an estimate of increased parking demand generated by the expanded park area and the recreational use it will attract. This increase is not tied to building development.
- It is my understanding that DUHMD/PS is currently conducting a survey of the private property south of Canyon to ascertain projected development and types of uses that would contribute to future access demand. This area, as well as the public lands within the civic area, were not included in the downtown development projections conducted in 2011/2 due to the uncertainty regarding the civic area planning project.
- Lastly, Table C (that details assumed parking supply rates for each land use) includes estimates of weekend daytime parking supply rates for comparison to the weekday daytime and evening rates. For the most part, the weekend parking rates are less than or equal to comparable weekday rates. The notable exceptions to this are the estimated parking demand for the Saturday farmer's market and the projected increased recreational demand for parking on weekends. The demand for parking generated by these two high weekend uses are, in part, met by parking supply in the surrounding CAGID, civic, and Boulder High School lots, which are all underutilized on weekend days when the farmer's market is at its peak.

Implementation Steps

- Finalize the program of uses and refine projected need for replacement and new parking in the Civic Area by exploring pedestrian, bike, and transit accommodation, and parking management strategies to potentially reduce parking demand, and define the location and size of new parking structures. This step assumes that every effort has been made to minimize the new parking space demand in the Civic Area.
- Estimate the cost of providing the identified parking.
- Identify ways to fund the necessary parking, including:
  - Public funding
  - Public/private partnerships
  - Expand CAGID (boundary and management/participation)
  - Sell land to private party, or land swap - incorporate parking partnership

I hope this information is helpful to the on-going planning of the Boulder Civic Area. Please let me know if you have any questions.

BF/

Attachments: Table A – Shared Parking Supply for Land Use Option A
Table B – Shared Parking Supply for Land Use Option B
Table C – Assumed Parking Supply Rates

Boulder Civic Area Parking Evaluation

Table A

Shared Parking Supply for Land Use Option A (Low and High)

Civic Area	*Land Use Type*	*Land Use Amount*	*Low Shared Parking Supply*	*High Shared Parking Supply*
West End				
	Existing Library	84,000 sq. ft.	303 spaces	458 spaces
	Senior Center	30,000 to 40,000 sq. ft.		
	Gallery – arts – events (N. of Canyon)	10,000 sq. ft.		
	Hotel (N. or Canyon)	15 to 30 rooms		
	Muni Building	24,000 sq. ft.		
	Municipal Office	0 to 80,000 sq. ft.		
	Increased Park Use			
East End			517 spaces	775 spaces
	Public Market	10,000 to 15,000 sq. ft.		
	Office	50,000 to 100,000 sq. ft.		
	Hotel or Apartments	100 rooms to 200 dwellings		
	Tea House & expanded BMOCA	24,000 sq. ft.		
	Performing Arts Center	800 to 1200 seats		
	CAGID Permit Parking	203 spaces		
Total Civic Area			**820 spaces**	**1234 spaces**

Table B

Shared Parking Supply for Land Use Option B (Low and High)

Civic Area	*Land Use Type*	*Land Use Amount*	*Low Shared Parking Supply*	*High Shared Parking Supply*
West End				
	Existing Library	50,000 sq. ft.	313 spaces	561 spaces
	Senior Center	30,000 to 50,000 sq. ft.		
	Senior Housing	0 to 100 dwelling units		
	Library North - Arts	20,000 to 40,000 sq. ft.		
	Library North – Performing Arts	400 to 1,200 seats		
	Gallery – arts – events (N. of Canyon)	10,000 sq. ft.		
	Hotel (N. or Canyon)	15 to 30 rooms		
	Gallery - arts related	10,000 to 20,000 sq. ft.		
	Increased Park Use			
East End			584 spaces	930 spaces
	Public Market	10,000 to 15,000 sq. ft.		
	Municipal Office	55,000 to 110,000 sq. ft.		
	Other Office	50,000 to 100,000 sq. ft.		
	Tea House & BMOCA	10,000 sq. ft.		
	Performing Arts Center	800 to 1,200 seats		
	Hotel or Apartments	100 rooms to 200 dwellings		
	CAGID Permit Parking	203 spaces		
Total Civic Area			**897 spaces**	**1,491 spaces**

Boulder Civic Area Parking Evaluation

Table C

Assumed Parking Supply Rates for the Land Uses Proposed in the Boulder Civic Area

Land Use Type	Unit	Weekday Daytime Parking Supply Rate	Weekday Evening Parking Supply Rate	Weekend Daytime Parking Supply Rate[1]	Notes
Existing Library	1,000 sq. ft.	2.0	0.5	1.8	Daytime rate replaces existing parking
Senior Center	1,000 sq. ft.	1.5	1.5	1.5	Daytime rate replaces existing parking
Senior Housing	Dwelling unit	0.5	0.5	0.5	50 % of non-senior housing
Gallery / Arts	1,000 sq. ft.	1.5	0.75	1.5	Similar to documented museum rate – reduced 10% for Boulder
Events Center	Seat	0.125	0.25	0.125	National rate (0.333) reduced by 30% for Boulder. Assume daytime rate 50% of evening
Public Market	1,000 sq. ft.	1.75	0.875	1.75	Applied aggregate CAGID rate for daytime. Assume evening 50% of daytime rate
Office	1,000 sq. ft.	1.6	0.16	0.25	CAGID rate reduced by 10% for increased TDM. Approx. 10% in evening
Tea House and BMOCA	1,000 sq. ft.	1.5	0.75	1.5	Same as gallery /arts rate with evening at 50% of daytime
Hotel	Room	0.8	1.0	1.0	National rate – limited potential to reduce with alternative modes
Apartment	Dwelling Unit	1.0	1.0	1.0	Applied existing CAGID rate
Performing Arts Center	Seat	0.125	0.25	0.125	National rate reduced by 30% for Boulder. Assume daytime rate 50% of evening
Farmers Market	Lump sum estimate	0 (except on Wednesdays)	0	900	Peak Saturday mid-day demand based on recent observations
Increased Park Use	Lump sum estimate	25 spaces	25 spaces	100 spaces	Estimated increase in destination trips to park

1. Weekend rates either estimated or based on comparable weekday v. weekend ITE trip rate data

WWE

TECHNICAL MEMORANDUM

Floodplain, Wetlands/Riparian Corridor and Water Quality Issues for Boulder Civic Area Project Update: Draft Public Realm Plan and Key Choices

Wright Water Engineers, Inc. (WWE) has prepared this memorandum to provide technical input and peer review on the May 16, 2013, memorandum to the City of Boulder (City) Planning Board from David Driskell, Executive Director, Community Planning and Sustainability and many senior City staff members regarding the *Boulder Civic Area Project Update: Draft Public Realm Diagram and Key Choices* (Project Update). Dr. Andrew Earles of WWE gained valuable insight into the planning of the Civic Area as a juror in the Civic Area Ideas Competition in January 2013 and has led the effort to draft this memorandum to comment on issues related to flood hazards, riparian wetland corridor protection and water quality.

The Civic Area planning process has involved many stakeholders. The Project Update includes many desirable aspects that will be beneficial for Boulder Creek and the riparian wetland corridor. Removal of a significant amount of parking within the High Hazard Flood Zone will improve public safety, flood conveyance and water quality. The Project Update presents a thoughtfully developed vision for the Boulder Creek corridor.

Components of the plan related to building in the Flood Fringe area (the portion of the 100-year floodplain outside of the Conveyance and High Hazard Zones) will have to carefully consider flood risk, both for the structures themselves and for surrounding structures. There may be challenges with achieving a mixed use program given floodplain constraints. There are engineering methods that likely can overcome these challenges; however, costs of design, permitting and construction will be expensive. Any construction within the Conveyance Zone should adhere to a 0.00-foot rise on any existing structures (i.e. no rise in water surface elevations beyond current levels in the 100-year flood event). Construction in the Flood Fringe may occur in accordance with City's Floodplain Ordinance and could potentially result in rises in 100-year water surface elevations of up to 0.50 feet (6 inches).

Boulder Creek has had large floods in the past and will in the future, and could be especially prone to flooding due to deforestation by pine beetle kill and/or wildfires in portions of the watershed. It is critical to remember that there are flood events larger than the 100-year event including the 500-year event and beyond. For facilities that are critical to flood management operations and public safety, protection beyond the 100-year event will likely be required, and planning efforts should proceed with an understanding of flood risk above and beyond the 100-year event since events of greater magnitudes may occur. The best strategy is to keep buildings out of the 100-year floodplain, not just the conveyance and High Hazard Flood Zones. Much of the development of the Civic Area occurred before the National Flood Insurance Program (NFIP) was established, and many buildings in downtown Boulder along the creek corridor lie within the 100-year floodplain. To achieve the activity and mix of uses

desired for the Civic Area, some buildings inevitably would be located in the 100-year floodplain. Potential flood impacts from any proposed structures should be thoroughly evaluated to avoid or minimize impacting other existing structures within the floodplain and surrounding areas.

The following sections provide detailed comments on selected elements of the Project Update.

Floodplain, Conveyance and High Hazard Flood Zones

The City of Boulder regulates floodplains along Boulder Creek (and throughout the City) through the City Code, Sections 9-3-2 through 9-3-8. The 100-year floodplain through the Civic Area is defined by three zones, with varying restrictions on development activities:

1. Conveyance Zone—The Conveyance Zone is the portion of the floodplain required for the passage or conveyance of the one-hundred-year flood and is determined by evaluating encroachments (fill) in the floodplain that can occur without causing a rise in 100-year water surface elevation (Base Flood Elevation [BFE]) of no more than 0.50 feet, after considering a reasonable expectation of blockage at bridges and other obstructions by flood-borne debris. The Conveyance Zone may also be referred to as a 0.50-foot rise floodway. For work in the Conveyance Zone (grading, trains, non-habitable structures, etc.) a “no rise” criterion applies and it will be necessary to conduct a floodplain study that demonstrates that improvements in the conveyance zone do not cause rises in the BFEs.
2. Flood Fringe—The Flood Fringe consists of portions of the floodplain that are not in the Conveyance Zone or in the High Hazard Zone. This is an area where development (fill) may occur, and with preservation of the Conveyance Zone, fill placed in the Flood Fringe would not be expected to increase BFEs by more than 0.50 feet.
3. High Hazard Zone—The High Hazard Zone consists of portions of the floodplain where an unacceptably high hazard to human safety exists defined as those areas where the product number of flow velocity (measured in ft./sec.) times flow depth (measured in feet) equals or exceeds four, or where flow depths equal or exceed four feet.

The Project Update includes features that reduce potential hazards to life and property associated with flooding, such as removal of a large amount of surface parking in the High Hazard Flood Zone and removal of the New Britain and Park Central buildings. These proposed measures will help to make the overall Civic Area more compliant with the floodplain requirements of the current City Code. Removal of the buildings, with replacement at a location outside of the High Hazard Flood Zone, is a critical safety need for the City and will improve conveyance in the area. Anthem Structural Engineering studied the soils, foundations and flood hydrology for these two buildings and determined

that in a large flood event, "the foundations of both buildings would be undermined due to scour, which would result in the collapse of the structures." [1] Removal of these buildings is arguably the most important public safety component of the entire plan and should be implemented as a high priority.

Removal of surface parking in the Highland Flood Zonewill lower the risk of damage to property due to the displacement of vehicles and potential loss of life, as well as reduce backwater effects that would likely occur due to parked vehicles. The removal of existing surface parking to gain additional park land and to help restore the floodplain would have many benefits including diminished floodwater velocities, reduced flood damages, and improved water quality and quantity management. To the extent that some surface parking remains within the 100-year floodplain, WWE encourages the City to investigate permeable pavement alternatives.

With regard to the options for the existing farmers' market and proposed market hall, WWE recommends managing the floodplain such that new permanent structures and potential obstructions are limited to the extent possible. Any structures such as fencing, steel frames or other similar features as well as additional landscaping/trees that affect the grade, hydraulic roughness and potential for blockage/obstruction will need to be accounted for in the analysis of the floodplain. Additional structures may be feasible, particularly in the Flood Fringe. In the Conveyance and High Hazard Zones, planned improvements and obstructions they create would likely need to be balanced by improving conveyance in other areas. Temporary structures are an alternative that may be considered in the Conveyance and/or High Hazard Zones; however, even this approach should be accompanied by hydraulic analysis demonstrating "no-rise" on existing insurable improvements in the Conveyance Zone unless structures are for daily use and/or can be quickly disassembled and/or moved if a flood alert is issued (e.g. like the current farmers' market, festivals and craft shows along the creek).

For temporary structures (and some that are permanent but not deeply anchored), it is important to keep in mind that in flood events, these features will tend to catch debris or become debris themselves. Obstructions and debris blockages increase flood depths that consequently increase flood hazards. Additionally, flow rates and velocities can be high enough during large flood events such as the 100-year flood to displace/dislodge structures, especially temporary structures. The conveyance of large debris items during a flood poses a threat to life and property. There are many road crossings downstream of the Civic Area as well as the Farmers' Ditch headgate and several bridges within the Civic Area (including Broadway) where debris would tend to accumulate in flood events, so the "breakaway" philosophy for temporary structures or statues/monuments is not advised because the debris will create greater flooding problems downstream.

From a floodplain perspective, the ideal locations for the construction of new structures such as a Performing Arts/Community Events Center and/or other Arts/Cultural/Science facilities would be outside of the 100-year floodplain. For the activity and mixed-use program planned for the Civic Area, however, it is not feasible to achieve these uses

[1] Anthem Structural Engineering, as quoted in Boulder Daily Camera, December 17, 2012.

without encroachment into the 100-year Flood Fringe. New construction within the 100-year floodplain would be consistent with the City's adopted floodplain regulations and FEMA-compliant City floodplain permit[2]. It is important to note that the displacement of floodwaters due to new structures within the 100-year floodplain will have effects elsewhere in the area. For improvements that are proposed within the Conveyance Zone, an evaluation of the effects of such improvements must be conducted prior to implementation to ensure that there are no rises in 100-year flood depths on any other structures and that any resulting rises in flood depths are acceptable, i.e. have no adverse impacts and are consistent with City regulations. It would be preferable to do this in a holistic rather than structure-by-structure manner so that flood problems are not transferred to areas planned for future development.

Improvements to Canyon Boulevard should be carefully assessed and reviewed prior to implementation. Conceptual renderings of proposed improvements show more vegetation and trees, a great improvement for pedestrians, bicyclists, and those in transit. The proposed number and density of trees is an important factor when managing floodplains. More trees can potentially decrease conveyance capacity, cause backwater and increase flood depths. Trees are important for many reasons and should not be eliminated from the Civic Area; however, they should be evaluated relative to their effects on floodwaters. An appropriate landscaping plan should be implemented – one that improves aesthetics, encourages habitat and growth, and accounts for effects to the 100-year floodplain.

Relocation of the Band Shell out of the 100-year floodplain would also be beneficial and could potentially allow for the construction of new facilities due to the compensation of floodwater displacement. The removal of the Band Shell outside of the Civic Area would reduce flood depths caused by backwater, decrease the potential of debris getting trapped during a flood event and allow for increased conveyance capacity. There are many factors to consider relative to the final disposition of the Band Shell, but from a floodplain management perspective it would be preferable that it not be located within the 100-year floodplain.

The Project Update includes flood risk management benefits, coupled with preservation of open space in the floodplain, riparian enhancement and educational elements that form a holistic approach for managing the floodplain/floodway. Changes to structures (removals and additions) within the 100-year floodplain and improvements to the riparian corridor and floodplain will need to be analyzed as a whole and on a phase-by-phase basis to thoroughly evaluate effects on flood conveyance, flows, velocities and depths, all of which need to be consistent with City floodplain regulations and should aim to promote the protection of the public, health and welfare. The Gilbert F. White Memorial, located in the Civic Area, would present an excellent opportunity for expanded public education/signage related to floodplain/floodway management principles from Boulder's own "father of floodplain management."

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[2] Because of the scale of the project and the modifications that will occur to the regulatory floodplain, we anticipate that the project will require a Conditional Letter of Map Revision (CLOMR) (prior to construction) and Letter of Map Revision (LOMR) (following construction) from FEMA to address changes in floodplain mapping. Within UDFCD's jurisdiction, UDFCD and their contractors administer the map revision process for FEMA, and early coordination with UDFCD is advised.

Riparian Wetland Corridor

Restoration of the Boulder Creek drainageway could integrate exciting improvements to the riparian and wetland resources of the area. Section 9-3-9 of the City Code establishes requirements for stream, wetland and waterbody protection to "preserve, protect, restore and enhance the quality and diversity of wetlands and waterbodies." For much of the past century, urban planning treated drainageways as part of the stormwater sewer system and largely deemphasized the riparian and wetland resources' presence in the landscape. This has not been the standard in Boulder, where Boulder Creek and its tributaries have been central components of the City's parks and trails network. Existing desirable conditions along these drainageways include greenways with native vegetation, designated wetland regulatory areas that include buffer zones, the use of natural materials to reduce erosion and educational signage promoting public awareness of the value of these areas. The comments, considerations and recommendations are offered in this section as possible enhancements to Boulder's existing natural drainageway resources.

The Project Update identifies potential riparian restoration, which includes areas between the existing multi-use path and Boulder Creek. This riparian corridor provides an important ecological interface between aquatic and terrestrial ecosystems. It is also the area with the greatest impact on downstream water quality. The following are initial observations of existing riparian and wetland corridor conditions that retract from the ecological value of these areas:

- Current use of the corridor has resulted in mostly open access to all areas by paths and over manicured lawns. This access reduces the amount of native vegetation in the area, can lead to erosion of sediment into the creek, and diminishes "quiet areas" that are valuable to wildlife.

- The existing typical channel cross section through this area is primarily incised and mostly lacks wetland areas along the ordinary high water mark. This limits the abundance and diversity of many desirable native plants. It also limits the hydrologic connectivity between the creek and the riparian corridor, an important component of a natural stream system.

- Existing stormwater management does not consistently integrate best management practices to reduce erosion and protect water quality. This can lead to downcutting, erosion and influx of sediment and other pollutants. Further, it does not take advantage of a potential source of water for side wetland areas.

- Existing conditions can complicate drainageway maintenance, as required to allow effective flow conveyance. As a result, when the drainageway requires maintenance (e.g., when a felled tree needs to be removed), mobilizing the equipment to conduct this activity can result in undesirable impacts to the corridor.

Some considerations for enhancing this area include the following:

- **Promote controlled use of the riparian corridor through the construction of an established trail network.** As demonstrated by the widespread use of informal trails, many visitors to the corridor want to get off the beaten path and have access to the creek. If a trail network is constructed to meet this demand, it will limit the extent to which informal trails develop. Access toward the creek and important habitat areas can be managed with low-impact fencing (e.g., split rail fencing) and signage. As noted above, effects of fencing and changes to the density and character of the vegetation along the creek would need to be evaluated for floodplain impacts and conformance to the City's Stream, Wetlands, and Water Body Protection Ordinance (City Code Section 9-3-9).

- **Enhance hydrologic connectivity between Boulder Creek and the adjacent riparian corridor.** By laying back the creek's banks in targeted areas, it could be possible to create enhanced wetland areas within the riparian corridor. These areas would be above Boulder Creek's normal high water mark, but would benefit from increased hydrologic connectivity. These areas could support a diverse plant community that would be desirable from water quality and urban wildlife perspectives.

- **Integrate stormwater outfalls into the riparian corridor.** This enhancement could include transforming existing stormwater conveyance to include outfalls to newly created treatment wetland swales that would dissipate energy, slow the release of water into the creek and promote retention of sediment and other pollutants. These features could be designed to become integrated into the overall natural riparian corridor system.

- **Incorporate drainageway maintenance access into riparian corridor and trail network's design.** In considering the types of equipment that are expected to be used for drainageway maintenance, and by incorporating their width, weight and access requirements into the riparian corridor and trail network's design, reoccurring impacts to natural areas can be minimized.

The planning effort has also produced ideas regarding various education and awareness enhancements. These types of enhancements could greatly improve the recreational value of the corridor, but would also have tremendous environmental conservation value. Fostering the public's relationship with the natural drainageway is expected to lead to greater environmental stewardship both at the site and beyond. To the degree possible, WWE encourages the City to explore educational and recreational enhancements that

would promote the public's understanding and appreciation of the Boulder Creek drainageway.

Water Quality

Given that more than half of the 27 acres in the Civic Area is parkland along Boulder Creek, there are many opportunities for water quality protection as a part of the Civic Area redevelopment. Enhancements to the Riparian Corridor including limiting access to selected portions of the creek, maintaining and/or reestablishing healthy "natural" vegetative banks and establishing a vegetated riparian bumper between the creek and more manicured portions of the open space will all contribute to protecting the water quality of Boulder Creek. The elimination of large amounts of surface parking will also remove a major source of pollution to the creek by significantly reducing the amount of runoff from surface parking areas. Chapter 11-5 of the City Code establishes the City's Stormwater and Floodplain Utility and requirements for stormwater management that will be applicable to the Civic Area, and Chapter 7 of the City Design and Construction Standards address stormwater design.

Given the amount of open area available along the Boulder Creek corridor, we strongly recommend investigation of Green Infrastructure (GI) and Low Impact Development (LID) techniques for management of stormwater runoff quality from areas that will be redeveloped in the Civic Area. GI and LID practices are aimed at restoring the hydrology of an area to a more "natural" condition. Typically, this is accomplished through using stormwater best management practices (BMPs) including grass swales, grass buffers, bioretention areas and other vegetation-based BMPs to infiltrate runoff, filter pollutants and create facilities that fit into the natural landscape. For surface parking areas that will remain in the Civic Area, we urge the City to investigate permeable pavement techniques to manage water quality and runoff volume. We would encourage the use of permeable paths where practical as these will generate less runoff than concrete walkways. Permeable pavements also should be considered for plaza areas as a runoff reduction measure.

While Boulder Creek is a wonderful amenity running through the Civic Area, controlling access to designated locations will do a lot to help with the stability of the banks and with the water quality of the stream. Where access is provided, dense vegetation should be planted to discourage people from migrating upstream or downstream from the access point. "Natural" barriers integrated with the landscaping around the access points, including boulders and trees, can also be used to discourage travel up or down stream from access points, and signs, explaining the importance of maintaining a healthy riparian corridor along the creek, may also discourage access in areas where establishment and/or enhancement of riparian vegetation is desired. Boulder Creek has some water quality issues with E. coli, and fecal matter from animals and other sources associated with multiple informal "social trail" access locations to the creek which has the potential to worsen the problem.

In addition to the runoff reduction and pollutant control measures such as grass swales, grass buffers, bioretention areas and other types of BMPs, we would encourage the City to investigate options for potential water harvesting and/or grey water reuse within the Civic Area. With the amount of new Civic building space proposed, there will be a significant amount of roof area that could provide a good source of water for harvesting. Some of the earlier proposals in the process included options for Green Roofs on some of these structures. While Green Roofs can be a good BMP in some climates, there are many limitations in Colorado, and generally it is necessary to have at least supplemental irrigation to maintain healthy vegetative cover. Green Roofs also have relatively high maintenance in this climate with plant replacement, irrigation repairs, etc. For these reasons, we believe that water harvesting would be a more attractive option to investigate, especially because this is a civic project in the heart of Boulder along Boulder Creek. To implement water harvesting, it would be necessary to work out the water rights for the harvesting to be allowed under Colorado Water Law (likely an augmentation plan); however, this is a potential opportunity for the City to lead the way in the State with treating stormwater as a resource. Recent gray water applications that are being developed and studied by Dr. Larry Roesner, P.E. of Colorado State University could also be considered as ways to improve water efficiency of the overall Civic Area through reuse in appropriate locations.

Although the project is currently at a Master Planning Level, the amount of open space included in the Master Plan provides a great deal of flexibility and many opportunities for innovative stormwater quality management.

Conclusions

The Project Update presents a conceptual plan for the Boulder Civic Area that will improve public safety by reducing flood risks, enhance the riparian wetland corridor along Boulder Creek and allow for implementation of innovative stormwater management practices to protect the water quality of the creek. The greatest challenges are related to the 100-year floodplain and the High Hazard Flood Zone. Limitations on rises in 100-year water surface elevations (also referred to as base flood elevations) will constrain the extent and types of development that can occur in the area. Detailed engineering and floodplain/floodway analysis will be essential to creating a final plan that does not adversely affect neighboring properties and creates and environment where public safety is paramount. Constructing the kind of program that is anticipated on the east end of the Civic Area will not likely be feasible at grade because of the rises that would be caused to the 100-year water surface elevations. There are engineering methods, including elevating structures on piers, and other practices that may allow for construction; however, costs should be expected to be higher than typical construction because of the need for adequate flood protection.

WWE hopes that the comments and recommendations provided in this memorandum are helpful and provide information that will be useful in moving ahead to the next stages of

the Civic Area Plan. If you have any questions related to this technical memorandum, please do not hesitate to contact WWE at (303) 480-1700.

MEMORANDUM

TO: **Members of City Council**

FROM: Jane S. Brautigam, City Manager
Paul J. Fetherston, Deputy City Manager
David Driskell, Executive Director, Community Planning and Sustainability (CP&S)
Susan Richstone, Deputy Director, CP&S
Maureen Rait, Executive Director of Public Works
Tracy Winfree, Director of Public Works for Transportation
Kathleen Bracke, GOBoulder Manager
Lesli Ellis, Comprehensive Planning Manager
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Sarah Huntley, Media Relations/Communications Manager
Terry Stonich, Information Resources Manager
Elizabeth Vasatka, Business Sustainability Coordinator
Jamie Harkins, Business Sustainability Specialist II
Megan Cuzzolino, Residential Sustainability Specialist II

DATE: **JULY 30, 2013**

SUBJECT: **Study Session: Boulder's Climate Commitment, Energy Efficiency Programs and Market Innovation Program Update**

Purpose

The key objectives for this study session are to:

- Update council and seek feedback on the options and analysis underway to define a new long-term goal for Boulder's Climate Commitment (the city's next generation of climate action planning) and the implications for near-term targets and related implementation strategies.
- Provide an introduction to the new data management platform being developed to monitor and report greenhouse gas (GHG) emissions related information for both the city organization and the larger community.
- Describe the overarching engagement strategy for expanding community participation in developing and implementing GHG reduction strategies. Review the remaining work plan elements to further

analyze, finalize and adopt the new goal, targets and implementation strategies for Boulder's Climate Commitment.

