Boulder City Council
STUDY SESSION

Tuesday
April 29, 2014

6-7:30 PM
TMP Update

7:30-9 PM
Boulder's Energy Future

Council Chambers
Municipal Building
1777 Broadway

Submit Comments to City Council
Email: council @bouldercolorado.gov
or
Attention: Alisa Lewis, City Clerk
PO Box 791, Boulder, CO 80306
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April 29, 2014
Study Session

TMP Update

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I.

MEMORANDUM

TO: Members of City Council

FROM: Jane S. Brautigam, City Manager
Paul J. Fetherston, Deputy City Manager
Maureen Rait, Executive Director of Public Works
Tracy Winfree, Director of Public Works for Transportation
David Driskell, Executive Director, Community Planning + Sustainability
Susan Richstone, Deputy Director, Community Planning + Sustainability
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Lesli Ellis, Comprehensive Planning Manager
Brett KenCairn, Senior Environmental Planner
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Kathleen Bracke, GO Boulder Manager
Chris Hagelin, Senior Transportation Planner
Micki Kaplan, Senior Transportation Planner
Marni Ratzel, Senior Transportation Planner
Randall Rutsch, Senior Transportation Planner

DATE: April 29, 2014

SUBJECT: **Study Session on the TMP Update including Complete Streets: Transit Planning, Bike and Pedestrian Innovations, and Regional, TDM and Funding Focus Areas**

I. EXECUTIVE SUMMARY

The City of Boulder's Transportation Master Plan (TMP) was created in 1989 and is a mature plan reflecting more than 20 years of consistent policy direction and success. The TMP continues to evolve as a "living document" responding to the needs and issues of the community as reflected in the focus areas of the update. This update builds on the city's broader community vision of the Boulder Valley Comprehensive Plan (BVCP) and sustainability planning efforts and is closely integrated with city projects such as Climate Commitment, Civic Area Plan, Access Management and Parking Strategy (AMPS), Envision East Arapahoe/Sustainable Streets + Centers, North Boulder Subcommunity plan update, and Comprehensive Housing Strategy.

The TMP is set within the broader context of the Boulder Valley Comprehensive Plan (BVCP) with the resulting transportation system expected to support the sustainability and quality of life goals set by the community. It also has a key role to play in helping to achieve the community's Climate Commitment goals, and the work of this update is guided by council direction following the Policy Refinement phase in September 2012. Council agreed that the city's transportation policy continues to produce positive results and has strong community support and directed this update to focus on the five Focus Areas: Complete Streets, Regional Travel, Transportation Demand Management (TDM), Funding, and Integration with Sustainability Initiatives. A key finding from the Policy Review was the need to accelerate the rate of change in mode shift if the

city is to meet the existing TMP objectives. The city's Climate Commitment goals suggest the need for additional mode shift and reduction in vehicle miles traveled in addition to shifting travel energy sources away from fossil fuels.

This study session is intended to provide council with the major results of work in the five Focus Areas and to share potential policy choices for achieving transportation and broader community sustainability goals. These directions proposed in the areas of transit, bike/pedestrian innovations and TDM will form the major new building blocks of the updated TMP and are very consistent with the Council's vision and priorities established in the Jan. 2014 council retreat. These building blocks would continue to:

- enhance multimodal travel options in Boulder;
- implement innovations to make the bike system more accessible to a wider range of users;
- build a state of the art transit system including bus rapid transit (BRT) that will be attractive to both residents and in-commuters; and,
- continue work exploring and leading toward a community wide Eco Pass.

In addition, the technical work of the update such as the sensitivity testing provides insight into the role transportation can play in supporting broader city goals such as Climate Commitment and place-making and how other policies and programs such as parking management can support the transportation investment. This memo builds on the City Council Information Packet from Feb. 18, 2014, which can be found on the Web at: https://documents.bouldercolorado.gov/weblink8/0/doc/124743/Electronic.aspx.

II. QUESTIONS FOR COUNCIL

1. Does council have any questions on the information and work efforts to date presented in these TMP focus areas:
    1. Does Council agree with the Living Laboratory approach and Action Plan framework for the Bike and Walk Innovations element of the TMP update?
    2. Does Council have feedback regarding the transit planning element and proposed "Path to a Renewed Vision for Transit"?
    3. Does Council have feedback regarding advancing next steps for analysis and coordination with Boulder County and RTD regarding the community-wide Eco Pass study?
2. Does Council have feedback regarding the proposed refinements to the TMP measurable objectives and updated targets?

III. BACKGROUND

A. Transportation Master Plan (TMP)

The TMP is set within the broader context of the Boulder Valley Comprehensive Plan (BVCP), with transportation supporting the sustainability and quality of life goals set by the community. The TMP was first adopted in 1989 as the city's long-range blueprint for travel and mobility throughout Boulder.

This update was initiated with a Policy Review based on the *2012 Transportation Report on Progress* (https://www-static.bouldercolorado.gov/docs/transportation-report-on-progress-2012-1-201305291118.pdf), a public phone transportation survey, employee survey, cross departmental interviews, Transportation Advisory Board (TAB) and expert panel input. Based on this review, the city's transportation policy continues to produce positive results and has strong community support but could benefit from refinement. The Policy Review phase results were presented to council in August and September 2012. City Council agreed with these results and directed that the work program be guided by the following:

- Maintain the existing four TMP Focus Areas with the following emphasis:
    - *Complete Streets*, (formerly Multimodal Corridors)*:* Rename, address transit system planning, explore bike and pedestrian innovations;
    - *Regional Travel:* continue the existing approach with a focus on US 36, the Northwest Area Mobility Study and other regional connections;
    - *Transportation Demand Management (TDM)*: explore community-wide Eco Pass and develop TDM packages for development review;
    - *Funding:* diversify transportation funding options and explore opportunities for additional funding to support on-going basic operations and maintenance needs as well as capital funding to achieve TMP goals.
- Add "Integrate with Sustainability Initiatives" as a new, fifth Focus Area.
- Add three new measurable objectives of *Safety, Neighborhood Accessibility, and Vehicle Miles Traveled (VMT) Per Capita for residents and in-commuters.*

IV. ANALYSIS: TMP FOCUS AREAS AND OBJECTIVES

This section presents the work in each of the five Focus Areas and the issues identified for council consideration based on community input and staff analysis:

A. Complete Streets Focus Area

The Complete Streets Focus Area strives to accommodate all modes of transportation by planning for pedestrians, bikes, transit and vehicles as facilities are planned, designed, and constructed. This focus area recognizes walking as the primary mode of travel and aims to develop the complete modal systems needed to accommodate increased travel while moving travel away from single occupant vehicles (SOVs). Complete Streets also recognizes the role that the multimodal transportation network provides to support land use, enhance urban design, and create place-making opportunities throughout the community. As noted by author and planner Victor Dover in his recent visit to Boulder, great streets are an important element of creating community and need to be "shaped, comfortable, connected, safe, and memorable." The Complete Streets focus area of the TMP aims to achieve these transportation goals, as well as support broader community goals as identified in the city-wide Sustainability Framework.

1. Bicycle and Pedestrian Innovations

This element of the Complete Streets focus area seeks to broaden the safety and appeal of bicycling and walking in Boulder. An emphasis is placed on fine-tuning the existing system through targeted enhancements to support a broad range of cyclists and pedestrians of all ages and abilities. These engineering improvements coupled with strategies to encourage, educate,

enforce and evaluate bicycling and walking are the “Five E’s” that comprise a comprehensive approach to increasing walk and bike mode share.

a) ***What we’ve learned***

With approximately 9 percent of resident commute trips made on foot and over 10 percent by bike according to the American Community Survey (ACS), people in Boulder walk three times more than the national average and bike at 20 times the national average. While this is great progress, the share of walking and biking trips needs to increase further to achieve the goals of the TMP and the city’s Climate Commitment goal of reducing greenhouse gas emissions to 80% below 1994 levels by 2050.

The core network of Boulder’s biking and walking paths is virtually complete. Since 1990, the city has completed many major infrastructure projects with an emphasis on building a multi-modal transportation system providing options to everyone. Yet, there is still tremendous potential to increase the mode share of trips completed on foot or bike, especially in comparison to international cities.

b) ***Work to attract interested but concerned cyclists***

With respect to bicyclists, studies in Portland, OR have shown that 60% of bicyclists are "Interested but Concerned" riders – people that like riding a bike but don’t feel comfortable or confident sharing the roadway with motor vehicles. While Boulderites are more likely to ride a bike than in other US cities, the demographics of bike riders in Boulder are similar to national data. According to the 2012 Boulder Travel Diary, there are twice as many men as women that commute by bike, while half of all trips completed by women are made by SOV or to transport children verses just one-third by men. Therefore, a primary goal of this update is to increase trips by older adults, women, and families with children. Throughout the listening and learning phase of the city’s TMP update, staff also heard that more work is needed to create a bike culture in Boulder that goes beyond sport cycling.

c) ***Strengthen partnerships for walk friendly community design***

Walking is the primary human travel option and the prioritized mode in the TMP. Throughout the listening and learning phase, the city learned that the there is a desire to strengthen the coalition of community based organizations in support of walk-friendly community design.

d) ***Boulder Walks Program***

Last summer, the city began the Boulder Walks program to learn what makes a good pedestrian environment. The program has introduced *Walk Audits* as a new tool to assess the qualitative aspects of walking. Throughout the summer and early fall, staff from Transportation and Community Planning and Sustainability (CP+S) partnered to host Walk Audits with community members to identify design elements that support a walk-friendly community. In particular, the relationship between the transportation network, the land use it serves and the streetscape interface of the two are factors that influence walk-friendliness.

The city also developed a Neighborhood Access Tool that characterizes the access that people have to walk to locations and businesses needed to meet daily needs. This tool illustrates aspects of the 20-minute neighborhood by displaying the area that can reach a given attractor in a 20

minute walk (walk shed). These walk sheds can then be aggregated to display the number of attractors available from a given location. The distance that one can walk in a given time depends on the quality of available pedestrian facilities, so information from the Walk Audits can be incorporated into the Neighborhood Access Tool. See **Attachment A** for an example of the output from the Neighborhood Access Tool.

e) Bicycle Innovations "Living Lab" Projects

Installation of new bicycle treatment pilot projects began in the Fall of 2013. The city has installed four treatments:

- buffered bike lanes along Spruce Street from 15th to Folsom and along University Avenue from 9th Street to Broadway;
- back in angle parking from Broadway to 17th Street; and,
- a protected bike lane along Baseline Road from 30th to 35th streets.

In October, the first segment of the multi-way boulevard along the south side of Pearl Parkway opened. This treatment and the planned shared roadway along Junction Place are being integrated into the Living Laboratory initiative and evaluation process. The e-bike pilot demonstration project also has begun and will be monitored through December 2014.

Projects installed as part of the living laboratory are anticipated to continue for approximately 12 to 18 months. Performance monitoring of the living laboratory bike innovation demonstration projects includes a number of qualitative and quantitative measurements. Before and after analysis is underway to evaluate the impacts of these pilot projects in addressing safety and comfort for all users. Staff collected before data in early August and initial after data for the installed projects in early November. Community feedback on the pilot projects has been on-going since installation through the Inspire Boulder website and direct contact with city staff. Data collection and additional community outreach to seek feedback on all of the living laboratory projects will continue throughout 2014.

The TMP website is a living resource for community members to receive up-to-date information on the progress of Living Laboratory projects, as well as other TMP focus areas. Interactive information including videos, maps, and before and after photos of the Living Laboratory projects can be viewed at www.BoulderTMP.net , using the "Complete Streets" link.

f) 2014 Walk Bike Summit

On Feb. 6, 2014, the city hosted the 2014 Walk Bike Summit in collaboration with the Transportation Advisory Board (TAB) and the Bike Walk Steering Committee. The Summit brought together agencies, organizations and businesses/retailers in the active transport industry, community groups and community focus group participants to envision and strategize how to increase walking and biking trips in the City of Boulder. A day-long event, the Summit featured several interactive group activities including a co-design session in the morning that produced drawings detailing elements important to community members in a walk and bike friendly community. Participants ventured out for a walk during lunch to guide a group discussion and reflections of personal experiences on the perception of the walking environment. The afternoon session focused on identifying and prioritizing strategies to achieve the shared vision for a walk and bike friendly community. The strategies included a balance of the Five E's and demonstrate

that the community is in support of taking an integrated planning approach to improving walking and biking in Boulder. The entire day's events of the Walk and Bike Summit were captured on a graphic recording included in **Attachment B** while strategies from the Summit are included in **Attachment C**.

g) Bicycle and Pedestrian Innovations Next Steps

(1) Developing a low-stress bicycle network

The city seeks to utilize the living laboratory approach to raise awareness and support for an integrated and connected low-stress network of protected bike lanes and other innovative bicycle treatments. An analysis is underway to evaluate the level of stress of the city's existing bicycle network to identify low-stress connectivity as well as barriers and opportunities. Staff is developing a programmatic approach to fine tune the network to identify and prioritize improved bicycle facilities supporting a more complete low-stress bicycle network. It is envisioned that the city will develop Bicycle Facility Installation Guidelines to create a "2.0 bicycle network" of a complete and connected low-stress network. The Guidelines would be informed by the evaluation of the installed treatments and be similar to the city's Pedestrian Crossing Treatment Installation Guidelines. The 2.0 bicycle network of planned improvements will attract a broader population of people as confident and comfortable cyclists. **Attachment A** includes an example of the Low-Stress Bicycle Network map.

(2) Bike and Pedestrian Action Plan Development

Community input from the activities described above result in the recommendations for the update and the proposed framework for the Bike Walk Action Plan shown in **Attachment C**, which establishes immediate, near term and long-term action items. These will be prioritized to achieve short- and long-term mode share targets for bike and walk commute trips by residents and in-commuting employees. It is envisioned that some action items will be community led initiatives supported by the city and agency partners and proposes that these also be included in the action items detailed in the TMP update.

The proposed action plan and investment strategy approach for bicycling and walking supports the council direction to stay the course with respect to enhancements and its retreat vision to increase the safety of the system for all users. To increase the percentage of low-stress route connectivity, fine-tuning the system will require capital improvements to provide better separation between cyclists and motor vehicle travel lanes. Options to retrofit existing bike lanes with buffered or protected bike lanes along arterial roadways will be explored as part of the analysis of developing a 2.0 network. Preliminary analysis and community members input supports better facilities along several corridors including 30th Street, North Broadway, Colorado Avenue, East Arapahoe and Canyon Boulevard.

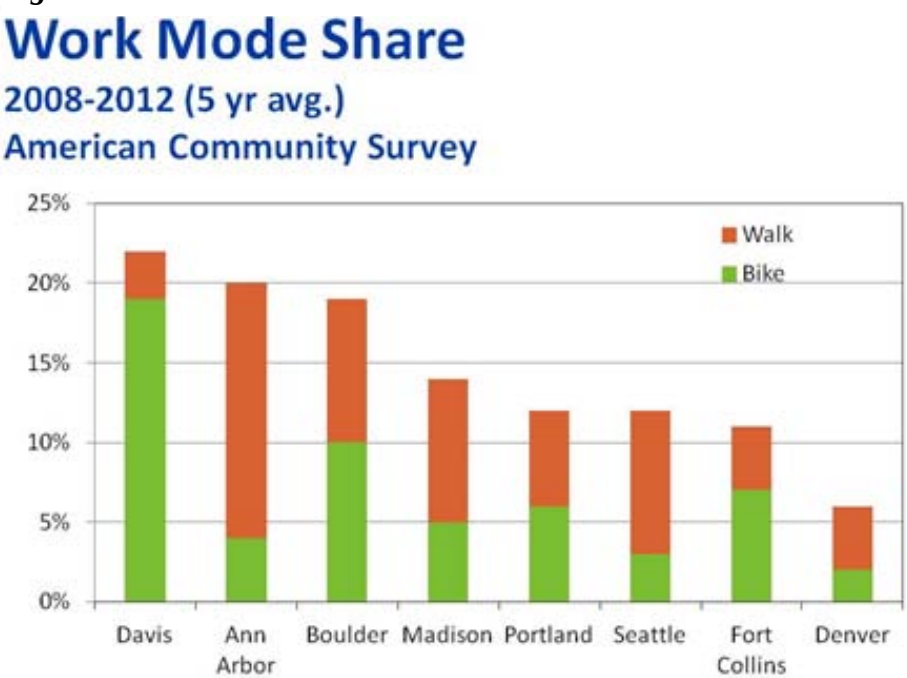
The Action Plan also will identify new initiatives and programs for education, encouragement, enforcement and evaluation. This investment supports the city in talking a leadership approach to guide community partnerships and strengthen Boulder's bicycling and walking culture**.** Community input will continue to guide the prioritization and final recommendations for the Action Plan.

(3) Bicycle and pedestrian mode share Targets

Public input throughout the TMP update has expressed a desire to set modal targets as benchmarks. Currently, one way the city of Boulder tracks the mode share of resident commute trips is using the American Community Survey (ACS), a National Census instrument. Several city surveys also gauge mode share trends of commute to work and all trips by mode. This information is fortified by on-the-ground bicycle counts monitoring use of the multiuse path and street system.

With respect to potential bicycle mode targets, the Transportation Division is considering a near-term target of achieving a 15 percent bicycle mode share for commute to work trips by Boulder residents. The League of American Bicyclists has established 15 percent bicycle mode share as the minimum threshold required to apply for the Diamond level Bicycle Friendly Community designation. This target also is identified as a likely tipping point that will realize a critical mass of community members completing trips by bike. Based on the potential approaches for a renewed transit vision identified in the TMP, staff is assessing the feasibility of reaching a 15 percent target by 2020 or 2025 and setting additional targets for bicycling that include doubling the near-term goal to 30 percent by 2035 and increasing trips another 10 percent to 40 percent of commute to work trips by 2050. Another objective is to achieve commensurate increases in multi-modal trips by in-commuters between now and 2050.

Figure 1



City staff is working to set a realistic 2020 target for resident walk trips to work. While peer communities have established a high bike or walk mode split, Boulder is unique in having achieved a balance between bicycle and pedestrian mode share. Given that travel to work distances are increasing, it is questionable whether future walk targets will keep pace with bike mode targets.

The city is seeking guidance from peer communities nationally and internationally in conjunction with considering a comparison analysis of neighborhood access and transit data to help identify walk targets for discussion and inclusion in the TMP update. These walk mode targets are being developed and will be presented for review at the Joint Board Workshop on April 23, 2014 and

at the study session. Staff is proposing that these updated bike and walk modal targets be incorporated into refined measureable objectives for the overall TMP update.

Guidance from Council

Does Council have feedback regarding the Living Laboratory approach and Action Plan framework for the Bike and Walk Innovations element of the TMP update?

2. ***Transit Planning***

a) ***Why a Renewed Vision for Transit?***

The HOP bus – celebrating 20th years of service, the first Community Transit Network (CTN) route– is a community-scaled bus with large windows, unique branding, and perimiter seating to encourage community interaction. A Renewed Vision for Transit will build upon the success of the CTN. (Image from the City of Boulder)

As described in the *Transit State of the System Report (SoS 2013)*, the city has made significant progress in transit service since 1990, but that progress has stalled since about 2000 and the city is not on course to meet the TMP mode share goals. In particular, transit ridership has stagnated over the past decade, likely due to the decline in funding for local transit service in Boulder. Over the last decade, RTD has cut service in Boulder by 20,500 hours, the equivalent of the DASH route. Sustainable funding for transit as well as additional funding is needed to address the 80% of Boulder in-commuters that drive alone to work. Capturing this market is critical to meeting the community's sustainability, climate, and mode share goals. The transit analysis shows there are significant opportunities to improve access and connections to transit, to serve East Boulder as it infills and redevelops, and to serve Boulder Junction, the expansion of CU East Campus and other areas of transition such as East Arapahoe.

b) ***Transit In Boulder Today***

The city plays an active role in ensuring its residents and workers have access to quality public transit. The city operates the HOP route under contract with VIA and "buys up" service hours from the Regional Transportation District (RTD) to increase service frequency on local routes. It is also very active in developing partnerships to enhance regional transit. As shown in the adjacent table, in FY 2012, the city spent $1.7 million on transit. During the same year, RTD spent $22 million on local transit operations in Boulder and an additional $21 million on regional service connecting Boulder to other

City of Boulder Transit Contributions

Cost Category	FY 2012 Budget
HOP	$ 722,797
JUMP & BOUND Buy-Up	$409,719
Paratransit	$228,568
Overhead, Advertising, Misc. Capital Expenses	$262,796
Personnel	$96,000
Total	$1,719,880

Source: City of Boulder

communities. The city has been successful in leveraging its transportation resources and has developed cost sharing agreements with the University of Colorado and RTD to help fund the HOP.