- Provide an update on 2013 progress in achieving residential and commercial energy efficiency goals, and key initiatives in each program area, including ongoing work related to the city's commercial energy efficiency strategy.
- Provide an update on the status of planning for the new market innovations grant program.
- Briefly highlight the city's participation in a new energy data research project and co-sponsorship of the Net Zero Cities conference this October with the City of Fort Collins and the Colorado Clean Energy Cluster.

Questions for Council

Climate Commitment

1. Does City Council have feedback on the magnitude and timeframe for the city's long-term goal for GHG reduction?
2. Does council have feedback on the related near-term GHG reduction targets?
3. Does council have feedback on the proposed outreach and engagement strategy?

Energy Efficiency & Market Innovations Programs

1. Does council have comments or questions regarding the energy efficiency program updates and proposed direction on the work plan items?
2. Specifically, does council agree with staff's recommendation to decide on the path of the city's future utility structure before designing a commercial building energy rating and reporting requirement, using the interim period to launch a new energy data initiative in collaboration with the Pecan Street Research Institute and other partners?

Executive Summary

In November 2012, Boulder voters resoundingly approved extension of the Climate Action Plan tax to continue funding for initiatives that seek to reduce GHG emissions in response to the well-documented and growing crisis of climate change caused by humans. Leading up to that vote, work was completed to evaluate CAP-funded programs to-date and to identify priorities for Boulder's climate action initiatives into the future. These included:

- Developing **a more integrated approach** to climate action, to capture the full range of city initiatives and investments and make GHG reduction targets a central focus of planning and action in each key area of GHG emissions. In other words, embrace the fact that GHG emissions are affected by a wide range of activities and investments, not just those funded by CAP dollars;
- Updating the city's GHG methodology and inventory, and articulating **a new long-term GHG reduction goal** (post-Kyoto) that could be translated into near-term targets by key sectors to inform implementation strategies, inspire action and inform the community about whether we are making adequate progress;
- Creating **a more robust and dynamic data management and reporting system** to ensure accurate and timely feedback on progress, and support data-driven decision-making, transparency and program effectiveness;

- Underscoring the urgency of **switching Boulder's electricity supply toward low- and no-carbon fuel sources**, since absent a significant shift in this area it will be impossible to achieve meaningful reductions in local GHG emissions;
- Increasing the city's and community's **focus on commercial energy use** as one of the largest contributors to local GHG emissions, and pursuing new and more aggressive strategies to reduce these emissions;
- Embracing the **economic benefits of committing to a low-carbon future**, positioning Boulder for continued success as a center for innovation;
- Partnering with residents, businesses, researchers and other cities and jurisdictions on new ways to achieve more aggressive GHG reduction goals, underscoring the necessity of **collective, cross-sector, coordinated action**.

This study session memo summarizes progress made in the first half of 2013 to act on these priorities and outlines the next steps toward putting in place a comprehensive and integrated approach to GHG emissions reductions. Following a brief narrative to provide background and context, the memo is presented in the following sections:

I. Renewing Boulder's Climate Commitment

1. ***The Facts.*** Where the city has been, what we've learned, and the hard realities of climate action.
2. ***Seven Principles, Six Pillars and Five Elements.*** What we know we need to do: principles to guide Boulder's climate planning-and-action, the key areas of action, and the elements that structure Boulder's climate commitment.
3. ***Goal Setting.*** What level of GHG emission reduction does Boulder need to achieve, by when, and what would it really mean to commit to such a goal? The city's analysis has looked at three potential long-term goals, and the implications of each: "80 percent by 2050," "Carbon Neutral by 2050" and "Carbon Neutral by 2030." Staff recommends continued discussion and exploration of two alternative goals: "80 percent by 2050" and "Carbon Neutral by 2050."
4. ***Defining Near-term Targets.*** How can a new long-term goal, which may appear unattainable (and far in the future), be translated into clear and achievable (though aggressive) near-term targets that motivate broad participation and action. The memo describes analysis currently being conducted and key considerations to define near-term targets, as well as their potential implications.
5. ***Core Strategies.*** How far can current policies and initiatives take us, as a community, and what new or expanded strategies will need to be considered? How will priorities be set, and the key strategies developed, funded and implemented? The planned approach to scenario development, testing and sequencing is detailed.
6. ***Monitoring and Reporting.*** How can progress toward near-term targets and the long-term goal be effectively monitored to provide meaningful and timely feedback that supports continuous improvement and, ultimately, attainment of the goal? The city team's work over the past 6 months to develop a new data management and reporting platform is summarized, with an example of the new community GHG report format to be presented during the study session.
7. ***Community Engagement.*** How can the community be involed in understanding and evaluating options and committing to taking the actions necessary to achieve meaningful reductions? A three-

phase approach to engaging the community is described, as well as a conceptual framework for continued community and partner engagement in climate commitment planning-and-near-term action.

8. ***Next Steps and Six-Month Action Plan***. What should the city staff team focus on during the coming 6 months to best position the Boulder community for both near-term and long-term success? Key work plan items are briefly presented for council's feedback.

II. Energy Efficiency and Market Innovations

1. ***Introduction.*** A brief overview of the information covered in this section of the memo.
2. ***Residential Energy Efficiency.*** Summary of 2013 activities focused on improving the energy efficiency of residential units, including the current program evaluation to ensure ongoing effectiveness in the "post-American Reinvestment and Recovery Act" funding period and a new residential energy data pilot.
3. ***Commercial Energy Efficiency.*** Summary of 2013 activities focused on improving the energy efficiency of commercial buildings, including continued delivery of EnergySmart services for businesses; the rating and reporting pilot project results; continued work with large commercial property owners; a peer city learning initiative; a new commercial energy data pilot; and current plans for the timing and implementation of a commercial energy rating and reporting ordinance.

To the extent possible, information presented within this memo is summary level, with more detailed information in attachments or via hyperlinks.

Background on Previous Council Discussions

Four council study sessions took place in 2012 that included discussion of Boulder's climate-related programs and goals. These were:

1. Jan. 31, 2012 study session, (pages 15 to 29 of memo)
2. May 22, 2012, study session (pages 5 to 20 of memo)
3. July 24, 2012, study session (pages 10 to13 of memo)
4. Dec. 11, 2012, study session (pages 13 to 17 of memo)

I. RENEWING BOULDER'S CLIMATE COMMITMENT

1. The Facts

Boulder's residents, businesses and community leaders have consistently demonstrated their ethical commitment to environmental stewardship, forging a path that not only protects the community's unique natural resources, but also positions the city for prosperity. Comprehensive community sustainability is now at the core of every major planning effort and decision making process in Boulder: how can the community continue to be stewards of our environment, in the face of a mounting global crisis, while supporting economic vitality, ensuring people's livelihoods, and advancing diversity and inclusiveness?

There is no doubt that human activity—embodied in a carbon-intensive economic system—is increasing the average temperature of the planet, and setting in motion significant climate change events. These facts are well documented elsewhere, and are not a focus for this memo. Instead, this memo, and the iterative planning-and-action efforts it represents, is focused on looking at Boulder's long-term goal for emission reductions; what adoption of that goal could mean in terms of implementation; and how to define and approach near-term action priorities in a manner that takes meaningful steps toward achieving the goal while also supporting equity and a resilient local economy.

Beginning in 2012, staff began work on the next evolution in Boulder's climate action efforts: moving away from a stand-alone plan for climate action, to a more integrated approach to GHG reductions. This new strategic framework—under the banner of Boulder's Climate Commitment—advocates an integrated and dynamic process of ongoing and iterative climate action efforts conducted with transparency, accountability and shared purpose. It embraces the reality that climate action is not a short-term project initiative, but an ongoing challenge and imperative that will require new ways of thinking, planning, learning, and acting.

The renewed Commitment is based on the latest climate science, to inform the level of GHG reduction necessary to avoid the worst climate consequences (at least in terms of Boulder doing its part), as well as several key "sobering facts" highlighted by the analysis to date regarding the magnitude of action that will be needed to achieve such reductions. These facts include:

- **Actions needed to achieve the new goal will be far more significant than anything done to-date.** Any of the more ambitious climate goals being considered-- "80 percent by 2050" or "Carbon Neutral by 2050" (and definitely anything with an even nearer term horizon)–will require an unprecedented level of action. While these goals reflect the scientific consensus related to necessary emission reductions, they represent a significant challenge—well beyond that represented by the previous Kyoto Protocol goal that guided efforts up to 2012.

- **Conservation and efficiency alone will not achieve the goal.** Even the most aggressive conservation and energy efficiency measures are unlikely to achieve more than 50 percent of the needed GHG reductions, and even that would require a level of investment and action significantly greater than anything achieved—or even contemplated—to date.

- **While there has been impressive participation in efficiency programs, a solid track record of "behavior change" by a broad cross-section of the community has not been established.** While many people have made changes such as switching their light bulbs, turning off their computer at night, purchasing hybrids, etc.—the level and type of change needed is much more fundamental. While more effective behavior change strategies are needed (through education, incentives, social norming, etc.), developing and implementing them will not be quick or easy—and will not, on their own, be sufficient for achieving the necessary levels of emissions reduction.

- **Economic and lifestyle trends point to more energy and resource consumption, not less.** While the efficiencies of appliances and buildings are improving, overall plug loads in homes and businesses are on the rise. Similarly, while recycling and reuse of materials is increasing, overall consumption patterns are increasing; and while the fuel efficiency of vehicles is improving, metro regions continue to sprawl and air travel continues to grow. In other words, while emission reductions are achieved in one area, they are often offset by emission increases in another.

- **Significant emission reductions will only be achieved through collective action and fundamental systems change.** There are many things outside the city's or community's control. Some changes must come from the federal or state levels; or from technological or service innovations in the private sector. However, as a community with strong partnerships between government, business, academia and residents—as well as a demonstrated commitment to collective action—Boulder is well positioned to take significant action, and set an example that others may follow.

2. Seven Principles, Six Pillars and Five Elements

Seven Core Principles

Confronting the sobering facts is an essential first step in understanding the magnitude of the challenge presented by climate change and the need for meaningful action. However, to guide the work efforts and critical decisions ahead, there is value in articulating and agreeing to a set of core principles that focus on positive action, as opposed to anxiety about the challenge ahead. Draft core principles are briefly listed and described below. These will continue to evolve through the upcoming community engagement process, with particular attention given to how they are carried forward in the implementation of Boulder's Climate Commitment.

1 **Be strategic, yet opportunistic.** There must be a clear understanding of goals and the actions needed to reach them, with implementation strategies grounded in financial, economic and social realities. But "big leaps" are likely to come through transformative breakthroughs—technological, economic, and regulatory—that have cascading effects and create new opportunities where few or none existed before. Remaining nimble, supporting innovation and being open to unforeseen opportunities will be essential, even as efforts are focused on strategic planning and action.

2 **Take calculated risks.** The magnitude of change necessary to achieve meaningful GHG reductions cannot be achieved through business-as-usual. New approaches must be tested, and risks will need to be taken. Managing risk is key—through careful analysis, engagement of multiple perspectives, and piloting of new approaches before taking them to scale. But the biggest risk is inaction, or even in cautious action that fails to have the impact necessary to make a difference.

3 **Avoid analysis paralysis.** Creating better data management tools, conducting deeper analyses and developing thoughtful and well-planned strategies is important. However, there is not time to wait for all the answers before acting. Even as we, as a community, continue to define the goals, targets and strategic priorities for Boulder's Climate Commitment, the majority of our efforts—now and into the future—need to remain focused on taking aggressive action.

4 **Partner.** Deep GHG reductions cannot be achieved through any form of "traditional government program." Meaningful action will require new forms of partnership with other government agencies, nonprofits, businesses, residents, and researchers. Success can only be achieved through coordinated action and the leveraging of multiple resources.

5 **Demonstrate ethical leadership.** Eliminating GHG emissions in Boulder will not alter global climate change. But that's not the point. Acting responsibly is an ethical position. Actions need to be grounded in scientific realities and thoughtful, well-informed analysis, but guided by Boulder's strong ethical compass.

6 **Focus on system change.** Personal behavior changes and investments in energy conservation and efficiency are important building blocks as we work toward 0our goal, but these will not achieve deep GHG reductions on their own. The challenge ahead requires fundamental system change, including transitioning from a high carbon economy to a low carbon economy. These changes will be significant and far-reaching.

7 **Harness the economic benefits of climate leadership.** Being a leader in the transition to a low carbon economy may be driven by an ethical position but is also economically smart. The communities and companies that position themselves as low-carbon innovators will be the economic and social leaders of the next 50 plus years.

The Six Pillars of Action

The implementation of the Climate Commitment focuses action in six broad areas that encompass the primary opportunities for reducing greenhouse gas emissions. These six categories or "pillars" were developed in 2012 and reviewed with council. It is important to note that additional refinement of this framework is taking place including clarification of interim targets and terminology. An important role of this framework is to also identify areas of collaboration across city departments and with external partners in developing strategies for achieving these targets. As part of these, a seventh potential "pillar"—community and urban design—has been identified. Although this aspect was assumed to be a part of the original six pillars, its leading role in the development of certain strategies (e.g., walkable neighborhoods) suggests the value of explicitly including it as a core and distinct focus area. A new icon and description for this seventh category is being developed. Figure 1 displays the current six pillars of Climate Commitment action.

Figure 1
Climate Action Commitment Action Areas

Five Key Elements

With this foundation of guiding principles and focus for areas of action, the process for developing and implementing Boulder's Climate Commitment are divided into five key elements, described in the figure below. Each of these elements is then described in greater detail in the remainder of this document.

Figure 2

Five Elements of Climate Commitment Development

CLIMATE COMMITMENT ELEMENT	OUTCOME
Goal Setting	• Set a goal that focuses community attention and action • Create integration and focus across all city operations and programs • Align goals with external partners and stakeholders
Defining Targets	• Establish incremental reduction targets that set a path to goal achievement • Translate the technical objective (GHG reduction) into measures that are relevant and motivational to the larger community
Strategy Development	• Identify high leverage sectors for action/ intervention • Formulate an implementation and staging plan for actions with quantifiable performance benchmarks • Foster/stimulate innovation and creative responses that benefit both Boulder and other communities and places • Position Boulder to effectively adapt to and prosper from a transition to a low-carbon economy/ society
Monitoring & Reporting	• Create effective feedback systems that enable evaluation and ongoing continuous improvement of program strategies
Community & Partner Engagement	• Collaborative goal, target setting • Joint development & implementation of strategies and programs • Cooperative gathering and assessment of monitoring and evaluation data and reporting

3. Goal Setting

The implications of adopting an ambitious goal such as carbon neutrality are significant and far reaching. Accomplishing a goal of this magnitude will require very significant changes—both locally and regionally/nationally—from a high carbon-based economic and social system to a low-carbon one. Given the significance of this choice, the staff and consultant team have conducted an extensive assessment of a number of the key considerations related to climate action goal setting, target development, and strategy selection. This analysis is included in a white paper in **Attachment A**. The following sections provide a summary of the key issues discussed in that analysis. Four areas of consideration are highlighted in the next section: the goal purpose, elements, options, and implications. The choices made in each will significantly shape the way Boulder defines and pursues its Climate Commitment.

Goal Purpose

Understanding the goal's purpose serves a number of critical functions including:

- Underscoring the importance of the long-term goal as a core community focus
- Clarifying the scale of the problem and solutions
- Acknowledging roles and an ethical imperative for the community to engage in problem-solving
- Creating a broad framework to organize action
- Unifying city organization efforts
- Distinguishing the external (larger than community) and internal (within community) objectives necessary to achieve the goal

In many climate action initiatives undertaken around the world, the primary focus or purpose of the goal-setting process has been on addressing the larger global climate change dynamic (external). In certain ways, this framing can create both a dissonance for community members and increase the potential for goal failure by overlooking the important internal community benefits associated with pursuing such a goal. Identifying, and uniting around, these benefits is integral to motivating large scale adoption and action.

A small number of cities like Arhus, Denmark, and Portland, Oregon, are in the midst of reframing their goals in ways that create more effective linkages between personal and community self-interest and the larger ethical obligations initially emphasized in climate change goals. These communities recognize that there will be a growing imperative to transition to a low-carbon economy. From this view, it is not a matter of whether a transition toward a low carbon community will happen, but when and under what circumstances that transformation will take place. Communities that are early to embrace this shift and position themselves as leaders are more likely to attract both the types of human and financial resources that will further accelerate an effective transformation. In this way they will also serve as successful models for other communities to emulate.

This focus on innovation and resiliency has a high probability of creating ecological, social and economic benefits. The cities noted above and countries like Germany are already starting to demonstrate the linkage between a transition to a low-carbon economy and their ability to endure and even thrive during periods of economic contraction or disruption.[1] Differences in community resiliency will likely become more pronounced and more significant as the impacts of climate change magnify.

[1] Please see references in the White Paper in Attachment A.

Goal Elements

The attached white paper provides a detailed overview of the core elements that comprise a long-term climate mitigation and GHG reduction goal. These can be summarized as:

1. Boundary (where does the community draw the boundaries of responsibility?)
2. Scope-greenhouse gas inventory procedures (what is counted and what is not ?)
3. Magnitude (how much reduction?)
4. Timeframe (by when?)

These four elements serve as the primary "knobs" with which a community can set its overall GHG emissions reduction goal.

The first and second of these knobs—Boundary and Scope—are largely determined by the selection of greenhouse gas inventory protocol and the accounting procedures that are utilized. Given both council and community desires to be able to compare Boulder with other communities, staff has begun to use the International Council on Local Environmental Initiatives (ICLEI) community protocol because of its widespread use around the world (over 1,000 communities worldwide and over 100 in the US). References for a more detailed overview of ICLEI are included as part of the attached white paper**.** Work is currently underway to update Boulder's GHG inventory using the ICLEI protocol, and the updated inventory baseline (including comparison to Boulder's previous inventory baseline and tracking of GHG reductions) will be completed this fall.

The remaining variables–Magnitude and Timeframe—are determined exclusively by individual cities. To provide a reference point for this choice, staff and consultants conducted an assessment of 17 other leading cities with climate action programs to compare current GHG emissions, GHG reduction goal and timeframe, boundary, current per capita GHG emissions, and the role of offsets, if any. This is included as part of the white paper in **Attachment A**. Three representative examples are summarized below.

Goal Options

As part of the benchmarking analysis noted above, staff surveyed the various approaches to setting goals related to magnitude and timeframe and narrowed to three options for comparison and illustration of the implications and tradeoffs. These three options all represent aggressive carbon reduction strategies, with the most ambitious listed last. The three selected and an example city that has adopted each goal are:

Option 1: 80 percent reduction of GHG below 2008 levels by 2050 (Portland)[2]
Option 2: Carbon neutrality by 2050 (Seattle)
Option 3: Carbon neutrality by 2030 (Arhus)

The following section provides a summary of the more detailed comparison provided in the attachment.

Goal Implications

To illustrate the scale of change implied by these three approaches, a simple annual reduction target was derived for each, that is,—the percentage of reduction that would need to take place each year over the duration of the goal timeframe to achieve each respective goal. Detailed technical analyses of the implications of these reductions are examined in **Attachment A**. For purposes of illustrating their

[2] Typically, reductions are indexed to 1990 as with the Kyoto protocol. However, in Portland, the city's emissions were actually lower in 2008 than they were in 1990, so the city decided to use that year as its baseline.

significance on a personal level, one sector—the residential sector—is used below to show the magnitude in reductions using three major categories of energy use—home electricity use, miles traveled in a fossil fuel vehicle, and home heating (assumes natural gas) thermostat set point impacts.

For Option 1 (80 percent reduction below 1990 levels by 2050), Boulder would need to reduce its greenhouses gases by 4.6 percent **every year** for the next 33 years–25 percent by 2020.

Option 2 (carbon neutrality by 2050) would require an **annual** reduction of 12 percent–50 percent by 2020.

Option 3 (carbon neutrality by 2030) would need an **annual** reduction of 25 percent–82% by 2020.

The three tables below illustrate what these options would mean in terms of energy use and travel for a typical household in Boulder (assuming no reduction in the carbon intensity of the community's energy source[3]). Similarly significant reductions would be necessary in the commercial and industrial sectors. These reductions are portrayed as the amount that would have to be reduced by decade for three representative points—2020, 2030 and 2050.

Table 1
OPTION 1: 80 Percent GHG Below 1990 Levels BY 2050

	2020	2030	2050
Reduction target by **Decade**	25%	50%	80%
Electricity Use	cut 25%	cut in half	cut by 80%
Travel (ave 20 mi/day 2013)	Reduce 5 mi/day (25%)	< 10mi/day (50%)	< 4 mi/day (80%)
Natural Gas/heating	change thermo 2 degrees	change thermo 4 deg	change thermo 8 deg

OPTION 2: Carbon Neutrality by 2050

	2020	2030	2050
Reduction target by **Decade**	50%	87%	100%
Electricity Use	cut in half	use 13% of current amount	use no carbon energy
Travel (ave 20 mi/day 2013)	< 10mi/day (50%)	< 3mi travel/day	No petroleum travel
Natural Gas/heating	change thermo 4 deg	change thermo 9 deg	No carbon fuel for heating

OPTION 3: Carbon Neutrality by 2030

	2020	2030	2050
Reduction target by **Decade**	82%	100%	
Electricity Use	use 13% of current amount	use no carbon energy	
Travel (ave 20 mi/day 2013)	< 3mi travel/day	No petroleum travel	
Natural Gas/heating	change thermo 9 deg	No carbon fuel for heating	

As these examples demonstrate, the necessary levels of personal energy use reduction will require very substantial shifts in either behavior, energy type, or most realistically, both.

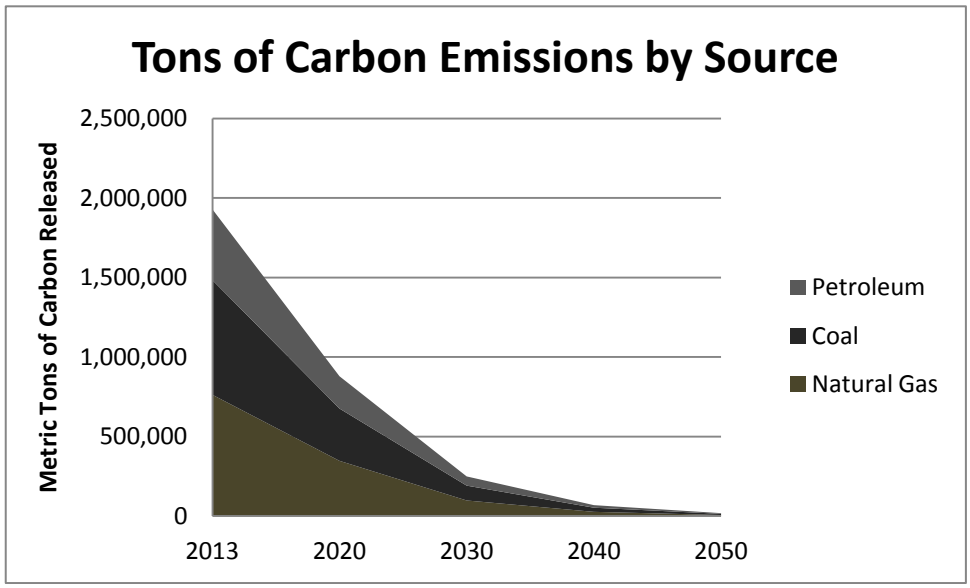
[3] Currently almost 90% of Boulder's energy supply is derived from GHG emitting fossil fuel sources. The role of reducing this "carbon intensity" of energy source is discussed in more detail later in the memo and in Attachment A.

It is also important to note that the calculations in Table 1 assume an absolute reduction of carbon emitted with no allowance for offsets. In practice, most of the cities adopting more aggressive carbon neutrality goals are assuming some level of offsets. **Reaching carbon neutrality without offsets will ultimately require 100 percent of energy being used by a community to come from non-fossil fuel sources.** The implications for designing real-world strategies to achieve an objective with these parameters are explored in more detail in the strategies section of this memo.

Using the carbon neutrality goal to depict this graphically, the tons of greenhouse gases that must be reduced can also be viewed as the amount of carbon-based energy being utilized. Figure 3 takes the annual reduction percentages for a carbon neutrality goal and displays the rapid decrease in the use of carbon-based energy that would need to occur to achieve neutrality by 2050.

Figure 3

Carbon Energy Reduction Trajectory to Achieve Carbon Neutrality by 2050[4]



The shape of the reduction curve in Figure 3 is only one potential pathway for these reductions. It is the optimal reduction pathway outlined by much of the current science regarding scenarios with the highest probability of stabilizing global warming, however, other reduction scenarios could be formulated that pushed more of the reductions into future years based on the hope that new technology or policy will create much more dramatic reductions in later decades. These considerations will be a part of choosing interim emissions reduction targets, as discussed in the next section.

[4] Figure derived from analysis conducted in attached white paper.

4. Setting Measurable Targets

Integral to the effectiveness of choosing a climate action goal is the identification and framing of specific interim targets that achieve sufficient progress to make goal accomplishment a plausible outcome. The ongoing credibility of Boulder's climate goal will ultimately rely on steady, measurable progress.

Interim Targets for Each Goal Option

One way to consider and compare the choice between goals is to determine what the interim targets will need to be to maintain a trajectory towards successfully accomplishing each goal. Attachment A provides an analysis of the three goal options described above to determine ten-year reduction targets that would need to be achieved to maintain consistent progress. This analysis demonstrates that Option 3—carbon neutrality by **2030**—would require a 25 percent reduction of GHG each year to achieve the goal. [5] This is a scale of reductions that appears to be significantly beyond the capacities of existing programs and technologies absent a significant investment in carbon offsets. It was therefore dropped by staff from further analysis as a potential goal.

Table 2 shows the decadal reduction objectives for the two goal options under exploration and the percentage of GHG reductions that must be accomplished to maintain consistent progress.

Table 2
GHG Reduction Targets under two goal options
(Total Projected Emissions 2013—2,125,000 mtCO2e[6])

	Option 1: 80% reduction of GHG emission below 1990 level by 2050			**Option 2: Carbon Neutrality by 2050**	
Year	GHG reduction target mtCO2e	% GHG reduced		GHG reduction target mtCO2e	% GHG reduced
2020	611,049	25%		1,226,141	54%
2030	707,645	53%		818,018	87%
2040	507,685	71%		330,298	96%
2050	360,589	82%		181,226	99%

[5] The 25% reduction is measured against each successive year's emissions rather than the original year's emissions. These calculations include growth based on a "business as usual" projection of energy use and emissions growth if no emissions reduction activities are implemented. See footnote 6. This ongoing projected growth results in the reduction target being larger than simply multiplying the %GHG reduced times the base year total emissions.

[6] Electricity emissions are forecast from the 20-year annual load model used in the Municipalization Exploration Modeling and current Xcel Energy emissions factors, https://www-static.bouldercolorado.gov/docs/municipalization_exploration_modeling-1-201305151619.pdf. Natural gas emissions are forecast from the average per household and per employee for 2005-2010 and projected growth in households and employment from the City of Boulder Community Planning and Sustainability Department, http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=1490&Itemid=5685. Transportation emissions are forecast based on maintaining VMT at 2.4 million daily VMT and, for the business-as-usual case, no changes in GHG intensity. Solid waste is forecast based on current per capita emissions and forecast population growth from the Community Planning and Sustainability Department.

To assess the level of **new** reduction actions that would be needed to achieve the necessary reductions each decade, the city contracted with The Brendle Group which analyzed existing and planned GHG-reduction programs for which data was available—those supported by both city government and the broader community including the private sector. The total savings potential for these existing programs was then calculated. Table 3 shows the additional reductions or renewable energy source substitution that would need to be achieved during that period to maintain the trajectory toward each goal.

Table 3
GHG Reduction Objectives with Existing Program Reduction Projections
(Total Projected Emissions 2013—2,125,000 mtCO2e)

	Option 1: 80% reduction by 2050				Option 2: Carbon Neutrality by 2050		
Year	GHG reduction target- mtCO2e	Existing Program Reductions	Cumulative Reduction GAP		GHG reduction target- mtCO2e	Existing Program Reductions	Cumulative Reduction GAP
2020	611,049	200,000	411,049		1,226,141	200,000	1,026,141
2030	707,645	287,000	1,031,694		818,018	287,000	1,757,159
2040	507,685	378,000	1,448,379		330,298	378,000	1,996,456
2050	360,589	453,000	1,733,968		181,226	453,000	2,102,683

Table 3 illustrates the potentially significant differences in decade targets as well as the scale of new programs and initiatives necessary to address the projected gaps. Importantly, the analyses being completed as part of Boulder's Energy Future have highlighted the potential GHG benefits of shifting Boulder's energy generation mix toward low- and no-carbon sources, which could substantially contribute to closing the gaps highlighted in Table 3. For example, a local utility or Xcel partnership that invested in the fuel mixes modeled as part of the analyses presented to Council on July 23, 2013 could reduce Boulder's carbon emissions by anywhere from 576,000 to 818,000 metric tons on "Day 1."

Additional Target Considerations

- *Incremental versus. Step-wise reductions:* Progress in achieving GHG reduction goals is unlikely to be in long durations of even increments—it is more likely to be accomplished by short-duration breakthroughs that create cascading effects. One example of this dynamic is illustrated by the numbers highlighted in the preceding paragraph—i.e., the GHG benefit that could be achieved by switching the fuel mix (and percent renewable energy generation) in Boulder's energy generation. This step could by itself result in 30-50 percent reduction in Boulder's GHG emissions within the span of just a few years. This might then be followed by a number of years in which the levels do not change significantly, or at least not as dramatically. Another example of this dynamic is the role of federal vehicle efficiency standards, carbon emission legislation or other "game changers" that are beyond the city's control, but could result in significant GHG reductions as well as new strategic opportunities.

  These dynamics suggest that five and 10 year targets are more likely to be useful as measures of progress than annual targets. This does not, however, diminish the importance of annual evaluation and reporting to carefully monitor changes to quickly spot any trends that show deviations from

expected dynamics. This is discussed in more detail in the monitoring and adaptive management section below.

- *Reductions must be sustained:* It is also important to clarify that each decade's GHG reduction target is in addition to reductions attained previously, and must be maintained to sustain the long-term decarbonization goal. For example, any energy efficiency gains achieved must be maintained—whether it is ensuring that upgraded appliances continue to achieve high efficiency, or changes in behavior that must be sustained to maintain lower energy use. This further underscores why energy source replacement is in many instances a more sustainable carbon reduction approach. Once an energy source is in place, it is typically productive for many years, possibly decades. A behavior change, by contrast, could be disrupted if economic or other conditions shifted that were needed to reinforce a behavior change. Understanding—and mitigating—these types of barriers will be important to lon-term success.

Translating Targets into Meaningful and Motivational Measures

Another key factor in the success of the Climate Commitment will be finding ways to translate the aspirational intent of the long-term goal into shorter term measurable changes that are meaningful and motivational to the community and other key entities. Recent polling demonstrates that while awareness of climate change is growing, previous approaches to messaging that focused on the perils, or behavior change that implied austerity or sacrifice, all had diminishing effectiveness at mobilizing individual behavior change or collective social or political action. This research suggests that sustained change motivation requires depicting a future condition with tangible personal benefit to excite and inspire action. These objective measures must also show progress that reinforces confidence in achieving the envisioned future.

A critical element of the community outreach and engagement campaign will be finding ways to translate the goal and targets that are being developed into a meaningful and inspirational vision for Boulder's future, linked to clear, tangible benefits for residents and businesses. If, for example, large-scale distributed generation emerges as a key opportunity and priority, linking the carbon reduction benefits with the personal benefits of lower utility bills and personal energy independence.

A second major emphasis in the translation of Boulder's climate action goal and near-term targets is in raising community awareness regarding the significant economic and community development potential of being a leader in the emerging low-carbon economy. Communities like Portland, Seattle and Fort Collins and countries like Germany and Denmark are already beginning to demonstrate that aggressive pursuit and promotion of low-carbon innovation—both public and private sector—creates significant economic development benefits. These enhanced opportunities—from new jobs to attracting new investment—can position Boulder to continue to be on the leading edge of the new energy economy. In this way, Boulder's Climate Commitment becomes a much larger benefit and asset to the community in both protecting our local and global environment and serving as a long-term strategy for economic vitality.

5. Strategy Considerations

The starting point for constructing a goal to carbon neutrality or a similarly ambitious reduction is the recognition that the goal is fundamentally about the community's relationship to energy. This is two-fold, encompassing both **how the community uses energy** and **where this energy comes from**. Carbon neutrality as a goal is essentially about choosing the balance between how much energy use reduction the community can achieve (while maintaining economic activity and vitality) combined with how much renewable energy can be produced. As energy history demonstrates, it is likely that the most prosperous

communities will be those that lead this shift. For the current energy shift, leading communities will be those that can maximize energy conservation (reduction) and efficiency (doing more per unit of energy) with the development of non-fossil fuel energy.

The strategy options under examination by the staff and consultant teams are presented below using the six major categories outlined in the 2012 Climate Commitment framework (i.e., Ramp Up Renewables, Better Buildings, Travel Wise, Waste Not, Grow Green, and Count Every Drop). Three—Better Buildings, Travel Wise, and Ramp-Up Renewables—are the focus of this analysis, as they represent over 90 percent of the energy use or production factors currently being considered.

Better Buildings & Travel Wise: How the Community Currently Uses Energy

The Better Buildings category represents all of the structures in Boulder—both those used for residence and those used for commercial/industrial activity. Consequently, the people responsible for emissions in this category include both those who live in Boulder and those who work in the community. Typically, building operations (i.e., heating and cooling) account for approximately 40 percent of emissions. Another 40percent of emissions occur as a consequence of energy used for activities within those buildings (i.e., residential, commercial, and industrial). These proportions between operations and activity vary somewhat between residential (higher activity), commercial (higher building operation) and industrial (higher activity).[7]

Travel Wise refers to all transportation related emissions and is responsible for approximately 20 percent of Boulder's GHG emissions.

Options for Inducing Energy Conservation & Efficiency
The city government has four broad areas of potential authority or influence through which it can influence energy use. These include:

- Financial—Utilization of incentives, financing mechanisms, procurement
- Regulatory—Ordinances, fees
- Innovation/Technology—Grants, pilot utilization
- Education/information—Education programs, community-based social marketing

Table 4 displays the potential application of these forms of influence in relation to the three major areas of energy use/greenhouse gas emissions.

[7] Please see Attachment A for additional analysis and sources.

Table 4
City Government Options for Influencing Carbon Emissions by Focus Area

Form of Influence	Better Buildings (~80% of GHG emissions)		Travel Wise (~20% of GHG emissions)
	Building Operations (40%)	Activity within Buildings (40%)	
Financial	incentives for retrofitting; financing for energy efficiency upgrades; procurement		Ecopass discounts; subsidized commuting programs; transit investment; infrastructure development
Regulation	building code requirements; Smart Regs; commercial energy efficiency strategy		parking management
Innovation – Technology	city facility retrofits; demonstration projects/pilots; grant programs to foster innovation	grant program to foster innovation	alternative fuel fleet acquisition, community charging station development (EV)
Education – information	building owner education; promotion of programs; school education programs; community-based social marketing	community-based social marketing campaign around reducing energy use	education programs, community-based social marketing

This assessment demonstrates several important factors in assessing strategy options. First, the city's primary area of influence in the built environment is primarily through its capacity to establish building code requirements. Boulder has developed some of the most extensive efforts of any city in raising the standards of energy efficiency in new construction and existing buildings. However, as subsequent analysis will demonstrate, even with very effective energy efficiency requirements that achieve as much as 50 percent reduction in these categories, the total contribution towards emissions reduction would likely be less than 20 percent (or half of the 40 percent contributed by building operations). These code driven efficiency gains are critical—they significantly reduce additional emissions growth. However, in the other major area of emissions associated with the built environment, specifically the activities that take place within the structure (any activity that uses energy not associated with heating and cooling), the city has much more limited influence. This begins to demonstrate the upper limits achievable through regulatory approaches.

Transportation represents a similar challenge. With additional innovation in technology, continued evolution of policy mechanisms and increased funding, strategies could approach 50 percent reduction in current transportation emissions (a potential overall GHG emissions reduction of 10%). Even with relatively high levels of conservation or efficiency, building operations and travel together are unlikely to achieve half the emissions reductions necessary to reach the climate goals being considered. This assessment is substantiated by reviewing the city's previous assessments of its current and projected demand-side management programs and a preliminary assessment of additional demand side reduction options.

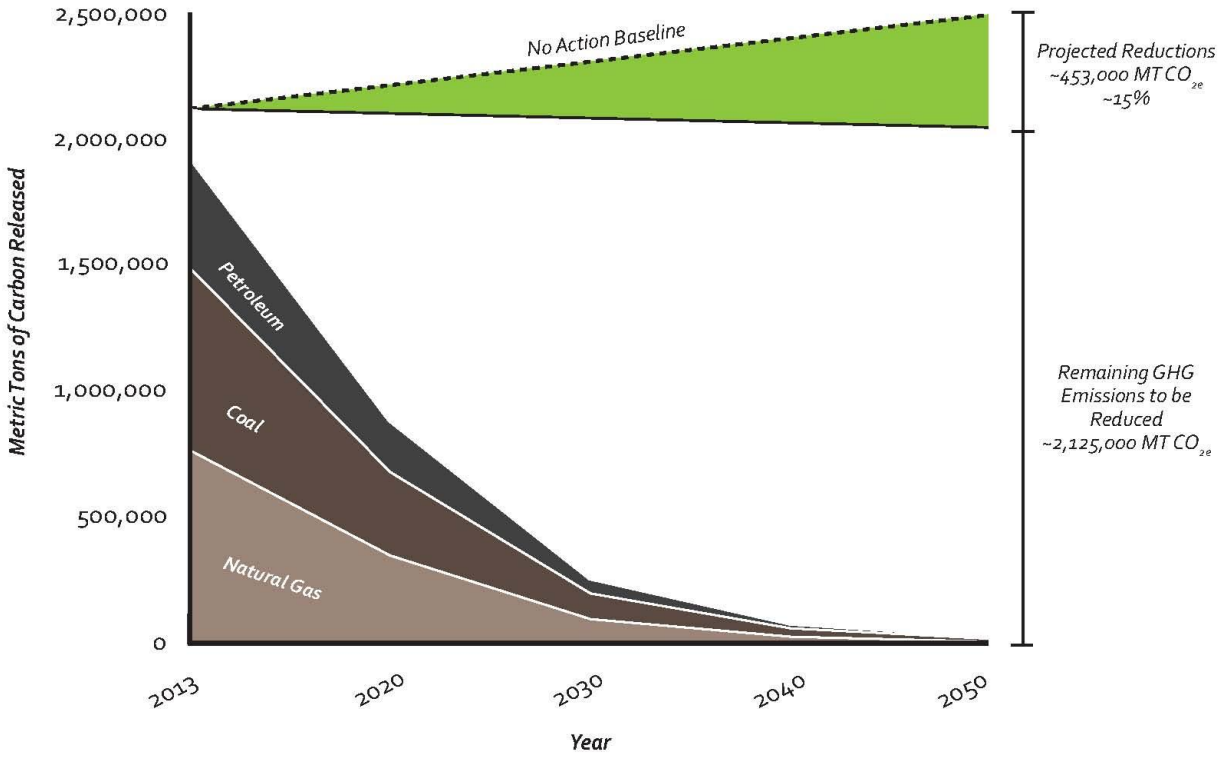
Contributions from Existing Programs
The City hired Rocky Mountain Institute and The Brendle Group in 2012 to conduct an assessment of the effectiveness of existing energy efficiency programs and their future GHG emissions reduction potential based on existing funding availability and program configurations. (See May 22, 2012 City Council study session for RMI report and July 24, 2012 study session for Brendle Report.) As part of the Climate Commitment work in 2013, the Brendle Group has updated this earlier analysis to include more recent

information and to incorporate several additional programs such as the energy efficiency requirements being increased in the building codes and potential addition of a commercial energy efficiency ordinance.

Figure 4 shows these reductions plotted against an estimated baseline of GHG emissions that would occur if no actions were taken.

Figure 4

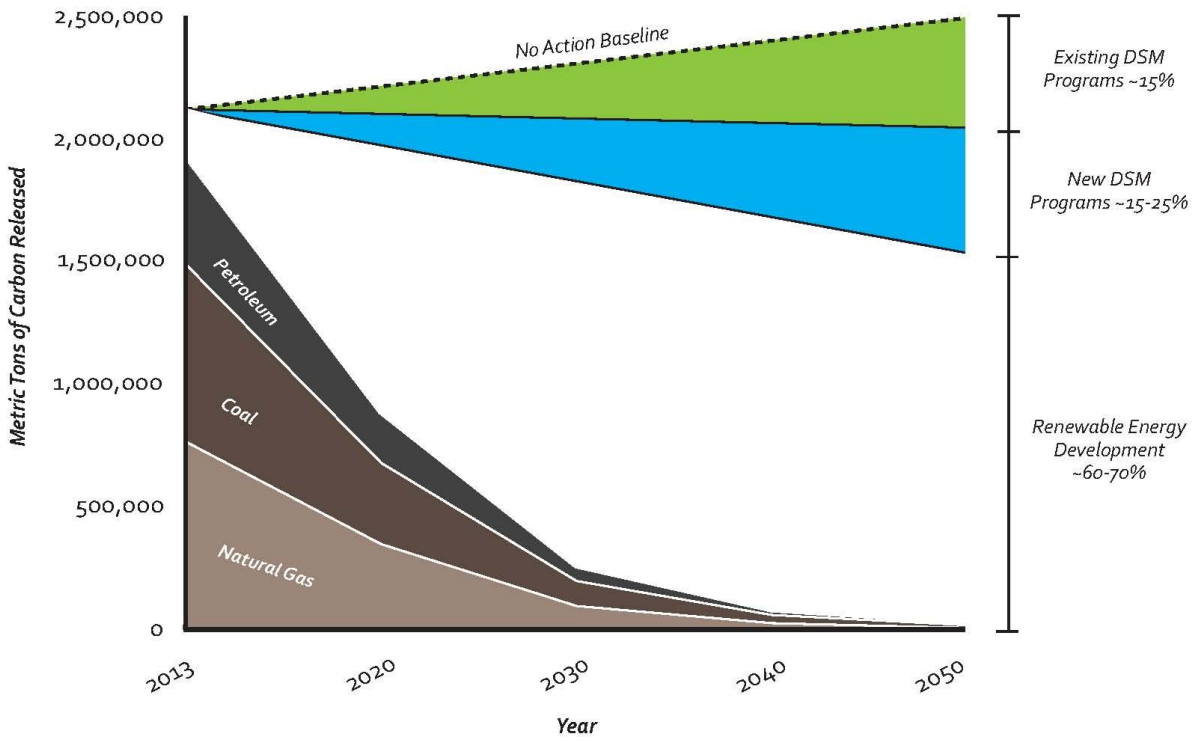
Projected GHG Emissions from Existing Conservation and Efficiency Programs



Potential for Additional Conservation/Efficiency Programs

A wide range of additional conservation and efficiency measures are being evaluated as part of the strategy development process currently underway. However, given the limits in scope of influence that the city has in some of the major areas of energy use, the total anticipated reduction—even with a range of additional conservation and efficiency measures that significantly expand current efforts—is not likely to exceed 50 to 55 percent of needed GHG emissions. The combination of existing and potential conservation and efficiency programs are depicted in Figure 5.

Figure 5
Existing and Projected Conservation and Efficiency Program Contributions to GHG reduction



It is important to note that this analysis is based on evaluation of existing technologies and approaches. There will undoubtedly be significant technical and technological innovation over the 33 years between 2013 and 2050 that will lead to new approaches that can reduce energy use and increase energy efficiency.

Ramp-up Renewables—Energy Supply

The analysis above demonstrates that significant expansion in non-fossil, renewable energy sources is a prerequisite to achieving significant GHG reductions. The potential of achieving a substantial increase in non-fossil-based energy is considered by examining both existing renewable energy potential in the present energy utility context, and additional options that might be possible under alternative utility configurations.

Existing renewable energy development potential

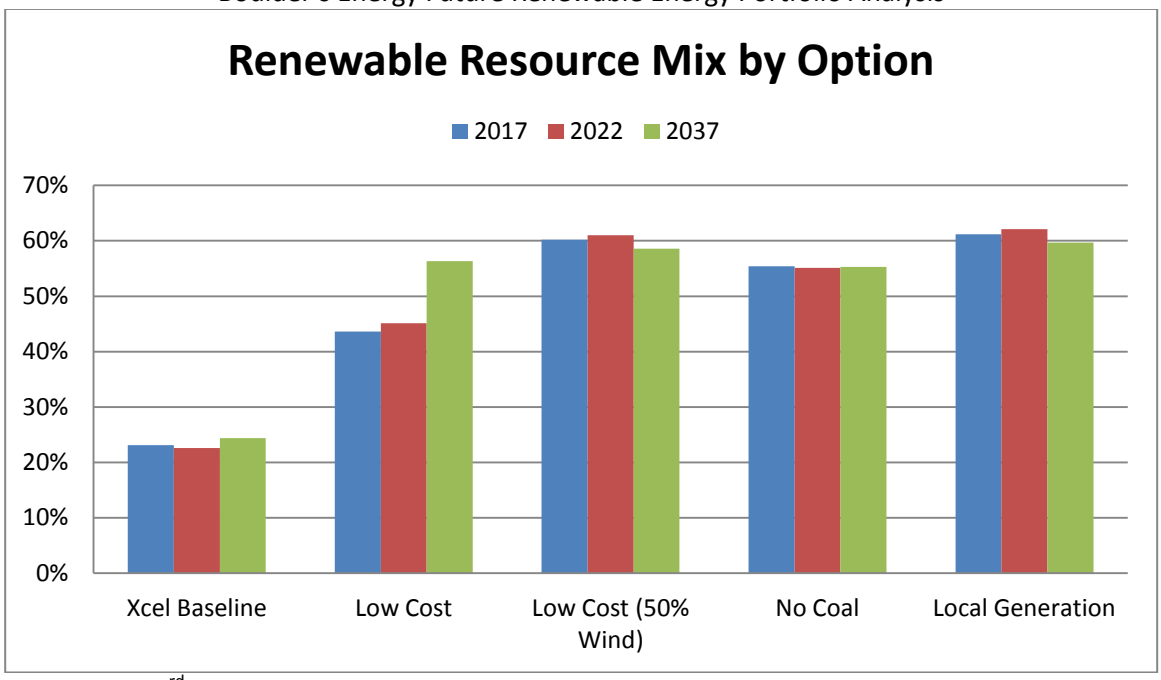
Presently, over 90 percent of Boulder's energy supply comes from high-carbon sources—coal (34 percent natural gas (36 percent and petroleum-based transportation fuels (21 percent Renewables are the source of close to 10 percent of the energy utilized in the community. Xcel, Boulder's electric and natural gas utility, has not indicated plans to invest in renewable generation beyond its current regulatory requirements in ways that would substantially alter this figure. However, it did signal its openness to considering new programs and services that could increase renewable generation as part of recent partnership discussions with the city and a community working group. [8]

[8] Importantly, another key factor is the way in which renewable are integrated within the overall energy system (i.e., whether they are displacing fossil fuel generation).

Potential additional renewable energy development
A substantial factor in determining the ability to develop significantly increased renewable energy resources will be the choices made in the current investigation of municipalization or other initiatives related to Boulder's energy supply. As the preceding analysis indicates, achieving a low-carbon (80% reduction) or carbon neutrality goal would rely on a mix of strategies. In the Ramp Up Renewables focus area, it would require supplying up to 60-70% of Boulder's future energy needs from renewable sources. Consequently, the scale of potential renewable energy development is a key metric in choosing among potential strategies.

The analysis being conducted for Boulder's Energy Future projects that 60+ percent of Boulder's electricity could be generated from renewable energy resources (a mix of local distributed generation and wholesale power purchases) with minimal impact on rates. Of particular importance is the possibility that the shift to 21enewable could take place within the next five to seven years. Achieving such emission reductions quickly (e.g., within the next decade) would be a significant step in achieving a long-term GHG goal, and could even facilitate subsequent reductions. The critical sequencing of reduction strategies is discussed in the next section. Figure 6 shows the growth in renewable energy in several scenarios of municipalization.

Figure 6[9]
Boulder's Energy Future Renewable Energy Portfolio Analysis



Source: July 23rd, 2013 Study Session Memo on Municipalization

[9] From the July 23rd Boulder City Council Study Session on Muncipalization

The consultant team will evaluate and model other potential scenarios in search of significant renewable energy expansion potential using the same "form of influence" analysis conducted above. Table 5 summarizes the major categories of strategies the team will evaluate.

Table 5
"Ramp-up Renewables" Strategy Focus Areas

Form of Influence	Ramp-Up Renewables Actions
Financial	Incentives & rebates; financing mechanisms; investment in energy assets
Regulation	Municipalization; PUC advocacy; legislative advocacy
Innovation – Technology	Grants; piloting technology; financing; investment
Education – Information	Information, community-based social marketing

Additional Strategy Considerations

Some of the potentially significant reduction strategies being studied require prior implementation of other strategies before they can achieve full benefits. Examples of this dynamic include:

- Expansion of local low-carbon energy production—Significant expansion of local and onsite energy generation, for example, will require a number of local grid upgrades as well as policy and utility authority changes to accommodate these types of resources.
- Electric Vehicle Adoption—Significant conversion from petroleum-based to electric vehicles could serve as an effective strategy for decarbonizing local travel (currently over 40 percent of transportation GHGs), but only if the source electric energy is no longer predominantly carbon based.
- Transit-oriented Development—Creating integrated neighborhoods (e.g., 20-minute walk, ecodistricts, etc.) will require decades-long community planning and design initiatives that integrate multiple services and multi-modal infrastructure development. Long-term planning efforts initiated now will not come to full fruition for years, but are nonetheless central to achieving long-term goals.

Due to these potentially significant enabling relationships between strategies, the focus of implementation may differ significantly in one period versus another. For example, early stage utility operations changes that enable large-scale renewable energy development will likely be a critical prerequisite to successfully staging other strategies like natural gas replacement or electric car adoption that depend on these prerequisite actions.

Next Steps in Strategy Identification and Development

A long list of potential strategies for consideration in both demand side (conservation and energy efficiency) and supply side (increased renewable energy production) is being compiled from the benchmarking work examining 17 leading cities and their climate action efforts, as well as research and

best practices being compiled by the project team and consultants. These are organized by focus area (Better Buildings, Travel Wise, Ramp-up Renewables) and discussed further in the white paper in **Attachment A**.

Based on initial analysis of the potential emissions reduction potential of each, a shorter list of strategies will be developed and shared with the public and the formal advisory groups, including the Environmental Advisory Board the Transportation Advisory Board. Initial presentations on the scope and approach of this project have already been presented to both the EAB and the TAB. Further presentations will be made to these boards and Planning Board, as appropriate, as more specific strategy recommendations emerge. With the transportation-related strategies, the climate commitment team is working closely with both the transportation staff and TAB to insure that any transportation-related recommendations are developed and encompassed as part of the Transportation Master Plan update. In addition, the city anticipates forming a technical working group of local climate action specialists in August to provide additional technical expertise and cost/benefit evaluation of the options being explored.

6. Monitoring and Adaptive Management Systems

The fourth core element of the Climate Commitment is a more comprehensive and systematic approach to the monitoring and evaluation of actions being taken by both the city and the larger community that impact GHG emissions or sequestration. Significant steps have been taken to build a more robust and real-time data gathering, management, reporting and forecasting system to enable the city to track progress toward the Climate Commitment goal.

Data management and reporting platform

As part of the assessment of the city's previous climate action efforts, council and staff identified the need for substantial enhancement of the city's climate-related data management. The 2013 Climate Commitment scope of work included funding from the CAP tax to secure technical support in the development of a new data management platform and reporting system that will standardize the collection and reporting of GHG-related data for city operations as well as the larger community. This system is being developed by the consultant group SWCA based on the internationally-recognized ICLEI protocol.