Thirty local and regional routes provide 32,000 daily transit trips into and from Boulder. Boulder's Community Transit Network (CTN) routes, including the HOP and the SKIP, are the most productive and cost effective routes operating in Boulder. Without transit, Boulder residents and workers would drive approximately 250,000 more miles each day and create over 100 additional metric tons of greenhouse gas emissions. Analysis conducted during the TMP update also show benefits for the "green dividend," reflecting dollars that do not leave the community in fuel costs. Transit use by Boulder residents and workers retains approximately $7 million annually that has the opportunity to be spent locally.

c) Transit Element: Progress to Date

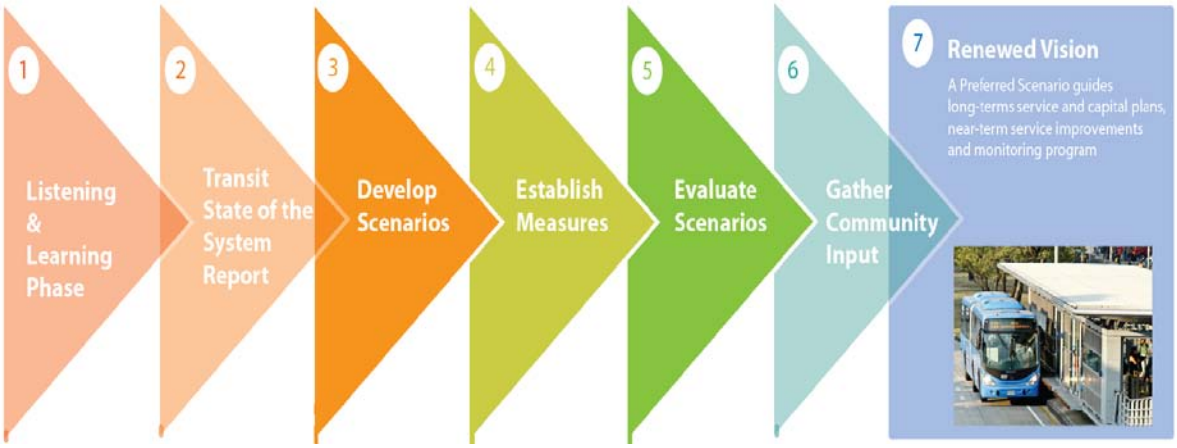
Since early 2013, the city has engaged the community, key stakeholders and agency partners to work towards developing a "Renewed Vision for Transit." This stakeholder engagement is being documented in the Summary of Community Outreach, at https://www-static.bouldercolorado.gov/docs/transportation-master-plan-summary-community-engagement-1-201404241141.pdf . The Renewed Vision for Transit will also inform a short-term service plan to guide service restructuring for the opening of Boulder Junction and US36 BRT and a fiscally constrained Action Plan to guide city investment in transit capital, programs, and service.

The *State of the System Report* highlights the most important opportunities, challenges and barriers to advancing transit in Boulder and was presented at the Aug. 13, 2013 study session. Opportunities identified in the *Report* include the proven productivity of the Community Transit Network (CTN), the stated desire of the community for more CTN service, and the potential to pair future infill and redevelopment with the Transportation Demand Management (TDM) programs. The full *State of the System* report can be found at https://www-static.bouldercolorado.gov/docs/BOULDER_TMP-SOS_Final_Rept_COMP-1-201311011558.pdf.

d) Scenario Development and Evaluation

A core element of transit planning was a transit scenario exercise as illustrated in the figure below.

Figure 2



Scenario planning was used to illuminate tradeoffs between different approaches to transit system development and gauge the appropriate level of transit investment in Boulder and on regional services connecting to Boulder. The Technical Advisory Committee (TAC), the TAB, and an intra-divisional staff committee helped develop three 2035 transit scenarios and a comprehensive evaluation framework used to measure the performance of different levels and types of investment. The TAC includes representatives from the city, Boulder County, RTD, BVSD, Via, Boulder Transportation Connections, 36 Commuting Solutions and other agency partners. These scenarios reflect different levels of investment in capital and service elements and are briefly described in **Attachment D**. Each of these scenarios is completely described in terms of service, capital improvements, cost and ridership down to the route segment and individual stop level.

e) <u>The Evaluation Framework</u>

There are a number of common measures for assessing transit performance; including ridership, productivity, cost effectiveness, travel time performance and reliability. However, high-quality transit can help to meet a number of other community goals such as the elements of the Sustainability Framework and these were packaged into four evaluation accounts to reflect the effects of transit: Community, Environment, Economy, and Efficiency. A number of technical tools were used in the evaluation, including a corridor-level ridership model. **Attachment D** includes information on the evaluation process and its results for the scenarios.

The TAC was engaged in an exercise to review each evaluation measure in detail and indicate which were most important to them in shaping the Renewed Vision for transit. The TAC was most interested in a vision that emphasized ridership and productivity, helped meet housing and transportation cost challenges, increased accessibility to services, amenities, and jobs and reduced vehicle miles traveled and greenhouse gas emissions.

The full report for the TMP Transit Scenario Analysis Results is at: https://www-static.bouldercolorado.gov/docs/draft-transit-analysis-report-1-201403211533.pdf.

f) Developing The Renewed Vision: Vision Elements

The Renewed Vision for Transit has four key elements including service/operations, capital, programmatic, and implementation. A draft of the first three elements was presented to the TAC in March 2014. These same elements are being reviewed by TAB and the community in April/May. The implementation element will be developed with fiscal guidance following this study session.

At this point in the TMP update process, elements of the Renewed Vision for Transit are not fiscally constrained but rather are based on our performance evaluation and community input. In May, the TMP team will develop a fiscally constrained plan and action plan.

(1) Path to the Renewed Vision for Transit – Guidance from Council

(a) Service Element

Using information on transit performance under the three analyzed transit scenarios, the TMP transit team has begun to prioritize 2035 service investments for Boulder, guided by input from the TAC, the Intra-division staff team, the TAB and community outreach. In developing priorities, it became clear that there are two investment approaches having strong support as well as a number of common elements. The Renewed Vision must ultimately take the best from both to find a balance between the two but these options help illustrate the costs and benefits of each approach. The balance that might be desired between the two reflects the values represented in the evaluation framework. The two options for council discussion are:

- **Connections within the community**, with an emphasis on ridership, productivity, and neighborhood accessibility. It is clear that investments in Boulder CTN type services do the most to address these priorities. See **Attachment E** for an emphasis map and performance against key measures.
- **Connections between communities**, with an emphasis on greenhouse gas emissions reduction, address housing and transportation cost challenge for those most affected, and provide access to jobs, including low income jobs. Investment in high-frequency, fast regional services, e.g., BRT on the Diagonal (119) and Arapahoe, best support these outcomes. See **Attachment E** for an emphasis map and performance against key measures.

Following discussions with TAB, City Council, and the community in April/May, the "best" of both approaches will be carried forward in the draft Renewed Vision for Transit.

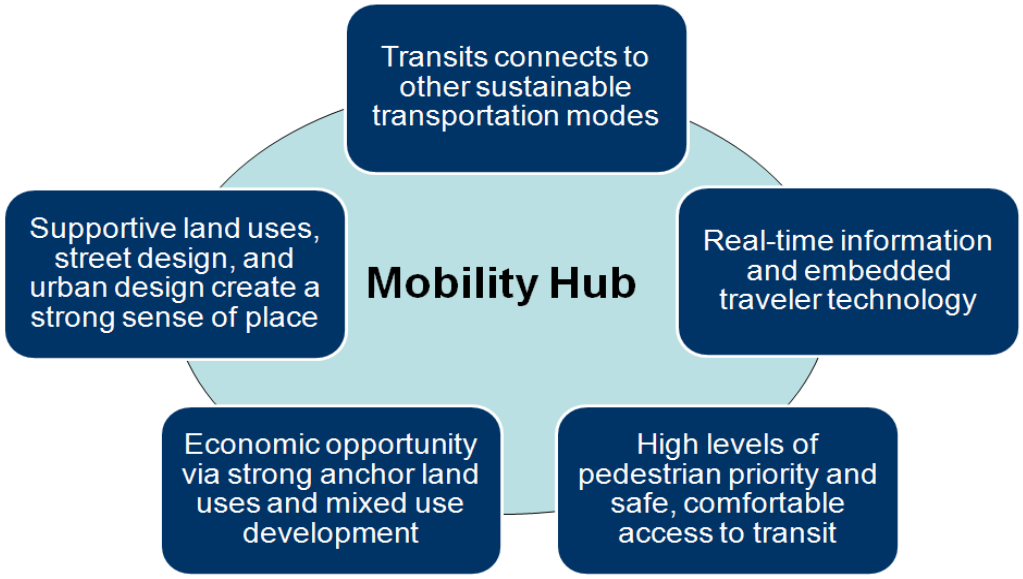
(b) Capital Element

The TMP update process has developed draft priorities for long-term transit capital investment, which include the following:

- **Bus Rapid Transit Corridor Improvements**. The Renewed Vision for Transit will identify places where demand is greatest for high frequency transit service. It will also identify where capital improvements to add transit capacity and increased speed and reliability would be most valuable. The city's process is also being coordinated with RTD's potential future regional BRT corridors being studied in the Northwest Area Mobility Study (NAMS) process.

- **North Boulder Transit Center.** The North Boulder Subcommunity Plan has identified a priority to develop a transit center that could also act as a transportation hub and neighborhood amenity. A Colorado DOT site at the junction of Broadway and 28th Street/US 36 has been identified as the logical site. The facility would include bus layover facilities, driver amenities, passenger waiting facilities, and full features of a mobility hub. Park and ride capacity could be developed and staff recommends examination of a mixed use development at this site to generate end-of-line demand that could support higher transit frequencies in the future.
- **Mobility Hubs.** There are a number of places in the Boulder transportation system that don't merit development of a full transit center, but are, or will be, critical junctures for connecting people between modes and to vital, walkable neighborhoods and corridor land uses. Mobility hubs will support increased transit transfer activity and provide a point of connection for neighborhood residents to access the best quality local and regional transit. The graphic below shows key concepts in developing successful mobility hubs that connect modes and people to transit-oriented land uses.

Figure 3

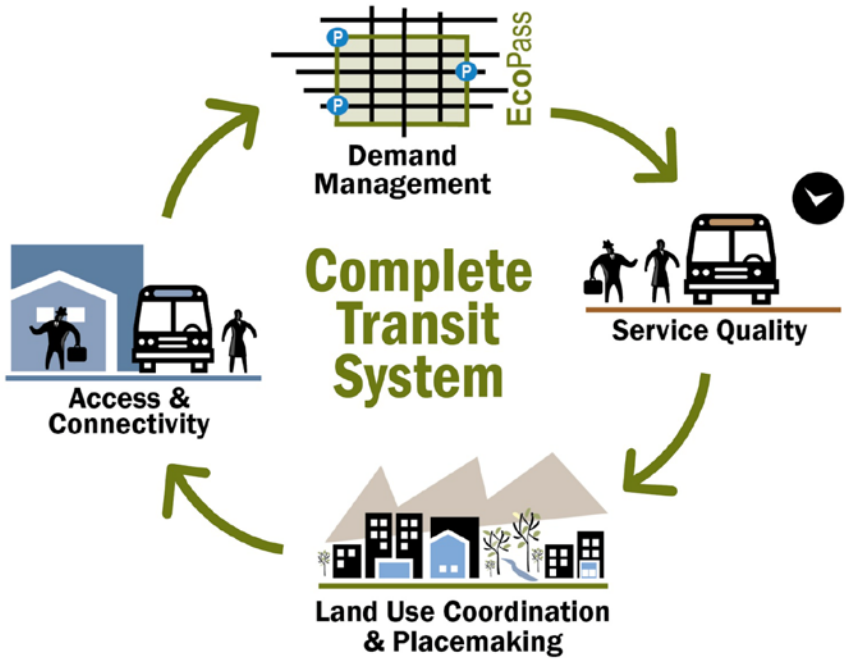


- **Williams Village – U.S. 36 BRT Connection**. The options include a concept to develop a U.S. 36 BRT station near Williams Village providing a grade-separated crossing to Williams Village and neighborhoods south of U.S. 36. This would require coordination with CU, including potential relocation of their shuttle stop and introduction of a new CTN route between Williams Village and Boulder Junction.
- **Stop Improvement Program**. Prioritized stop improvements based on level of usage and other special access needs.

(c) Programmatic Element

Boulder residents and stakeholders know that a high-quality effective transit system requires more than just frequent service. To maximize transit's mobility and access value and its value in attaining other community goals, there is a virtuous cycle at play. As represented in the following graphic, service must be complemented by supportive land use patterns and form, sidewalks and bike facilities that allow safe and comfortable access, and fare and informational programs that encourage transit use.

Figure 4



The programmatic element will recommend investments and policies to support all these areas. Three areas in particular should be stressed in the plan:

1. **Expansion of the Eco Pass program.** Boulder County, in coordination with the city, recently published a report detailing the costs of implementing a city- or county-wide Eco Pass program, including options for various distribution methods. (See: http://www.bouldercounty.org/doc/transportation/ecopassfeasibilitystudy.pdf). As part of the TMP update, the team tested how many additional riders could be attracted in 2035, using the same methods as the County report. A summary of these results is shown below:

	Employees & Residents	**Residents** Only	Employees Only
Net New Annual Trips (County)	5,380,500	5,023,500	2,371,500

Net New Annual Cost for Eco Pass (County)	$9.4M	$8.6M	$4.0M
Net New Annual Trips (City)	3,213,000	2,295,000	1,836,000
Net New Annual Cost for Eco Pass (City)	$5.1M	$3.5M	$2.9M

The TMP analysis shows that Eco Pass expansion would attract new riders at a cost of $1.50 to $1.75 per net new trip (this does not including additional service costs where new bus capacity is needed). This is comparable to a cost of $3.00 to $5.00 per net new trip for the most cost effective service investments. Eco Pass expansion represents one of the most cost effective means to increase ridership and accomplish other priority city goals, such as meeting the Climate Commitment targets and supporting local employers/access to jobs.

2. **Introduction of real-time information.** Real-time passenger information was the most requested transit improvement in the 2013 Design Your Transit System survey. The capital plan includes recommendations for advanced passenger information displays at all transit centers and mobility hubs.

3. **Expansion of Access Districts**. In coordination with the Boulder Access Management and Parking Strategy (AMPS), the TMP Update Transit Element supports future expansion of Access Districts where paid/managed parking is complemented with a suite of TDM programs. Sensitivity analysis was conducted to gauge how paid/managed parking would influence transit ridership in 2035. This conceptual exercise assumed existing parking districts as well as future districts such as at Boulder Junction, CU East Campus and longer-term potential areas such as North Boulder and along East Arapahoe.

The following table illustrates the potential net new travelers on transit if paid parking were implemented, assuming a parking rate that is comparable to current downtown parking rates.

Potential Access District	Net New Daily Weekday Riders (Low)	Net New Daily Weekday Riders (High)
Boulder Junction	700	840
CU East Campus	2,515	3,018
Broadway	908	1,089
Arapahoe	2,257	2,709

Total Net New Daily Weekday Riders	6,380	7,656
Total Annual Net New Daily Weekday Riders	1.6M	2.0M

(d) Implementation Strategies

The implementation element of the TMP update Transit Element will be developed in May following input from the TAB and City Council in April. The implementation element will include:

- Funding plan
- Description of fiscally constrained scenarios
- Action and vision plans describing Immediate, Near-Term, Mid-Term, and Long-Term priorities
- Strategies for continued partnership development to advance regional transit goals
- Service delivery options

Investment principles to guide local transit funding are attached and were reviewed by the TAC, Intra-division City Staff Team and the TAB. These will be used in shaping the TMP Transit Element Action Plan

g) Complete Streets Focus Area Next Steps

Information from the bicycle and pedestrian innovations, transit analysis, on-going community feedback, coordination with agency partners and GIS tools will be incorporated into future corridor plans and street design strategies to enhance the city's Complete Streets and place making goals. Done properly, these improvements will lead to "Completer Streets" as presented by Victor Dover in his book "*Street Design*".

Suggested action items include future integrated corridor plans for East Arapahoe, 30th Street, Colorado Avenue, Canyon Boulevard, North Broadway, and other streets, including within the Downtown such as 13th Street, and potential new opportunities within the University Hill district.

Guidance from Council

> ***Does Council*** *have feedback regarding the transit planning element and proposed "Path to a Renewed Vision for Transit"?*

B. Regional Travel Focus Area

The transit planning discussed above is an integral aspect of the Regional Focus Area of the TMP update as transit represents one of the primary options for long distance regional travel. The Regional Focus Area recognizes projected population and employment growth and the limited investment planned for the regional corridors serving Boulder except for US 36. The on-going regional BRT and bicycle improvements on US 36 are in large part a result of a long-term collaborative effort by corridor communities to bring planning efforts and funding resources to improvements on the corridor. Improvements on other regional corridors will only result from similar efforts.

The approach to regional issues identified in the 2003 and 2008 TMP was to:

> "Create Effective Regional Partnerships that Produce Results
> • Boulder is not in this alone. Regional partnerships with Boulder County, neighboring cities, RTD, and the Colorado Department of Transportation (CDOT) are the keys to providing solutions for regional travel into and out of Boulder.
> • Form broad coalitions to support a package of improvements and the funding for improvements on the regional corridors.
> • Develop regional consensus for multimodal improvements to regional corridors including, but not limited to, automobile, rail, bus, bicycle and pedestrian access.
> • Improve regional transit connections through enhanced transit centers such as Boulder's Transit Village and Broadway/Euclid Transit Center.
> • Support a Boulder County transit vision and regional corridor improvements through the Boulder County Consortium of Cities Regional Transit Committee.
> • Provide regional bicycle connections to other communities."

Through consistent work over the last ten years, Boulder has had significant success in following this approach. The US 36 corridor is under construction and largely reflects the vision of the city to provide actively managed High Occupancy Toll (HOT) lanes with greatly enhanced travel times for transit and a continuous regional bike facility. In a similar collaborative approach and with support from the city, Boulder County has had significant success in providing high frequency transit connections between communities in the county. These efforts include the BOLT and DASH transit services and the community Eco Pass programs for Nederland and Lyons. The city and its regional partners have completed major improvements at the Broadway/Euclid intersection with funding from numerous partners and the Boulder Junction (Boulder Transit Village) transit facility called for in the 2003 TMP is under construction.

As Boulder has neither the financial resources nor the jurisdiction to make improvements on the other regional corridors, the city should continue focused work with regional partners to expand travel options on other Boulder County regional corridors connecting to the city. A significant asset to this effort is the recently adopted Boulder County Transportation Master Plan. The policy direction of this plan update is consistent with the city's TMP as it has a focus on sustainability, the reduction of VMT and providing travel options between the communities of Boulder County. The County has been very active in supporting additional transit services, providing Eco Passes to communities and addressing first and final mile issues for transit riders.

Other regional partners have also become more aligned with the city's transportation policy. The CU Master Plan for the Boulder campus envisions a pedestrian campus, the development of the East Campus area at densities comparable to the main campus, and the development of a transit corridor between the main and East Campus areas along Colorado. CU has been an active partner supporting the improvement of the US 36 corridor and cooperated on the East Campus connections work. BVSD is interested in supporting and improving walk, bike and transit services to their facilities. City and BVSD staffs have held two workshops in the last six months to identify strategies and projects that the agencies can cooperate on. Both have been active partners in the transit planning TAC.

Based on the transit planning analysis of this update and the RTD NAMS work, the Diagonal Highway (SH119) and Arapahoe (SH 7) have the highest potential for increasing transit ridership, followed by South Boulder Road. These three corridors should be priorities for ongoing work in the Regional Focus Area with the Envision East Arapahoe Planning Project as one step in this direction.

An additional area of regional work that crosses TMP Focus Areas is represented by the *US 36 First and Final Mile Study (US36 FFM) developed through 36 Commuting Solutions*. The "first and final mile" issue is characterized by difficult multi-modal access between transit stations and surrounding destinations such as residences, employment and shopping and this study identified access strategies such as long-term bike parking and storage, electric bikes, shuttle circulators, station cars, scooters or golf carts. Similar efforts should accompany any efforts to improve transit service on the regional corridors identified in the NAMS study and the TMP update.

1. ***Regional Next Steps***

Staff will continue to be actively involved in both the US 36 improvement process and the RTD NAMS project. In addition, staff is involved with DRCOG efforts to update the regional plans to 2040. Based on the limited opportunities for the city to take action alone on the regional corridors, the update should continue to reflect the current patient, collaborative approach of bringing planning focus and then funding to priority corridors. Based on findings from the NAMS and TMP update transit planning efforts, these efforts include regional arterial BRT service along the Diagonal Highway (SH119), Arapahoe (SH 7), and South Boulder Road corridors. In addition, continued collaboration with CU Boulder, BVSD and Boulder County will advance our shared interests and goals.

C. *Transportation Demand Management (TDM) Focus Area*

The update's TDM Focus Area for this update includes the major activities described below.

1. ***Community-Wide Eco Pass***

In a joint study with Boulder County, staff and consultants analyzed the feasibility of implementing a community-wide Eco Pass program. The study included three different scenarios for two specific geographic areas, including providing Eco Passes to: all residents, students and employees; and, residents and employees only for the City of Boulder and Boulder County as a whole. The feasibility study estimated costs for passes as well as the cost and service needs from induced demand. The study also explored opportunities and challenges of implementation and administration, possible finance mechanisms to pay for the program and the potential benefits in regard to GHG emissions reductions, VMT reduction and increased access to jobs and housing. The Community-wide Eco Pass Feasibility Study was released on Feb. 25, 2014 and is available on the city's website along with a Frequently Asked Questions page at: www.BoulderTMP.net. The findings have been incorporated into the TMP update and specifically the various transit investment scenarios assessed. City and County staff have been presenting the findings of the feasibility study to key partners to gather feedback.

Next steps are dependent on direction staff receives from City Council, the position taken by the Boulder County Commissioners and the willingness of RTD to move forward with a new pass

program. City and County staff have discussed the formation of an inter-agency working team to focus on potential implementation strategies for city-wide and/or county-wide Eco Pass program(s) if Council directs staff to move forward with designing an implementation and funding plan

2. ***TDM and Development Review***

The TDM Toolkit is used by staff and Site Review applicants to plan and implement a set of policies, programs, facilities, and strategies to mitigate the impact of new development or redevelopment projects on our transportation system. An update to the TDM Toolkit was initiated in 2011, but was put on hold due to staff changes and changing priorities. With the TMP Update and AMPS underway, the process to modify the TDM Toolkit is on the 2014 work plan. The redesign of the TDM Toolkit and any possible policy changes related to integrating TDM into Site Review is fully integrated into both the TMP and the AMPS processes.

a) ***Conduct Best Practices Research***

Staff and a consultant team are conducting best practices research to gather information in three subject areas: (1) opportunities to create sustainable funding sources for the implementation of TDM; (2) current best practices for the integration of TDM requirements into the development review process; and, (3) best practices for encouraging and/or requiring developers to include bike share and car share spaces at new developments.

A major component of the research for this task is the collection of best practices information from communities that have implemented successful development-based TDM requirements. Communities that will be reviewed will ideally have established programs; be able to provide lessons learned; and, have similar population, land use and development trends and community values as Boulder. Also included will be communities that do not have these characteristics but offer excellent examples of enforcement policies, dealing with transfers of ownership, maximizing developer participation in TDM, integrating transportation management associations into program delivery or other identified areas of interest

b) ***TDM Toolkit Modification and Design***

Following the best practices research, staff and consultants will work to review and modify the existing TDM Toolkit. The effort includes review of current issues that limit the toolkit's effectiveness.

Information gathered in the best practices research will be used to identify new tools and strategies that can be used to improve the effectiveness of the toolkit as well as identification of innovative parking strategies, infrastructure improvements and TDM programs that can maximize the benefits associated with TDM in the city. Additionally, this process will identify tools to estimate the impacts associated with TDM strategies and the costs and resource requirements associated with strategy implementation.

Draft recommendations will be reviewed through a public outreach process with developers, the TAB and Planning Board. Feedback obtained from that process will be used to update and improve the draft recommendations. Final recommendations will include cost estimates for the city and for new development projects along with estimates of the toolkit's impacts on vehicle

trip generation and the community cost savings associated with anticipated vehicle trip reductions.

Within the TDM program, city staff is working with Boulder Transportation Connections (formerly Boulder East), Boulder's non-profit transportation management organization ,to implement a TDM Plan evaluation program that will measure the effectiveness of TDM plans currently in place for recent commercial and residential developments.

Staff will provide an update regarding the TDM Tool Kit analysis and draft recommendations to city boards in May and to City Council at the June 10 City Council Study Session regarding AMPS.

c) Parking

The AMPS is also focused on reviewing how parking management and TDM work together to meet the goals of the TMP and the city's Sustainability Framework. AMPS has developed guiding principles and a framework of seven areas of focus, including: TDM, on and off street parking management, district management, enforcement & compliance, pricing strategies, code requirements, and technology and innovation to increase access and support the city's multi-modal transportation system. More information regarding AMPS is available in **Attachment F**.

3. TDM Focus Area Next Steps

For the community-wide Eco Pass discussion, next steps include formation of the inter-agency working group to explore potential implementation strategies for both the city-wide and county-wide approach.

For the TDM Took Kit and parking, the project team is conducting best practices research and policy review in preparation for the more in-depth discussion with City Council at the June 10 Study Session.

Guidance from Council

Does Council have feedback regarding advancing next steps for analysis and coordination with Boulder County regarding the community-wide Eco Pass study?

D. Funding Focus Area

One of the primary outcomes of the TMP update process is refining the vision of the transportation system supporting the community's values and updating the investment program supporting that system. The investment policies of the current plan are:

> "The city shall generally give priority to transportation investments as follows*:
> • Highest priority - system operations, maintenance and travel safety;
> • Next priority – operational efficiency improvements and enhancement of the transit, pedestrian and bicycle system;
> • Next lowest priority - quality of life, such as sound walls and traffic mitigation; and
> • Lowest priority - auto capacity additions (new lanes and interchanges).
> * *Note that within each priority level, all items are given equal weight.*

Investment in modal enhancements will be integrated between all modes, focused in the designated multimodal corridors and prioritized by the ranked multimodal corridor segments.

As the street network is the primary infrastructure for all modes, it will be managed and expanded to balance its use by all the modes. Roadway capacity will not be added at the expense of the non-auto modes.

The city's transportation system includes all the modes and the resources needed for the sustainable operation of the system. Any consideration of the share of system funding allocated to future growth will be based on this system."

Additional investment "Guiding Principles" were added as part of the Complete Streets Investment program to reflect the limitation of the current fiscal environment. These Principles include continuing TMP goals and policies, and:

- Balance community mobility and regional FasTracks access -- The second priority in the TMP is "operational efficiency and enhancements of the transit, pedestrian and bicycle system." Changes to the TMP project lists balance these general community mobility improvements with improving access to regional FasTracks transit services. Ideally, projects will do both.
- Be strategic in project selection -- Given limited resources, the TMP project lists will be fine-tuned to identify those projects which have maximum impact. The 2003 TMP called for completing all projects within key multimodal corridors. The new approach is to develop a leaner subset of projects. Investigate ways to incorporate innovation into project execution. Large projects, such as the final phase of improvements on 28th Street, will be streamlined.
- Stretch city dollars -- Follow through on existing grants and commitments. All projects in the CIP that have been awarded federal funding will be completed, as city dollars are highly leveraged on these important projects.
- Maximize outside funding -- The City of Boulder will proactively seek other funding from a wide variety of sources including: RTD general and FasTracks funding, CDOT and other state funding opportunities, Boulder County, Federal transportation funds and other federal earmarked funds, joint projects with CU, BVSD, and other community partners.
- Leverage city dollars with private investment during development review -- Only implement if funding materializes. Some projects which require highly leveraged funding will not be constructed or implemented if partner funding does not materialize. Examples include:
    - 14th and Walnut Transit Station improvements (RTD, federal, COB)
    - Broadway at CU/Euclid Transit Station improvements (RTD, CU, federal, COB)
    - HOP Express – direct service between BTV and downtown (COB, RTD)
- Ensure outside funding -- Some projects are slated to be funded by other agencies. The city will strongly advocate for full funding and execution of these projects. Examples include:
    - Fully functional BRT services with dedicated lanes on US 36 (CDOT)
    - Enhanced 204, 206 and 208 transit services (RTD)
    - TDM and outreach during construction (RTD, CDOT)

- Secure long-term replacement funding mechanisms for transportation-related investments. Seek to maximize the linkage between these mechanisms and use of the system.

1. Multimodal Corridor Prioritization Criteria

Because available transportation funds are insufficient to fully fund all the corridors, improvements to the corridors need to be phased. Multimodal corridors were divided and prioritized into segments based on a number of transportation and land use characteristics. Additional description of these principles and examples are included in the existing TMP. Staff believes that these investment policies are sound and recommends they be retained in the update. Modifications can be made as needed to the prioritization criteria to reflect the Sustainability Framework and the city's priority-based budgeting system as well as to incorporate the proposed transit investment guiding principles.

In addition, principles have been developed to guide the investment of the funds for transit service. These draft principles largely reflect existing practices of maintaining the Community Transit Network and transit service hours within Boulder. These guiding principles are contained in **Attachment G**

2. TMP Project List

One result of this update will be a revised list of projects and programs representing the community's vision for transportation in Boulder. As an initial step in developing this investment program, staff has reviewed each enhancement project in the current TMP. This list includes over 800 individual projects including various types of bicycle facilities, pedestrian facilities and crossings, underpasses, transit investments and roadway projects. This effort is intended to verify completed projects, identify projects that should be removed from the plan and suggest project additions. Staff teams are reviewing projects in each quadrant of the Boulder Valley based on their knowledge and experience of the area.

A draft list of projects suggested for addition or deletion is provided at www.BoulderTMP.net along with a map showing their location. Staff will provide an updated approach for advancing priority, strategic projects during next steps of the TMP update process utilizing the fiscally constrained, action and vision investment program structure of the current TMP.

3. Funding Next Steps

With leadership from the TAB and City Council in 2013, voters passed a 0.15 cent increase to sales and use tax to invest primarily in the operation and maintenance of the existing multimodal system with limited capacity to improve the system. During the process, policy makers stated they wanted to eventually transition transportation funding to more user-fee based sources. The TMP update financial analysis includes the new 0.15 cent tax increase and will include a recommendation for continuing to explore future potential user-fee based transportation funding mechanisms.

The Complete Streets Focus Area may suggest the need to modify or replace the process used for the existing investment programs. In particular, a significant change in the transit vision would suggest that connections be prioritized to support additional transit service. The revised

investment programs will be based on any modifications to the approaches suggested in this memo and a revised estimate of expected funding from current revenue sources, including the new ballot measures revenue.

E. Integration with Sustainability Initiatives Focus Area

This new focus area emphasizes on-going, city-wide integration of projects and planning efforts under the city's Sustainability Framework of the BVCP. As noted in earlier section, collaborative and interdepartmental project management is occurring across city-wide planning initiatives. As examples, interdepartmental teams have developed the scope for the AMPS effort, two multi-departmental Travel Wise workshops were held to define the transportation portion of the Climate Commitment, and staff is collaborating on the *Envision East Arapahoe* project, which has been identified as a high potential corridor for regional arterial BRT. The project will serve as the first corridor study and is scheduled to be completed by December 2014 in order to inform the update to the BVCP starting at the end of the year.

TAB and Transportation staff also participated in a joint Board workshop with the Planning, Design and Parking Boards in April 2014 as a follow up to the two joint board workshops in 2013 to discuss inter-connected topics of transportation, parking, land use, and urban design.

Given the TMP is a "living document" it will continue to be influenced by ongoing efforts such as Climate Commitment and the upcoming Boulder Valley Comprehensive Plan Update.

F. TMP Update Measurable Objectives

Since the 1996 TMP Update, the plan has contained a set of goals and objectives meant to be the measurable reflections of those goals. Each of the existing six TMP objectives were discussed in the *Policy Review Report* presented to council at the Aug. 28, 2012 study session. Three additional objectives were proposed based on progress in developing additional data sources and identified gaps in the existing objectives: safety, "20-minute neighborhood" accessibility, and vehicle miles traveled per capita for residents and in-commuters.

Improvements to all of the objectives as well as approaches to the three new ones are part of this update and are discussed below. In all cases, factors that need to be considered in developing or changing how these objectives are measured is the availability of meaningful data, the effort needed to collect and process the data, and the continuity of the measures over time. While the city always tries to collect accurate and meaningful data, consistent measurement allows for the comparison of data over time to see change and trends. The most valuable aspect of any objective is to track change over time as a measure of progress toward the goals of the TMP and related city-wide goals.

1. Existing TMP Objectives

a) Continued progress toward no growth in long-term vehicle traffic

Since 1994, the city has prepared annual estimates of average daily Vehicle Miles Traveled (VMT) for the Boulder Valley using data from the vehicle count program as well as the DRCOG regional model. This process produced an estimate of average daily VMT of 2.7 million for

2013. In Boulder this figure has held relatively steady over the last approximately 20 years in contrast to regional and national trends

A new factor related to VMT estimates is the city's greenhouse gas (GHG) reduction goal and the need to produce a VMT estimate consistent with the International Council for Local Environmental Initiatives (ICLEI) methodology. This approach requires that the city account for half of the in- and out-commute trips by non-residents employed in the Boulder Valley and by residents employed elsewhere. The transportation sector represents approximately 22 percent of the city's GHG emissions and initial consultant estimates show that in-commuters contribute 32 percent of these. A methodology for estimating external commuter VMT based on existing city data has been developed for use in the Climate Action inventory. A focus on reducing the single occupant vehicle (SOV) mode share of the external commuter is important to achieving both TMP and Climate Commitment goals, so this number is included under the emissions objective.

b) Reduce single-occupant-vehicle travel to 25 percent of trips

Accommodating increased person travel while reducing Single Occupant Vehicle (SOV) travel to 1994 levels is accomplished by shifting existing and future trips into the non-SOV modes; consequently, this remains an important objective and is a shorthand way of reflecting the increase in non-SOV trips as well.

While the modal targets from the 1996 TMP have not been changed to-date, several aspects of the current update suggest they should be reviewed and potentially adjusted. To meet the city's transportation and GHG reduction goals, further reductions in VMT and increased utilization of the existing non-SOV modal systems, particularly for the long distance external commute trips, will be necessary.

Staff proposes that the modal targets be reviewed and updated as needed once the major building blocks of this TMP update are determined. The SOV mode percent may need to be adjusted downward to maintain vehicle traffic at 1994 levels and further reduced to achieve Climate Commitment goals. Highlighting modal shares for the other modes may be helpful for other areas such as GHG reduction and for benchmarking our efforts to the best practices of other communities.

c) Continued reduction in mobile source emissions of air pollutants

Air pollution has a variety of direct health effects and motor vehicles are significant sources of air pollution. Motor vehicles have been regulated by the Federal Clean Air Act since 1990 and, since that time, the Environmental Protection Agency (EPA) has had the authority to set emission standards for different classes of motor vehicles. Largely due to this regulation, cars have become 90 percent cleaner with technological change being the biggest driver of emission reductions. This objective recognized that the city does not have a regulatory role in reducing vehicle emissions, but that reductions in VMT also produce a direct reduction in pollution.

Mobile GHGs have not been a regulated pollutant, so the city's new Climate Commitment GHG reduction goal adds a new dimension to this objective.

(1) Transportation and Climate Action

Transportation staff has been working closely as part of the larger city Climate Commitment initiative to quantify the GHG emissions generated through the transportation sector and develop strategies that make a significant contribution to the new provisional goal of reducing GHG's by 80% below 1990 levels by 2050. A core objective of this effort has been to establish an ambitious but achievable objective for transportation GHG reduction, and the targets and timeframes for implementing these objectives.

As part of this effort, a multi-departmental team was formed that also invited a number of key transportation partners from the County and CU, as well as three consulting groups: Nelson Nygaard, Fox-Tuttle and the Southwest Energy Efficiency Program (SWEEP), to assist in this analysis and strategy development process. The transportation working group identified four areas of analysis to inform the strategy development process and formed sub-groups tasked with developing analysis and options in each area. These four task areas included:

Quantify GHG Emissions from Seven Leading Transportation Sectors -- Review and refinement of existing transportation data to quantify the VMT and GHG emissions contributions of seven major subsets of the transportation sector. The seven sectors analyzed include: Boulder residents, Non-resident employees, Students, Transit, Freight, Visitors, and Boulder Airport.

Additional Transit Contributions -- Assess the GHG impact of transit service expansion and the reduction potential of transit fleet conversion to low/no-carbon vehicles

Energy Efficiency and Source Switching – Assess the GHG reduction contributions of Corporate Average Fuel Economy (CAFÉ) standard scenarios and the potential for fleet conversions to high efficiency or zero-carbon (electric vehicle) options.

Existing Travel Demand Management program expansion -- Evaluate the potential of existing and new policies, programs and services to provide additional GHG reductions through mode shift and reduction of single-occupant vehicle (SOV) use.

(2) Results

The revised analysis of the transportation sector contributions to total city-wide GHG emissions have been completed and reviewed and are included in Table 3 below. This analysis provides important insights regarding the levels of GHG emissions coming from particular subsectors, and can help inform more focused strategy development.

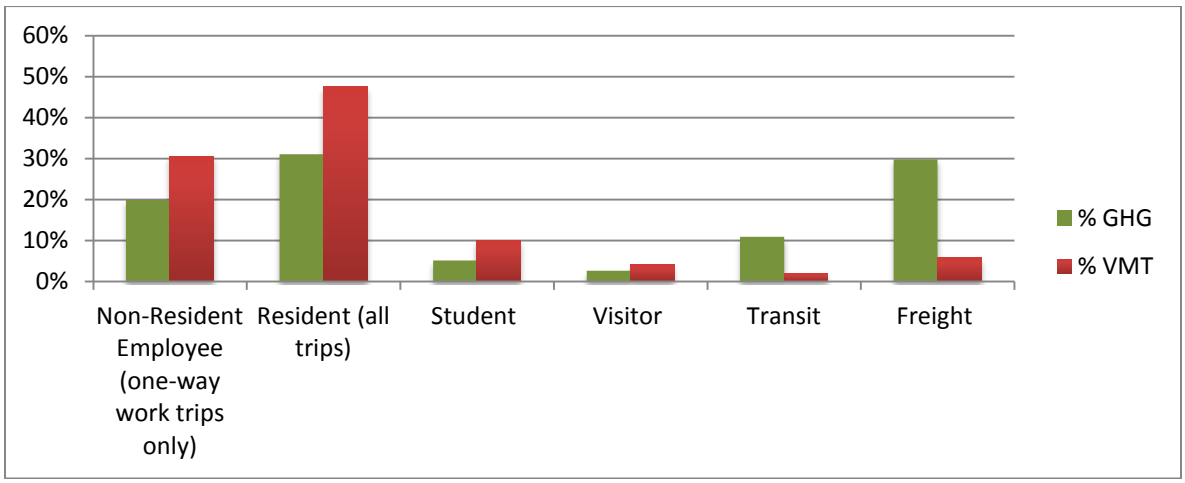
Table 3 – Annual VMT and GHG by Transportation Sector

Transportation Sector	*Annual Estimated VMT*	*% VMT*	*Annual Estimated GHG (MT)*	*% GHG*
Non-Resident Employee (work trips only)	**192,796,800**	**31%**	**70,748**	**20%**
Resident (all trips)	**301,105,728**	**48%**	**110,493**	**31%**
Student (all trips)	**63,648,000**	**10%**	**18,339**	**5%**
Visitor	**25,550,000**	**4%**	**9,376**	**3%**

Transportation Sector	*Annual Estimated VMT*	*% VMT*	*Annual Estimated GHG (MT)*	*% GHG*
Transit	**12,111,283**	**2%**	**38,738**	**11%**
Freight	**36,500,000**	**6%**	**105,959**	**30%**
Boulder Personal Aircraft			**2,188**	**0.6%**
TOTAL	**631,711,811**	100%	**355,841**	100%

An important finding in this analysis was the unique significance of the carbon intensity of the fuel type in determining the contribution of GHG emissions from each sector. This accounts for the differences between the VMT and the GHG and is particularly prominent for Transit and Freight which are both sectors that typically utilize engines burning diesel, a fuel with higher carbon intensity than vehicles using gasoline. This relationship is demonstrated by the graphic in Figure 5.

Figure 5 – Comparison of VMT and GHG by Transportation Sector



The research and recommendations from the remaining three subgroups—transit analysis, existing program contribution analysis, and energy source change analysis--are still being synthesized and will be disseminated for review and presented at a joint board workshop on April 23. Future discussions with the community, boards, and City Council will take place as work on the TMP update and Climate Commitment moves forward.

d) <u>No more than 20 percent of roadways congested (at Level of Service [LOS] F)</u>

This objective recognizes that the roadway system is used by all modes and that safe and efficient functioning of the road system is in everyone's best interest. This objective is evaluated on the basis of counts and modeling for the city's signalized intersections. There are currently 139 signalized intersections in the city and, as the vast majority of congestion occurs at intersections, this is an accurate measure for the functioning of the roadway system for vehicles.

During the policy review discussion with council, council members observed that the current measure does not incorporate the number of people impacted by congestion at those intersections operating at a congested Level of Service (LOS). The level of service analysis performed also calculates total intersection delay, which accounts for the number of vehicles passing through the intersection that can be reported as part of this measure. Staff does not recommend replacing the current measure because it would break continuity over time, but supplementing it with delay at signalized intersections would be a reasonable approach. The city also conducts a travel time study on six of the arterial corridors that measures travel time and delay during the peak periods. As this most accurately represents the experience of a motorist using one of these corridors, staff suggests reporting the results of this study under this objective. A second concern is that weighting by vehicle volume would accentuate the current weakness of this objective by focusing only on motor vehicles. Consequently, staff proposes that we work to add a multimodal level of service (MMLOS) based on person trips to this objective. There are a number of new technological approaches to measuring use of the transportation system that the city is exploring. These have the potential to provide a much larger sample size and more accurate information on the performance of the transportation system. Once one of these approaches is proven, staff suggests this objective is reframed to maintain transportation system performance from a more holistic, multimodal perspective.

e) Expand fiscally viable transportation alternatives for all Boulder residents and employees, including the elderly and those with disabilities

This objective recognizes the aging of the population and the increasing diversity of transportation needs. Close to a third of the population does not drive due to age or infirmity and transit access is a key aspect of mobility for this population. With bicycle and pedestrian systems that area largely complete, expanding access to transit and special transit services seems to be the best measure for this objective. This has been reported as city contributions to Via, the area's special transit provider, and the number of Eco Passes available to the community.

With one of the focuses of this update being a renewed vision for transit, an area of potential improvement for this object would be to report the percent of Boulder's population that has access to high quality transit service. A recent geographical information system (GIS) analysis of access to transit stops shows that 86 percent of Boulder's population is within a quarter mile of a transit stop, but this does not reflect the actual walk distance to the stop or the quality of the available transit service. Using the Neighborhood Access Tool and the service levels developed in the transit analysis, staff suggests adding a report of the portion of the population that has actual quarter mile access to high quality transit.

f) Increase transportation alternatives commensurate with the rate of employee growth.

This objective expresses the desire to expand transportation options in the employment areas of the city. This reflects the reality that many of the city's employment centers are in the eastern part of the community and are auto focused in their development pattern. Redevelopment of this area and the completion of the modal systems in these areas is one of the challenges and opportunities in reaching the city's transportation and GHG goals.