- *City Operations*: The new data management system will integrate all of the information previously gathered on city operations through the McKinstry energy performance contract and provide a mechanism for city staff to maintain and manage this data and monitoring functions. McKinstry has been actively involved in assisting the collection and integration of its previous work on the 2008 and 2011 city operations assessments. Close coordination is also taking place with both the city's Information Technology and CP&S' Information Resources departments to ensure ease of integration of the new platform within existing data gathering and management systems. This should minimize the additional workload for staff in various departments to integrate data relevant to city GHG emissions and mitigation activities as part of their regular information workflow.

- *Community Actions*: The new system will provide, for the first time, a consistent and replicable process for gathering community-wide emissions information, thereby allowing for a more accurate year-over-year assessment of the impacts of various GHG-reduction strategies. Complete integration and harmonization between the new data management system and prior-year community GHG reporting is expected to be completed by the end of August. It is likely that the final numbers will be different than

previous reporting given the inclusion of some new emission sources that were not previously covered by earlier reporting protocol. However, once finalized, the new system will provide a stable baseline for monitoring ongoing changes in community GHG emissions. Nonetheless, there will continue to be challenges in effectively reporting certain emissions information based on the ongoing challenges in receiving timely and accessible electricity and natural gas data from Xcel Energy. Dockets are under consideration at the PUC in an effort to clarify and improve these information exchange issues. This issue is likely to be eliminated completely if the community chooses to move forward with creating its own electricity utility.

A brief demonstration of some of the features of the new data management system will be included during the study session presentation.

Internal Data Management Capacity

As part of a larger effort to integrate and effectively track all of the Local Environmental Action Division (LEAD) programs and other climate action efforts, the city has hired a sustainability data analyst to a two-year position to significantly upgrade the program performance monitoring capabilities of the department. This staff position will coordinate the work of the IT and IR departments to create a data warehouse that as a single integrated data storage area for all city-related environmental sustainability data. This data warehouse will also serve as the data storage location for all of the information tracked by the new Climate Commitment GHG reporting tool.

7. Community and Partner Engagement Plan

Community engagement is the fifth element of the Climate Commitment and sits at the center of both its development and subsequent implementation. With the magnitude of the community's possible Climate Commitment goal and what staff believes is a necessary shift toward more positive and relevant messaging, the city has developed a communications and outreach plan that utilizes a combination of both proven and new strategies. These include:

- Segmenting the community conversation into phases that are easy for the public to understand. Each phase will offer clear milestone points for entry, engagement, and feedback about Boulder's Climate Commitment;
- Developing an identity and over-arching brand for Climate Commitment planning and resulting service delivery efforts so that the community recognizes both the issue and the steps being taken, together, to respond;
- Re-engaging the community in an understanding of and discussion about our collective climate goals and the relationship between demand programs and changing the carbon intensity of our energy supply; teeing up a meaningful community conversation about individual vs. collective action and the appropriateness of each;
- Identifying areas where community members, both as individuals and in a collective sense, can have the greatest positive impact;
- Leveraging existing resources and exploring less traditional strategies that could boost engagement during the appropriate phases of the planning process; and
- Utilizing city volunteers and community members to serve as climate ambassadors to their social networks, helping to communicate why climate action is a top priority and what we, as a community, are considering doing to make a real impact.

Outreach & Engagement Plan

The community outreach and engagement plan consists of three phases.

- *Phase I: Refreshing the Climate Commitment Story.* The first phase was soft launched in July, as staff began to relink the discussion about whether to create a municipal utility to our community's climate related goals. It is expected to become more prevalent in August and perhaps into early September. This ground-setting phase consists of re-casting the climate story and working with the community to re-imagine what's possible. While much of the communications and outreach work will occur in-house to stretch the reach of the budget, the city has contracted with Vermilion, a local communications strategy firm, to assist with developing a brand identity and a toolkit of materials. This toolkit will include a central website with downloadable content that appeals to a variety of audiences, including members of the business community who are critical partners to achieving a more ambitious GHG goal. The toolkit is also likely to include the production of several short videos that feature Boulder community members telling personal climate stories, i.e. how does having a healthy and thriving community matter to them and what steps are they taking to get there? The budget also includes advertising in local media and in visible locations, such as Boulder buses.

  In addition to this professional consulting work, the Climate Commitment team anticipates engaging the community in the exploration of goals and targets, as well as ways to motivate broad participation.- Climate action has always been driven in Boulder from the grassroots level and we are fortunate to have many experts and specialists in the field who are willing to collaborate, both in terms of setting goals – long and short-term – and developing approaches to achieving them. Building off the success of the working group approach that was modeled in the development of EnergySmart and most recently by the Energy Future team, staff is assembling a Climate Commitment technical working group to help guide scenario formation and testing. This group will have up to 15 members covering a broad base of expertise. Like the Energy Future working groups, these working members will be advisory and will helping vet assumptions for ambitious but realistic goals and identifying ways to engage the community. It is anticipated the group will meet three to four times during the remaining months of 2013 and into early 2014. The EAB will continue to play an important role in guiding the Climate Commitment policy-related directions.

- *Phase II: Outreach on Objectives and Strategies.* Feedback received from the working group and EAB will form the basis for much of the engagement in Phase II, which will occur from September into early 2014. During this phase, the city will work to gather feedback about proposed targets and possible ways to achieve these from a broader cross-section of Boulder. Consistent with the desire to emphasize the positive and lasting benefits of sustainability on our community's resiliency and well-being, staff will be looking for opportunities to participate in or create events where individuals can learn about how all of the city's and community's efforts relate to one another. This outreach is likely to include open houses and tabling at related events, as well as neighborhood- and more informal social network-level interactions. As much as possible, the city will be looking for opportunities to combine messaging about like initiatives to avoid overwhelming or saturating the public. The staff team is also looking to engage young people in this important conversation, perhaps through a video competition, which will culminate in the mid-to-late fall.

- *Phase III: Summarizing feedback and finalizing options for consideration.* Phase III will consist of helping to prepare written materials, publicizing boards and commissions and council meetings and collecting

feedback to help decision-makers understand the community sentiment around the commitment, in general, as well as specific targets and possible approaches to meeting them.

Integration of Community Engagement in Ongoing Climate Commitment Efforts

A key feature of the new Climate Commitment effort is a more dynamic and real-time system for tracking progress and supporting continuous program improvement utilizing the city's new data management and reporting platform for all city and larger community efforts. The ability to gather and synthesize new information in a more dynamic way will also help support ongoing community engagement. As part of the next generation Climate Commitment process, staff intends to create more active ongoing engagement mechanisms to insure that the actions taking place are both effective and responsive to the core issues and concerns of the community.

8. Next Steps and Near-term Action Plan

Next Steps in Refining and Testing the Climate Commitment Goal, Targets and Strategic Priorities

Potential near-term targets and related strategy implications are still in the process of development and analysis by consultants and staff, with preliminary results anticipated by late August. These will be offered for review through both the community outreach and the technical working group processes described above. Staff anticipates a recommended goal and action plan available for council review by the end of 2013, with adoption in early 2014.

Following is a summary of the anticipated schedule for what is envisioned as an iterative process of refining potential targets and strategies in the coming months:

Program Component	Timeframe for Completion
Goal Options Analysis	May – August 2013
Target Setting & Strategy Analysis	June – October 2013
Data Management Platform Design	April – October 2013
Community Outreach & Engagement	July – Early 2014
Climate Commitment goal/target adoption	First quarter, 2014

Near-term Action Plan

Consistent with the core principle of "avoid analysis paralysis," the staff team is also devoting time and effort to a number of 2013 action initiatives that will help reduce GHG emissions in both the near- and long-term. These are listed and briefly described below, with relevant dates or milestones noted as appropriate:

1 *Continue to work toward decarbonization of Boulder's electricity through either municipalization or a new partnership with Xcel Energy.* Significant short-term decarbonization of source energy is a fundamental prerequisite to achieving long term climate goals. Increasing renewable energy sources by as much as fifty percent in the next 7-10 years is a minimum achievement threshold to maintain

sufficient progress sufficient for either a carbon neutral or 80 percent by 2050 goal. Council is reviewing the most recent analysis results related to this issue at its July 23, 2013 study session.

2 *Adopt updated energy codes.* Work related to the updating of city building codes, including analysis of energy code requirements and the related GHG benefits as well as construction cost impacts, was completed in 2013 and presented to the Planning Board in June. Recommended code updates are scheduled for Council consideration on August 20 (first reading) and September 3 (second reading).

3 *Continue to demonstrate the integration of GHG reductions in a master plan through the TMP process.* The staff and consultant teams working on the Transportation Master Plan update and on Boulder's Climate Commitment have been collaborating to analyze and evaluate the potential GHG benefits of alternative transportation strategies and investments. The results of this work will be shared and discussed with Council during future study sessions on the TMP.

4 *Pilot neighborhood / district approach to sustainability data and action through the Pecan Street partnership.* The city is working with a team from the Pecan Street Research Institute to develop a pilot energy data program in Boulder based on PSRI's work in Austin and other communities. In addition, a cross-department team from transportation, utilities, energy and community planning has been exploring the "eco district" concept that would approach "sustainability infrastructure" investments in related programs at a neighborhood scale. These interrelated efforts are discussed further on page 34 of this memo.

5 *Work on a comprehensive approach to "education for sustainability" across departments and with key partners.* A team of city staff involved in delivering or funding sustainability education programs to schools and local groups has been meeting to develop a more coordinated approach to program design, funding and delivery. This team will continue to meet to develop an integrated strategy in collaboration with Boulder Valley School District and nonprofit groups involved in education for sustainability.

6 *Add "community design" as a key area for climate action.* The increased focus on "walkable neighborhoods," integration of transportation and land use planning, and other strategies for reducing energy use in the built environment has heightened the awareness of how land use patterns are essential to long-term emission reduction strategies. As a result, the Climate Commitment graphic is being revised to reflect "community design" as a seventh pillar of action (see page 7-8). The staff team is considering how GHG reductions could be addressed in upcoming projects such as area planning and the 2015 Boulder Valley Comprehensive Plan update.

7 *Continue Peer-to-Peer Learning Exchanges / Co-sponsor Net Zero Cities conference.* In recent months, the city teams involved in multiple sustainability initiatives have hosted peer-to-peer learning exchanges with other cities, including a visit from Portland's director and deputy director for Planning and Sustainability as well as colleagues from Fort Collins and Denver. The Boulder team is also involved in a peer learning initiative on commercial energy rating and reporting through the Urban Sustainability Directors Network. These exchanges have been proven to be extremely productive and mutually beneficial. One outgrowth has been a recent agreement for Boulder to co-sponsor the Net Zero Cities conference in Ft Collins this October (website at www.netzerocities.net). Additional information about this learning opportunity will be provided in the July 30 study session presentation.

Additionally, staff will continue to work on the energy efficiency programs and initiatives outlined in the next section, including continued delivery of EnergySmart services, implementation of SmartRegs, a new energy data pilot for both residential and commercial buildings, continued partnership with large commercial property owners, work toward development of a commercial energy rating and reporting ordinance and/or program, and launch of the new market innovations competition. More detail on each of these areas of action is provided in Section II of this memo.

II. ENERGY EFFICIENCY AND MARKET INNOVATIONS PROGRAM UPDATE

Introduction

In November 2012, voters approved the Climate Action Plan (CAP) tax extension with astounding support. At its Dec. 11, 2012, Study Session, City Council provided guidance on CAP program priorities. The background on the CAP tax and priority programs for 2013 can be reviewed in the Dec. 11, 2012 study session memo.

On March 19, City Council received the last update on the city's CAP programs, most notably, the EnergySmart 2013 first quarter report on accomplishments (see March 19, 2013 information memo).

While the U.S. Department of Energy (DOE) Better Building grant (ARRA) funding ended in May 2013, the City of Boulder and Boulder County continue working together to provide EnergySmart services at a reduced funding level through 2013 and beyond. During this time period, the city continues to utilize CAP funds to supplement county funds and enhance residential and commercial services within the city limits. As previously reported to council, the countywide goal to reach 10,000 residential units by the end of the federal grant funding was achieved, with the city accounting for approximately 60 percent of the total, and rental units seeking SmartRegs compliance accounting for approximately 40 percent of the total.

Other city efforts are also helping improve energy efficiency in buildings, though are not CAP tax funded. These include the adoption of new building and energy codes, and increasing the efficiency of city-owned buildings and facilities through an Energy Performance Contract. These two work plan items will be reviewed by council in the third and fourth quarters of this year, respectively.

This section of the memo, focused on providing updates for energy efficiency programs funded by the CAP tax, is organized in three parts:

1. Residential Energy Efficiency
    a. Residential Program Updates
    b. Residential Program Delivery Evaluation
    c. Boulder County Community Sustainability Matching Grant
    d. Residential Outreach

2. Commercial Energy Efficiency
    a. Commercial Program Updates
    b. Commercial Building Energy Rating and Reporting
    c. Commercial Outreach
    d. Next Steps

3. Market Innovations

1. Residential Energy Efficiency

Residential Program Updates

The City of Boulder and Boulder County have worked to transition the EnergySmart program seamlessly from federal grant funding to solely city and county funding. While the program capacity has been reduced, uptake remains strong. As outlined in **Attachment B**, more than 6,000 residential units in the city have enrolled in EnergySmart to-date, and nearly half of them have completed an upgrade. The countywide goal to reach 10,000 residential units by the end of the federal grant funding was achieved, with the city accounting for approximately 60 percent of the total, and rental units seeking SmartRegs compliance accounting for approximately 40 percent of the total.

The 2012 SmartRegs' benchmark was to reach 5,000 units inspected and 2,500 units compliant – both goals were exceeded, with 5,057 units inspected and 2,619 units compliant at the end of 2012. Through the second quarter of 2013, approximately 6,000 units (cumulative) have been inspected and more than 3,000 units have been deemed compliant. Further detail on the SmartRegs program is provided in **Attachment C**, which displays the following data:

SmartRegs Baseline and Final Compliance Information:
3,362 units were compliant through second quarter 2013.

- 1,936 units were compliant at their initial (baseline) inspection, of these:
  - 1,265 units (65 percent) were MFU's (multifamily units);
  - 98 units (5 percent) were single family homes; and
  - 573 units (30 percent) are not designated by housing type.
- 126 units were compliant by way of an exception.
- 1,300 units have come into compliance after the initial inspection, of these:
  - 633 units (49 percent) became compliant from the quick install measures provided by EnergySmart; and
  - 667 units (51 percent) became compliant after completing an upgrade.

SmartRegs Investment and Rebate Information:

- The average cost for units that were not initially compliant but made investments to reach compliance (labeled "baseline non-compliant, final compliant") was $2,734 before rebates.
  - The average rebate in this category was $682.
  - The average cost for units that were initially compliant but made investments anyway (labeled "baseline and final compliant") was $1,886 before rebates.
  - The average rebate in this category was $450.

SmartRegs Energy and Financial Savings Information:

- The average annual energy savings in units that were not initially compliant but made upgrades to reach compliance (labeled "baseline non-compliant, final compliant") was 403 kWh and 104 therms.
- The average annual financial savings in this category was $114.
- The average annual energy savings in units that were initially compliant but made upgrades not required by the ordinance (labeled "baseline and final compliant") was 316 kWh and 55 therms.
- The average annual financial savings in this category was $70.

Residential Program Delivery Evaluation

The city's CAP tax funds have traditionally been used to increase residential EnergySmart outreach and advisor services within the city, add rebates for city participants and provide administrative services. Additionally, these funds have been key to implementing a customized SmartRegs compliance path for residential rental property owners to help them meet the city's rental housing code requirements.

The end of the federal grant funding coupled with a shift in CAP tax allocations provides an opportunity to reflect on the program achievements, evaluate strategies, and consider how best to position the program – and the city's resource commitments – in a reduced funding environment. To this end, the city issued a request for proposals (RFP) and selected Cadmus to develop a four-year program that accomplishes the following:

- Fosters market transformation in the energy efficiency sector.
- Provides recommendations regarding appropriate level of support offered to rental properties seeking
- SmartRegs compliance (rebates and/or advisor assistance).
- Maintains steady momentum of SmartRegs inspections and units reaching compliance, leading to 100 percent rental unit compliance by the 2019 deadline.
- Strategizes funding of program components.
- Maximizes efficiencies of internal staff time.

The evaluation and plan is expected to be completed in September, with the results and recommendations being incorporated into 2014 work planning process. The county and Populus (the contractor that delivers EnergySmart residential services) are participating in the evaluation and plan development process.

Boulder County Community Sustainability Matching Grant

In May 2013, the county introduced its first Community Sustainability Matching Grant program, available to all communities in Boulder County to help further county-wide sustainability objectives.

The city applied and was awarded $15,000 to prepare a simulated training tool to increase the efficiency and reach of SmartRegs inspector training. Historically, SmartRegs trainings were designed as day-long, in-person sessions for individuals wishing to become SmartRegs inspectors, administered by the city and open to qualified individuals. A third-party consultant was contracted to instruct attendees on the SmartRegs Prescriptive Pathway checklist and its applicability in the field.

Prior to the new county grant announcement, staff had been investigating the possible development of a simulation (computer-animated software) training tool for a more accessible and financially sustainable alternative to in-person trainings. Given the innovative nature of the proposed training tool and limited budget, the city applied for and was awarded county grant funds. By expanding the original budget, a more customized platform with interactive lessons can be incorporated into the training software. Matching the $15,000 in CAP tax funds already allocated to this project, the county grant will provide an additional $15,000 towards the project. The new tool is expected to launch in summer of 2014.

Residential Outreach

As an on-going effort to evolve outreach to the residential sector, residential energy efficiency

communication strategies targeting single family units (SFUs) are now shifting to a community-based social marketing (CBSM) approach. CBSM prioritizes social networks and face-to-face interaction, relying on demonstrated successful techniques, such as personalized messages, social norming and voluntary commitments to reach residential customers and motivate action. Built into this approach is an emphasis on tracking outreach efforts to measure their effectiveness. Communications support will focus on driving EnergySmart enrollment within the city by targeting neighborhoods with a high number of owner-occupied homes and past participation in EnergySmart.

In addition, the city is continuing its partnership with Populus to drive multi-family unit (MFU) participation in the EnergySmart program and compliance with the SmartRegs ordinance. Concurrently, the city will continue to coordinate outreach efforts with Boulder County, identifying areas of cross promotion and opportunities for engagement around energy efficiency and other sustainability initiatives.

2. Commercial Energy Efficiency

Commercial Program Updates

The EnergySmart commercial program continues to demonstrate consistent participation through second quarter of 2013. Boulder County's commercial/ business sector grant funded goals were to provide 5,300 services to the commercial/business sector (reached 84 percent of the goal), and encourage 3,000 unique businesses to participate (reached 93 percent of the goal). Despite the end of the federal grant funding, the countywide program continues to build a strong customer base, brand recognition and on-going professional relationships.

Within the city, CAP tax funds have supplemented countywide grant funds, helping support higher levels of participation. The city's implementation goals were to provide 3,000 services and reach 1,800 unique businesses and commercial building owners by May 2013. The city achieved 95 percent and above toward both goals. Through the second quarter of 2013, 2,849 services were provided to Boulder businesses and commercial building owners with 1,753 unique businesses participating.

"Advising to Action" conversions have increased over time, as advisors have built ongoing customer relationships. Sixty-seven percent of all businesses advised to-date have invested in energy efficiency upgrades. More commercial EnergySmart details are provided in **Attachment D**.

Commercial Energy Efficiency Strategy Development

As set forth in the December 2012 study session memo and discussion, a key focus for the city's CAP tax investment in 2013 and beyond is on making dramatic improvements to energy efficiency in commercial buildings: the single largest source of local GHG emissions (due to the carbon intensity of the electricity supply, the large number of commercial buildings as a percent of the overall building stock, the age and inefficiency of those buildings, and the energy-use intensity of many Boulder industries).

As discussed in previous council study sessions on the topic, addressing commercial energy efficiency is challenging for many reasons: the diversity of building types, the "split incentive" between building owners and utility-bill-paying tenants, the diversity of business processes that drive energy use, the different ways in which businesses value (or don't value) efficiency investments in relation to other cash flow needs, and the lack of detailed energy use data to inform targeted upgrades and efficiency programs.

To develop a successful efficiency strategy for commercial buildings, the city has continued to learn from the delivery of EnergySmart services to businesses (developing relationships with participating businesses, learning about their needs and the obstacles to efficiency investments, and fine-tuning program and service options) while undertaking research activities to inform development of a more robust policy and program strategy.

In 2013, significant resources have been dedicated to the exploration of municipalization as well as renewed partnership discussions with Xcel Energy within the construct of a new community working group. These discussions have been a key focus of the Boulder community, including many Boulder-based businesses. From a GHG emissions perspective, these efforts may represent the most significant opportunity for significant emissions reductions in the coming 5 to 10 years through the switching of energy generation away from coal toward low- and no-carbon sources.

Because of the time and energy devoted to participation in these discussions by Boulder's key business organizations and partners, the city team has postponed the launch of any new significant outreach and engagement effort toward developing a new commercial energy efficiency policy framework and potential ordinance(s), until after council makes key decisions on next steps. Instead, several key work efforts have been completed or launched that will provide valuable baseline information for future ordinance development. Each of these is described briefly below.

- **Commercial Building Energy Rating and Reporting Pilot: Results and Next Steps.** Earlier this year, the Commercial Building Energy Rating and Reporting Pilot Program Report was completed, with summary results presented to council in its March 19 information memo.

  The consultant's recommendations based on the pilot program findings include:
  - Continue supporting a voluntary rating and reporting program similar to the pilot.
  - Investigate better ways to access whole building energy use data – i.e. potentially include utility data release in tenant lease, collaborate with Xcel Energy to set up an automatic electronic data transfer or online account, etc.
  - Investigate installing sub-meters and potentially offsetting some of the cost of purchase and installation.
  - Work with Xcel Energy to provide rebate and incentive programs for energy reduction in existing commercial buildings.
  - Continue to work with both building owners and tenants (partnering with programs such as *EnergySmart*) to gather energy data and develop new incentive or regulatory programs; the tenant and owner need to work together to create higher performing buildings.

The report provided insights into the challenges related to implementation of a commercial energy rating and reporting program, in particular the lack of a streamlined process in receiving energy use data. Multi-tenant strip malls and buildings proved to be extremely difficult for the rating and reporting process, and acquiring a high number of tenants' energy use data through the PUC's consent waiver process proved challenging.

Nationwide, nine major cities have adopted commercial building energy rating and reporting requirements. As a whole, those cities have diverse utility structures and governing policies at the city, state or utility level that support the streamlined access to whole-building energy use data.

Key factors that have contributed to success in these cities include:

- Participation and cooperation from the utilities
- Automated benchmarking service provided by utility electronically inputting energy use data into ENERGY STAR Portfolio Manager (ESPM)
- Access to whole-building energy use data

Following completion of the pilot, the city team has continued to work with commercial property owners and business tenants to support voluntary rating-and-reporting efforts and act on other recommendations outlined in the report.

- ***Pecan Street Research Institute: Circuit-Level Energy Data Pilot.*** In light of the barriers to accessing energy use data, the city has agreed to join a research pilot spearheaded by the Pecan Street Research Institute, a university-affiliated group in Austin, TX that is focused on developing and testing advanced technologies, business models and customer behavior research surrounding energy management systems[10]. The pilot initiative is supported by DOE grant funds and is being undertaken in several communities, including Fort Collins, to provide circuit-level energy data on a variety of building types. Pecan Street is offering grant funds for 50 residential units and the city is providing additional funding for 25 small business customers. The circuit-level data technology used by Pecan Street is provided by eGauge, a Boulder based company.

  Since Pecan Street is a research institute, the partnership agreement provides data protection to the customer while giving the city access to anonymized energy usage data. The effort is all "behind the meter or from the customer side of the meter" so neither the city nor the customer needs to go through Xcel to access their electricity data. eGauge provides real time data in one minute intervals at the level of individual circuits, allowing customers to better understand their energy use patterns and targeted efficiency opportunities. It will also provide information for the city that can help refine program and service offerings, and more refined baseline data for further development of a commercial energy efficiency strategy. Lastly, since Pecan Street has the largest data set of customers' actual energy use and uses the data for research purposes, the intent is to collect data for decades to come. For more project details see **Attachment E**.

- ***Eco-District Idea Exploration.*** Related to the Pecan Street research initiative, an inter-departmental city team has been engaged in discussions to explore the emerging "eco district" concept and its potential application in Boulder. EcoDistricts have been implemented in a number of US cities as an integrated approach to district- or neighborhood-level sustainability, linking green infrastructure investments to community organizing and "social capital." The City and County of Denver is in the initial stages of a similar exploration and pilot program, and the City of Fort Collins is exploring expansion of its existing FortZED project along similar lines. The Boulder city team has been participating in an EcoDistricts working group as part of the USDN and been discussions with the Portland Sustainability Institute (now the EcoDistricts Institute) regarding a potential Boulder visit this fall. A version of the EcoDistrict model

[10] www.pecanstreet.org/what-is-pecan-street-inc/

may be "piggybacked" onto the Pecan Street data pilot, linking energy data collection with the installation of similar "smart" water meters to provide better water use data and efforts to collect better transportation and waste/recycling data.

- ***Unico Properties* Energy Performance Contract.** Unico Properties is the largest owner of commercial buildings on the Pearl Street Mall, and is working with the city and EnergySmart on multiple energy efficiency retrofits within its building portfolio. Additionally, because Unico's strong sustainability mission, it has contracted with McKinstry to work on deeper energy retrofits sized for buildings less than 50,000 square feet.

  This private sector energy performance contract will not only result in greater energy efficiency, but will also benefit the city by identifying significant cost-effective measures in older, smaller size commercial buildings. The data from this project will benchmark the buildings' before and after energy use, verified by actual energy and cost savings data. The city team is grateful for the partnership and collaboration of both Unico and McKinstry in providing access to this valuable learning opportunity.

- ***Office Building Benchmarking Guide, Urban Sustainability Directors Network* (USDN).** Boulder is a participating city in an effort spearheaded by the City of Berkeley and funded by a grant from the USDN to develop an Office Building Benchmarking Guide for local governments. Since office buildings are the largest commercial building use in the country, a streamlined approach to rating and reporting (with an emphasis on hard-to-reach Class B[11] spaces) will have significant value to all of the participating cities.