Current measures in this objective are the least developed of the six existing objectives. Currently, they have been reported as simply the change in transit service hours and miles of bike facilities relative to employment change. As with the objective above, using the Neighborhood Access Tool and the transit service levels, we can report the portion of employees having access to high quality transit. And given the opportunity for redevelopment in the area to create a more pedestrian and transit supportive environment, there is the opportunity to track and report this change. Potential measures that can be mapped and reported would be:

- the change in intersection density to reflect the change to a finer, more pedestrian friendly grid;
- land use and zoning change to mixed use; and,
- areas with TDM programs and with managed parking.

These kinds of land use changes are goals of the Boulder Valley Comprehensive Plan.

2. New TMP Objectives

a) Safety

Safety has always been a priority under the TMP, with safety being the first investment priority of the TMP. The *2012 Safe Streets Boulder Report* was the result of several years of staff work to adapt the city's comprehensive database of crashes to allow for a comprehensive city-wide review and analysis of pedestrian and cycling crashes. As staff maintains and updates this database, it is now practical to accurately analyze pedestrian and cycling crashes across the city and set an objective related to safety. As bike and pedestrian accidents involve a high rate of injury, staff believes a focus on these types of accidents is particularly important.

The federal government has recently established a goal of eliminating fatalities on the highway system. Reflecting this, the city's ultimate goal should be to strive toward zero for serious injury and fatal accidents. Staff recommends establishing an objective of "Continuous improvement in safety for all modes of travel." Draft measures to track progress include total crashes, injury crashes, and fatal crashes by mode expressed as a rate to reflect usage and allow benchmarking to local, regional and national cities.

b) Neighborhood Access

Over the last year, city staff has been working with a consultant to develop the GIS-based Neighborhood Access Tool. Based on a travel time budget, this tool develops a travel shed around each attractor based on the available facilities for the mode. Multiple travel sheds can then be overlaid to show the access to a set of attractors for each area of the city. In addition to the city's transportation system, the current model included ten categories of destinations including schools, parks, public facilities, and social activity sites (coffee shops, etc.) that are weighted based on input from the staff team. Based on running the model with the attractors and weights developed by the staff team, just over 26 percent of the city's residents live in an area with an Access score greater than 69. As the city refines the destinations and weights, this objective could suggest a portion of the city residents that should live in an accessible neighborhood. The city of Portland has established a goal of having 90 percent of residents in a twenty minutes neighborhood by 2035.

The fully developed and functional model was imported to the city's GIS system and has been explored and tested by city GIS staff. Development of the access model has been supported by a multi-departmental staff team. The model has the potential to improve access and investment decisions across the community.

c) Vehicle Miles Traveled Per Capita

As millions of daily VMT has little meaning or personal relevance, there was general agreement at the August 2013 study session that the TMP should track per capita VMT for both Boulder residents and commuting trips in and out of the city.

Staff has prepared initial estimates of per capita VMT based on our survey data, which is shown in Table 4 below

Table 4

VMT per capita (SOV+MOV)		Source of Calculations
Boulder Residents, all trips	11.16 miles	2012 Modal Shift Report
All commute trips	19.23 miles	2011 Boulder Valley Employee Survey
Boulder Residents, commute trips	6.0 miles	2012 Modal Shift Report
Non-resident employees, commute trips	28.7 miles	2011 Boulder Valley Employee Survey

While a per capita VMT for different classes of travelers is helpful for tracking trends in these categories and for comparing individual behavior to these averages, it does not take into account the location in the community, the factors that support non-SOV use, and the options available. An additional refinement of the objective would consider these factors to track per capita VMT by areas of the city or by development types. Through work in the TDM Toolkit and the Neighborhood Access tool, it should be possible to develop per capita VMT data and expectations at a finer grain. This would encourage continuous improvement in all areas of the community toward the city's transportation and Climate Commitment GHG reduction goal of 80 percent from 1990 levels by 2050.

Guidance from Council

Does Council have feedback regarding the proposed refinements to the TMP measurable objectives and updated targets?

V. PUBLIC PROCESS

The TMP update process has involved a broad cross section of the community through conventional activities as well as through a wide range of new tools and technologies. These include open houses, Web materials, video, print media, and a comprehensive set of social media tools. Two stakeholder advisory committees are also working in the transit and bike/pedestrian areas. Staff has also integrated outreach efforts with other planning initiatives including Climate Commitment, AMPS, and the North Boulder Sub-community Plan.

A reinvigorated public outreach effort is underway through social media, including a series of new topics on the Inspire Boulder website and the new TMP update video - http://vimeo.com/65935689. A major community event is being planned for May, and other events featuring city planning projects involving TMP features will take place in the spring. Staff has also been presenting the TMP update work to a number of community groups. Additional information on public outreach for the TMP update can be found in the ongoing *Public Outreach Summary Report* -https://www-static.bouldercolorado.gov/docs/transportation-master-plan-summary-community-engagement-1-201404241141.pdf.

VI. COMMENTS FROM BOARDS

The TAB has guided the development of this TMP Update during numerous regular board meetings over the last two years. The TAB is generally supportive of the development of the multimodal analysis and planning, innovations, transit refinements, etc.

The Transportation Advisory Board (TAB) reviewed a draft study session memo and presentation at its Apr. 14, 2014 meeting. Generally, board members provided positive comments on the materials and technical work and offered suggestions on clarifying the questions to council. The Board noted that the transit options were not really choices as we needed to both improve transit within the community and to surrounding communities to serve in-commuters with transit. TAB supports the bicycle and pedestrian innovations and Living Lab approach. The Community wide Eco Pass appears to be very cost effective in terms of transit ridership and TAB members suggested the TMP needs to push hard for major changes rather than tweaks around the edges if we are to reach our climate goals. The Board did not directly respond to the questions for council at this time and will continue to work on the TMP Update during the balance of the process prior to Council acceptance.

Otherwise individual board members offered comments and ideas to continue to help refine and guide the TMP Update. For example. one Board member noted that while transit had many benefits, GHG reduction was not a strong point relative to cost effectiveness. Another Board member suggested there needed to be a stronger focus on road diets and supporting strategies in land use and parking management to get the large changes needed in VMT and GHG reduction. He also suggests moving away from the level of service (LOS) objective as California is doing. Staff from Transportation and Community Planning & Sustainability is hosting a third Joint Board Workshop on April 23 to discuss the TMP update and intersecting topics with AMPS and Climate Commitment with the Transportation Advisory Board, Planning Board, district boards, and Environmental Advisory Board. Feedback from this workshop will be shared with City Council at the April 29, 2014 Study Session.

VII. NEXT STEPS

Work is continuing in all the Focus Areas of the TMP update with specific attention on assembling the major building blocks needed for a draft update.

Staff will return to City Council this summer with updated information, including capital project list and refined prioritization approach as well as financials. The financial information is

updated with the new funding for transportation and the assumption that we will continue to work on new funding sources that are more tied to use.

A variety of public outreach activities will bring the potential elements of the update to the community. These activities include a variety of presentations, a major open house in May, and renewed activity on social media including the Inspire Boulder website.

The following is the anticipated schedule for board and council consideration of the TMP update:

Apr. 14, 2014	Transportation Advisory Board
Apr. 17, 2014	Initial Briefing at Planning Board
Apr. 23, 2014	Joint Board Workshop on TMP update and the related projects of Climate Commitment and the Access Management and Parking Strategy
May 12, 2014	Transportation Advisory Board
May 22, 2014	Briefing at Planning Board
June 9, 2014	Transportation Advisory Board recommendation
June 19, 2014	Planning Board recommendation
July 15, 2014	Council consideration

For more information and updates regarding the Transportation Master Plan update, please visit: www.bouldertmp.net.

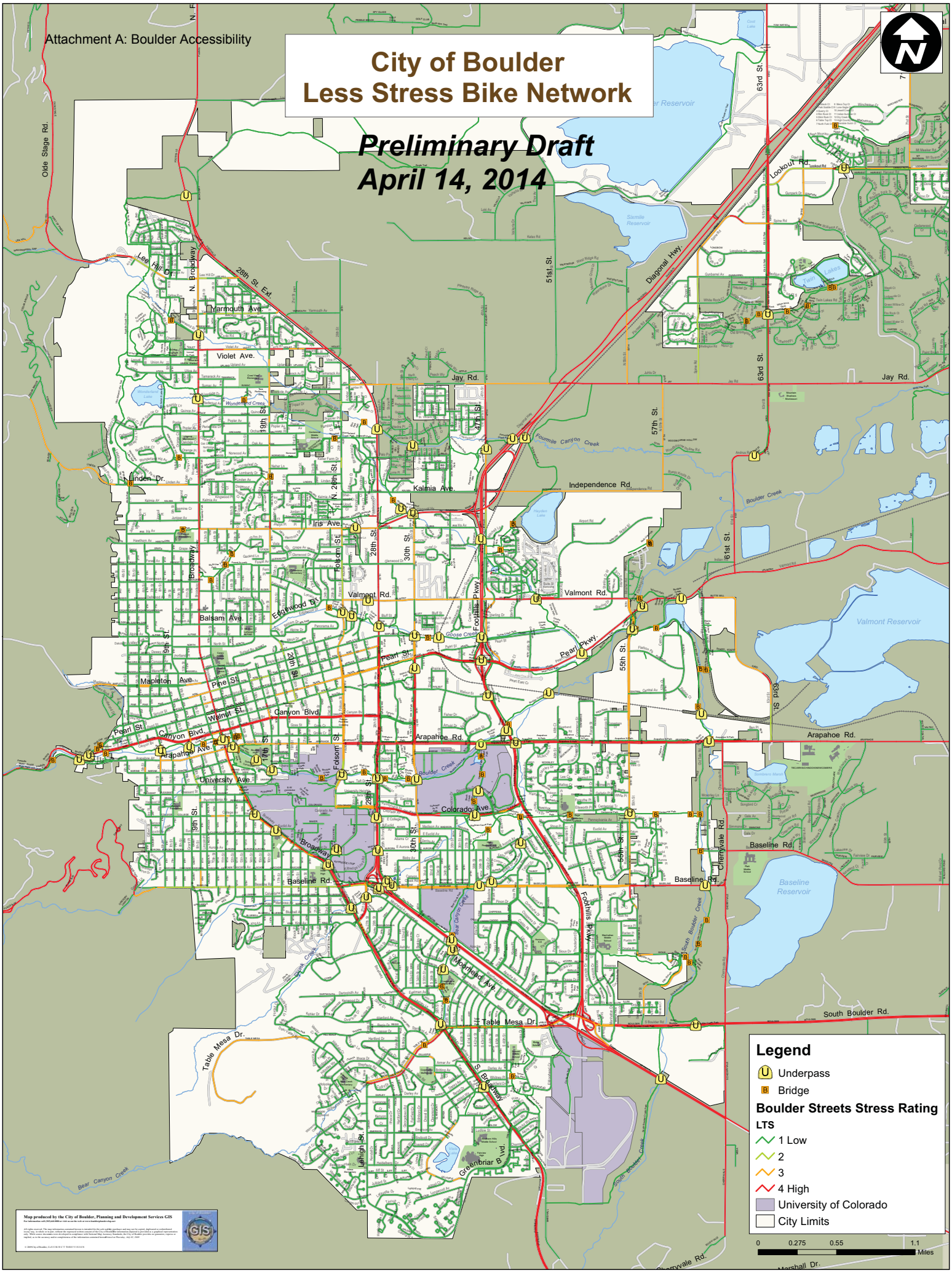
ATTACHMENTS

A. Examples from the Neighborhood Access and Low Stress Bicycle Network Tools
B. Walk and Bike Summit graphic recording
C. Potential strategies for the Walk Bike Action Plan
D. Transit Scenarios and Evaluation Results
E. Three Transit Scenario Descriptions
F. Transit options emphasis map and performance against key measures
G. Access Management and Parking Strategy Information
H. Draft Guiding principles: City of Boulder Transit Funds

Attachment A: Boulder Accessibility

City of Boulder
Less Stress Bike Network

Preliminary Draft
April 14, 2014



Legend

- Underpass
- Bridge

Boulder Streets Stress Rating

LTS

- 1 Low
- 2
- 3
- 4 High
- University of Colorado
- City Limits

0 0.275 0.55 1.1 Miles

Map produced by the City of Boulder, Planning and Development Services GIS
For information call (303)441-3160 or visit us on the web at www.bouldercolorado.gov

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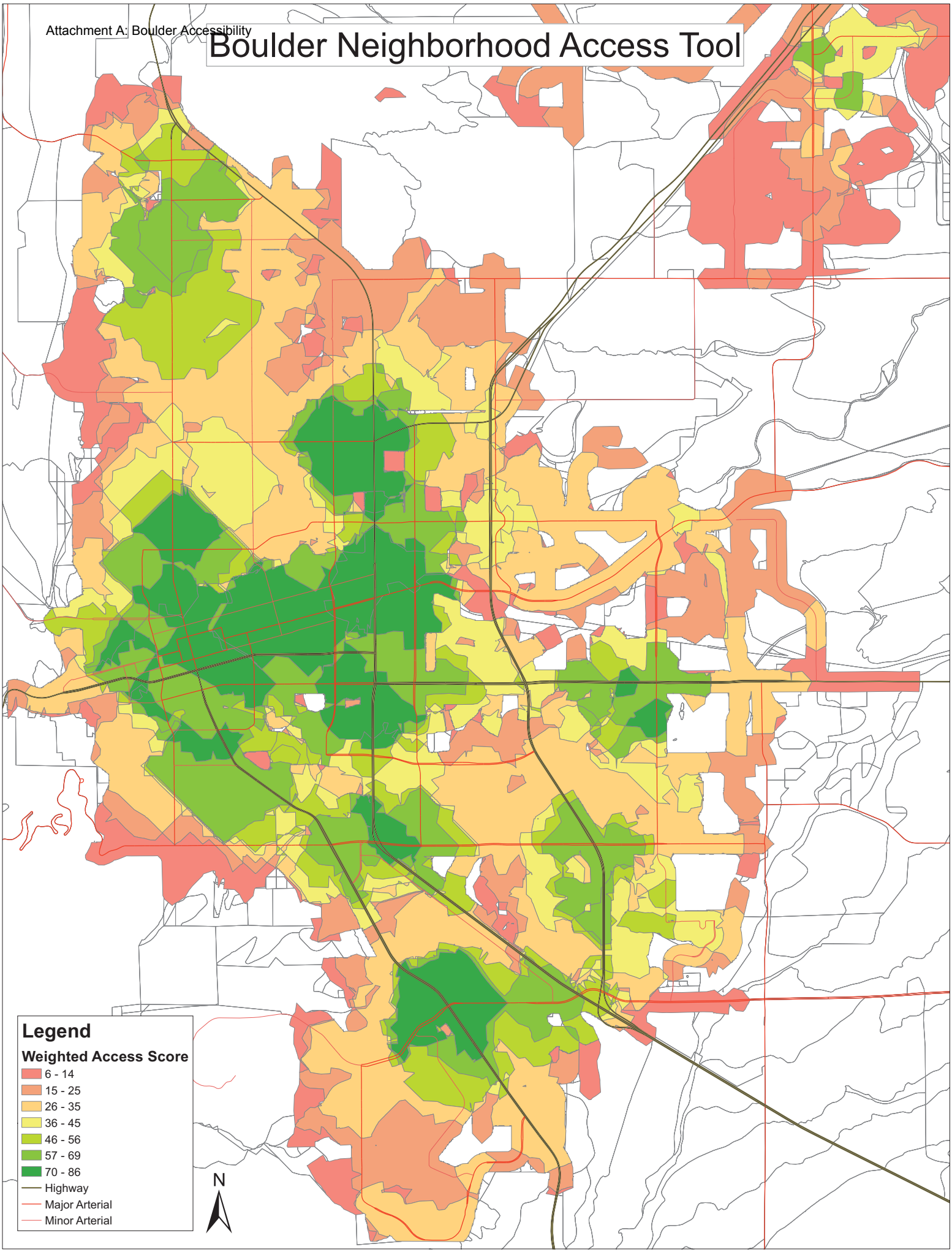
Attachment A: Boulder Accessibility

Boulder Neighborhood Access Tool



Attachment B: Walk Bike Summit Graphic

Bike Walk Action Plan draft

IMMEDIATE ACTION ITEMS: 2014 AND CONCURANT WITH PLAN ADOPTION					
Action Item	**Description**	**Focus**	**Responsibility**	**Funding sources**	**Funding estimate**
Living Laboratory	Continue on-going analysis of pilot projects as well as identify additional treatments and programs to test bicycle facilities to see if they are appropriate for Boulder.	Engineering	GO Boulder, Transportation Operations and Engineering staff	Transportation Operations Innovations	$ TBD
Boulder Walks Program	Continue to conduct walk audits to assess the built environment and guide future consideration of pedestrian policy changes city-wide. Introduce a neighborhood focus and work with community associations and groups to develop neighborhood-based walking map(s) highlighting points of interest and historic significance.	Evaluation, Education	GO Boulder, CP&S, Historic Preservation	Pedestrian Planning	$ TBD
Multi-use path Etiquette campaign	Develop a public outreach and educational campaign to raise awareness about proper etiquette on Boulder's multi-use path system.	Education	GO Boulder, Communications	Bike and Pedestrian Planning	$ TBD
Crosswalk Safety Week(s) project		Education, Enforcement	GO Boulder, Communications, BPD, CU-Boulder Police	Bike and Pedestrian Planning, Safe Routes to School	$ TBD
City-led Walk & Bike events	Issue a Request for Proposals (RFP) for a professional services contract with organization(s) to plan, host and evaluate educational/encouragement events that will create a utilitarian cycling and walk friendly community with an aim on attracting interested but concerned cyclists. Include Walk & Bike Month and Winter Bike to Work Day events, Bike Skills 101 workshops as examples of city-led events to be accomplished.	Education Encouragement	GO Boulder, Communications, Finance, CAO, CMO	Bike and Pedestrian Planning	$ TBD
2.0 Bicycle Network Plan	Conduct low-stress connectivity analysis to complete analysis of existing system, identify deficiencies and develop scenarios to support a more complete, integrated and connected low stress network.	Evaluation, Engineering	GO Boulder, Transportation Operations and Engineering, Information Resources	Bike Planning	$ TBD

Bike Walk Action Plan draft

IMMEDIATE ACTION ITEMS: 2014 AND CONCURANT WITH PLAN ADOPTION					
Action Item	**Description**	**Focus**	**Responsibility**	**Funding sources**	**Funding estimate**
Bicycle Parking Requirements Update	Amend bike parking requirements for new development to be calculated be calculated based on land use and square footage (commercial) or units/bedrooms (residential) and that a ratio of short-term bike parking and long-term bike parking be required	Policy Engineering	GO Boulder, Transportation Operations and Engineering, Communications	Bike Planning,	$ TBD
Bicycle Byways	Brand local bike corridors to raise awareness of a low-stress system of bike routes using lower cost, high-impact, distinctive directional and wayfinding signs and marking treatments. Additional bicycle and pedestrian amenities including public art will be explored, to make these bike byways fun, inviting and to create a sense of place. Initial Bicycle Byway corridors identified include 29th Street, 28th Street Frontage Road, 13th Street.	Engineering	GO Boulder, Transportation Operations and Engineering, Communications	Bike Planning, Capital Bond Initiative	$ TBD
Traffic Safety Engineer FTE	Hire a new full-time equivalent (FTE) to coordinate data collection, analysis, and reports to identify and prioritize counter measure strategies and improve safety and reduce collisions, including those involving bicyclists and pedestrians	Personnel, Engineering, Safety	Transportation Operations and Engineering, GO Boulder	Transportation Operations	$ TBD
TOTAL					

NEAR TERM ACTION ITEMS: 2015 AND 2016					
Action Item	**Description**	**Focus**	**Responsibility**	**Funding sources**	**Funding estimate**
Bicycle Facility Installation Guidelines	Develop guidelines to provide a set of criteria, procedures, and policies that guide the installation of bicycle facilities within the City of Boulder.	Engineering, Policy	GO Boulder, Transportation Operations and Engineering staff	Transportation Operations Innovations, Bike Planning	$ TBD
Walk & Bike event sponsorship program	Establish guidelines and criteria to sponsor community-based events that promote walking and bicycling. Award one large sponsorship contribution (up to $10K) and five small sponsorship contributions (up to $5K)	Education Encouragement	GO Boulder, Communications, Finance, CAO, CMO	Bike and Pedestrian Planning	$ TBD

Bike Walk Action Plan draft

NEAR TERM ACTION ITEMS: 2015 AND 2016					
Action Item	**Description**	**Focus**	**Responsibility**	**Funding sources**	**Funding estimate**
Corridor Studies	Support corridor studies along 30th Street, East Arapahoe Avenue, Colorado Avenue and Canyon Boulevard to evaluate and prioritize options for improved bicycle and pedestrian treatments	Evaluation, Engineering	GO Boulder, CP+S, Transportation Operations and Engineering staff		$ TBD
Bicycle corrals	Establish threshold criteria for a minimum number of bike parking spaces per commercial block. Develop process for considering requests to convert on-street parking space(s) to bike parking corrals Utilize downtown business improvement district and/or University Hill as geographic focus areas to develop criteria and process	Policy Engineering	GO Boulder, Transportation Operations, Community Planning & Sustainability, Downtown and University Hill Management District – Parking Services,	Bike and Pedestrian Planning, DUHMD-PS, Transportation Operations Innovations	$ TBD
New GO Boulder FTEs	• A Transportation Planner I or II to assist in initiating, managing and coordinating transportation planning and implementation of bike, walk and transit modes of travel options. • A Community Outreach Specialist to provide programmatic support and outreach coordination for the GO Boulder team, including grant writing to secure state, federal and other funding in support of transportation programs and capital projects.	Personnel			$ TBD
TOTAL					$ TBD

LONG TERM ACTION ITEMS: 2017 AND BEYOND					
Action Item	**Description**	**Focus**	**Responsibility**	**Funding sources**	**Funding estimate**
	•				$ TBD
	•				$ TBD
TOTAL					$ TBD

Transit Scenarios and Evaluation Results

These three 2035 transit investment scenarios were developed for evaluation, along with a 2035 baseline scenario. The scenarios were designed to provide different approaches and levels investment in the markets served, level of service investment, service types and level and type of capital investment.

The scenarios for 2035 are briefly described as:

- **Baseline:** This scenario represents a "No Net New Service" position with the assumption that any financial growth is consumed by increases in operating costs and that capital development is limited to currently funded projects such as the US 36 Corridor BRT. This scenario acts as a point of comparison for Scenarios 1 through 3, which represent varying levels of growth and system investment.
- **Scenario 1: Local and Regional Enhanced Service**. This scenario emphasizes investment in operating resources to develop a CTN level of service on the most productive corridors in the city and on regional connections to/from Boulder. Capital investments in transit corridors are limited in this scenario.
- **Scenario 2: Boulder Local CTN Buildout.** This scenario focuses on local Boulder service investment, making the buildout of the CTN network a top priority. CTN service is delivered on all corridors that are believed to have supportive land use attributes by 2035. Corridor capital investments are prioritized on corridors that best support CTN development by providing needed speed and reliability enhancements.
- **Scenario 3: Local and Regional Rapid Transit Network**. This scenario has a more modest level of investment in local and regional transit operations, although it provides a 63% increase over the Baseline scenario. Capital development for BRT and Enhanced Bus is emphasized in this scenario to improve travel time and reliability. This scenario reflects the regional BRT corridors being evaluated by RTD as part of the Northwest Area Mobility Study (NAMS) analysis.

Transit Scenario Analysis Results

The scenarios were not meant to represent system plans that could be fully implemented, but illuminate possible futures and test key tradeoffs to inform the development of the Renewed Vision for Transit. The analysis results answer these key tradeoff questions:

- Which scenario results in the most cost effective investment from a ridership standpoint?
- Which scenario has the greatest impact on greenhouse gas reduction?
- Which scenario most effectively captures regional transit riders?
- Which scenario most effectively serves job access and transit dependent riders?

As evidenced by the key findings summarized in Tables 1 and 2 below, there is no one scenario that performs the "best." Rather, the analysis highlights how local versus regional investments impact these key tradeoff questions differently. For example, local investment in transit (e.g. Scenario 2) is the most cost effective on a rider basis but does not perform the best from a transit dependent riders and job access standpoint. In contrast, regional investment (e.g. Scenarios 1 and 3) have the greatest impact on reducing greenhouse gas emissions, providing regional access to jobs, and capturing retained wealth in the local economy.

Table 1

EFFICIENCY	SCENARIO 1	SCENARIO 2	SCENARIO 3
Ridership/Productivity	2nd	BEST	2nd
Travel Time	3rd	2nd	BEST
Cost Effectivness	3rd	BEST	2nd
User Experience	3rd	2nd	BEST

COMMUNITY	SCENARIO 1	SCENARIO 2	SCENARIO 3
Transit Accessibility	2nd	3rd	BEST
Transit Mobility	2nd	3rd	BEST
Housing & Transportation Costs	BEST	2nd	BEST
Active Transportation	2nd	BEST	2nd

ECONOMY	SCENARIO 1	SCENARIO 2	SCENARIO 3
Neighborhood Accessibility	BEST	BEST	2nd
Access to Jobs	BEST	2nd	BEST
Green Dividend	BEST	3rd	2nd

ENVIRONMENT	SCENARIO 1	SCENARIO 2	SCENARIO 3
Change in VMT	BEST	3rd	2nd
Mobile Source Emissions/ GhG Reduction	BEST	3rd	2nd
Net New Operating Cost per kg GhG Reduced	BEST	3rd	2nd

Table 2. Transit Scenario Analysis Results Key Findings

Efficiency	▪ Scenario 2 (in-city CTN focused strategy) nets the most new riders at the lowest cost per ride ▪ Reducing travel time attracts regional ridership ▪ Regional investments are least cost effective but yield other benefits (i.e. travel time, GhG reduction, and other community benefits noted below) ▪ In Scenario 3, the Diagonal (119) has highest ridership potential of all regional BRT routes, and Arapahoe/SH7 and South Boulder are also strong routes ▪ Scenario 1 (local and regional investment) captures the most regional riders (total and net new riders)
Community	▪ Scenarios with higher service investment outside of Boulder (i.e. Scenario 3) do a better job serving low to mid-income residents, access to jobs, and transit dependent populations ▪ Active transportation outcomes are better for in-city routes due to higher net new ridership and higher rates of walk and bicycle access to transit
Economy	▪ Scenario 2 has highest access to retail and services within Boulder ▪ Scenarios that focus on regional investment (i.e. Scenarios 1 and 3) put CTN/frequent service within walking distance of the most jobs and the most low- to mid-wage jobs ▪ At a corridor level, BRT on the Diagonal/119 and Arapahoe/SH7 are among the best performers for GhG reduced and therefore capture the most “retained wealth” (“retained wealth” is derived from VMT reduction)
Environment	▪ Scenario 2 maximizes reduction in GhG and VMT within the City of Boulder, but Scenario 1 (local and regional investment) has highest overall GhG and VMT reduction benefit ▪ Regional investments are a less cost effective on a per ride basis due to longer trip lengths, but provide greater GhG reduction benefits

Boulder TMP Update: Transit Element

Renewed Vision for Transit - Scenarios

		Annual Operating Elements & Costs				Capital Elements & Costs (Including Vehicles & Facilities)			
Scenario Title	**Scenario Description**	**Distinguishing Features**	**Total**	**Local**	**Regional**	**Distinguishing Features**	**Total**	**Local**	**Regional**
Baseline -- Current and Funded Service and Capital	• Illustrative of 20-year transit future under current funding sources • Provide point of comparison for other scenarios	• US 36 BRT • Service levels comparable to existing system	$60M	$26M	$33M	• US 36 BRT facilities to Table Mesa • Bus only lanes with enhanced stops on 28th, Diagonal, and Arapahoe • Transit Hub at Euclid and Broadway • Boulder Junction Transit Center	$112M	$37M	$74M
Scenario 1 -- Local and Regional Enhanced Service	• High operating cost • Low capital cost • Enhances local and regional service	• Provide circulation between Boulder Junction, 29th St, CU Main Campus, and CU East Campus (CTN+ route) • Expand service within other Boulder County communitites, including Lafayette, Louisville, Broomfield, and Superior • Provide commuter express service from Denver to IBM and other Gunbarrel employers via US 36	$106M	$33M	$73M	• US BRT facilities to Table Mesa • CTN bus stop improvements on Broadway, 19th/20th, 28th, 30th, Diagonal, South Boulder Rd, Arapahoe, Pearl, and Valmont	$173M	$45M	$128M
Scenario 2 -- Boulder Local Community Transit Network (CTN) Buildout	• Low operating cost • Medium capital cost • Builds out Boulder CTN grid • Enhances service on highest priority regional routes	• Provide rapid transit on N and S Broadway • Provide circulation between Boulder Junction, 29th St, CU Main Campus, and CU East Campus (CTN+ route)	$96M	$41M	$54M	• US 36 BRT facilities extended to North Boulder • CTN bus stop improvements on 28th, South Boulder Rd, Baseline, Arapahoe, Valmont, Iris, and Jay	$238M	$115M	$124M
Scenario 3 -- Local and Regional Rapid Transit Network	• Medium operating cost • High capital cost • Supports reliable, competitive regional connections with substantial capital investment • Coordinated with Northwest Area Mobility Study (NAMS)	• Provide rapid transit on N and S Broadway; 28th; 30th & the Diagonal; Arapahoe to Lafayette • Enhance bus on South Boulder Rd; Pearl St • Upgrade express bus from North Boulder to DIA via Broadway and US 36	$100M	$27M	$72M	• US 36 BRT facilities extended to North Boulder • Rapid Transit facilities on 28th, 30th and the Diagonal, and Arapahoe to Lafayette • Enhanced Bus facilities on South Boulder Rd and Pearl St • CTN bus stop improvements on Valmont, Iris, and Jay	$466M	$176M	$290M

Key

$50 million

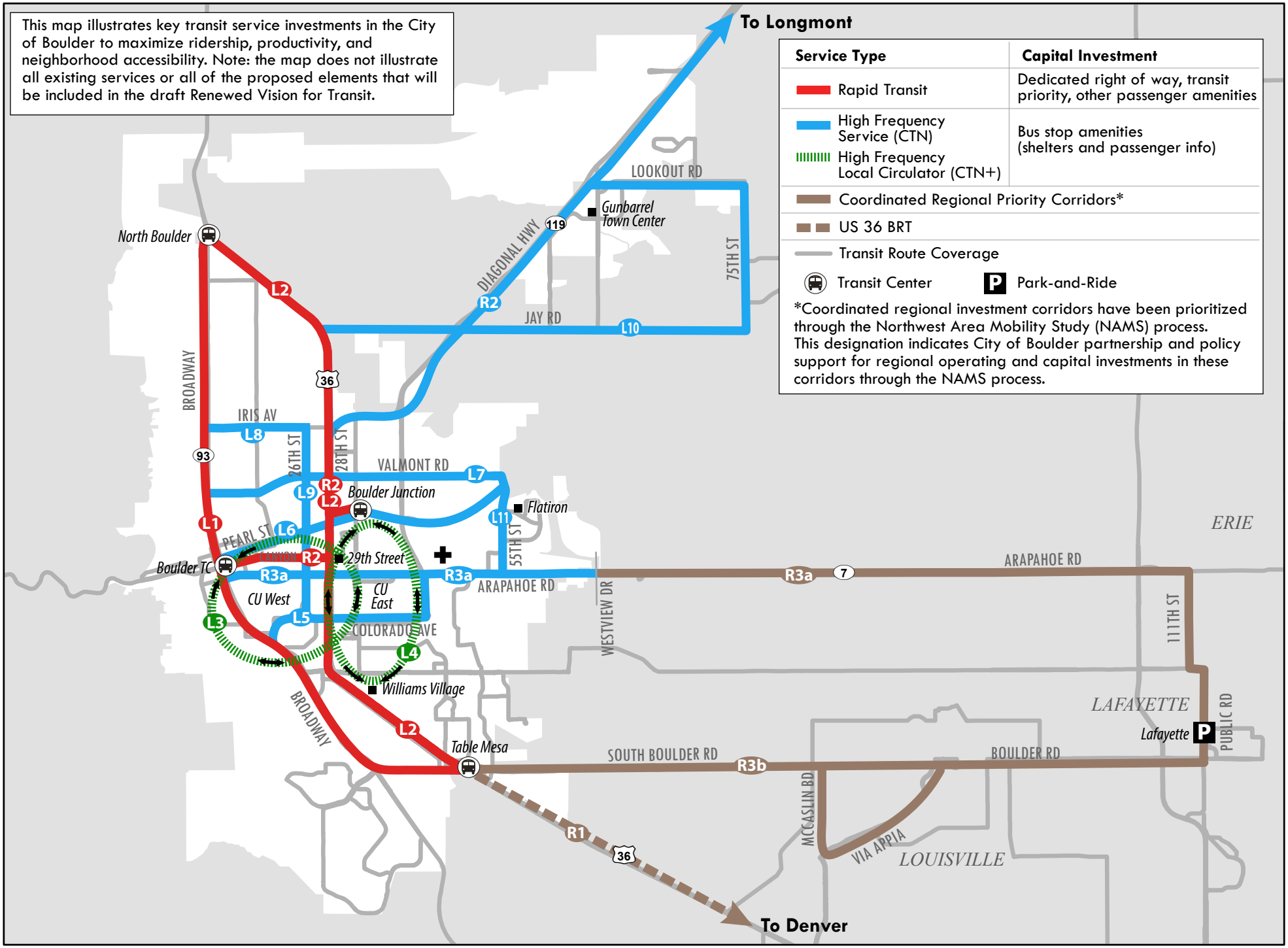
$25 million

NOTE: Scenario programmatic elements will be determined in coordination with City and County studies that evaluate EcoPass expansion and opportunities for new or expanded parking districts; strategies identified in the City of Boulder Climate Commitment; and through the US 36 Commute Solutions partnership that has identified first and last mile commuting needs.

Updated 2/17/2013

Attachement F: Transit options map and performance against key measures

Proposed Service Investments: Emphasizing Ridership, Productivity, Neighborhood Accessibility



Boulder TMP Update

Draft Vision Approaches: Ridership, Productivity, Neighborhood Accessibility Emphasis

Service Summary (Ridership, Productivity, Neighborhood Accessibility)

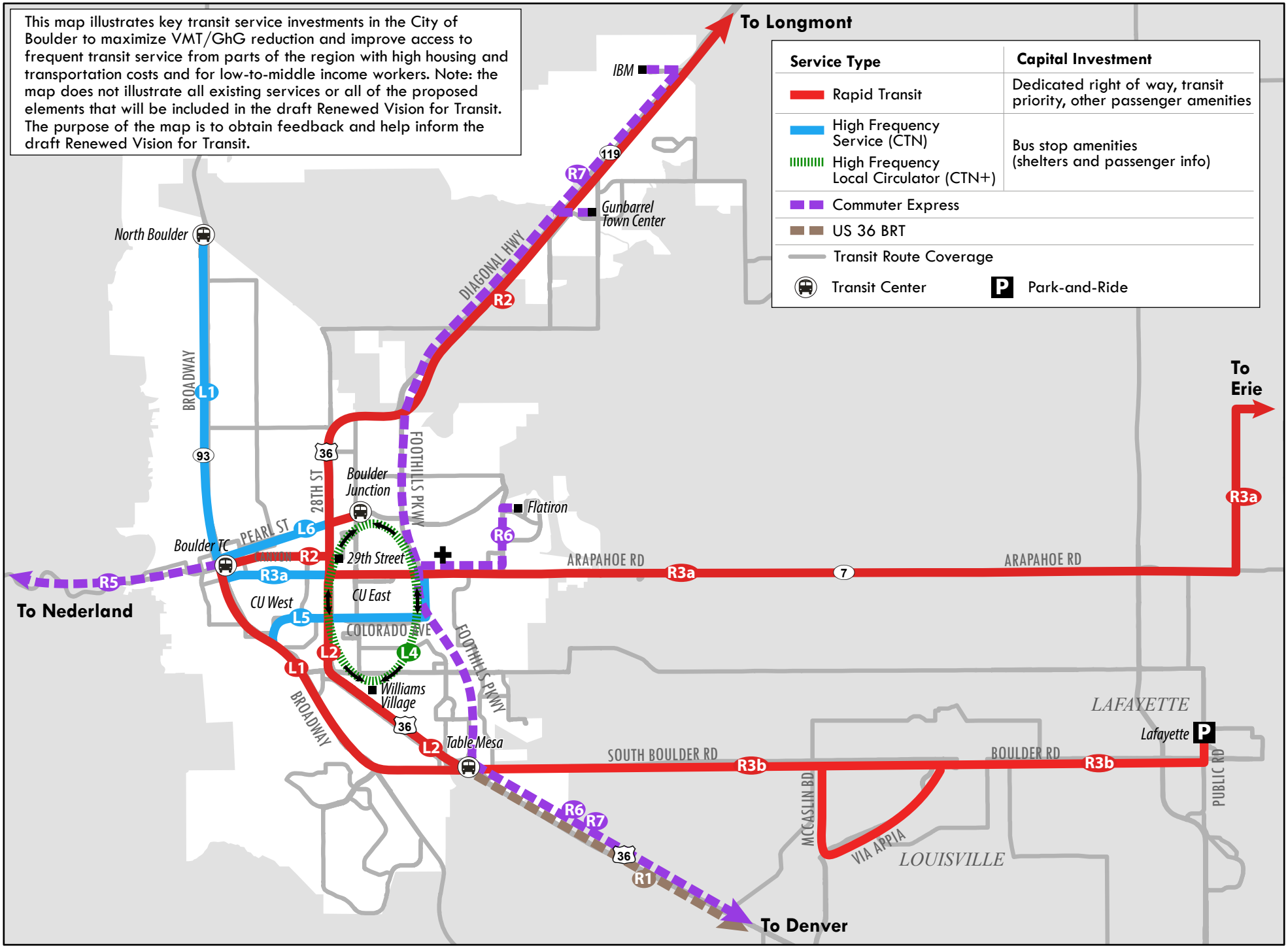
Service Description			Cost Summary		Ridership and Productivity (2035)	
Project ID	Corridor Description	Service Type	Annual Operating Cost	Capital Cost	Total Annual Weekday Rides	Total Rides per Service Hour
Key Regional Corridors						
R1	US 36: Boulder - Denver	US 36 BRT	-	-	-	-
R2	Diagonal: Longmont - Downtown (via Canyon)	Local - CTN	$6.2 M	$8.3 M	911,000	19.1
R3a (in-city)	Arapahoe: Downtown - City Limits	Local - CTN	$1.9 M	$2.5 M	382,000	26.5
R3a (out-of-city)	Arapahoe: City Limits to Lafayette	NAMS	-	-	-	-
R3b	South Boulder Rd: Table Mesa - Lafayette	NAMS	-	-	-	-
Local Rapid Transit or High Frequency Service (CTN)						
L1	Broadway: Table Mesa - N. Boulder	Rapid Transit	$6.1 M	$48.6 M	4,809,000	134.0
L2	28th: Table Mesa - N. Boulder	Rapid Transit	$2.0 M	$29.7 M	279,000	27.4
L3	Central / West Circulator (Enhanced Service)	Local - CTN +	$2.1 M	$3.2 M	3,094,000	118.5
L4	Central/East Circulator (Extended/Bidirectional)	Local - CTN +	$2.7 M	$4.2 M	1,199,000	35.2
L5	Stampede (Extended/Bidirectional)	Local - CTN	$2.3 M	$3.1 M	536,000	30.3
L6	Pearl: Broadway to 55th	Local - CTN	$1.3 M	$1.5 M	253,000	26.1
L7	Valmont: 9th - 55th	Local - CTN	$1.3 M	$1.8 M	357,000	35.3
L8	Iris: Broadway - 26th	Local - CTN	$0.6 M	$0.8 M	88,000	19.1
L9	26th/Folsom: Colorado - Iris	Local - CTN	$1.0 M	$0.2 M	153,000	21.0
L10	Jay: 28th - 75th	Local - CTN	$2.4 M	$3.8 M	156,000	8.5
L11	55th: Valmont - Arapahoe	Rapid Transit	$1.4 M	$2.1 M	109,000	10.3

Approach Metrics

Measure	Data
Annual Weekday Operating Cost	$31.3 M
Capital Cost	$109.7 M
Net New Annual Weekday Rides	6,661,000
Total Annual Weekday Rides	12,326,000
Total Rides per Service Hour	50.0
Operating Cost per Rides	$2.54
Annualized Operating + Capital Cost per Total Rides	$3.29
Annual VMT Reduced	8,740,000
Annualized Operating + Capital Cost per VMT Reduced	$4.64
Annual GhG Emissions Reduced (MT) [1]	2,780
Housing+Transportation Costs [2,3]	63,910
Access to Low-to-Middle Income Jobs [2,4] (Work Location)	324,103
Access to Low-to-Middle Income Jobs [2,4] (Home Location)	99,401

Notes:
1. From new transit trips
2. Within 3/8 mile distance of corridors included in approach
3. Number of households paying greater than 45% of income for combined housing and transportation costs
4. Workers earning $3,333 per month or less

Proposed Service Investments: Emphasizing VMT/GhG Reduction, Housing+Transportation Costs, Job Access



Boulder TMP Update

Draft Vision Approaches: GhG/VMT Reduction, Housing+Transportation Costs, Job Access Emphasis

Service Summary (GhG/VMT Reduction, H+T Cost, Job Access)

Service Description			Cost Summary		Ridership and Productivity (2035)	
Project ID	Corridor Description	Service Type	Annual Operating Cost	Capital Cost	Total Annual Weekday Rides	Total Rides per Service Hour
Key Regional Corridors						
R1	US 36: Boulder - Denver	US 36 BRT	-	-	-	-
R2	Diagonal: Longmont - Downtown (via Canyon)	Rapid Transit	$8.8 M	$88.8 M	1,239,000	27.0
R3a	Arapahoe: Downtown - 28th (Local - CTN); 28th - Erie (Rapid Transit)	Local - CTN/ Rapid Transit	$9.6 M	$80.0 M	1,543,000	28.3
R3b	South Boulder Rd: Table Mesa - Lafayette	Rapid Transit	$4.5 M	$53.4 M	1,240,000	49.4
Regional Commuter Express Corridors						
R5	Boulder - Nederland	Express Corridor	$1.8 M	$2.6 M	319,000	34.7
R6	Denver - Flatiron	Commuter Express	$3.5 M	$6.8 M	310,000	16.8
R7	Denver - IBM/Gunbarrel	Commuter Express	$4.5 M	$11.7 M	701,000	29.8
Local Rapid Transit or High Frequency Service (CTN)						
L1	Broadway: Table Mesa - Downtown (Rapid Transit); Downtown - N. Boulder (Local - CTN)	Rapid Transit/ Local - CTN	$5.4 M	$7.0 M	3,484,000	83.8
L2	28th: Table Mesa - Valmont	Rapid Transit	$1.6 M	$2.1 M	180,000	14.5
L3	Central/West Circulator (HOP)	No Change	-	-	-	-
L4	Central/East Circulator (Extended/Bidirectional)	Local - CTN +	$2.7 M	$4.2 M	1,199,000	35.2
L5	Stampede (Extended/Bidirectional)	Local - CTN	$2.3 M	$3.1 M	536,000	30.3
L6	Pearl: Broadway to 28th	Local - CTN	$0.6 M	$0.7 M	204,000	42.5