  The three main components of the project: research, inventory analysis of office buildings, and a best practices survey of existing programs. Other participating cities in this project are San Francisco, Oakland, San Jose and Salt Lake City.

- ***Boulder – Portland Peer Exchange (USDN) .*** In April, sustainability directors and key staff from Portland, OR and Boulder spent two intensive days learning from each of the cities' work. This exchange was funded by the USDN. The purpose and outcomes of the meetings were to provide in-depth, high functioning, rapid exchanges of candid insights, emerging directions and lessons learned. The meeting topics focused on climate plans, EcoDistricts, carbon tax, energy efficiency programs, business and residential programs and engagement strategies and organizational structure. Fort Collins, Denver and Boulder County staffs joined in the conversations and presentations to leverage learning throughout the Front Range cities. The take-aways and relationships from the exchange were highly valuable and the on-going staff communications about best practices and lessons learned continue.

Commercial Outreach

To date, CEES communications support has largely focused on leveraging partner resources to organize and implement business outreach events. Most recently, the city sponsored and presented recognition awards as part of the annual Boulder County Business Report - Boulder Earth Conference on June 12. These awards recognized five businesses that worked through the EnergySmart program and achieved the most

[11] Buildings competing for a wide range of users with rents in the average range for the area. Building finishes are fair to good for the area. Building finishes are fair to good for the area and systems are adequate, but the building does not compete with Class A at the same price. www.boma.org/research/pages/building-class-definitions.aspx

impressive energy and cost savings. The estimated combined energy savings from the five businesses' energy efficiency retrofits total the energy to power 490 Boulder County houses.

The most significant upcoming communications initiative is the development of an overarching brand and suite of new outreach materials that streamline current business sustainability services into a single, customer-friendly "one-stop shop" beyond what EnergySmart has created. A similar approach was taken by Portland, OR recently and has contributed to their overall success with business outreach related to sustainability. It is anticipated that future communications capacity will be dedicated to developing the messaging, communications and outreach for a commercial building energy rating and reporting ordinance.

Next Steps

The focus of efforts over the remainder of 2013 will be to continue pilot programs and other efforts to refine more comprehensive and aggressive initiatives for advancing commercial energy efficiency. These include:

1. Convene focus groups with leading energy services companies, commercial building owners and tenants to discuss best practices for tracking and monitoring energy use for the building structure and business operations.
2. Organize panels and/or working groups during the NetZero Cities conference in October related to new initiatives, including (potentially) commercial building rating and reporting; community based social marketing and other behavior-change strategies; and EcoDistricts.
3. Draft collaborative learning objectives, opportunities and work efforts from the two Pecan Street pilot projects in Fort Collins and Boulder.

3. Market Innovations

Overview of Program Development

One of the recommendations that came forward as part of the 2012 review of the city's previous five years of CAP programs was the development of a Market Innovation or Open Request for Proposal (RFP) Program. The general purpose of the program is to solicit innovative strategies to reduce GHG emissions from the Boulder community, in recognition that city CAP-funded programs need to be paired with private sector efforts to achieve our community goals. Specifically, the stated objective of the program was to foster innovation that leads to private sector adoption of GHG emission reduction strategies.

The mechanism currently being considered for implementing this objective is the establishment of a RFP process that invites innovative GHG reduction strategies from individuals, businesses or other organizations. Staff has been referring to the program as "Market Innovations," however a more specific name reflective of the program's objectives is still under consideration.

As program development continues, several key issue areas have emerged that staff has been working through with input from the Environmental Advisory Board (EAB). These areas of current program development include:

- Scope of program – what types of initiatives should be solicited;
- Funding strategy – what kind of cost-effectiveness requirements, if any, must a proposal meet to be considered for funding; and
- Engagement of the community/professional expertise.

Regarding the engagement of community/professional expertise, the next step for the program is to form a working group of community members with divers experience to assist with further program design and administration. The EAB has provided input that the working group should include a broad range of participants, with experience in areas such as venture capital and high tech companies (not necessarily energy-related), along with potential members from University of Colorado, NREL, and other federal labs. The working group will assist with further program development and oversight in order to avoid staff resources being taxed too heavily.

Specific proposed tasks for the working group include:

Phase 1

- Finalize the objective and scope of the program based on EAB input
- Develop and finalize the evaluation criteria used to score applicants
- Develop application requirements/materials
- Develop oversight plan
- Assist with program launch

Phase 2 – Post Launch

- Assist staff with evaluation of proposals and interviewing applicants
- Select winning proposals to be recommended to City Council
- Assist staff with on-going oversight
- Evaluate performance of selected proposals
- Refine program based on first year experience

A proposed program structure will be provided to City Council via an information packet in August, with a tentative program launch date in September.

ATTACHMENTS

Attachment A: Climate Action Post-Kyoto: Issues and Options for Establishing a New Carbon Reduction Goals, Targets and Strategies

Attachment B: Residential EnergySmart Progress Report

Attachment C: SmartRegs Update Report

Attachment D: Commercial EnergySmart Progress Report

Attachment E: Pecan Street Energy Data Gathering Pilot Proposal

Climate Action Post-Kyoto: Issues and Options for Establishing a New Carbon Reduction Goals, Targets and Strategies

Prepared by City of Boulder and The Brendle Group, Fox Tuttle Transportation Group, and Stockholm Environmental Institute
July 23rd, 2013

The purpose of this white paper is to provide a technical discussion of the issues and considerations for establishment of a new carbon reduction goal for the city as part of its Climate Commitment. While other cities have set dramatic reduction targets ranging from 80 percent reductions to complete carbon neutrality, it isn't clear that such ambitious goals are linked to a strong understanding of the implications of the goal or a plausible plan for attaining them.

The objective of this analysis is to provide the City Council with sufficient information on the magnitude and implications of what is required to achieve the greenhouse gas (GHG) reductions necessary to address today's conditions and some of the potential options and pathways for accomplishing the goal. With this background, council can then provide guidance to city staff and consultants who are initiating a more detailed and quantitative scope of work to complete the Climate Commitment. In particular, this analysis is intended to help with inform the discussion about setting a long-term goal to drive the planning process, as well as specific shorter term targets, metrics that will form the basis for the next generation of Boulder's climate action efforts. Recognizing planning as an iterative process, the community will have the opportunity to revisit and refine the provisional goal, related targets and metrics, and strategies after more detailed analysis is performed in the coming months. The paper has five sections:

I. Rationale for an expanded climate action commitment
II. Considerations in setting a new climate action goal
III. Interim target setting
IV. Identification of strategy options
V. Preliminary pathway towards a low carbon future

I. Rationale for Significantly Expanding Climate Action Efforts

This section summarizes two important motivations for expanding Boulder's climate action efforts. The first segment will summarize recent scientific findings that underscore the importance of acting as quickly as possible to avert increases in global temperatures that could result in significant detrimental impacts both globally and locally. The second segment describes the economic and community development benefits that Boulder could enjoy as part of continuing to be a leader in the development and implementation of state-of-the-art carbon reduction strategies.

Addressing the Growing Threat of Global Warming

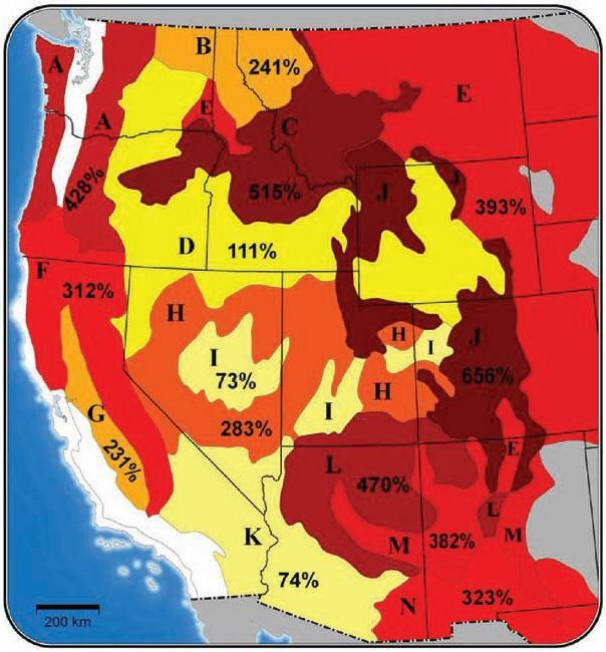
Over the past five to seven years, improvements in climate modeling capability have reaffirmed the increasing urgency to take more aggressive action to reduce GHG emissions than previously thought necessary. Studies suggest that the earth's mean temperature should not exceed 2 degrees C above the pre-industrial level if the earth is to maintain a safe operating space for humanity.[1] Average temperatures

[1] For an assessment of the "reasons for concern" associated with warming of 2 degrees, see Smith et al (2009), http://www.pnas.org/content/106/11/4133.abstract. The 2-degree target was also noted by signers of the Copenhagen Accord.

have already risen by .74°C (1.3° F). As if to reinforce this reality, 2012 was the hottest summer in US history, capping what had previously been the warmest decade on record (2000-2009).[2]

On a more local level, the implications of these findings are sobering. Of the numerous significant impacts that may be experienced in the Boulder Valley, the rapid escalation in wildfire incidence and intensity is likely to be one with the greatest visibility and impact. The 2013 early season fires in southern Colorado are reminders of the large fires that heavily impacted the watersheds of Fort Collins and surrounding communities in 2012 and the devastating fires that took place just west of Boulder in 2011. In 2013, had the northern Front Range not had unseasonably late and heavy snow falls, it is likely that it would also be facing extreme early season wildfire risks.

Figure 1
Increased Probability of Western US Wildfire under 1.8°F Increase in Global Temperatures



This combination of increasing drought, years of fire suppression and overstocked forests, and increased urban-wildland penetration of housing development create the conditions for a rapidly increasing risk of large-scale catastrophic wildfire in the Boulder area. Such events could significantly impact air quality, soil stability, urban view-shed, and water quantity and quality. To illustrate the magnitude of the increased risks created by global warming, Figure 1 shows the projected increase in wildfire probability based on just a 1 degree C increase in average global temperatures.[3] This analysis indicates that **the Front Range could see a 656 percent increase in wildfire probability under a 1.8°F (1°C) increase in global temperatures.**

Keeping temperature rise within this range will require a dramatic and rapid reduction in global greenhouse gas emissions. The IPCC Fourth Assessment report suggested that even a 450ppm CO_2 equivalent trajectory (roughly 400 ppm CO_2 alone), would require reductions from developed countries on the order of at least 80 to 95 percent from 1990 levels by 2050.[4] This assessment was corroborated by the 2011 National Academy of Sciences study on climate stabilization.[5]

Capturing the Opportunity of Leading the Way to a Low-Carbon Economy

In addition to the serious perils created by the escalating use of fossil fuels for energy, there is enormous opportunity available to those who help develop and demonstrate a pathway beyond this energy source. In a study of US business commissioned by the World Wildlife Fund in 2013, it was estimated that there is $1.26 trillion

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[2] From NCAR/UCAR https://www2.ucar.edu/climate/faq/how-much-has-global-temperature-risen-last-100-years

[3] Ibid. Page 180

[4] See Box 13.7, page 776, of the IPCC Fourth Assessment Working Group III report (Metz et al. 2007). http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter13.pd

[5] From National Academy of Sciences "Climate Stabilization Targets: Emissions, Concentrations, and Impacts over Decades to Millennia". 2011

in potential savings that could be mobilized through investments in energy efficiency alone.[6] This represents a huge and growing market for goods and services associated with these savings opportunities. Boulder is well positioned to help lead this transition given the many intellectual, institutional and financial assets within the community. The economic benefits of this leadership could be significant.

Energy Efficiency—Boulder's energy efficiency programs have leveraged private investments totaling more than $10 million in local energy upgrades, which include the purchase of goods and services. These local expenditures generate a multiplier that results in an additional $5 million to $7 million economic activity locally. With a continued focus on energy efficiency, these local benefits can be expected to increase. In a similar analysis of the potential economic benefits of climate action, the city of Cleveland estimates an annual savings of over $300 million when its plan is fully implemented.

New Technology Development—Boulder already attracts some of the best and brightest new entrepreneurs. Companies like E-Gauge, Tendril and Snugg Home have made Boulder their home base in part because of the city's reputation as a leading edge community. Some of the strategies that are being considered to reduce carbon emissions--micro-grids, eco-districts, distributed generation development--could also serve as platforms for businesses to develop new products and services for emerging markets in places following Boulder's example.[7]

Business recruitment—A recent report by CDP "Wealthier, Healthier Cities: How climate change action is giving us wealthier, healthier cities" indicates that 63 percent of actions cities are taking to reduce greenhouse gas (GHG) emissions have the potential to attract new business activity.

Economic Vitablity—Evidence is emerging that cities or regions that make a significant commitment to developing a low-carbon economy are positioned to outperform those that do not. On a national scale, in the period between 1990 to 2010, US GDP increased by 102 percent but emissions also increased by 13 percent. In contrast, during the same period, Germany installed over 200 percent more renewable energy capacity than the US, maintained a comparable level of GDP growth (96 percent) and did so as it reduced its overall greenhouse gas emissions 24 percent. At a more local level, the city of Fort Collins reported a decrease in GHG emissions of 11 percent while simultaneously experiencing population growth of 13 percent and economic growth of 4 percent.[8]

Future penalties for late adoption—As the urgency for climate action grows based on the increasingly unavoidable evidence of its growing impacts, there will likely be policy and regulatory changes that will begin to penalize carbon intensive energy sources. President Obama's June 25 speech outlining his new climate action plan signaled that the EPA authorities to enforce carbon reduction under the Clean Air Act likely to begin to be implemented. This could lead to significant energy cost increases for places like Boulder and other utility customers dependent on coal for a substantial part of their energy supply. Rapid

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[6] "The 3% Solution: Driving Profits Through Carbon Reduction. https://www.cdproject.net/CDPResults/3-percent-solution-report.pdf

[7] Despite having abundant water resources, the city of Portland, OR has actively promoted and supported innovations in water conservation and efficiency explicitly to foster entrepreneurial activity that will lead to new economic development associated with successful start-ups working in these sectors.

[8] Emissions data from Carbon Dixoxide Information Analysis Center http://cdiac.ornl.gov/, economic data from Gapminder http://www.gapminder.org/world/#$majorMode=chart$is;shi=t;ly=2003;lb=f;il=t;fs=11;al=21;stl=t;st=t;nsl=t;se=t$wst;tts=C$ts;sp=6;ti=1820$zpv;v=0$inc_x;mmid=XCOORDS;iid=phAwcNAVuyj1jiMAkmq1iMg;by=ind$inc_y;mmid=YCOORDS;iid=phAwcNAVuyj1gkNuUEXOGag;by=ind$inc_

transition to low or no carbon energy sources is one of the best insurance policies against major increases in energy costs and the associated impacts on economic activity.

Taken together, these two sets of factors—significant and growing perils from global warming and substantial economic and social opportunities from low-carbon innovation—provide a strong rationale for considering an even more ambitious climate action agenda. The following sections outline the key considerations for selecting a new goal, establishing specific measurable targets, and identifying and selecting strategies to accomplish these targets and maintain progress towards the larger goal.

II. Considerations in setting a new climate action goal

Establishing a long-term GHG reduction goal requires decisions on a vast number of options, the sum of which can lead to very different results depending on the choices made. These choices can be summarized into four broad categories:

- **What will be counted (Scope)** and therefore included in the GHG emissions inventory for which the city is taking responsibility (and what isn't but needs to be considered)? What is the role of offsets in how GHG reductions are accounted?
- **Where are the geographic boundaries (Boundary)** set that determine the area within which considered emissions will be counted towards the city's GHG responsibilities?
- **How much (Magnitude)** is the city committing to reduce these emissions?
- **By when (Timeframe)** is the city committed to accomplishing these emission reductions?

The first two categories—what is counted and where boundaries are set—are the areas around which literally hundreds of choices must be made. Given the potential exponential number of combinations and the variation in results that could then occur, public and private organizations have created protocols to standardize this process. Boulder's choices of a protocol to guide this process are discussed below.

The second two categories of decision—how much GHG reduction to commit to and the timeframe for these reductions—are the two choices made entirely by the city. The decisions made in these areas will largely determine the type of strategies selected, how these strategies are framed with the community, the impacts of these strategies, and the timeframes within which they must be implemented.

Scope and Boundary—The ICLEI Protocol

As noted earlier, the range of options in finalizing a scope and boundary for the city's GHG targets are immense. This is further complicated by the obligation to differentiate between the city as a separate legal entity and the broader Boulder community with its many different types of inhabitants: individuals, businesses, organizations, educational institutions etc. The wide range of variables to be considered in these categories typically requires over 30 pages of technical specifications in most leading GHG protocols.

To simplify and standardize this process, 200 local governments from 43 nations convened in 1990 to form the International Council for Local Environmental Initiatives (ICLEI). Since 1990, ICLEI has been one of the leading initiatives to integrate the emerging science of GHG accounting and reporting with the development of a standardized framework that creates a systematic, replicable and comparable system for determining key choices in a city's GHG inventory. While there have been other efforts to develop inventory protocols, the one established by ICLEI is the only protocol available that integrates both city organization and community-wide inventory.

Based on these and other factors as well as consultation with the Environmental Advisory Board, city staff chose the ICLEI protocol as the basis for its GHG inventory process. Staff was particularly influenced by the protocol's relatively clear and transparent specifications widespread use, and ongoing technical support. Given the many details related to both protocol and to scope and boundary issues, those interested in additional information on the ICLEI protocol should visit the ICLEI website for more details on the protocol. Attachment B also has an extended discussion of offsets, a topic of substantial importance in considering how to configure the various reduction elements of a deep reduction strategy.

Magnitude and Timeframe—Choosing a Goal Framework

As noted above, the choice of goal magnitude (how much GHG emission to reduce) and timeframe are best guided by social and political processes in each community. Choosing the amount of greenhouse gas reduction the city is committing to achieve (magnitude) can be considered from either a numerical or a philosophical perspective. Viewed numerically, climate goals indicate the amount of reduction below a given level. This tacitly assumes that there will continue to be some basis of energy system that utilizes carbon-dense energy and, as a consequence, releases greenhouse gases. An alternative approach is to view the goal as a statement of commitment to a new economic and social platform that is based on energy sources and uses that entirely replace high-carbon energy with low or no-carbon energy. The timeframe becomes the duration of transition between these two systems. This is the functional effect of a carbon neutrality goal that does not utilize off-setting or sequestration to allow continued carbon-dense energy use.

In practice, an aggressive numerical goal and an absolute reduction carbon neutrality goal may lead to similar outcomes in the shorter term. Longer term, however, it may be important to clarify which of these end states is the basis of the long-term goal—a reduced or highly off-set system that continues to utilize carbon-intensive energy sources, or a system that strives to entirely replace such sources as part of a new energy economy.

Benchmarking with Leading Global Cities

To provide reference points for these choices, staff and consultants surveyed 17 leading climate action cities around the world to examine how they have configured choices in these four broad areas. The detailed results of this assessment are included in Attachment A. Six criteria were used for comparison and contrast of programs between the cities:

- Boundary of emissions inventory
- Current level of GHG emissions
- Current inventory expressed as a per capita value
- Emissions reduction goal
- Emissions reduction timeframe
- Role of off-sets

The 17 cities selected are similar in having conducted a formal planning process that set a specific goal and timeframe. From this common foundation there are a wide range of variations. On the more conservative (less GHG-reduced) end are cities like Bellingham, WA (28 percent GHG reduction by 2020) and Jönköping, Sweden (40 percent GHG-reduced by 2020). On the more ambitious end are Copehagen, Denmark (100 percentcarbon neutrality by 2025) and Aarhus, Denmark (100 percent by 2030).

Several examples were included to illustrate the range of potential variation that communities can choose. For example, Melbourne, Australia, plans to become net-zero by 2025 but intends to achieve 65 percent of this reduction through the purchase of offsets. By contrast, Zurich, Switzerland bases its goals and interim

objectives on what is referred to as a "2,000 Watt Society" the end goal of which is to achieve a level of 1 metric ton of CO2 equivalent emitted per capita annually.

Comparison of Potential Goal Options

To provide a reference point to consider and verify Boulder's climate goal, three different potential goal and timeframe choices were selected for benchmarking to illustrate the potential differences they demonstrate.

For purposes of comparison in the following section, this paper uses the assumption that the options do not include any form of off-setting. This means that the percentage decrease in GHGs—80 percent or 100 percent--are absolute. **In fact, most of the cities reviewed with aggressive carbon reduction goals either plan to utilize offsets to provide a significant portion of their reported carbon reductions or have not yet defined a complete plan to achieve the required reductions**. The exception to this statement is Aarhus, which may be able to achieve neutrality due to the extensive development of wind resources and the existence of an extensive district heating system serving a significant portion of their community that is in the process of being converted to biomass fuels.

> ***80% below baseline year by 2050***—Cities with this goal include Fort Collins, Colorado; Portland, Oregon; York, England; and Madison, Wisconsin.

This approach is supported by the 2010 National Academy of Sciences (NAS) report "*Climate Stabilization Targets: Emissions, Concentrations, and Impacts over Decades to Millennia."* According to the NAS study, this reduction pathway is the least aggressive approach that still has a high likelihood of keeping average temperature increases to below 2°C globally (3.6°F). As with other strategies, the long-term success of this strategy requires beginning carbon reductions soon (by 2016) given the compounding impacts of early year emissions reductions

> ***100% below baseline year by 2050 (Carbon Neutrality)—***This is the goal set forth by Seattle, Washington; Copenhagen, Denmark; and Melbourne, Australia.

A unique feature of carbon neutrality as the basis for a stated goal is the differing views on the role of offsets. Typically carbon neutrality does not mean zero carbon emissions, but rather a balancing of carbon emissions by some form of off-setting: sequestration, on-site renewable energy generation or purchased carbon credits. An alternative view, as discussed above, is to see carbon neutrality as a statement of an end goal for completely replacing fossil fuels with low or no-carbon alternatives. This would imply that while offsetting may be utilized as a part of interim steps, the long-term goal would be full replacement of fossil carbon energy sources.

The role and degree of the carbon balancing agents—sequestration, renewable energy production, off-set purchases—is entirely undefined and left to each initiative to determine for its unique circumstances, objective and political circumstances. As a consequence, some approaches to carbon neutrality may actually result in a higher actual carbon release than programs that set specific aggregate carbon emissions reduction targets.[9] Consequently, Boulder or any other entity formulating a carbon neutrality plan is under

[9] As an example, a facility using fossil fuel-derived energy for heating e.g. natural gas, would have a carbon release that could be "net" out by putting a large PV array on-site generating an equivalent amount of energy for grid use.

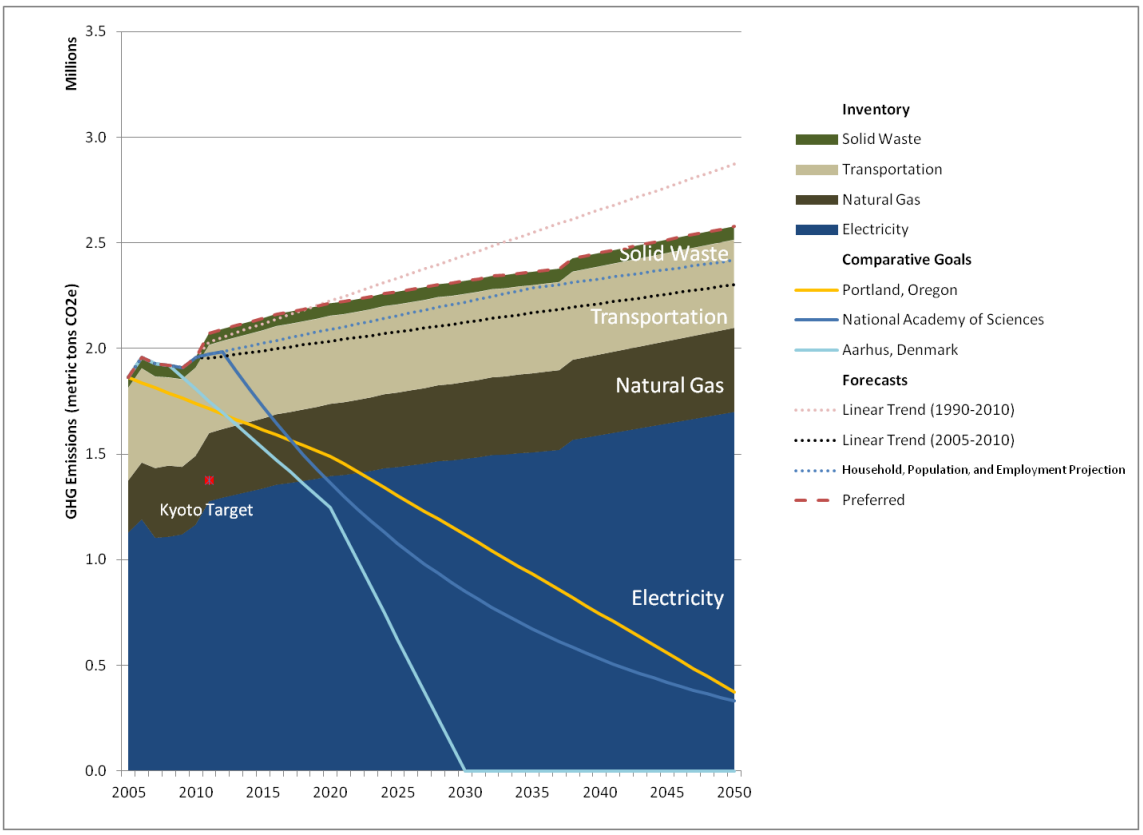
the obligation to be explicit about how these and other factors are handled and the rationale for choices made.

100 percent by 2030—Aarhus, Denmark and Copenhagen, Denmark (by 2025)

Only two cities in the research have proposed this magnitude of reduction in such a short timeframe. Because of the many similarities between Aarhus and Boulder, city staff selected Aarhus for this brief comparison. As noted above, the actual emissions reductions they plan to accomplish are a total of 2,032,540 mtCO2e. In one scenario, this reduction may include offsetting emissions through investments in new wind turbines and a minor contribution from regional forest establishment. However, it is likely that one of the largest Danish combined heat and power facilities located within Aarhus will convert to 100 percent biomass by 2015, which could lead to a climate neutral or climate positive Aarhus by 2030. Either of these scenarios will be significant components of Aarhus' road map for achieving its climate goals.