Approach Metrics

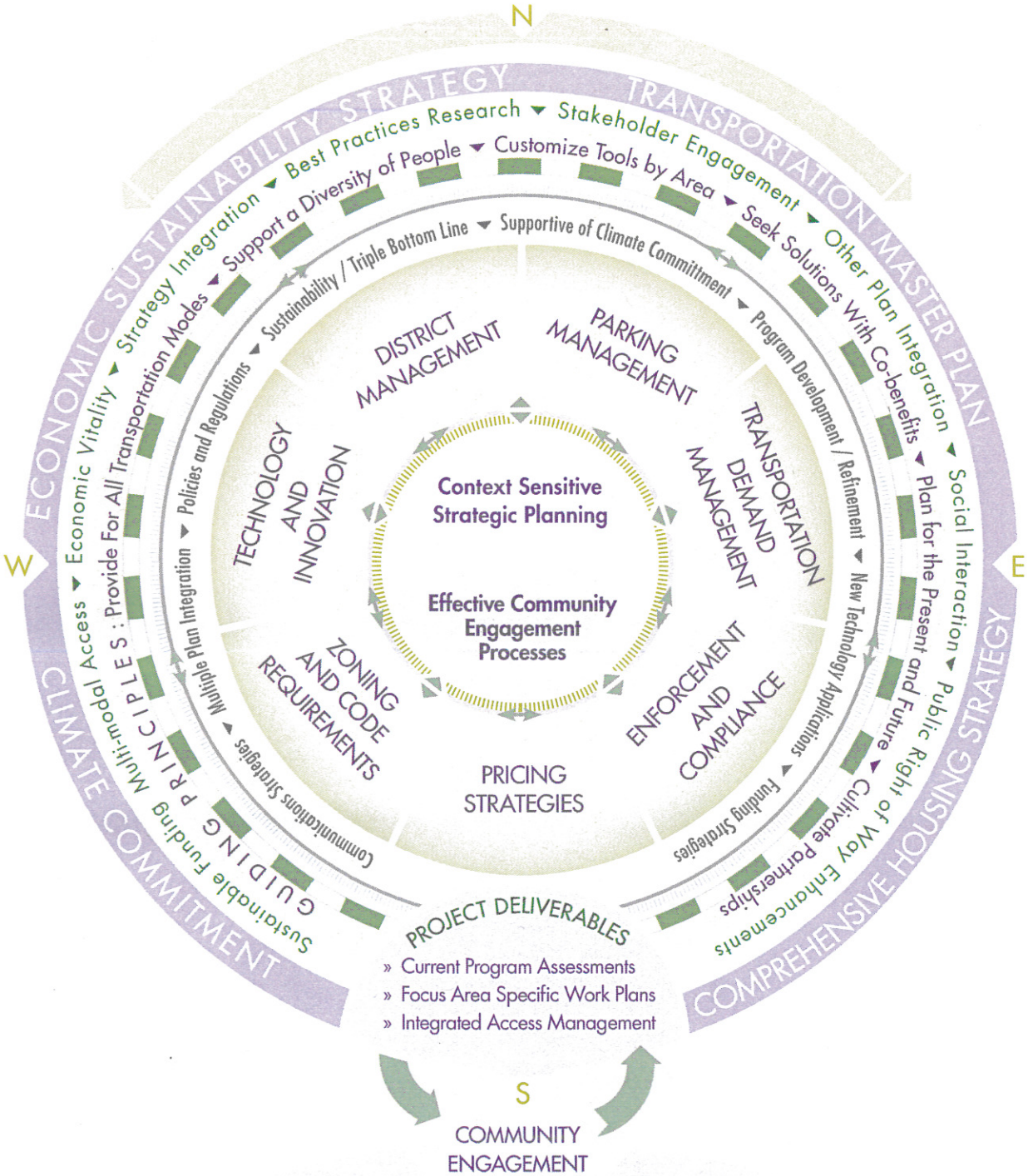
Measure	Data
Annual Weekday Operating Cost	$45.4 M
Capital Cost	$260.5 M
Net New Annual Weekday Rides	6,277,000
Total Annual Weekday Rides	10,955,000
Total Rides per Service Hour	38.1
Operating Cost per Ride	$4.33
Annualized Operating + Capital Cost per Total Rides	$6.00
Annual VMT Reduced	20,397,000
Annualized Operating + Capital Cost per VMT Reduced	$3.22
Annual GhG Emissions Reduced (MT) [1]	6,480
Housing+Transportation Costs [2,3]	76,100
Access to Low-to-Middle Income Jobs [2,4] (Work Location)	611,800
Access to Low-to-Middle Income Jobs [2,4] (Home Location)	181,100

Notes:
1. From new transit trips
2. Within 3/8 mile distance of corridors included in approach
3. Number of households paying greater than 45% of income for combined housing and transportation costs
4. Workers earning $3,333 per month or less

CITY OF BOULDER

Access Management & Parking Strategy Development

AMPS



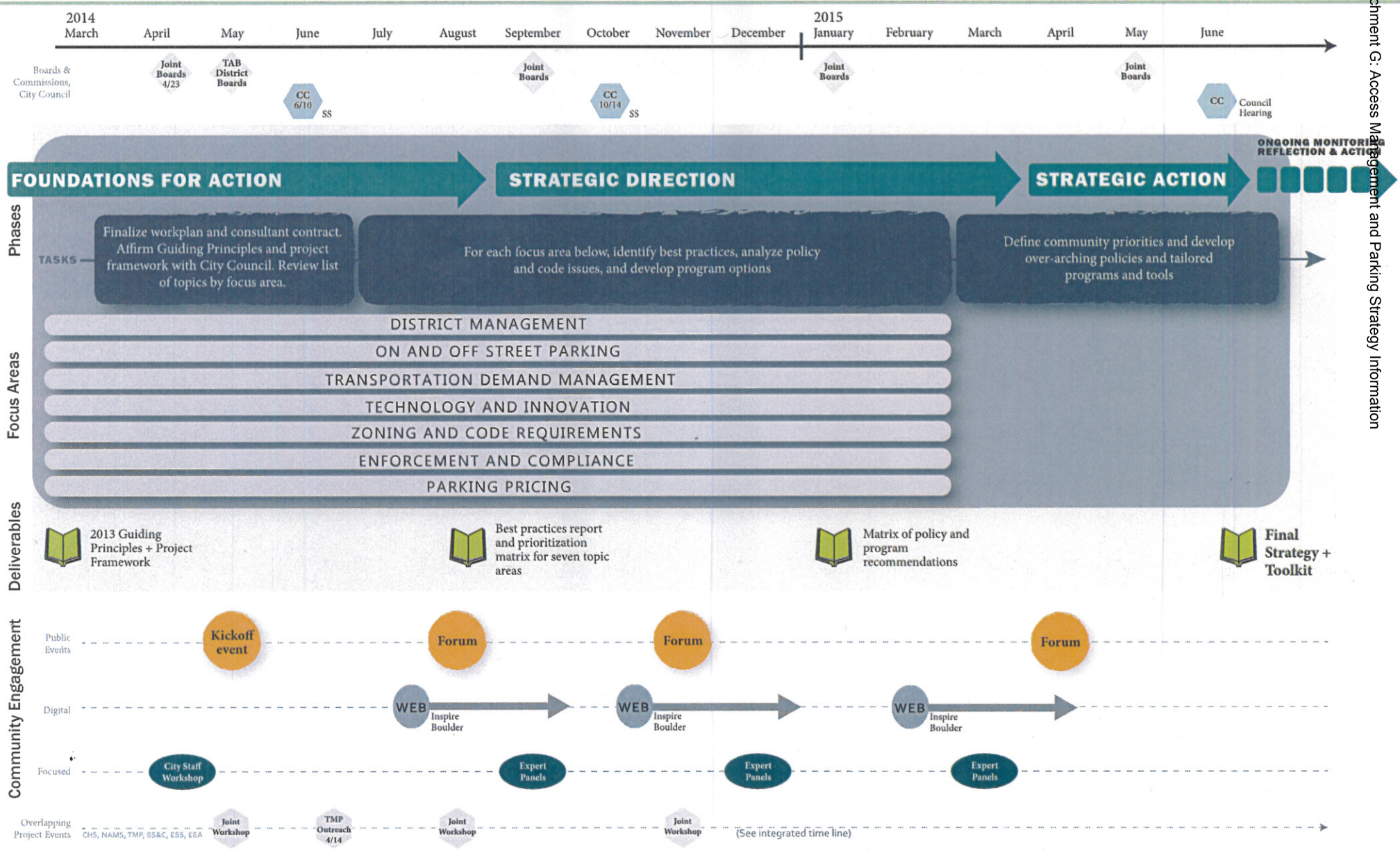
- » Multiple Departmental Work Plan Integration
- » Integrated Planning Framework
- » Sustainable Funding Strategies
- » Updated AMPS * TDM Toolkits
- » Performance Measures
- » Citywide AMPS Implementation Strategies
  - » East Arapahoe Corridor
  - » North Boulder Update
  - » Comprehensive Plan Update
  - » Boulder Junction

PROJECT OUTCOMES

Kimley-Horn and Associates, Inc.

DRAFT 04/18/14

AMPS Access Management and Parking Strategy Timeline



AMPS

Access Management and Parking Strategy

List of Topics by Focus Area (overlap of topics and discussion is expected)

1) District Management
2) On and Off Street Parking
3) Transportation Demand Management
4) Technology and Innovation
5) Zoning and Code Requirements
6) Enforcement and Compliance
7) Parking Pricing

DISTRICT MANAGEMENT

Partnerships with private parking providers
Integration between districts
Green parking certification
Future integration of access districts into other districts (eco-districts, arts, innovation)
District development projections
Parking/access demand planning software
Guidelines for the creation of new districts
Carshare, carpool, charging station strategies to support access districts
Public private partnerships
Civic Area parking strategy

- City, library, and public short term parkin g

ON and OFF STREET PARKING

72-hour parking limitation
Back in parking to facilitate bike traffic
Move bike lanes between curb and parking lane
Loading zone management
Disabled parking designation and location
Time zones and a management tool
Neighborhood Parking Program (NPP)
Edge parking – areas on the edge of town for commuter parking
On-street car sharing
City employee parking
Bike corrals
Parklets .
Variable message signage
Replacement of gate access system
Incorporation of public art
Electric vehicle charging stations
North Boulder Rec Center Parking

TRANSPORTATION DEMAND MANAGEMENT (TDM)

RTD smart card impact on pricing
"Last mile" strategies

One access card for parking, transit, and share programs
Enhanced pedestrian amenities
Bike parking options citywide
Implementing Boulder Junction TDM district
Community wide EcoPass
Parking cash out
Alternative work schedule
Carpool / vanpool
Balancing all needs in ROW
TDM Tool Kit for private development

TECHNOLOGY and INNOVATION

Integration of existing five technology systems
Consideration of new technologies

- Apps for parking availability, mobile phone payment, variable message signage

ZONING and CODE REQUIREMENTS

Off-street parking standards
Parking requirements by use rather than zone
Parking minimums and maximums
Compact and tandem parking standards
Area specific parking standards
Oversupply of parking
Unbundling parking, on-street permit or metering

ENFORCEMENT and COMPLIANCE

Responsibility of enforcement within city
License plate recognition system
Fine amounts in relation to parking pricing

PARKING PRICING

Evaluate the full range of fees from parking fines to on-street and garage rates

Neighborhood Permit Program

- Evaluate the commuter, resident, and business parking permit systems

Variable and performance based pricing options

- Variable pricing depending on time, duration and location

Parking fine amount
Civic Area parking strategy

- City, library, and public short term parking; replacement parking

Draft Guiding principles: City of Boulder Transit Funds

The following principles are intended to guide future investment decisions for use of the City of Boulder transportation funds for transit.

Strategically Invest Local Revenues –

- **Invest Resources that are consistent with Transportation Master Plan Priorities**
- **Local revenues need to support local improvements -** Locally raised transit funds should benefit the local community.
- **Prioritize Operating and Capital Investments for Efficiency and Effectiveness** – Strive to achieve a cost-effective investment program that increases transit ridership and mobility.
- **Leverage public investments to achieve multiple purposes whenever possible -** The transportation system should also support other community goals such as environmental sustainability, economic vitality, and community health and energy independence.

Ensure Accessibility: The transportation system must be accessible and safe for users of all abilities and incomes.

Preserve Integrity of Community Transit Network – Branded, direct, frequent and user-friendly service attributes are the hallmarks of the CTN, which has increased ridership significantly. Maintain and expand CTN service attributes.

Emphasize Reliable and Predictable Transit Service: The reliability of the system and predictability of travel time are frequently as important as speed. Prioritize multiple multimodal options over reliance on a single option. Expand real-time travel information.

Cultivate and Expand Partnerships -

- **Develop and maintain effective regional partnerships and coalitions:** Regional transit is important to provide enhanced options to in-commuters to support the local employment base and improve air quality for Boulder residents and employees.
- **Coordinate and pursue regional partnerships that leverage local funds** - Improve regional transit to and from Boulder. Develop and maintain regional partners to help provide effective regional service and partner on funding.

Maintain "net" service hours in Boulder: During the last decade, there has been significant reduction in RTD transit service in Boulder.

- Ensure rebuilding of the local transit system to ensure "no net loss" of service hours and if possible, service expansion and enhancement to transit routes that are effective, productive, meet community needs and are consistent with the Transportation Master Plan.
- Some parts of the transit system may need to be reduced while other parts are enhanced or expanded to meet changing demand.
- As Boulder invests more in transit, assure that RTD does not divest resources.

MEMORANDUM

TO: Members of City Council

FROM: Jane S. Brautigam, City Manager
Heather Bailey, Executive Director of Energy Strategy and Electric Utility Development
David Driskell, Executive Director of Community Planning and Sustainability
Susan Richstone, Deputy Director of Community Planning and Sustainability
Jonathan Koehn, Regional Sustainability Coordinator
Yael Gichon, Energy Sustainability Coordinator
Kelly Crandall, Energy Strategy Coordinator
Kara Mertz, Environmental Action Project Manager
Elizabeth Vasatka, Business Sustainability Coordinator
Jamie Harkins, Business Sustainability Specialist II
Elyse Hottel, Sustainability Data Analyst
Juliet Bonnell, Administrative Specialist
Lesli Ellis, Comprehensive Planning Manager
Brett KenCairn, Senior Environmental Planner
Sarah Huntley, Media Relations/Communication Manager
Colette Crouse, Sustainability Communication Specialist
Lisa Smith, Energy Communication Specialist

DATE: April 29, 2014

SUBJECT: Study Session: Boulder's Energy Future

I. PURPOSE

This memo provides an overview of the next phase of work aimed at achieving the energy future the Boulder community envisions. It summarizes current and planned efforts for city-supported energy services and innovations, including the direct relationship of those efforts to achieving the community's climate commitment goal. This memo also outlines next steps in exploring municipalization of the electric utility system as the path that will enable Boulder to move aggressively toward the creation of the "utility of the future."

Staff has the following questions for council:

1. Does council have any feedback on the proposed vision for the "utility of the future?"
2. Does council have any questions on the implementation and refinement of the city's energy services, as presented for 2014?

II. OVERVIEW AND BACKGROUND

This memo will:

1. Link the city's climate commitment goals to our energy services, new pilot initiatives and municipalization efforts;
2. Describe the city's vision of the "utility of the future," specifically in terms of how it would relate with and serve its customers;

3. Provide an update on current city-supported energy services and 2014 program enhancements;
4. Describe innovative energy service pilots being planned and implemented in 2014/15;
5. Outline the ongoing work associated with creating a municipal utility and the resources and effort directed toward transitioning to a new utility business model;
6. Provide an update on regional, national and international partnerships; and
7. List the next steps and schedule for 2014/15.

Climate Commitment and Boulder's Energy Future

Climate science has identified the need for a rapid transition to a low-carbon world. Boulder has been a leader in developing and implementing ambitious climate action programs to respond to this growing crisis. Through the development of what are widely recognized as some of the most innovative and effective energy efficiency and conservation programs, the city reached an important conclusion: conservation and efficiency alone were not sufficient to achieve the city's previous Kyoto Protocol goal, let alone more significant greenhouse gas reductions. This is largely because of the high carbon intensity of the city's electricity supply. This was the impetus that compelled the city to explore options to change the source of our electricity supply—which accounts for approximately 60 percent of Boulder's greenhouse gas (GHG) emissions.

Reports released this year by the Intergovernmental Panel on Climate Change have indicated that climate change is happening faster than originally anticipated. As a result, the panel has made the unprecedented call for a rapid and systematic disinvestment from all fossil fuel-based energy infrastructures. The rise in extreme weather events around the world underscores both the immediacy and urgency of this mandate. Local experiences such as the floods of last September and the four most destructive fires in Colorado history, within the last five years, illustrate the potential impacts of unchecked climate change even closer to home. Staff is proposing an approach that addresses both the causes of climate change (climate mitigation) and prepares Boulder for the likely continuation of impacts (climate resilience).

Transitioning to a low-carbon economy will not be easy. However, Boulder has already begun building a foundation for a new energy economy that will position the community for economic, environmental and social benefits. The growing clean tech and clean energy sectors employ a significant local workforce and generate an increasing share of the local economy. This could grow with a more community-focused and community-invested energy infrastructure. Increasingly clean local energy will also reduce local pollution and improve air and water quality for both human and wildland communities. By creating an energy system that supports local generation and intelligent application of energy efficiency, Boulder can also create an energy marketplace that opens the door to new entrepreneurial ideas for energy goods and services. The extensive analyses conducted to date have demonstrated that Boulder can create the "utility of the future," which will provide stable, safe and reliable energy while leading a transition to a dynamic, prosperous and healthy way of life.

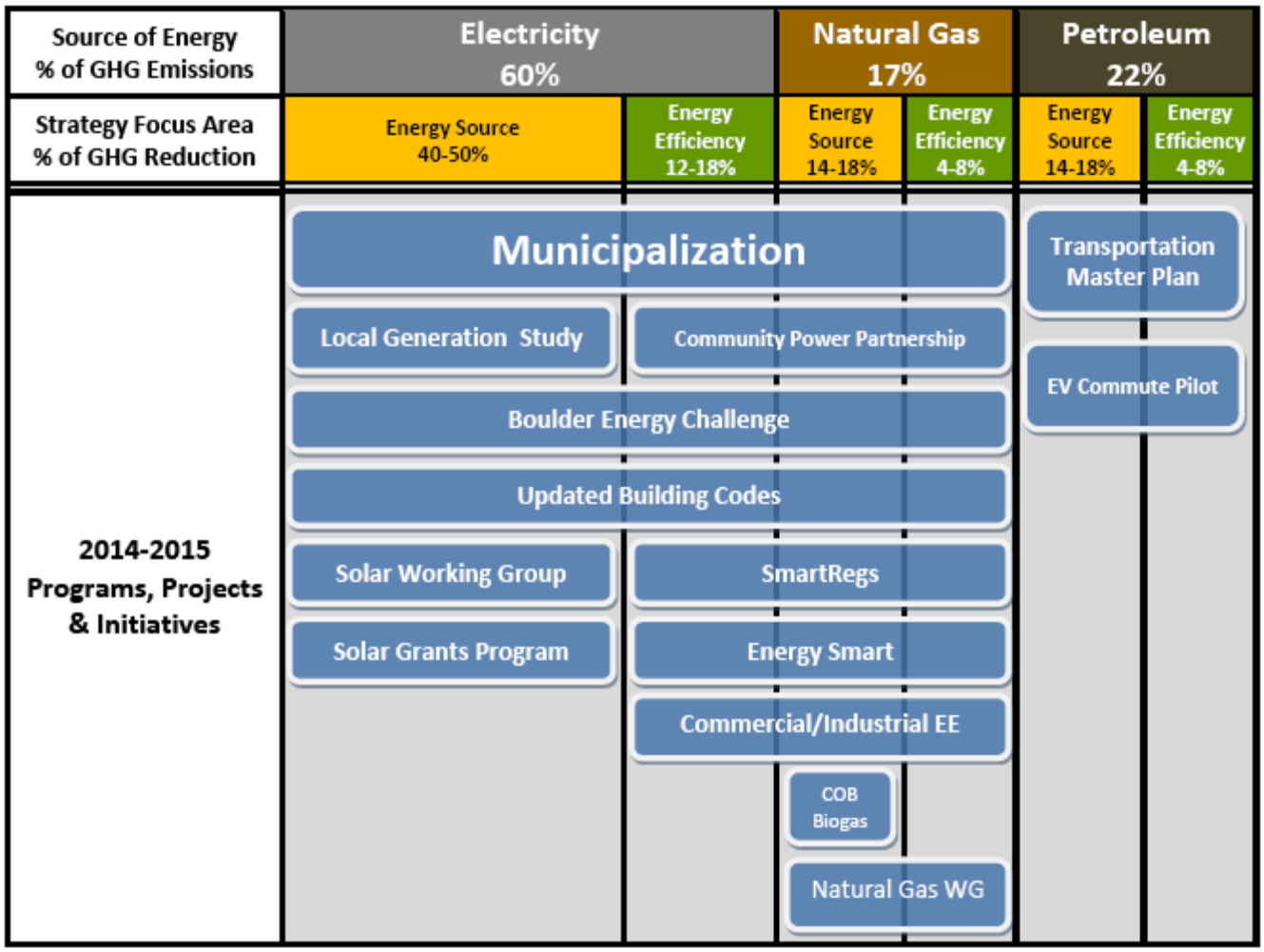
Four guiding principles, which draw from both the energy future goals (**Attachment A**) and proposed climate commitment focus areas, provide an initial foundation and direction for this vision:

1. **Ensuring safe, reliable and secure energy—**The first priority of Boulder's approach will be to ensure the community has access to safe, clean, reliable and secure energy. This includes investments and system enhancements so that energy services can withstand local and regional disruptions, and provide increasing opportunities for individuals, businesses and institutions to provide additional reliability and resilience through technologies such as microgrids and on-site energy generation and storage.
2. **Prioritizing a rapid transition from fossil fuels—**The only way to achieve the scale of emission reductions necessary to stabilize the climate involve a rapid transition from fossil fuels. This transition also protects and restores the environmental health on which the community depends.
3. **Invest in our local economy—**A fundamental objective is to direct substantial revenues back to the local economy, supporting existing businesses, creating new jobs and expanding business opportunities.
4. **Designing a marketplace for innovation—**Central to achieving these principles is the creation of a new energy services marketplace to foster innovation and the development of new energy products and services that serve local needs and then can be applied in regional, national and international settings.

Together, these four principles integrate Boulder's climate action, climate resilience, and economic vitality objectives. They also provide the fundamental criteria for evaluating both the design and strategy for developing a local utility and any proposed alternatives to be considered.

The creation of a local electric utility represents one of the most significant staff and community efforts ever undertaken. Considerable resources are needed to transition to a city-owned utility that will be ready to fulfill the principles outlined above. At the same time, most utility industry observers agree that a transformation of the traditional electric utility business model is inevitable. Boulder has positioned itself to help shape this transformation and demonstrate an approach that creates diverse, customer-centered energy choices for Boulder residents and businesses.

Understandably, setting goals and stating principles do not reduce emissions on their own. Simultaneous to the exploration of muncipalization, the city continues to enhance its energy services for Boulder customers. **Graphic 1** below is an illustrative representation of Boulder's 2014/15 energy services, programs and initiatives aimed at achieving emission reductions through demand-side strategies and source replacement.



Graphic 1: Connecting Climate and Energy Services

These efforts are vital to maintaining the momentum our community has started in this area. This memo describes work being undertaken in 2014/15 to continue, enhance and expand the city's energy services within the status quo of the current utility environment. As described below, EnergySmart, solar grants, the Community Power Partnership, and the local solar strategy are also helping prepare the city, in incremental steps, to operate the customer-facing services associated with the "utility of the future." Because the city is currently limited in its ability to implement "supply-side" energy services, the efforts that can be developed in the short term will differ greatly from those that might be possible when empowered with the authority that comes with municipalization.

The process for getting to "Day 1" – the day the city acquires the assets from Xcel Energy (Xcel) is detailed in a transition plan that will be presented to council on May 13. Considerable resources are needed to transition to a city-owned utility that will be ready to reliably and economically serve the community. It will be important to focus staff efforts on being ready for "Day 1," providing for a smooth transition of the utility operations from Xcel to the city.

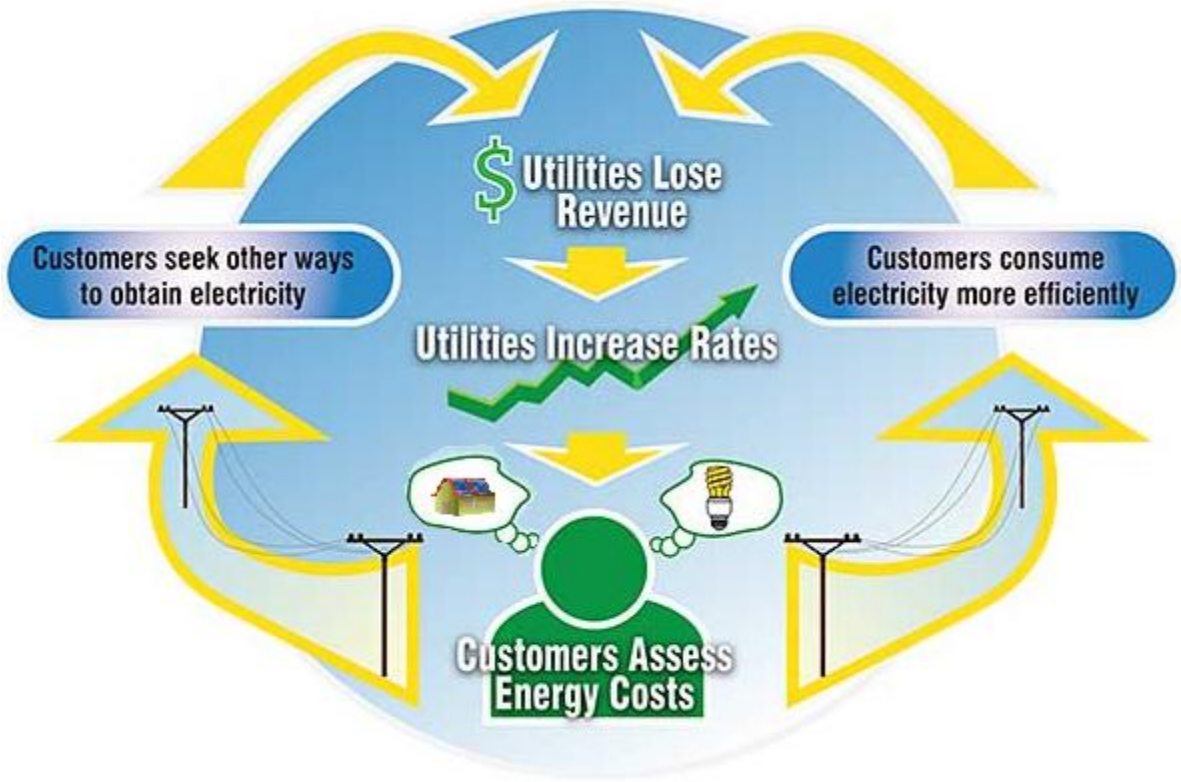
III. TRANSITIONING TO THE "UTILITY OF THE FUTURE"

The strategies and technologies best-positioned to achieve Boulder's climate and energy goals necessitate an overhaul of the current utility business model in favor of one that accommodates a different energy system and relies on a fundamentally different revenue model. The traditional utility business model is geared toward large capital investment in centralized generation and subsequent sales of electricity. It is ill-suited to support investment in aggressive energy efficiency, distributed generation or other technologies and strategies that reduce demand and energy sales. Additionally, there are a number of other pressures on the existing utility model, including:

- New environmental regulations
- Investment requirements
- Flat load growth
- Shifting fuel economics
- Falling cost of low-carbon resources
- Upward pressure on rates

Thinking rigidly about these changes is part of the problem. New technologies, including renewable resources, grid intelligence, and storage continue to outpace the political and regulatory environment. The electric utility that Boulder envisions embraces these industry challenges as opportunities. As an example, some utilities have identified the confluence of efficiency, conservation, on-site solar, and energy storage as a "death spiral" in which costs are increasingly borne by customers who cannot afford to go off the grid.[1] In fact, the Rocky Mountain Institute recently performed an analysis on "grid defection," which demonstrated that solar-plus-storage systems could be competitive with traditional retail service for customers in several key states as early as 2020.[2] **Graphic 2** illustrates how every day more customers reduce their consumption and generate their own energy even if they are grid-tied, which steadily depletes income, and thus requires the utility to raise rates on its remaining customers. These increases, in and of themselves, speed further efficiency measures and self generation, leading to even higher increases in rates.

[1] *See* Peter Kind for the Edison Electric Institute, *Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business* (2013)
[2] *See* Rocky Mountain Institute, *The Economics of Grid Defection* (2014)



Graphic 2: The Utility "Death Spiral"

The "utility of the future" is a different utility business model that provides "energy as a service." It sells or facilitates the provision of services that electricity provides—health, comfort, safety, and economic vitality—while reducing its impact on our natural environment and rapidly transitioning from fossil fuels to clean, renewable energy. It would have a different relationship with customers as it helps them use less energy, manage energy more efficiently, and self-generate where possible. Boulder is looking at a fundamental shift in thinking about the purpose of the utility: how it measures success, how it is organized and operates, how it engages with customers, and how it is financed and made economically viable.

Imagining the Future

Imagine a future in which Boulder has one of the least carbon intensive power supplies in the country and where both homes and businesses have become net-zero. The city has a diverse power supply that is a mix of local generation and large scale renewables. Boulder is a model for the country with respect to its electric reliability, management and innovation.

Homes within the community have state-of-the-art energy efficiency improvements, no matter what the household income or size, because it is affordable through various incentives and financing options, such as on-bill financing. Comfort is not sacrificed because the power is clean. Home devices inform customers about their use patterns, and technology allows them to manage energy use automatically and effectively. For example, businesses and homes have preprogrammed lighting and temperature controls that adjust to the activity in the building. Electricity comes from on-site systems such as rooftop solar and battery storage; or, if you rent

or live in multifamily housing, through shares in a community-based generation facility. You plug in your electric vehicle and it is timed to charge from the electricity you have stored in your battery system. You have control over your energy and water use and have worked out a program with your electric utility for a billing plan that meets your needs. Online tools give customers access to energy use details, allowing them to manage both their services and rates.

The utility manages local generation resources as part of the overall electric supply. Electricity comes from waste heat or other renewable systems. Large, energy-intensive businesses are interconnected by a micro grid and battery system for redundant reliability such that they are sharing backup systems, saving money and providing protection from natural disasters or other system failures. Electric car charging outlets are abundant and stored electricity from wind generated during the night powers the systems that charge cars during the day. The utility is part of the economic vitality engine for Boulder, an active partner in testing and showcasing new energy innovations.

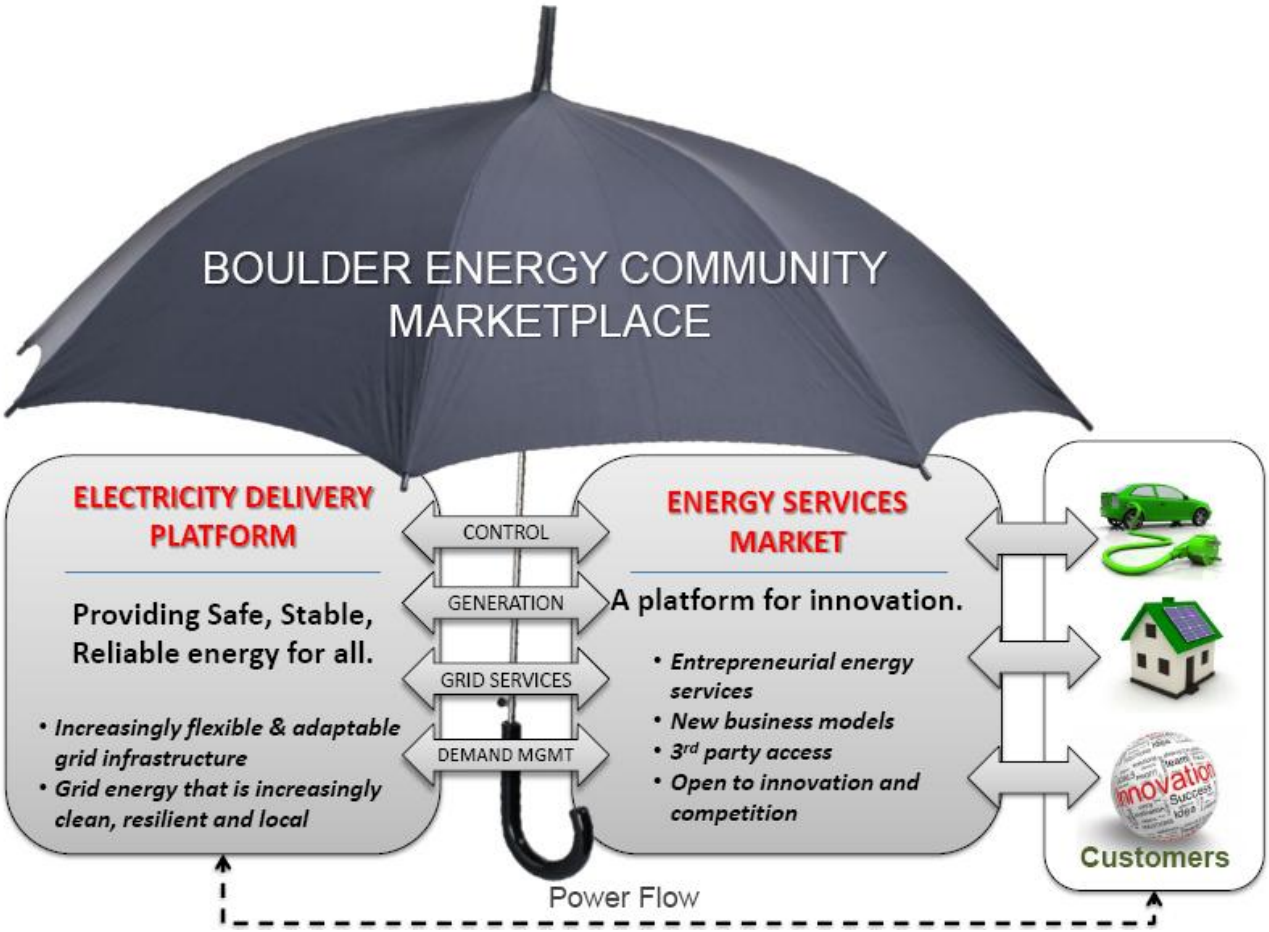
Energy Innovations Marketplace… a Potential Path Forward

The future described above will not happen overnight. It will require a different relationship between the utility, its customers and the private sector. While there is general agreement around the key drivers that are shifting the landscape of the utility business model, little has been discussed about the expectations of tomorrow's utility customers. Innovative, emerging approaches are beginning to shape the electric grid, turning it from a one-way conduit for distributing power into a far more decentralized, intelligent network for improving energy reliability and efficiency.

Boulder envisions a utility framework that allows the utility to focus on its core function of providing stable, reliable and increasingly clean energy through flexible and resilient grid services and utility functions such as:

- Voltage support
- Grid management
- Congestion management
- 24/7 power
- High reliability
- Frequency support
- Outage detection and management
- Service installation
- Acquiring resources
- Maintaining infrastructure
- Servicing customers
- Pricing/rate setting
- Collecting revenue to cover costs
- High quality customer contact/service

At the same time, the utility can provide a platform for innovation, allowing the private sector to engage in entrepreneurial actions resulting in an "energy services market." **Graphic 3** illustrates a new relationship between the utility and the private sector, not unlike that of smartphone companies providing a "platform" for innovation for application developers.



Graphic 3: Boulder Energy Community Marketplace

In the "energy community marketplace" concept, enhanced services are developed through a market-based approach of partnering with leading entrepreneurs, creating services such as:

- Demand-response aggregation
- Accelerated demand-side management strategies
- Lighting, HVAC etc. service contracts
- Aggregated peak-load reduction
- Energy coaches to help find best services to meet your needs "cradle to grave"
- Distributed Generation "intra-grid" transaction brokering
- Electric vehicle energy storage aggregation for demand-response
- Dynamic rate options (fixed, demand, contracted, time of use (TOU))
- Expanded and flexible solar gardens
- Turn-key local generation and storage services
- App-based services to be activated by smart phones and other mobile devices

The "energy community marketplace" represents one concept. Transitioning to a new utility business model will take time and a thoughtful approach. Staff intends to develop a public

process to discuss a collective vision and mission for what Boulder's utility could and should look like. It will also require asking, and answering, a series of questions, such as:

1. What approaches and functional areas should the utility offer on Day 1?
2. How can the utility evolve from "Day 1" to ensure a clear focus on achieving the vision?
3. How could a utility prioritize energy efficiency and distributed generation, treating them as desirable and useful, rather than disruptive?
4. How can the utility increase reliability and safety, while creating flexibility in grid operations?
5. What rate structures are easiest for customers to understand while encouraging efficient energy consumption?
6. How much renewable energy can be generated locally in Boulder?
7. What services do customers want?
8. How can a utility make costs and ratemaking transparent and understandable?

This list of questions, plus others, will be fleshed out over the coming year as part of a public process to consolidate Boulder's energy-related goals into the vision of a "utility of the future." As described in the next section, current energy service offerings and new initiatives will also help provide answers to these questions.

IV. ENERGY SERVICES – TODAY AND IN THE FUTURE

"Energy services" are developed collaboratively between the city (or city utility, if one exists) and the community to meet community energy goals. Energy services are slightly different from energy-as-a-service but they center on the same goals of clean energy, collaboration, and economic vitality. Because a municipal utility has different legal and practical capabilities, the energy services that might be implemented with a local electric utility are different from those the city can offer under the status quo (see **Table 1**).

The development of energy services under a municipal utility will focus directly on Boulder's vision for the "utility of the future," under which the city could provide diverse energy choices for customers building on current successful programs. In fact, over the past several years, staff has identified a range of new energy services that could help achieve climate and energy goals through demand- and supply-side efforts. However, implementing these services is predicated on the city having the necessary authority to do so. That level of authority differs depending on the regulatory and operational context of the distribution system and utility management.

Table 1 is not intended to be comprehensive; rather it illustrates the types of strategies that could be pursued, helping to identify "what's possible" while also clarifying "what's doable."

Status Quo	Municipal Utility
• EnergySmart – advising/concierge • Solar Grants – access to distributed generation for diverse customers • Community Power Partnership – advanced behind-the-meter analytics and customer feedback • Boulder Energy Challenge – facilitator, seed funding, local economic development	• Customer choice of electric generation resources • Microgrids to balance local renewables • Transactive or "peer-to-peer" energy-the ability to sell excess power to a neighbor or donate to a school, non-profit or charity. • Innovative rate structures to facilitate efficiency and renewables • Incubator for cleantech • Plug-and-play photovoltaic, electric vehicles, energy management, and efficiency services for all customers • Data analytics • Unique rates and payment plans

Table 1: Sample Energy Services from "Boulder the City" vs. "Boulder the Utility"

Importantly, Boulder currently offers several innovative energy services—including EnergySmart for Home and EnergySmart for Business—that are built upon a unique energy advisor model. This model was developed through Community Tech Teams in 2010/11 (funded, facilitated and pilot tested by the city), providing a powerful illustration of the innovation that can be harnessed through collaborative problem-solving with community stakeholders and local experts, and partnering with other governmental agencies and private businesses. EnergySmart services—which are now delivered countywide through a public-private partnership—have achieved significant market penetration and audit-to-action ratios that are far higher than industry standards. The Boulder-born model has been recognized as a national best-practice model and is being replicated in Denver, the San Francisco Bay Area, and other cities around the country.

But while these services have achieved significant success, the city continues to explore new initiatives to advance community energy goals within the existing "status quo" framework. These initiatives, as well as current services, are listed below (**Table 2**) and described in the subsequent section of this memo.

Continued Offerings (2013-2015)	New Initiatives (2014-2015)
• Residential and Commercial EnergySmart • Solar Grants and Rebates • Voluntary Building Benchmarking • Greenhouse Gas Emissions Analysis	• New Commercial/Industrial Energy Efficiency Strategy • Boulder Energy Challenge Grant Competition • Community Power Partnership • Local Solar Strategy • Natural Gas policy development

Table 2: Energy Services in Boulder

A. Continued Offerings

1. EnergySmart—Residential

Consistent with council's past direction on CAP tax funding, in 2014 the city continues to support EnergySmart services, working with program partners (Boulder County, Populus and others) to provide advisors and rebates that assist property owners and homeowners with energy efficiency upgrades.

To ensure continued success of the program, the city hired the Cadmus Group in 2013 to assist in evaluating residential energy efficiency efforts, in light of funding constraints stemming from the conclusion of the US Department of Energy's (DOE) Better Buildings Grant and other competing priorities for CAP tax dollars. In September 2013, Cadmus completed its work, identifying strategies that best leverage and maximize city funds and resources moving forward. For the full Cadmus report, view **Attachment B.**

As highlighted in the report, the residential EnergySmart program continues to perform well. Of the 11,396 countywide participants who have engaged in the program through the end of 2013, more than 6,400 participants—or 57 percent—were Boulder residents. The advisor service continues to prove its value, with 77 percent of participants in owner-occupied units completing upgrades after meeting with an energy advisor. More detailed information on program accomplishments and metrics are provided in the EnergySmart Residential Progress Report.

Key recommendations for advancing the city's residential energy efficiency strategy, which will be the focus of work in 2014, include:

a) Adopting a 15-year EnergySmart goal (with short-term goals and targets)
b) Offering a lower-cost participation option beyond phone or in-person advising
c) Maintaining investments in marketing
d) Prioritizing SmartRegs funding to maintain high participation rates
e) Maintaining funding for technical assistance, which has been key to EnergySmart success and SmartRegs compliance
f) Exploring new funding sources to supplement existing budgets
g) Limiting incentives to short-term promotional events and considering bonus incentives to encourage deep energy savings

The city is using these recommendations with its key partners to prioritize budgets and resource decisions, and is developing coordinated short-term and long-term marketing and outreach plans in partnership with the county.