Figure 2 graphically displays the steepness of these reduction trajectories in comparison to baseline trend increases should no action be taken. The forecast for business-as-usual emission growth is based on sources that forecast factors that will drive emissions in each inventory segment.

Figure 2
Trajectory of GHG Reductions Necessary to Achieve Carbon Reduction Goals



Source: The Brendle Group 2013

III. Setting interim targets

Inherent to whatever long-term goal is selected is the core question of how progress will be measured. While setting an ambitious long-term goal is important for its aspirational/inspirational value, this value will be quickly eroded if appreciable and visible progress is not made towards its fulfillment. One way to consider and compare the choice between goals is to determine interim targets to maintain a trajectory towards successfully accomplishing a longer-term goal.

Table 1 provides a comparison of the three goal options by converting the long-term goal into annual and 10-year targets. For the 80 percent reduction by 2050 goal, an average annual reduction of 4.6 percent would be necessary. A carbon neutrality goal by 2050 would require a 12 percent annual reduction goal. The Aarhus goal of carbon neutrality by 2030 would require an average annual reduction of 28 percent.[10]

These relationships and the total percentage of total reduction that would need to be accomplished each decade till 2050 are displayed below.

[10] Note that the reduction percentages are based on the total for each year. Consequently the total reduction in mtCO2e each successive year decreases because the percentage is of a smaller and smaller number. It is also important to note that in order to accurately project the level of emissions against which conservation and efficiency programs are subtracted, it is necessary to project emissions levels into the future based on continued growth in use of fossil fuels in all sectors. **Electricity emissions** are forecast from the 20-year annual load model used in the Municipalization Exploration Modeling and current Xcel Energy emissions factors, http://www.bouldercolorado.gov/files/Energy/2013/modeling/Annual_Load_Model.xlsx. **Natural gas emissions** are forecast from the average per household and per employee for 2005-2010 and projected growth in households and employment from the City of Boulder Community Planning and Sustainability Department, http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=1490&Itemid=5685. **Transportation emissions** are forecast based on maintaining VMT at 2.4 million daily VMT and, for the business-as-usual case, no changes in GHG intensity. Solid waste is forecast based on current per capita emissions and forecast population growth from the Community Planning and Sustainability Department.

Table 1
Comparison Decadal GHG Reduction in Three Carbon Reduction Goals

	Scenario 1: 80% reduction below 1990 by 2050					Scenario 2: Carbon Neutrality by 2050					Scenario 2: Carbon Neutrality by 2050					
	% Reduction/year				4.60%	% Reduction/year				12.00%	% Reduction/year				28.00%	
Year	Year	Target mtCO2e	Amt Reduced (w/growth)	Decade Amt Reduced	% Reduced	Program Year	Target mtCO2e	Amt Reduced (w/growth)	Decade Amt Reduced	% Reduced	Program Year	Target mtCO2e	Amt Reduced (w/growth)	Decade Amt Reduced	% Reduced	Projected Emissions Growth
2014	2014	2,125,000				1	2,125,000				1	2,125,000				0
2015	2015	2,027,250	114,750		5%	2	1,870,000	272,000		12%	2	1,530,000	595,000		28%	17,000
2016	2016	1,933,997	113,254		9%	3	1,645,600	244,400		23%		1,101,600	428,400		48%	20,000
2017	2017	1,845,033	99,964		13%	4	1,448,128	208,472		32%		793,152	308,448		63%	11,000
2018	2018	1,760,161	96,872		17%	5	1,274,353	185,775		40%		571,069	222,083		73%	12,000
2019	2019	1,679,194	93,967		21%	6	1,121,430	165,922		47%		411,170	159,899		81%	13,000
2020	2020	1,601,951	92,243	611,049	25%	7	986,859	149,572	1,226,141	54%		296,042	115,128	1,828,958	86%	15,000
2021	2021	1,528,261	80,690		28%	8	868,436	125,423		59%		213,151	82,892		90%	7,000
2022	2022	1,457,961	82,300		31%	9	764,223	116,212		64%		153,468	59,682		93%	12,000
2023	2023	1,390,895	79,066		35%	10	672,517	103,707		68%		110,497	42,971		95%	12,000
2024	2024	1,326,914	78,981		38%	11	591,815	95,702		72%		79,558	30,939		96%	15,000
2025	2025	1,265,876	70,038		40%	12	520,797	80,018		75%		57,282	22,276		97%	9,000
2026	2026	1,207,645	69,230		43%	13	458,301	73,496		78%		41,243	16,039		98%	11,000
2027	2027	1,152,094	65,552		46%	14	403,305	64,996		81%		29,695	11,548		99%	10,000
2028	2028	1,099,097	66,996		48%	15	354,908	62,397		83%		21,380	8,315		99%	14,000
2029	2029	1,048,539	56,558		51%	16	312,319	48,589		85%		15,394	5,986		99%	6,000
2030	2030	1,000,306	58,233	707,645	53%	17	274,841	47,478	818,018	87%		11,084	4,310	284,959	99%	10,000
2031	2031	954,292	56,014		55%	18	241,860	42,981		89%		7,980	3,103		100%	10,000
2032	2032	910,395	56,897		57%	19	212,837	42,023		90%						13,000
2033	2033	868,516	45,878		59%	20	187,297	29,540		91%						4,000
2034	2034	828,565	48,952		61%	21	164,821	31,476		92%						9,000
2035	2035	790,451	44,114		63%	22	145,042	25,779		93%						6,000
2036	2036	754,090	44,361		65%	23	127,637	25,405		94%						8,000
2037	2037	719,402	42,688		66%	24	112,321	23,316		95%						8,000
2038	2038	686,309	82,092		68%	25	98,842	62,479		95%						49,000
2039	2039	654,739	43,570		69%	26	86,981	23,861		96%						12,000
2040	2040	624,621	43,118	507,685	71%	27	76,544	23,438	330,298	96%						13,000
2041	2041	595,889	40,733		72%	28	67,358	21,185		97%						12,000
2042	2042	568,478	40,411		73%	29	59,275	21,083		97%						13,000
2043	2043	542,328	39,150		74%	30	52,162	20,113		98%						13,000
2044	2044	517,381	36,947		76%	31	45,903	18,259		98%						12,000
2045	2045	493,581	36,800		77%	32	40,394	18,508		98%						13,000
2046	2046	470,876	34,705		78%	33	35,547	16,847		98%						12,000
2047	2047	449,216	34,660		79%	34	31,281	17,266		99%						13,000
2048	2048	428,552	32,664		80%	35	27,528	15,754		99%						12,000
2049	2049	408,839	32,713		81%	36	24,224	16,303		99%						13,000
2050	2050	390,032	31,807	360,589	82%	37	21,317	15,907	181,226	99%						13,000

Source: City of Boulder and The Brendle Group

Based on this analysis and the magnitude of reductions that would have to be accomplished, Option 3—carbon neutrality by 2030—was dismissed from further consideration. The remainder of comparisons will focus on the 80 percent GHG reduction by 2050 and the 100 percent (carbon neutrality) reduction by 2050.

To evaluate the additional emissions reductions and the low or no carbon energy replacement that will be needed to achieve the targets of the two options considered, the Brendle Group updated the 2012 analysis of existing programs it conducted in 2012. The updated analysis includes the additional reductions anticipated from changes being made to building codes as well as projections for the potential energy savings that could occur through implementation of a commercial energy use ordinance. This analysis also projected the potential new renewable energy supply development projected under existing or planned programs. The projected GHG reductions were then totaled for each decade between the present and 2050.

The results of this assessment are displayed in Table 2. This table shows annual reductions accomplished by each program on an annual basis.

Table 2
Summary of Projected GHG Reductions by Current City Programs

Program	Approximate Annual Reduction at Full Implementation (MTCO2e)	Assumptions
Better Buildings/Energy Efficiency		
Residential SmartRegs and EnergySmart	300	Ongoing implementation at 2013 funding level through 2033 (approximate time to assess all units)
Commercial EnergySmart	2,300	Ongoing implementation at 2013 funding level through 2020
Residential Building Code	4,900	Roadmap to a net zero energy residential building code by 2030.
Commercial Building Code	3,300	Roadmap to a net zero energy commercial building code by 2030.
Commercial Energy Ordinance	50,700	Group 14 projections of lighting and non-lighting efficiency potential covered by ordinance.
10 for Change	1,250	Average of 2008-2011 continued through 2050
Xcel Energy DSM Programs	0	Assumed to be included in Xcel Energy's Load Forecast that is the business-as-usual forecast.
TOTAL Better Buildings	**63,750 MT CO2e**	
Ramp-up Renewables/Generation & Distribution		
Distributed PV generation	2,200	Ongoing installation of PV at the average rate of 2008-2011
City-owned hydroelectric	15,100	Projected in 2013 based on average annual generation and assuming maintenance of 50 percent of RECs for remaining plants (no Boulder Canyon)
TOTAL Ramp-up Renewables	**17,300 MT CO2e**	

Travel Wise-Transportation		
Neighborhood Eco Pass Program (NECO)	3,050	Average of 2008-2011 continued through 2050
Business Eco Pass Program (BECO)	5,300	Average of 2008-2011 continued through 2050
Boulder B-Cycle	50	Average of 2008-2011 continued through 2050
TOTAL Travel Wise	**8,400 MT CO2e**	
Other Programs		
Waste Not-Solid Waste		
Zero Waste Programs and Services	4,000	Average of 2008-2011 continued through 2050
Off-set Mechanisms		
Xcel Energy Windsource	26,500	Average of last six years of Windsource purchases.
City Operations		
Energy Performance Contracts	5,750	2011 outcomes
Alternative Vehicle Fleet	250	2011 outcomes
City Organization Recycling & Composting	100	2011 outcomes
TOTAL Other Programs	**36,600 MT CO2e**	

For some of these programs, the benefits continue to aggregate each year so there is a gradually increasing emissions reduction impact over time. The Brendle Group modeled these impacts to project the total emissions contributions from existing and planned programs out by decade, assuming that the efficiency measures that are installed in each year are maintained going forward.

Based on these projections and assumptions, a total emissions reduction potential for existing programs was estimated by decade for these programs. The projected reduction levels are listed below:

Annual Reduction achievable in 2020	200,000 MTCO2e
Annual Reduction achievable in 2030	287,000 MTCO2e
Annual Reduction achievable in 2040	378,000 MTCO2e
Annual Reduction achievable in 2050	453,000 MTCO2e

These existing program reductions by decade are summarized in comparison to the decade targets required to achieve each of the two goals in Table 3. By subtracting the anticipated savings from existing programs from the reduction amount that will need to be achieved to reach each goal, the amount of additional reductions/energy source replacement is then derived for each goal by decade. Because a shortfall in any given year accumulates, the total gap continues to grow.

Table 3
GHG Reduction Objectives with Existing Program Reduction Projections
(Total Projected Emissions 2013—2,125,000 mtCO2e)

	Option 1: 80% reduction by 2050				Option 2: Carbon Neutrality by 2050		
Year	GHG reduction target- mtCO2e	Existing Program Reductions	Cumulative Reduction GAP		GHG reduction target- mtCO2e	Existing Program Reductions	Cumulative Reduction GAP
2020	611,049	200,000	411,049		1,226,141	200,000	1,026,141
2030	707,645	287,000	1,031,694		818,018	287,000	1,757,159
2040	507,685	378,000	1,448,379		330,298	378,000	1,996,456
2050	360,589	453,000	1,733,968		181,226	453,000	2,102,683

Source: Staff and Brendle Group

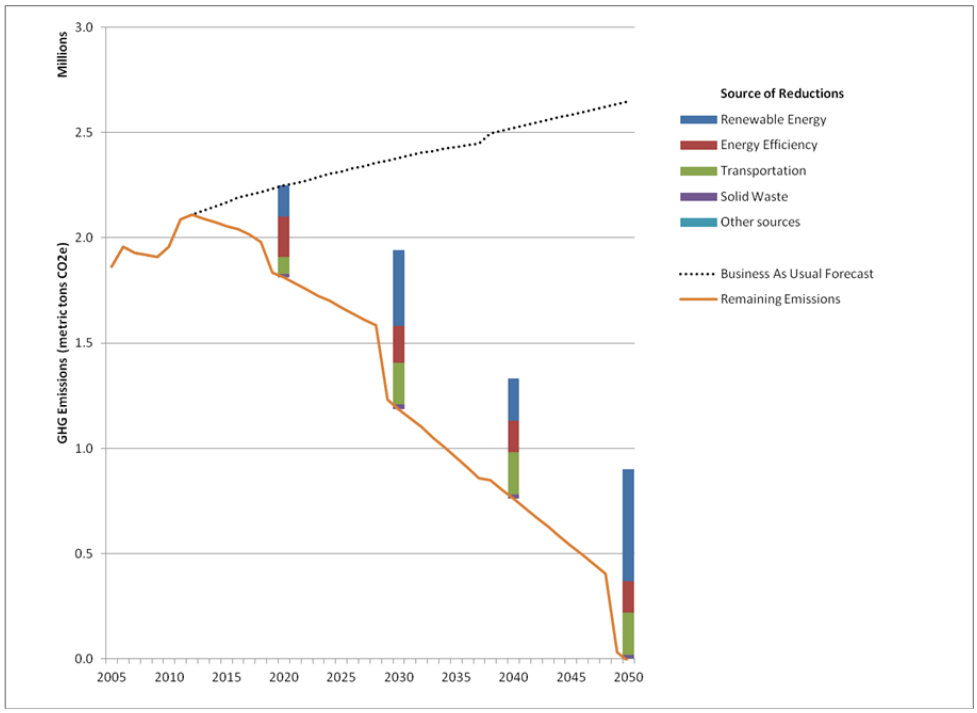
These emission reduction gaps can now form the basis for selecting a suite of strategies sufficient to achieve whichever goal is selected.

Other Target Considerations

Annual versus five- or 10-year objectives--An obvious advantage to annual reduction targets is the clarity and measurability it establishes. This would enable decision-makers to easily assess whether current initiatives are delivering the scale of reductions necessary to remain on a trajectory to achieve the overall goal. However, there are also several potential disadvantages to this approach. First, some actions will take multiple years before measurable benefits are experienced. This includes both programs with significant initial ramp-up logistics (e.g.large scale retrofitting, EV conversions etc) or long planning horizons e.g. land use/urban design changes that reduce vehicle trips.

An even more important qualification to a strict annual reduction target approach would be the unlikeliness that it would correlate with the established pattern of reductions that follow both technology and social innovation. Figure 3 shows a hypothetical but plausible scenario for Boulder's GHG reduction efforts that illustrates the way progress is likely to follow a more step-wise reduction than a linear one.

Figure 3
Hypothetical Evolution of Emissions Reduction Achievements



Given the likely stepwise dynamic, and the importance of having a high probability of being able to achieve established measurable targets, five- or 10-year targets may be a more realistic and effective target timeframe.

Strategy Interdependencies that Affect Objectives—A number of high priority strategies may depend, at least for their full beneficial impact, on actions being taken in other programs or strategies. Reducing transportation greenhouse gas emissions, for example, may require significant investment in urban and community design that will not fully achieve benefits for several decades. Similarly, strategies to switch out high-carbon energy sources like petroleum in transport or natural gas in heating may require substantial decarbonization of electricity energy supplies <u>before</u> implementing these measures even though they would have a substantial impact on carbon emissions. These interdependencies may inform both which strategies are selected for implementation and the order in which they are implemented.

Target "Themes" --A key factor in choosing shorter term objectives is how to translate the aspirational intention of the long-term goal into measures and specific objectives that are meaningful and motivational to the community and other key entities in the near term. Recent polling demonstrates that while awareness of climate change is growing, previous approaches to messaging that focused on the perils, moral obligations or behavior change that implied austerity or sacrifice have diminishing effectiveness at mobilizing behavior change or collective social or political action. This research suggests that effective change motivation requires depicting a future condition that excites and inspires action that also brings tangible near-term personal benefits. If, for example, large-scale distributed generation emerges as a priority for a particular timeframe, the promotional campaign might focus on stimulating large scale home PV installations by framing the opportunity based on personal energy independence "Be Your Own Utility," or "Utility Bill Free by 2023." If residential transportation GHG emissions reduction

emerged as a key focus area, the campaign might focus on exciting opportunities associated with personal electric vehicle adoption—"Look at me, I'm Driving Carbon Free!"

IV. Identification of Strategy Options

Boulder has more than 10 years of on-the-ground experience in developing and implementing programs intended to reduce greenhouse gas emissions. This direct, practical experience will be immensely valuable in guiding the targeting, development and implementation of Boulder's next generation of climate action initiatives. As part of developing its next stage Climate Commitment, Boulder identified six areas of activity that have climate impacts: Better Buildings, Travel Wise, Ramp up Renewables, Waste Not, Grow Green and Every Drop.

This section provides an overview of the analysis currently underway to identify a set of strategies that can be implemented to put the city on course to achieve the climate goal it selects. Three of the six categories will be the focus of this assessment: Better Buildings, Travel wise, and Ramp-up Renewables. Two of these--Better Buildings and Travel Wise—represent over 95 percent of the energy used in the community. The third—Ramp-up Renewables—explores options for significantly expanding low-/ or no-carbon energy sources. The remaining three categories are important to climate action efforts in a range of ways that will continue to be explored as part of the larger Climate Commitment program development process.

Given the significance and implications of the goals analyzed, the staff and consultant teams anticipate that the range of new strategies required to reach these goals will come from three main sources:

1. Significant evolution and expansion of Boulder's existing programs developed over the last decade;
2. Emerging innovative strategies from other top-performing communities aiming for neutrality or near neutrality in the mid-century horizon for which plausible plans are being developed; and
3. Transformative new strategies not yet known that will come from market and policy innovations from communities that capitalize on the opportunities of a low-carbon economy.

Furthermore, because of the magnitude and time horizon of the goals being considered, it's important to not limit consideration to city-led programmatic augmentation strategies. Strategies need to support broader pathways that will be required to achieve neutrality, and these pathways will require significant private-sector investment and consumer participation.

For example, significant expansion of energy efficiency and conservation measures will require substantial upgrades to the quality and timing of energy use information that can direct and manage next-generation energy efficiency technologies. These new energy/information systems will require innovation across utilities (regulated monopoly), technology (public and private research and development) and use (private sector).

Similarly, substantial increases in renewable energy supply requires associated action in utility-scale renewables outside the boundaries of Boulder city limits, new innovations in small-to-medium sized distributed renewable energy plants within the city limits, and significant uptake of residential and commercial installations by end users. Consequently, each major sector of energy innovation has multiple interrelated innovation pathways that must take place, each having significant roles for public, private and institutional sectors.

With these considerations in mind, a preliminary illustrative list of augmentation strategies is provided below, organized in the same framework as existing strategies: Better Buildings, Travel Wise, and Ramp-Up

Renewables. A number of additional cross-cutting strategies are also included. The list will be further developed with public input and the expertise of the Climate Commitment Working Group, then analyzed for their individual and combined contributions to the goal under different scenarios.

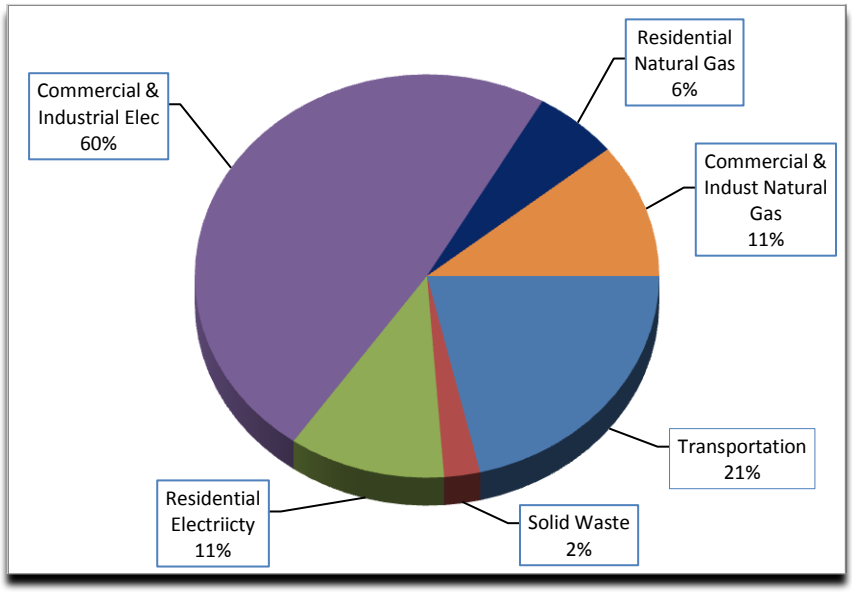
Overview of Boulder Energy Use

To provide a starting point for identifying where the largest potential gains in GHG emissions are possible, Figure 4 shows the breakdown of energy use across the major user segments in Boulder. This information is based on the 2010-2011 Boulder Climate Action Plan, the most recent years for which good natural gas usage data is available.

Figure 4
Energy Consumption by Type and User

This information provides a composite of energy use for each major sector. This is summarized as follows:

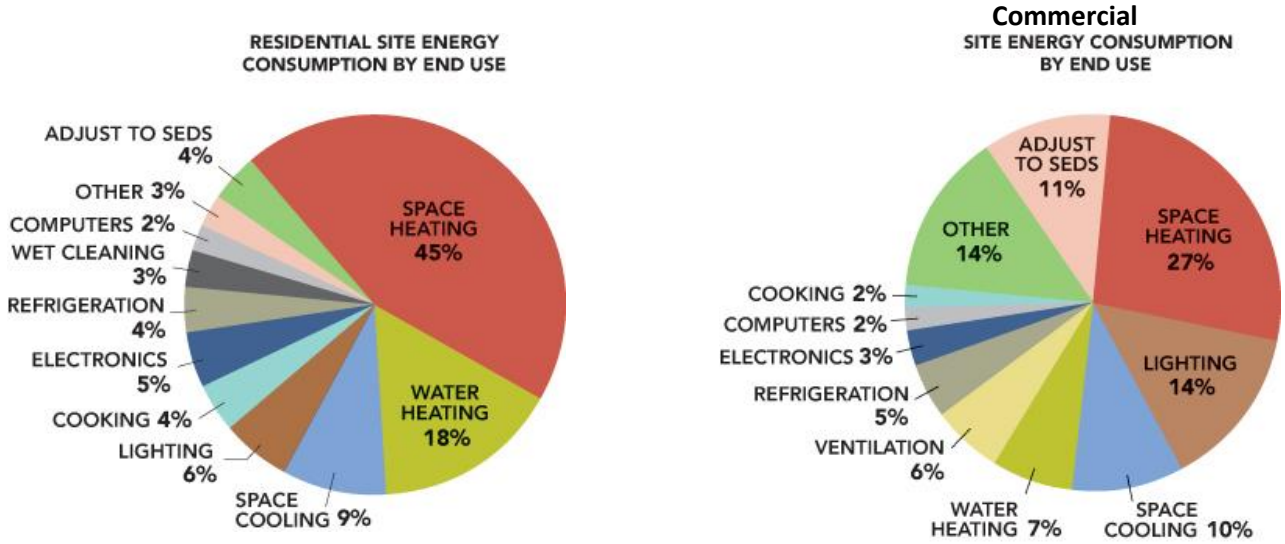
Residential	17%
Commercial/Industrial	60%
Transportation	21%
Other (street lights etc)	2%



Energy Use Strategies—Better Buildings

An important realization of this analysis is that close to 80 percent of the energy used in Boulder takes place in the built environment. However, as only about half of that energy use is related to the actual operation (heating, cooling, lighting) of buildings, 40 percent of **total energy usage** is the portion over which the city has some area of influence through building codes, licenses and other energy use ordinances. This significant use of energy in non-building related activities is displayed in Figure 5 for both residential and commercial buildings.

Figure 5
Energy use in Residential and Commercial Buildings[11]



More recent analysis by the Energy Information Administration (EIA) indicates that the proportion of energy going to these primary building operations is actually dropping in comparison to other energy uses such as the proliferation of energy-using appliances and information/entertainment devices. This issue of other energy uses taking place in buildings is a critical consideration in determining where and how the city can have the greatest influence to reduce greenhouse gas emissions in buildings.

Commercial/Industrial Energy Use-- The data portrayed above suggests that the biggest area of potential savings to be achieved is in the commercial and industrial sector buildings. Unfortunately, the way the data is aggregated underscores a challenge that has complicated the city's energy efficiency efforts from their outset. The way that information is distributed by the city's utility provider, Xcel Energy, makes it difficult, if not impossible, to disaggregate larger-scale users, particularly separating industrial from commercial users. This is significant because the types of uses vary significantly between these two classes of users. As the figure above demonstrates, energy use patterns between commercial and residential buildings also vary in significant ways that will impact targeting energy efficiency efforts. The differences between commercial users and industrial users are even more significant because of the wide variation in the types of industrial processes and energy uses that take place in the broader "industrial" category.

Area of Influence--An essential first step in evaluating where the city can best target its efforts to reduce greenhouse gas emissions is to examine where it has influence in each of the major energy use categories of the Better Buildings category. Table 4 provides a preliminary assessment of the areas of influence the city has in the buildings sector.

[11] From DOE "Buildings Energy Databook http://buildingsdatabook.eren.doe.gov/ChapterIntro2.aspx. "Adjust to SEDS" refers to the Energy Information Administrations adjustment factor to reconcile State Energy Data Systems (SEDS) with end user use surveys.

Table 4
City Influence Points for Energy Use

Form of Influence	Better Buildings(~80%)	
	Building Operations (40%)	Activity within Buildings (40%)
Financial	Incentives for retrofitting, financing for energy efficiency upgrades, Procurement	
Regulation	Building codes requirements; Smart Regs; Commercial Energy Efficiency Ordinance	
Innovation – Technology	Implement City facility retrofits to demonstrations, sponsor grant program to foster innovative systems	Sponsor grant program around innovative energy use systems
Education - information	Building owner education; promotion of programs; school education programs; community-based social marketing	Community-based social marketing campaign around reducing energy use

This analysis begins to provide an outer boundary for potential energy reduction in this sector. With the majority of the city's potential influence related to influence over building structure and operations (heating, lighting, cooling), it has direct influence over approximately 40 percent of the total 80 percent of energy use represented by this sector.

New Program Strategies Under Consideration—As noted earlier, the strategy identification and evaluation portion of the Climate Commitment consultant contracts is in its early stages with initial options for consideration to be completed by mid-August. Table 5 provides a preliminary listing of potential strategies being considered for this sector. The table includes references to cities that may be featuring a similar strategy as a significant part of their climate action efforts.

Table 5
Building related Emissions Reduction Strategies Being Considered

Strategy	Targeted Sector or Pathway	Description
Better Buildings/Energy Efficiency		
Ramped Commercial Energy Efficiency Ordinance	Commercial Energy Efficiency; Existing Buildings; Regulatory Approach	This City is currently developing a three phased program towards regulating the energy performance of all existing commercial buildings. This augmentation strategy assumes the energy performance requirements will increasingly be more aggressive over time and with technology advancement.

Strategy	Targeted Sector or Pathway	Description
Expanded and Ramped Residential SmartRegs	Single Family and Multi-family, rental and non-rental; Existing Buildings; Regulatory Approach	This augmentation strategy builds from the existing mandatory program to expand the program scope to include all existing residential units (e.g., single family, multi-family, rental and non-rental). This augmentation strategy also assumes the program's energy performance requirements will increasingly be more aggressive over time and with technology advancement.
Low Watt Society	Consumer Lifestyle	Modeled after Zurich's "2000-Watt Society" and also used by other Swiss cities, such as Basel, this approach provides a targeted and unifying focus on consumer lifestyles and energy use. It could include a range of other emerging best practice strategies including various behavior change programs, gamification, on-line access to utility date with neighbor comparisons, social networking and personal energy challenges.
Energy Efficiency Market Transformation	Develop the market supply of products and services needed to meet regulatory requirements	Given the heavy emphasis on a regulatory approach for the first two strategies above, this strategy would seek to grow the market of service providers for energy efficiency implementation across the commercial and residential sectors. This includes workforce development; contractor training; public-private partnership with major suppliers; and cluster based economic development.

Energy Use Strategies—Travel wise

As over 20 percent of the current emissions profile, travel is a significant area for reduction activities. A substantial amount has already been done in this category as a part of the alternative mode emphasis in Boulder transportation planning, as well as collaboration with other regional transportation entities like RTD. The current process underway to update the city's Transportation Master Plan (TMP) has created an effective context and process for identifying and considering upgrades to existing efforts that can meet emissions reduction objectives in addition to the broader set of transportation plan goals.

Comparison with Other Leading Cities--As a point of comparison for evaluating Boulder's current and proposed efforts, Table 6 provides a summary of the transportation-related objectives within the climate action plans of other leading cities.

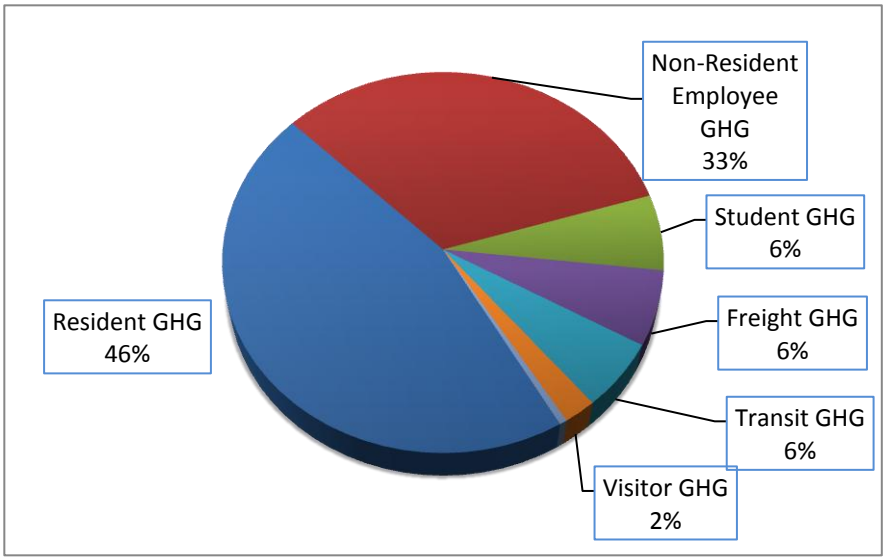
Table 6
Comparison of Transportation Emissions Objectives by Leading Cities

City	Current Annual Trans.GHG (MT per capita)	Plan Target Year	Plan VMT Reduced	Planned Trans.GHG Reduced	Avoided Annual Trans. GHG (MT per capita	2013 Trans. Budget (Per capita)
BOULDER	4.2	TBD	TBD	TBD	TBD	$233
Ft. Collins, CO	7.5	2020	20%	n/a	0.11	$341
Seattle, Wa	2.7	2030	20%	82%	0.13	$489
Portland, OR	5.4	2030	30%	50%	0.15	$575
Madison, WI	4.6	IN PROGRESS				$232
Austin, TX	6.4	2020 Carbon Neutral				$106
Burlington, VT	4.7	2030	10%	20%	0.12	$375
Eugene, OR	4.1	2030	N/A	50%	0.1	$510

The comparison shows interesting differences across the various cities with the most notable factors highlighted. Both Seattle and Portland show substantial reduction goals and a correspondingly high level of capital investment in their transportation systems.

New Program Strategies Under Consideration—As part of identifying new strategies for consideration, transportation consulting firm Fox-Tuttle conducted an analysis of Boulder's existing transportation data to identify where the areas of highest GHG emissions were taking place. Figure 6 shows the results of this analysis.

Figure 6
Transportation GHG by User Segment



This analysis provides important insights to help target new transportation programs, particularly to identify new strategies to address both resident travel (around-town travel) and non-resident employee

travel. These new program strategies are being developed in collaboration with staff and the Transportation Advisory Board and will eventually be referred for consideration to the TMP as it gets updated. An overview of the transportation strategies currently under consideration are listed in Table 7.

Table 7
Transportation related Strategies Being Considered

Strategy	Targeted Sector or Pathway	Description
Travel Wise		
Mode Shift Strategies	Demand	Completing core infrastructure and facilities and corresponding programs and policies to encourage their use.
Low-Carbon Fuel Use	Supply	(e.g., electrification, alternative fuels, vehicle efficiency, etc.) EV Conversion
Community-wide Eco Pass	Demand	Expand Eco Pass Access to all Boulder residents and employees with corresponding transit service increases to meet new demand.
Access Management & Parking Strategies	Demand	Current AMPS work program item is identifying opportunities for city-wide and district parking policies and management strategies.
TDM Plans for New Developments	Demand	Modification of existing TDM Plan requirements to mitigate the impacts of new developments and support multi-modal travel options.
First and Final Mile Solutions	Supply	Providing first and final mile solutions for transit users to provide transit to work site travel options.
Neighborhood Accessibility	Demand	Land use and transportation changes to meet daily needs by foot, bike or transit.

Other Energy Use Strategies

In addition to strategies directly focused on buildings and transportation, a series of other strategies are also under consideration. These additional strategies, and the Climate Commitment category under which they would be best placed, are listed in the Table 8 below.

Table 8
Other Emissions Reduction Strategies Being Evaluated

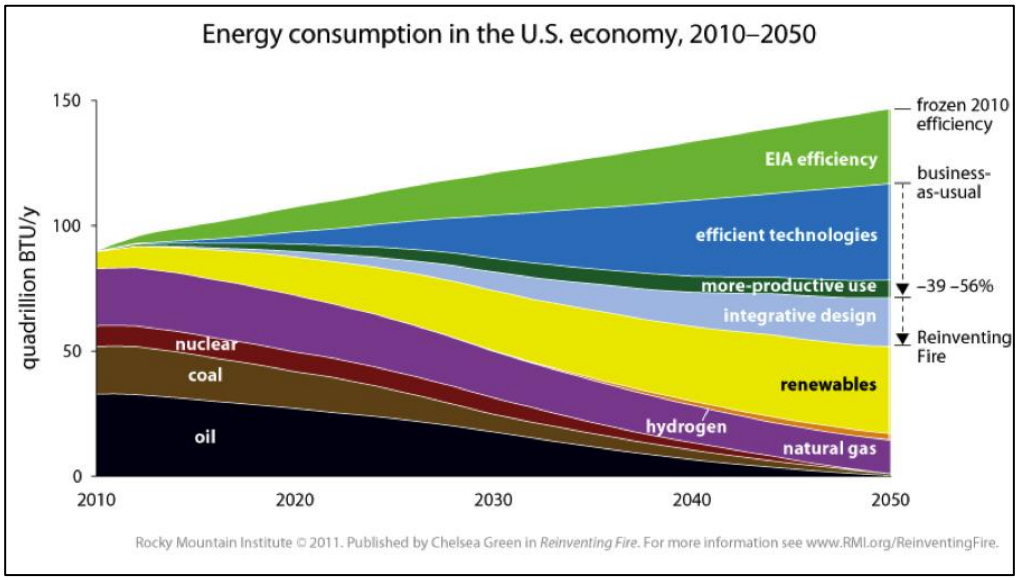
Strategy	Targeted Sector or Pathway	Description
Cross Cutting Strategies		
Urban Design and EcoDistricts	Transform community at neighborhood scale	Increasingly, cities are pursuing targeted efforts to implement their community-wide climate action plans at the neighborhood scale. New York and Cleveland are two examples. Urban design and land use planning are important components in the transformation to low carbon neighborhoods where transportation demand is reduced and energy is supplied through district-scale solutions. Fort Collins' FortZED initiative is an example of an eco-district – a movement gaining national traction.
Voluntary Carbon Reduction Program	Large institutions and commercial sector	Some of Boulder's largest greenhouse gas emitters also have goals for climate mitigation. This strategy would convene and support the largest institutions (e.g., CU, NIST, IBM, etc) in their climate efforts. It would be coupled with a broad based voluntary program for all commercial businesses. Fort Collins' voluntary business program, Climate Wise, has been one of the most successful strategies in the city's CAP. There are numerous other examples of similar approaches from other cities that can be used to shape a program in Boulder.
Carbon project fund	Financing for innovation	This strategy would look at funds and other financial mechanisms to stimulate investment in energy efficiency and renewable energy.

Energy Supply Strategies – Ramp-up Renewables

An important finding related to the preceding analysis of energy use/demand-side reduction options is the magnitude of low- or no-carbon energy development that will have to take place to achieve any of the more ambitious climate action goals.

In a similar analysis of the entire US energy use economy, Rocky Mountain Institute (RMI) outlined a strategy for an 80 percent reduction of fossil fuel use by 2050. RMI's analysis, showing the proportions of contributions from both energy reduction and energy supply, is provided in Figure 7.

Figure 7
Proposed Pathway to 80% GHG reductions by 2050-RMI



The RMI analysis is used here as a "best case" assessment of the potential for demand side management. If this scenario were converted to a carbon neutrality goal, it would suggest that approximately 60 percent of the emissions reduction goals can be achieved through conservation and efficiency. This would suggest that a minimum of 40 percent of additional low- or no-carbon energy will have to be developed to fill this gap. If the natural gas component RMI projects beyond 2050 were removed, a minimum of 40 to 50 percent of the 2050 energy scenario will be provided through renewable sources.

Another approach to estimating that gap would be to return to the analysis of Boulder's current energy use by sector. As noted in the Better Buildings section, 80 percent of energy use takes place in the buildings, but almost half of the energy use (40%) is associated with building structure and operations over which the city has some measure of influence. If around half of this building operations energy use could be reduced—a very impressive accomplishment in comparison to past efforts—this would result in a total energy/greenhouse gas reduction of 20 to 25 percent.

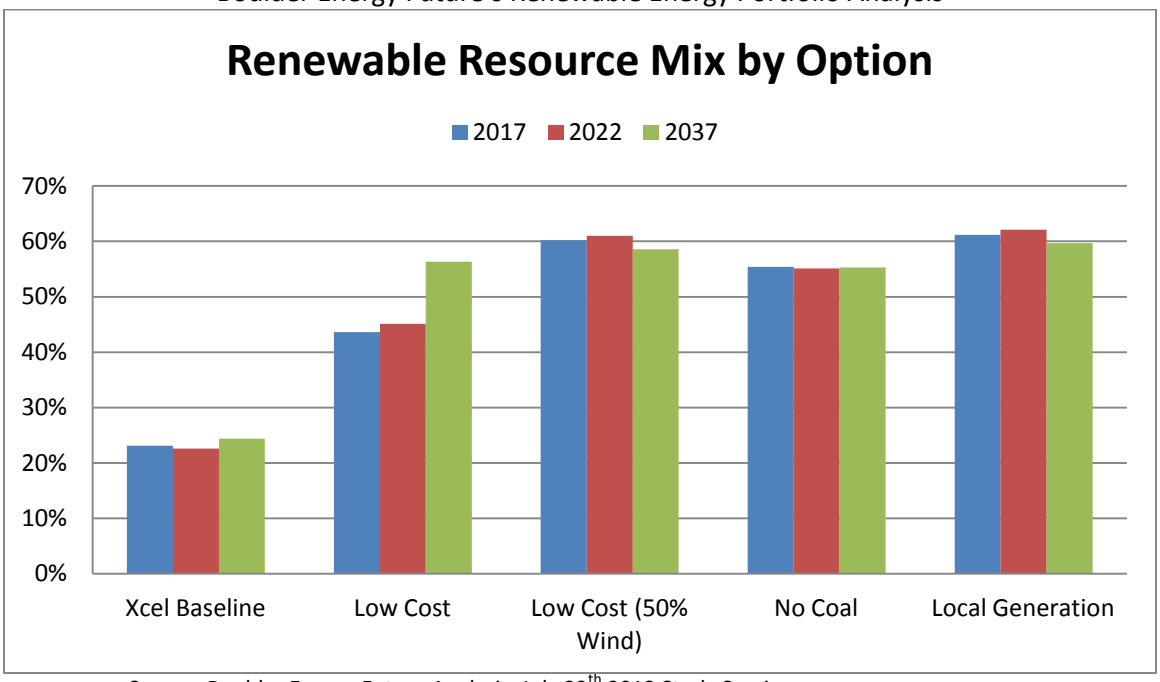
Of the remaining 20 to 25 percent of total energy use that is not related to buildings, transportation represents the vast majority (about 21 percent). A gradually increasing conservation effort that over 30+ years achieved an aggressive 50 percent reduction in transportation energy use (very optimistic) would then yield an additional overall energy reduction of 10 percent. This summary assessment suggests that

even with very effective conservation efforts, a total reduction of 35 percent would be a likely "best case" outcome for energy use/demand side management in the Better Buildings and Travel wise categories.

Based on this assessment, for a Boulder carbon neutrality strategy to be plausible, it will need a renewable energy development strategy capable of adding an additional 50 to 65 percent of low- or no-carbon energy by 2050.

In the Boulder Energy Future's analysis of muncipalization, a range of low- or no-carbon energy scenarios were modeled. The results of that modeling are included in Figure 8.

Figure 8
Boulder Energy Future's Renewable Energy Portfolio Analysis



Source: Boulder Energy Future Analysis, July 23th 2013 Study Session

This modeling indicates that under the municipal utility option, Boulder would be able to achieve a total renewable proportion of over 60% of its energy mix. Whether or not Boulder pursues municipalization of its energy source, the Boulder Energy Future analysis suggests that such a mix of resources could be formulated. This analysis would suggest that whether it is through municipalization or some other pathway**, large-scale expansion of renewable energy is a precondition to successfully accomplishing a major carbon reduction goal** such as carbon neutrality or an 80 percent reduction by 2050.

New Program Strategies Under Consideration—As part of the analysis now underway, The Brendle Group and its support team are evaluating additional strategies for significantly expanding renewable energy development. This analysis is being guided using the same framework of "forms of influence" outlined in the analysis of demand side efforts discussed above. The form of influence analysis for renewable energy development is included in Table 9 below.

Table 9
City Influence Areas for Renewable Energy Development

Form of Influence	Ramp-Up Renewables Actions
Financial	Incentives & rebates; financing mechanisms; investment in energy assets
Regulation	Building codes; land use codes; municipalization; PUC advocacy; legislative advocacy
Innovation - Technology	Grants; piloting technology; financing; investment
Education - Information	Information, community-based social marketing

Based on these broad categories, The Brendle Group has initially identified the following potential renewable energy strategies for further analysis in Table 10.

Table 10
Low/no carbon Energy Development Strategies Under Consideration

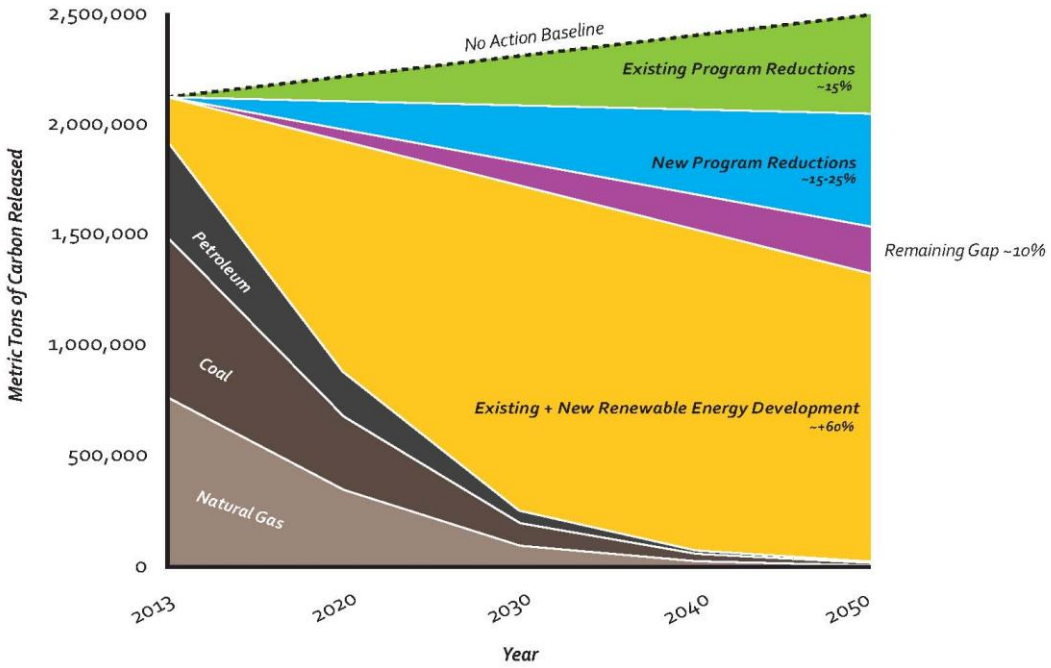
Strategy	Targeted Sector or Pathway	Description
Ramp Up Renewables/Energy Supply		
Renewable Energy for Residential and Commercial Buildings	Commercial and residential end users	Further enhanced PV, solar thermal uptake beyond what is included in existing programs Accelerated commercial and residential installations (e.g., roof top solar, solar gardens, etc.), solar site clearinghouse, various examples
Industrial scale and campus renewable energy	Institutional and industrial end users	For example, anaerobic digestion at breweries, CHP for corporate and college campuses, waste-to-energy, wastewater treatment plant digesters, biogas, biomass, and micro-scale hydro. Aarhus and Copenhagen in Denmark as well as Munich, Germany offer good examples for comprehensive approaches.
District scale Low-Carbon Energy	District scale heat and power; multiple end users and sectors	District cogeneration including infrastructure development shifting from building level to district level heating systems. Burlington, VT offers an example of transitioning an existing system.

Strategy	Targeted Sector or Pathway	Description
Utility scale Low-Carbon Power	Utility scale power	Offsite, utility scale wind, solar, hydro, etc
Smart Grid	Energy supply optimization	Storage, demand response, smart meters, pricing, etc. in order to optimize the electric grid under a highly renewable portfolio. Examples include Fort Collins, Austin, and Basel.
Electrification of remaining loads	Access to low-carbon supply	Conversion to electric heating, loads not on district supply

V. Conclusion: Pathway to a Low-Carbon Future

Combining all of the preceding analysis, Figure 9 shows a potential pathway to accomplishing a carbon neutral goal.

Figure 9
Potential Pathway to Carbon Neutrality



Source: Staff and Brendle Group

The preceding analysis suggests that while a carbon neutrality goal is an enormous undertaking, it can be achieved if:

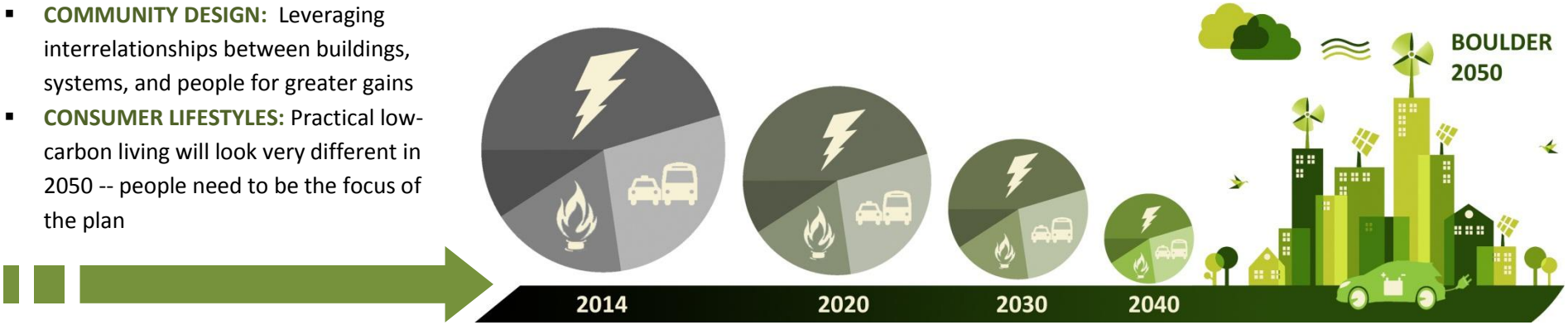
- action is taken early,
- critical early-stage strategies, such as decarbonization of energy supply, are aggressively implemented as soon as possible, and
- a coordinated set of other strategies is staged to reinforce the gains being made in each sector.

The scope of the changes required also mandate much more far-reaching engagement and collaboration with a wide array of public and private sector entities and the broader community. The perils that could result if both Boulder and the larger global community do not take these actions are grave. At the same time, the urgency of this action creates huge economic and technological opportunities for communities that are early leaders in the transition to a low-carbon economy and society.

This technical portrayal will need to be framed in terms and images that are both relevant and compelling to the future while also focusing on the many benefits that can be achieved through early and active pursuit of a low-carbon future. The figure below depicts these concepts on a mid-century planning horizon, inspiring an imagining of what low-carbon living could look like when the goal is achieved.

Figure 10
GHG Reduction Pathway to Carbon Neutrality

- **BETTER BUILDINGS:** Deep efficiency improvements across residential, commercial and industrial buildings
- **TRAVEL WISE:** New types of vehicles and significant increase in transit and pedestrian alternatives
- **RAMP-UP RENEWABLES:** Significant expansion of local and regional renewable generation
- **COMMUNITY DESIGN:** Leveraging interrelationships between buildings, systems, and people for greater gains
- **CONSUMER LIFESTYLES:** Practical low-carbon living will look very different in 2050 -- people need to be the focus of the plan



ATTACHMENT A
Summary of Leading City Climate Action Goals

City	GHG inventory boundary and protocol (if known)	Current GHG Inventory, tCO2e (year)	Current GHG Inventory, tCO2e per Resident	GHG Emission Reduction Goal and Estimated Reductions Relative to Base Year (MTCO2e)	Timeframe of GHG Emission Reduction Goal	% of Reduction Expected to be Achieved Through Offsets	Additional Notes
Aarhus Denmark (Pop. 314,545	City limits	2.01million (2009)	7.1	100% (2,032,540) **No base year**	2030	Offset is strategic action that can be used to achieve zero by 2030	They have no set amount of GHG to reduce b/c they want to be 0 MTCO2e by 2030. **No baseline year.**
Austin, TX and Travis County USA (City Pop. 812,025; County Pop. 1,030,588)	County limits, using ICLEI's 2012 Community Protocol)[12]	14.9 million(2010)	14.6	25% below 2007 **(3.2 Mt)** 70% below 2007 **(10.5 Mt)**	2015 2030	Not specified.[13]	Municipal utility (Austin Energy) considering divesting in its share of coal power plant

[12] Source: CDP-2012 Responses

[13] Austin's Climate Action report discusses local projects available for individual offsets (tree-planting and supporting solar panels) funded and verified by Austin Energy

City	GHG inventory boundary and protocol (if known)	Current GHG Inventory, tCO2e (year)	Current GHG Inventory, tCO2e per Resident	GHG Emission Reduction Goal and Estimated Reductions Relative to Base Year (MTCO2e)	Timeframe of GHG Emission Reduction Goal	% of Reduction Expected to be Achieved Through Offsets	Additional Notes
Bellingham, WA USA (Pop. 2012 81,360)	City limits, using ICLEI CACP software[14]	997,000 (2005)	12.23	2000 Base Year: 7% reduction 28% reduction **(0.27 Mt)**	2012 2020	None specified. Mentioned offsets may play a role post 2020.	
Burlington, VT USA (Pop. 2010 42,417)	City limits, using ICLEI CACP software	405,000 (2010)	9.54	80% reduction from 2007 baseline year. Equal to a (**317,818 ton reduction by 2050**) 20% reduction from 2007 baseline year.	2050 2020	No mention of offsets, but new 2013 draft CAP update mentions the use of urban forestry to sequester co2 as a strategy	Updating CAP in 2013. Have draft on their website.
Copenhagen Denmark Pop. 559,440	City limits	1,959,000	3,5	100% (1,958,886)	2025	Kind of offset: Investments in wind farms outside the city limit. As there is no possible space left inside the city of Copenhagen	Investment in offshore wind farms will most likely the first step
Eugene, OR USA							

[14] Source: City of Bellingham GHG Inventory and Climate Protection Action Plan

City	GHG inventory boundary and protocol (if known)	Current GHG Inventory, tCO2e (year)	Current GHG Inventory, tCO2e per Resident	GHG Emission Reduction Goal and Estimated Reductions Relative to Base Year (MTCO2e)	Timeframe of GHG Emission Reduction Goal	% of Reduction Expected to be Achieved Through Offsets	Additional Notes
Fort Collins, CO USA (Pop. 143,986)	City limits *see notes section	2.28 million (2011)	15.8 (2011)	80% from 2005 **(2,032,000 tons reduced by 2050)** 20% from 2005	2050 2020	0.34% by 2020 They estimate offsets will provide 7,000 tons of savings by 2020 No stated goal involving offsets	Scope includes direct emissions (natural gas, transport), and indirect (elec., landfill gas, discarded recyclables, and air travel).
Jönköping, Sweden (Pop. 126,331)	City limits[15]	579,000 (CO2 only; 1990)	4.58	40% from 1990 **(0.23 Mt; of which transport 0.15Mt)**	2020	No mention of offsets	
Madison, WI USA (Pop. In 2010 240,000)	City limits	3.95 million (2010)	16.46	80% reduction below 2010 or 1990 levels (not specified) (3.16 Mt)	2050	No mention of offsets	

[15] Values taken from Jönköping Sustainable Energy Action Plan submission to EU Covenant of Mayors

City	GHG inventory boundary and protocol (if known)	Current GHG Inventory, tCO2e (year)	Current GHG Inventory, tCO2e per Resident	GHG Emission Reduction Goal and Estimated Reductions Relative to Base Year (MTCO2e)	Timeframe of GHG Emission Reduction Goal	% of Reduction Expected to be Achieved Through Offsets	Additional Notes
Melbourne, Australia (Pop. 2009-10 98,162; 429,000 workers)	City limits	4.88 million (2009-10)	50 [16]	Zero net emissions by 2020; relative to a 2002 base year this is a reduction of 3.75 MTCO2e	2020	Expects to reduce emissions 35% relative to BAU in 2020 and will offset the remainder, estimated at 5 million tons[17]	Currently updating their climate action plan
Munich Germany (Pop. 1.4 million)	City limits	9.8 million (2010)	7[18]	50% below 1990 levels by 2030 (~7 MtCO2e) 3.15 tons CO2e per capita by 2030	2030 (10% every 5 years)	No mention.	
Oberlin, OH USA (Pop. 2010 8,286)	City limits using ICLEI CACP[19]	174,000 (2007)	21.0 tons/capita	2007 Base Year: 50% **(0.09 Mt)** 75% **(0.13Mt)** >100% **(<0.17Mt)**	2015 2030 2050	Not specified. In order to achieve carbon positive will require Climate Positive Credits. Striving for local carbon offset market with a Greenhouse Pilot.	Goal is to become a "Climate Positive City", reducing GHGs below zero, for which it lists measures outside the city limits related to land use and food

[16] This is high due to very high employment but low population in Melbourne city limits)
[17] Melbourne expects to source its offsets from the National Emissions Trading Scheme
[18] http://helpdesk.eumayors.eu/docs/seap/32_1319545671.pdf
[19] 2013 Climate Action Plan

City	GHG inventory boundary and protocol (if known)	Current GHG Inventory, tCO2e (year)	Current GHG Inventory, tCO2e per Resident	GHG Emission Reduction Goal and Estimated Reductions Relative to Base Year (MTCO2e)	Timeframe of GHG Emission Reduction Goal	% of Reduction Expected to be Achieved Through Offsets	Additional Notes
Örebro, Sweden (Pop.2010 135,000)	City limits, using a partial consumption-based method (Energy use, transport, air travel, and food)[20]	910,000 (2000)	6.7 tons/capita	40% Per Capita below 2000 **(0.31 Mt)** 90% **(0.82Mt)**	2020 2050	None mentioned	Long term goal set less than one ton per person, " a level where, if it were to be applied globally, it would not endanger the climate"
Portland, OR USA	County and City			80% (6,895,508)	2050		
Seattle, WA USA	City limits						
York England (Pop. 2008 197,800)	City limits	1,160,000 (2008)	5.86	80% reduction below 1990 levels by 2050 **(0.90 Mt)** 40% reduction below 1990 levels by 2020 **(0.45Mt)**	2050 2020	No mention of offsets in 2010-2013 CAP	

[20] Climate Plan Summary for Örebro

City	GHG inventory boundary and protocol (if known)	Current GHG Inventory, tCO2e (year)	Current GHG Inventory, tCO2e per Resident	GHG Emission Reduction Goal and Estimated Reductions Relative to Base Year (MTCO2e)	Timeframe of GHG Emission Reduction Goal	% of Reduction Expected to be Achieved Through Offsets	Additional Notes
Zurich, Switzerland (Pop. 2005 366,809)	Energy-related CO2 emissions within the City limits[21]	2.02 million (2005)	5.5	1 ton CO2e per resident Per capita primary energy consumption goal "2000 Watt Society": 2,500 watts, of which 2,000 watts renewable energy per person (equals 1 tCO2e/capita)	2050 (interim targets in 2020, 2035)	No mention of using offsets	"2000-Watt Society" also used by other Swiss cities, such as Basel

[21] http://helpdesk.eumayors.eu/docs/seap/16_1348132236.pdf

Attachment B
Issues Related to Establishing Scope and Boundary for Boulder's GHG Inventory

There are several key scope and boundary issues that council may wish to consider as there is latitude within the protocol on these choices and they have potentially significant impact on the bottom line calculations.

Scope

1. *Production emissions (sources) and consumption emissions (activities)*

GHG inventories have historically divided emissions into scopes to define where they occur, the relationship of the reporting entity to the emission, and to prevent double counting of emissions between entities. For example, the emissions from a power plant generating energy are Scope 1 (direct) while a consumer that accounts for the emissions associated with his/her consumption of electricity are Scope 2 (indirect, energy). Similar labels have long been sought for community inventories but are complicated by the more complex relationships between parties and ownership of emissions.

The most recent ICLEI protocol divides emissions into *Sources* and *Activities* where sources are direct emissions in the community that are the responsibility of an entity in the community and activities are indirect emissions that may occur elsewhere and/or may be the responsibility of another entity outside the community (e.g. a landfill) but result from demand generated by another community (e.g. a community sending waste to a landfill outside its community).

The majority of community inventories are production-based, including many sources for which data can reasonably be gathered such as stationary consumption of fuels in the community (e.g. natural gas) and on-road transportation in the community. Most community inventories also include the activity emissions associated with electricity consumed in the community.

Increasingly, communities are including some consumption-based, or activity, emissions in their inventories. These often include on-road vehicle travel demand generated by the community that crosses its boundaries (e.g. commuter travel), solid waste that is disposed of outside the community, and airline travel by residents and employees. These can represent significant emission sources that the community can influence with policies and programs.

Some communities are including a broader array of activity emissions such as the upstream impacts of fuel extraction and delivery for stationary combustion and transportation, of the transmission and distribution of electricity, of fuels used in the treatment of water and wastewater that may occur outside the community, and of the materials and goods used in the community (e.g. concrete, food, paper, etc.) This approach to inventories can provide a more holistic estimate of the community's GHG emissions and can open up new opportunities for reduction strategies. However, it also raises additional challenges with respect to the availability of data on the activities, the methodologies associated with calculating the emissions, and the ability of the community to influence the emission activities.

2. *GHG inventory and reduction reporting in absolute values and/or on a per-capita basis*

Reporting GHG inventory and reduction performance can be done in absolute values for the community or on a per capita basis. Each of these approaches has advantages.

Absolute values provide a clear indication of the total emissions inventory, reductions achieved and a relatively easy comparison to reduction targets the community sets. Absolute values will also include growth in the community and hold the community accountable for addressing the emissions resulting from that growth.

Per-capita values facilitate comparison with peer communities of varying sizes. Per-capita values can also help the community see progress in reducing emissions intensity even if the respective change in absolute emissions is not as apparent due to growth in the community. Finally, per-capita values can help to emphasize the individual's contribution to emissions and responsibility in helping the community achieve reduction goals.

3. Role of Offsets in the Inventory and Reduction Plan

The ICLEI protocol requires the community to report gross GHG emissions without the impact of carbon offset projects, stocks, sinks, sequestration projects, purchases of carbon credits or renewable energy certificates. The community may optionally, and separately, report the emissions reductions associated with any of the above activities. Boulder has done this historically by reporting GHG reductions associated with city-owned hydroelectric generation resources and the purchase of renewable energy credits (RECs) by residents and businesses in the community through Xcel Energy's Windsource program.

Offsets and RECs represent contractual commitments to emission reduction whereby the purchaser can effectively "lease" the carbon reduction benefit from a third-party's project for one year. Typically, these projects will occur outside of Boulder. The city currently dies not utilize offsets in determining either city or community greenhouse inventories.

Beyond the practical consideration of whether Boulder can achieve aggressive GHG reduction goals without offsets and the philosophical consideration of whether Boulder's plan should favor local actions or leasing the benefits of actions elsewhere, the community should also consider which actions will maximize the return for the community. Many local actions can offer a financial payback as well as other community co-benefits, such as decreasing sensitivity to energy prices, increasing energy independence, more comfortable and productive buildings and industries, and decreased travel time. Traditional offsets, though they may have a role in an aggressive reduction plan, usually don't offer these local benefits.

<u>Geographic Boundaries</u>

Generally, community inventories set a geographic boundary for emissions sources at the city limits to align with available data sets and the community's sphere of influence. Any additional activities included in the inventory, such as waste disposal outside of the boundary or cross-boundary commuter traffic, are by, definition, occurring at least partly outside of the boundary. Boulder's inventory has historically aligned with the city limits.

There aren't any particular benefits to conducting inventories and documenting reduction activities in an area broader than the city limits. However, as Boulder considers potential reduction strategies and designs reduction programs, a regional approach may become relevant. A number of benefits can be envisioned including, but not limited to, a broader and more successful market for programs that seek to stimulate GHG reducing markets (e.g. for efficiency products) and broader regional support for transportation planning and infrastructure that reduce emissions.

1. *Accounting for commuter trips*

There is the option in the ICLEI protocol to include commuter vehicle travel either by accounting for all of a commuter's round-trip mileage within the city limits or by accounting for just one leg of the commute (e.g. half of the mileage) but including any mileage outside of city limits. Boulder has elected for the latter approach to better account for the influence of the substantial in-commuter impacts.

2. *Air Travel*

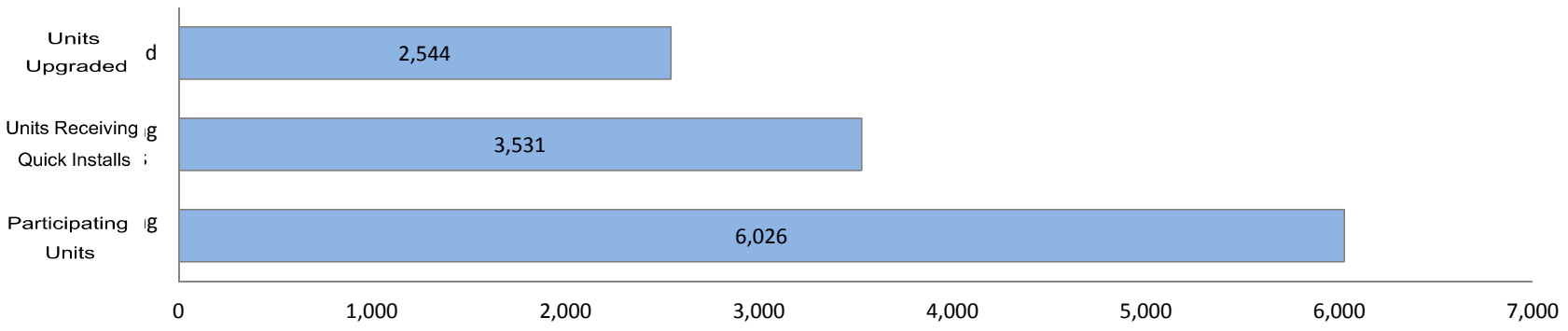
The current inventory creates a placeholder for beginning to incorporate air travel generated by Boulder residents but originating from DIA. The data is not yet available to accurately integrate this element but staff anticipates its availability in the future and have created a mechanism for integrating it into the inventory.

City of Boulder - Residential EnergySmart Progress Report: through June 30, 2013

This page summarizes progress to date since October 2010 in achieving Boulder's energy efficiency goals through residential EnergySmart services. The EnergySmart program was conceived and developed through a joint effort of the city and community members, and is now delivered countywide in partnership with Boulder County and the City of Longmont. The progress reported here is only for services delivered within the City of Boulder. For more information, visit www.EnergySmartYES.com.

PROGRESS TOWARD GOALS

RESIDENTIAL UNITS PARTICIPATING IN ENERGYSMART



IMPACT

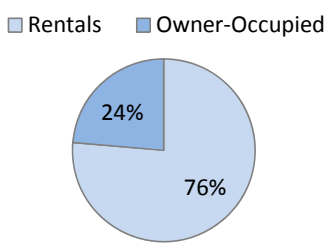
WORK COMPLETED	LEVEL OF INVESTMENT	DEEMED ANNUAL SAVINGS*			
Number of Quick Installs	Private Investment	kWh	Therms	Costs	$mtCO_2$
30,527	$7,452,304	1,987,821	561,873	$597,712	4,580
Number of Upgrades	Total Rebates Paid				
5,038	$1,255,669				

Electricity savings to date from residential EnergySmart are enough to power 315 Boulder homes each year!

HIGHLIGHTS

- 50% of participants in EnergySmart across Boulder County cited energy cost savings as their primarpy reason to particiate. 43% cited Smart Regs as their primary reason to participate.
- Air sealing and attic/ceiling insulation are the top two upgrades overall
- Each dollar spent on residential energy efficiency rebates leverages about $5.93 in private investment.
- County-wide 10,735 total homes are enrolled.

ENROLLMENT



ADVISING TO ACTION

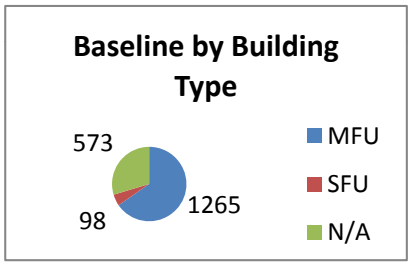
Owner-occupied units that make upgrades after receiving EnergySmart advising:	74%
Rental units that make upgrades after receiving EnergySmart advising:	32%

* Includes deemed savings from upgrades and quick installs.

Last updated June 30, 2013
Dashboard design credit: City of Boulder, Boulder County

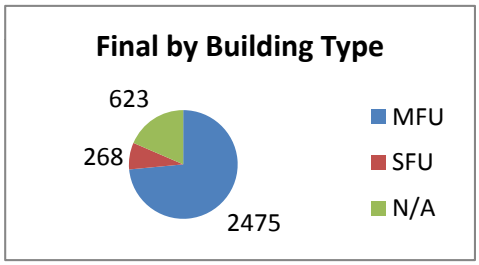
SmartRegs Data: January 2011 through June 2013

SmartRegs Baseline & Final Compliance Information



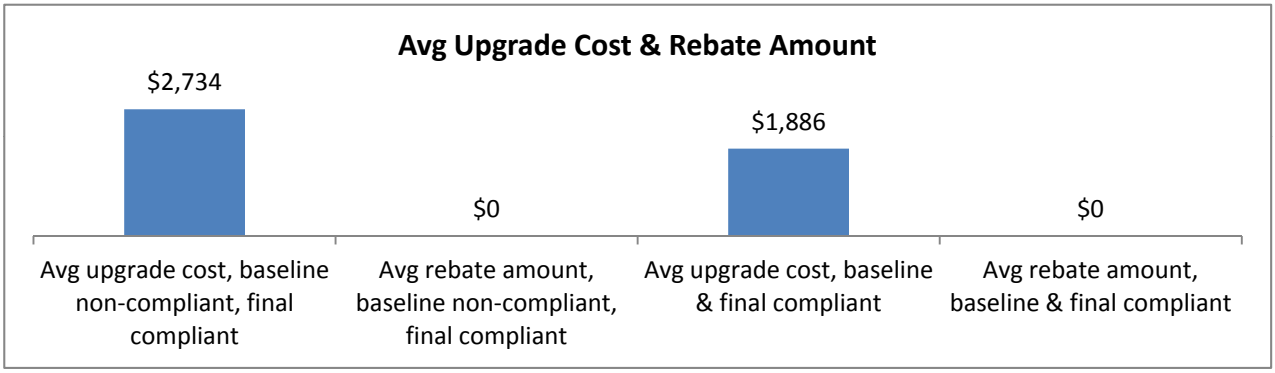
Total Compliant at Baseline: **1936**

Total Compliant Final:	**3362**
Compliant After QI:	**633**
Compliant After Upgrade:	**667**
Compliant by Exception:	**126**

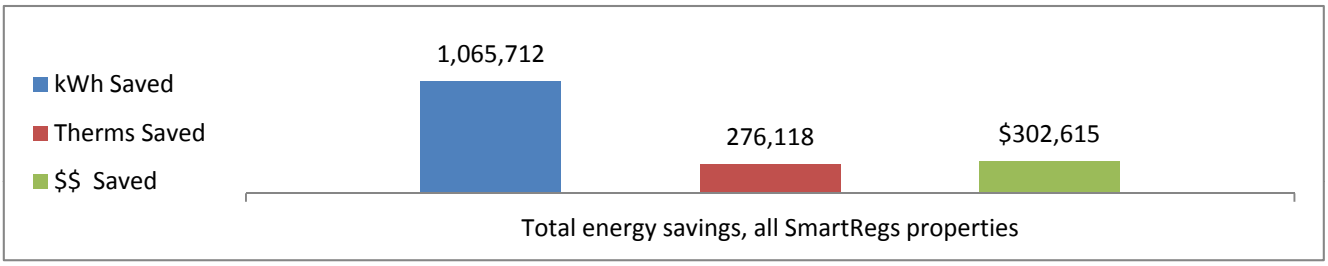


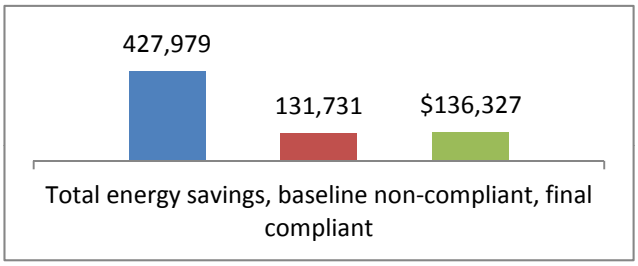
SmartRegs Investment & Rebate Information

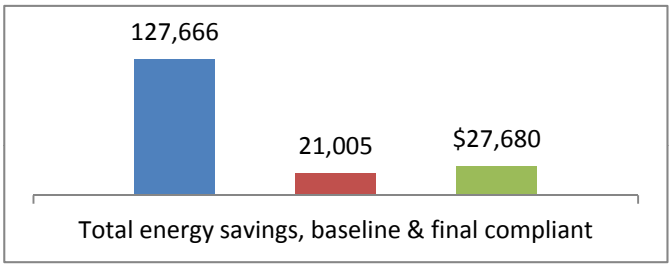
Total upgrade investment, all SmartRegs properties: **$ 3,171,346.31**

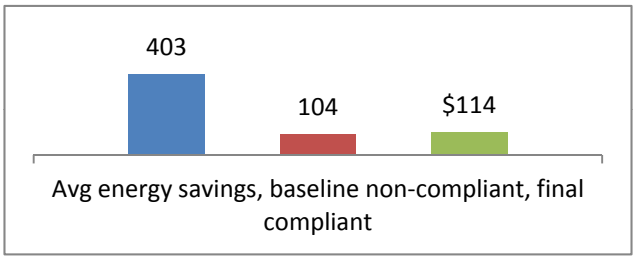


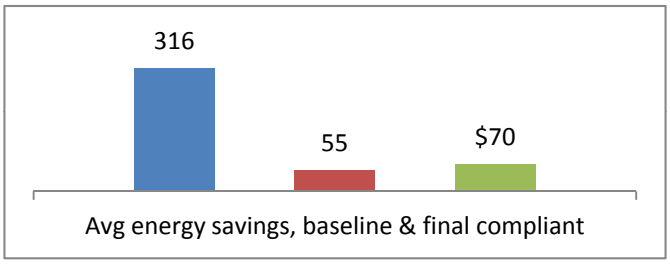
SmartRegs Energy & Financial Savings Information











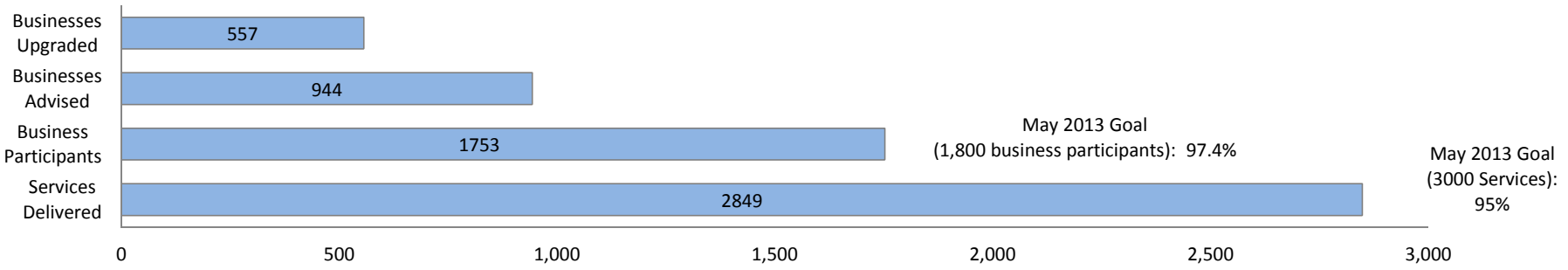
Last updated June 30, 2013

City of Boulder Commercial EnergySmart Progress Report: through June 30, 2013

This page summarizes progress to date since October 2010 in achieving the goals of the commercial EnergySmart services. EnergySmart was conceived and developed through a joint effort of Boulder County Commissioners' Office of Sustainability, Boulder County Public Health, City of Boulder and City of Longmont. For more information, visit www.EnergySmartYES.com.

PROGRESS TOWARD GOALS

PARTICIPATION IN ENERGYSMART BY BUSINESSES OR PROPERTY OWNERS



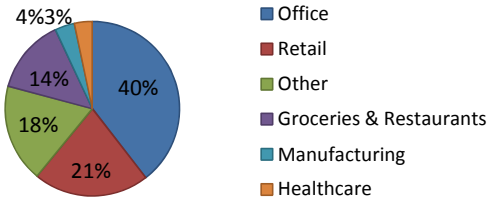
IMPACT

WORK COMPLETED		FUNDING BREAKDOWN	DEEMED ANNUAL SAVINGS FROM UPGRADES & QUICK INSTALLS			
Number of Upgrades	Total Rebates Paid	Federal	kWh	Therms	Cost Savings	$mtCO_2$
610	$1,163,568	$668,568	7,426,250	8,807	$658,093	5,941
Total Project Investment	Private Investment	City				
$5,886,529	$4,722,961	$495,000				
Total Investment:Rebates*	Program Simple Payback (yrs)**	County	Energy and emissions savings to date from commercial EnergySmart are equivalent to taking 1238 cars off the road!			
5.1 to 1*	1.8					

HIGHLIGHTS

- This report includes the last of the DOE BetterBuildings grant rebate dollars.
- Based on success, Boulder County, City of Boulder, and City of Longmont have secured funding to continue EnergySmart beyond the grant period with rebates and administration.
- Assessments much more frequently (55%) continue to further Advising when Advisors conduct both.
- Market Transformation: 152 contractors have completed at least 1 commercial energy efficiency upgrade, and the availability of high efficiency HVAC equipment has improved dramatically.
- EnergySmart has been recognized by EPA's Climate Leadership Award.

USES OF BUILDINGS ENROLLED IN ENERGYSMART



ADVISING TO ACTION

Businesses that make upgrades after receiving EnergySmart advising services:

67%

** For every $1 spent in rebates, over $5 were invested in the community towards these efficiency projects.*

*** The total Rebate amount invested in the program to date will be equalled by the resulting Energy Cost Savings in 1.8 years.*

Last updated June 30, 2013

Dashboard design credit: City of Boulder, Boulder County

City of Boulder and
Pecan Street Research Institute Project

Project Objectives:

- Begin to build an anonymous, aggregated database of circuit-level energy usage data for residential, small business and institutional customers in Boulder
- Test the ability of the City to bypass Xcel Energy to access anonymized energy usage data
- Work with Pecan Street's other US research communities to begin to understand the usefulness of circuit-level energy and water usage data for the purposes of:
    - Community Climate Action Planning
    - Designing communitywide energy products and services
    - Measuring the effectiveness of energy products and services
    - Increasing energy literacy in the community
    - Promoting behavior change in terms of energy usage and investment in energy products and services
    - Engaging youth in the community's climate action efforts
- Identify the most useful format to customers for the delivery of energy and water usage data
- Understand how small business energy use data will complement and inform the development of a rating and reporting requirement and/or other small business energy efficiency strategies.
- Collaborate with Fort Collins' Pecan Street project to begin identifying the advantages of having real time energy usage and water data for the customers, the utility and community in advancing climate and energy goals.

Project Planning:

On July 8, Pecan Street Research Institute staff visited Boulder to meet with city staff on the project's scope and timeline. There are two sector-specific components to the project involving recruitment of 50 residential volunteers and one Boulder Valley School District high school; and 25 small businesses volunteers.

Funding

The residential parts of the project are funded by a Department of Energy (DOE) grant through Pecan Street; the commercial project will be funded from the City's Climate Action Plan tax. These projects are still in the development.

Technology

The technology used to retrieve electricity use data without utility involvement is from eGuage, a Boulder-based company. eGauge provides up to 12 circuit level monitoring devices per premise, and a flexible, secure, web-based interface for viewing energy usage. The electric energy information is retrieved in one-minute intervals and is able to provide real time, appliance or equipment level data to the users.

Preliminary project scope and timeline:

- Finalize project and communication plans by the end of July.

- Determine neighborhood and business selection process - August
- Beta test Pecan Street's customized web portal with small focus group - September
- Gather feedback from focus group participants– October
- Launch program – November
- Receive monthly data analysis – December and on-going
- Quarterly project check-ins thereafter
- Periodic reports to Council on research results for the purposes of:
    - Fostering innovation and economic vitality opportunities
    - Program and service enhancements
    - Policy guidance relating to the community's climate action goals