2. SmartRegs – Licensed Rental Housing Energy Efficiency Requirement

The January 2019 deadline for rental housing compliance under SmartRegs continues to drive EnergySmart in Boulder, accounting for 76 percent of all city residential participation. Through the end of 2013, nearly 5,500 rental units had participated in the program as a means for meeting compliance requirements. The city is currently working to develop a five-year SmartRegs compliance strategy for the remaining 13,400 units, which account for fewer than 7,100 rental licenses held by 4,500 property owners. A report on the program's progress through 2013 is provided in the SmartRegs Progress Report.

With approval of the $15,000 Boulder County Sustainability Matching Grant in July 2013, the city finalized a contract in September with Interplay Energy, LLC to begin development of a simulation training tool for SmartReg's inspector certification and renewal. A beta version of the tool is expected to launch summer 2014. This training tool is expected to bring efficiencies to the training process and enhance the city's ability to ensure that property owners are benefitting from customer service and advice from qualified, knowledgeable experts.

In 2014, the city also continues to contract with Populus for SmartRegs assistance in:

a) Managing the hotline;
b) Providing technical advising and checklist maintenance;
c) Some marketing and outreach to property owners; and
d) Administrative processing and data tracking.

In addition, the city is working to develop a comprehensive marketing strategy to encourage property owners with expiring rental licenses to engage in the compliance process now rather than wait until the compliance deadline. This includes redesigned SmartRegs outreach materials to better educate property owners about the compliance process and available assistance through EnergySmart advising services. The city is working with Populus to develop an outreach strategy to target property owners who have received a SmartRegs inspection but have not yet reached compliance, encouraging owners to utilize the advising services and rebates to reach compliance now.

3. EnergySmart—Commercial

Developed and piloted by the city through a collaborative community process, EnergySmart commercial services are delivered through collaboration between the City of Boulder, Boulder County, the City of Longmont and Xcel. Like its residential counterpart, the commercial program continues to be very successful and is seen as a national best-practice model. In September 2013, the city and county exceeded the established DOE's Better Building Grant goals of delivering energy efficiency services to more than 3,000 unique business participants countywide and more than 1,800 unique businesses within the city. Through 2013, nearly 2,000 City of Boulder businesses and property owners have engaged in EnergySmart, with the program's contractor (Boulder County Public Health) exceeding its contract goals for advising services by 104 percent or 531 businesses. Nearly 50 percent of all business participants who engaged in EnergySmart advising services subsequently implemented energy efficiency upgrades. More information on program accomplishments and metrics, are included in the EnergySmart Commercial Progress Report.

To support flood recovery efforts, the city and county have released additional rebates for heating, cooling, ventilation and air conditioning (HVAC) equipment, and have proactively offered energy efficiency services to potentially impacted businesses. More than 65 businesses were contacted, with 11 pursuing upgrade projects and two requesting assessments.

The EnergySmart for Business program will continue to work on streamlining its service delivery model in 2014 and enhancing outreach and marketing efforts. Also, a significant focus for the city's commercial energy efficiency work in 2014 will be developing a more defined commercial and industrial energy efficiency strategy with input from the business community, as described in the New Initiatives section of this memo.

4. Solar Grants and Rebates

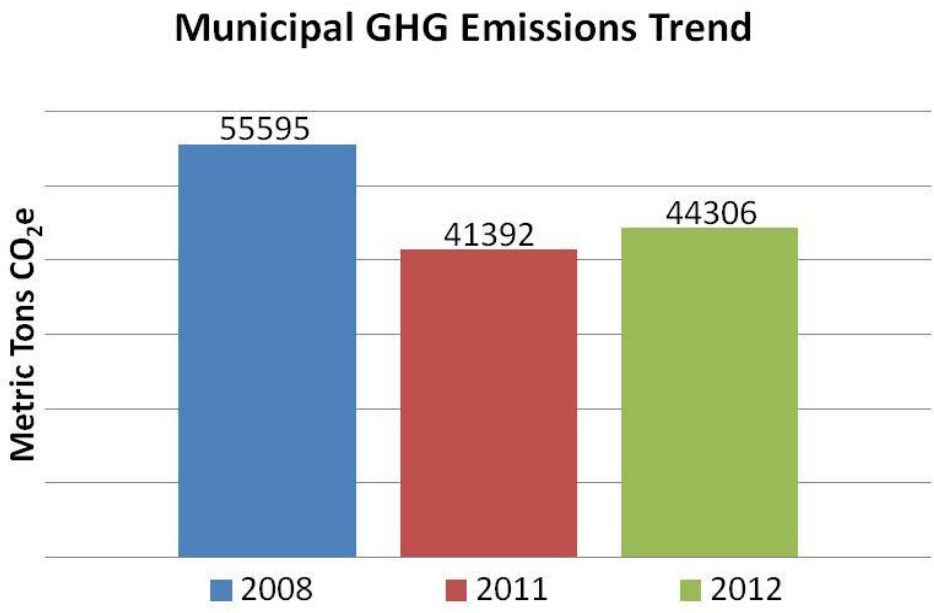
With the adoption of Solar Ordinance No. 7487 in 2006, a renewable energy fund was created that sets aside a portion of sales and use taxes paid annually for photovoltaic (PV) and solar thermal systems. Thirty-five percent of this fund is available to provide rebates to Boulder residents and businesses who have installed solar electric or solar thermal systems on their property. In 2013, residents received close to $800 total in solar rebates on 74.99 kW PV installations.

Since 2008, the remaining 65 percent of the renewable energy fund has been used by the Solar Grant Program. This program is designed to improve access to PV and solar thermal systems for homeowners in affordable housing and Boulder-based 501(c)(3) nonprofits by providing financial assistance to cost-effective projects that provide renewable energy and lower energy costs, encourage education, and promote social equity. In 2013, two homeowners and two nonprofits were awarded a total of $52,052 to install PV systems totaling 35.54 kW, which will be completed by September 2014.

Given the changes that have taken place in the solar industry over the last six years and the continuously evolving broader goals of the city regarding climate and energy, research is being undertaken to determine how the program could be altered to improve its effectiveness and better meet community goals. This includes analysis of similar programs and consultation with experts in the solar industry participating in the city's current Solar Working Group. Based on the results of this research and analysis, staff will develop recommendations for program improvements by the end of 2014 with implementation of approved recommendations beginning in the first quarter of 2015.

5. Greenhouse Gas Emissions Inventory

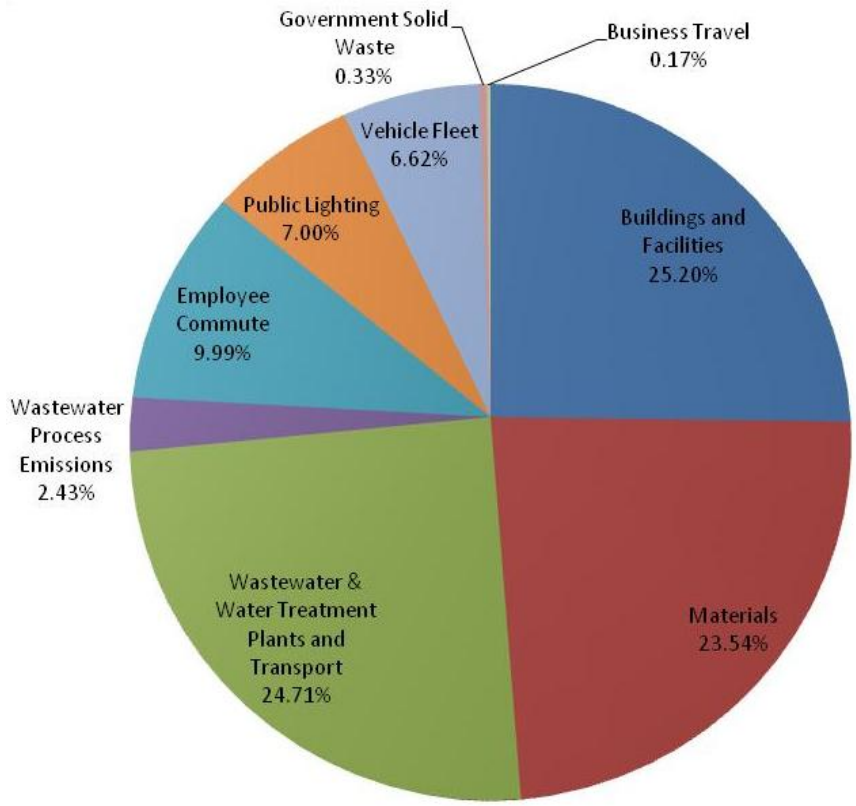
Last year, a new system for data analysis was introduced to the city's sustainability toolbox. Designed and built by SWCA Consultants, this new software tool allows the City of Boulder to conduct greenhouse gas inventories and analysis in-house, rather than contracting to an outside consultant. It also improves upon the sophistication of previous iterations built in Excel. After extensive testing, the new tool was recently used to prepare the 2012 City of Boulder municipal greenhouse gas inventory, results shown below (**Graphic 4**).



Graphic 4: City of Boulder Municipal Greenhouse Gas Emissions

Several changes were made to the municipal inventory with the introduction of the new system. These include updating the carbon emissions factor to reflect Xcel's Colorado energy intensity, updating the eGrid methane and nitrous oxide factors from 2009 to 2012, and the addition of facilities accounts that were not previously tracked in McKinstry Consultants' 2008 and 2011 municipal inventories. While these changes contributed to an increase in the inventoried emissions between 2011 and 2012, the overall trend continues to be downward, thanks in large part to the energy efficiency improvements implemented in city facilities and shifts in the city's vehicle fleet.

As shown in **Graphic 5** below, Buildings and Facilities, Materials and Water/Wastewater Treatment and Transport continue to be the city organization's largest areas of opportunity for emissions reductions.



Graphic 5: 2012 Municipal GHG Inventory Results by Sector

B. New Initiatives

In addition to the energy services Boulder has developed and is currently delivering, the city team is undertaking several new initiatives in 2014/15 that will help advance the community's energy goals as well as further develop the city's expertise and knowledge in energy services. Some important questions that these initiatives will help answer include:

1. How do customers want to receive energy usage data to best inform their choices?
2. Are there ways to create incentives tied to reductions in GHG emissions that harness the entrepreneurial spirit of Boulder and contribute to long-term systemic change?
3. Are there current policies and practices in place that hamper expansion of local distributed generation?

Answering these questions—and new ones that arise on the path to developing a new utility business model—will become increasingly important as the city continues to work toward its goal of creating the "utility of the future," whether that's through municipalization or some form of partnership. Regardless, the city's work in energy services will continue to involve a broad discussion among multiple stakeholders.

In 2014, the city will involve key stakeholders in the following new initiatives:

1. Next-Generation Strategy for Commercial and Industrial Energy Efficiency

In 2013, staff outlined baseline work to inform development of a commercial and industrial energy efficiency strategy, including the results and next steps from the Commercial Energy Rating and Reporting Pilot program, as detailed in the March 19 Information Packet memo. The identified next steps include the following actions:

a) Implement a meaningful voluntary rating and reporting program as part of the expanded and revitalized Partners for A Clean Environment (PACE) program in coordination with overarching climate commitment strategies;
b) Leverage existing EnergySmart advising services for businesses and building owners to make the voluntary rating and reporting system as easy to use as possible; this includes helping businesses access and use the ENERGY STAR Portfolio Manager software tool;
c) Connect with specific industries in the city in coordination with conversations about the possible creation of a local electric utility to identify services that would benefit businesses and help them play a role in achieving the community's energy goals;
d) Continue to collaborate with peer cities, DOE and the Environmental Protection Agency (EPA) to develop tools and resources for more streamlined and standardized implementation of commercial building rating and reporting policies at the local level;
e) Utilize resources from the DOE's Building Technologies Program that is developing a Standard Energy Efficiency Data (SEED) platform. The program offers a software tool that provides a standardized format for collecting, storing and analyzing building energy performance information on large portfolios; and
f) Hire a new Energy Services Manager/Lead Strategist to develop a new leading-edge commercial and industrial energy efficiency strategy, integrated with existing demand-side management programs as well as with planning efforts in the municipalization project.

In addition, other new initiatives, described below, are engaging with businesses and commercial property owners in energy data pilots (through the Community Power Partnership), and engaging Boulder's innovative clean energy businesses in helping design the new Boulder Energy Challenge Grant Program and an integrated solar strategy. These efforts will also inform and potentially intersect with development of a next-generation commercial/industrial energy efficiency strategy.

2. Community Power Partnership

This two-year pilot research project, launched in collaboration with the Pecan Street Research Institute (PSRI) out of Austin, Texas, seeks to use Boulder-based E-Gauge equipment to monitor and provide real-time energy and water usage information to participants in 50 homes and up to 25 small businesses as well as one institutional setting (Fairview High School). Through this initiative, the city will work with participants to understand how customers like to receive and use real-time usage information, better measure the effectiveness of existing programs, and foster both better conservation behaviors and investment in high-impact efficiency improvements.

The Community Power Partnership is designed to begin building a database of circuit-level energy usage data for residential, small business and institutional customers in Boulder. Through PSRI, the city will have the ability to compare and contrast this with data from other communities around the country. The city is most interested in understanding customers' desire for this type of information and to begin to understand its usefulness (to both the customer and the city) for the purposes of:

a) Community climate action planning;
b) Designing communitywide energy products and services;
c) Measuring the effectiveness of existing energy products and services;
d) Increasing energy literacy in the community;
e) Promoting behavior change in terms of energy usage and investment in energy products and services;
f) Engaging youth in the community's climate action efforts; and
g) Interfacing with the BVSD high school sustainability curriculum.

The city also intends to use the aggregated data to align city rebates and incentives, compare deemed savings with actual savings, and create a better data/feedback cycle than is available through surveys and self reporting. BVSD and other participants have expressed a keen interest in identifying opportunities to shift their demand and save money. Because this project will provide real-time usage information to customers for both energy and water, it is the first time the city is testing a unified system for sustainability information. This small pilot project will help inform future efforts to provide integrated utility services, and provide data that will be useful in structuring future utility services in alignment with customer needs.

3. Boulder Energy Challenge Grant Program

The Boulder Energy Challenge, originally called the Market Innovations Grant Program, is designed to invite and stimulate local innovation and create market-driven solutions for reducing greenhouse gas emissions in Boulder.

The Boulder Energy Challenge grant program's focus for the 2014 grant cycle will be on energy efficiency and clean energy related efforts, although other projects that reduce GHG emissions will also be evaluated. Additional background information on this program was included in the July 30, 2013, study session packet.

Program development began in 2013 and continues into 2014. A community working group was formed in early 2014 to assist staff with program development and proposal evaluation. The group consists of the following members:

- Steve Morgan, City of Boulder Environmental Advisory Board
- Bob Lachenmayer, Colorado Clean Energy Cluster
- Eric Gricus, Innovation Center of the Rockies
- Jeff York, CU Leeds School of Business
- Bret Fund, CU Leeds School of Business
- Stacey Simms, McKinstry
- Ann Livingston, Colorado Green Building Guild
- Neal Lurie, Boulder Chamber

The working group has made recommendations to staff about programmatic details, including the scope of the program, funding strategy, application requirements, evaluation criteria,

outreach efforts and more. Members will also assist with the evaluation of submitted proposals; a process that will include a community showcase event with an element of public participation.

The program is expected to launch early in the 2nd quarter of 2014 with approximately $300,000 in Climate Action Plan tax funding. Council will receive an Information Packet with the proposed 2014 program structure prior to launch.

4. Local Solar Strategy

This effort coordinates various solar-related initiatives that are happening across the city organization with a goal of developing a framework for future actions related to increasing solar and other types of local, renewable energy generation. Solar initiatives are being vetted with a community solar working group—including solar experts, industry representatives, and interested residents—that was created in late 2013. The group meets monthly to pursue the following objectives:

a) Analysis of barriers that currently exist to achieving more distributed generation;
b) Development of recommendations to ensure a smooth transition from Xcel to city-operated programs (if municipalization occurs) in a manner that does not adversely impact the customer;
c) Discussion of the role of solar distributed generation in the "utility of the future," either through the creation of a new municipal utility or through products offered by Xcel; and
d) Recommendations for future efforts.

Over the course of meeting, the working group's role has expanded to look more broadly at how to advance solar generation opportunities in Boulder, including potentially updating codes and review processes, increasing education and outreach, updating or creating new incentives, discussing program delivery options as well as possibilities for direct investment.

The Solar Working Group has made some preliminary recommendations related to things the city can do in the near term without requiring creation of a municipal utility. These include:

a) Identifying strategies to reduce soft costs by revising permitting and inspection processes;
b) Investigating the property tax impacts of on-site PV; and
c) Reviewing zoning standards and other related codes and processes related to solar for potential updates and improvements.

In addition, with an eye toward the future, if the city were to own the distribution system and have ratemaking ability, the solar working group has suggested that the city should investigate:

a) On-bill financing;
b) Quantifying the value of solar, including looking at methodologies that effectively consider and balance costs and benefits for solar customers, the utility, non-solar customers and society more generally;
c) Net metering and virtual net metering: Traditional net metering allows consumers to sell back to the grid any excess generated power, including the option to carry forward any net generation to the next billing period. Virtual net metering would be a billing system that could reflect generation somewhere other than on the customer's premise; and

d) Intelligent Grid opportunities: This refers to both the electric network and the communications network which must work together to ensure the continued safe and reliable operation of the system as demands on the grid are expected to increase with variable demand, supply and storage. The system must be set up in a way that is based on the grid of today while fostering the "utility of the future."

The Solar Working Group is currently scheduled to conclude in May. Staff is evaluating whether to continue meeting with this group as currently constituted or to migrate them into broader working groups related to the local electric utility transition, where they could contribute to development of new customer programs and resource planning.

5. Natural Gas Working Group

Another community working group was recently formed to discuss and guide the city on issues surrounding natural gas. Focused primarily on the opportunities and challenges that would face a future municipal utility, the Natural Gas Working Group has identified its 2014 work plan to include:

a) Developing high-level guiding principles for natural gas procurement;
b) Identifying best management practices in the natural gas extraction and procurement industries;
c) Identifying both near-term and long-term goals to make clear the resource mixes that Boulder's electric utility might be transitioning from and moving toward;
d) Outlining a strategy to support development of a natural gas certification process; and
e) Crafting a recommendation to the city for a resource planning process.

V. MUNICIPALIZATION EXPLORATION

To achieve the vision outlined in the introduction of this memo, City Council has directed staff to take the next steps toward creating a municipal electric utility. As outlined in **Table 1**, creating such a municipal electric utility would allow implementation of a wide range of services and strategies that can help move Boulder aggressively toward its energy goals. Over the last two years, staff and community working groups have conducted detailed analyses which included both financial and resource modeling, risk-based probabilistic modeling, and qualitative comparisons as to how well a municipal electric utility would perform in securing the energy future goals and Charter metrics. Based on the outcome of this work, council approved acquiring the assets to create and operate such a utility. To that end, staff has embarked on the next phase of the municipalization exploration project, implementing council's direction.

Preparing to operate an electric utility involves a significant level of work from both consultants and staff in various departments across the city. The goal of this effort is to be prepared, on "Day 1"—the day the city acquires the assets from Xcel—to operate an electric utility. The objective is to ensure the utility is an integral part of the city and leverages existing resources to the extent possible as it delivers on the promise of clean, reliable, and cost-effective electric service.

A. Legal and Regulatory Steps

1. Acquisition

Following up on council's authorization to acquire Xcel's assets for a municipal utility, the city manager sent the Notice of Intent to Acquire to Xcel on Jan. 6, 2014. The city and Xcel negotiators have had a few meetings and negotiations are continuing. These attempts to negotiate the purchase with Xcel are the good-faith negotiations required before the city pursues condemnation to acquire the property. Hopefully the negotiations will be successful and condemnation will not be necessary. If condemnation is necessary, after filing the Petition with the court, it is expected condemnation proceedings would take 15 to 24 months.

2. PUC Appeal

The city has filed an appeal of the rulings of the PUC on Xcel's declaratory judgments. The city's Opening Brief is due in May. The PUC then files a responsive brief, the city has an opportunity to reply, and the court decides the case on the record and the briefs.

3. Transition Plan

Staff issued an RFP at the end of 2013 and hired Power Services to develop a step-by-step work plan to guide the city through a transition to owning and operating an electric utility. The draft work plan will be presented to council on May 13 for discussion. The transition work plan will address everything from power supply acquisition, to operating and maintaining the system, to backroom operations like information technology systems and financing. The work plan will be comprehensive and will include a plan for staffing and outsourcing, along with estimates of key costs to implement. Staff plans to have a public outreach process to get feedback on the plan and establish new working groups to assist in the implementation phase.

4. Governance

Earlier this year, council authorized the reconvening of the Governance Working Group to discuss several issues that have not been addressed pertinent to the formation of a utility advisory board. These included:

- Advisory board appointment process
- Advisory board term limits
- Delegation of powers from council to the advisory board
- Advisory board/staff relationship

Staff has since communicated with the Governance Working Group and advised them that the city anticipates issues related to the city serving customers outside the city limits will be resolved by late 2014 or early 2015, and the city plans to reconvene the Governance Working Group to discuss the above issues at that time.

VI. REGIONAL, NATIONAL AND INTERNATIONAL PARTNERSHIPS

City staff participates in a significant number of regional, national and international collaborations that support the Boulder community's climate and energy goals while sharing and bringing back lessons learned. Generally, the determination to participate is based on the following guidance:

1. Likelihood that the collaboration will help achieve Boulder's climate and energy goals;
2. Ability to exchange practical lessons learned to support other communities' energy and climate goals;
3. The collaboration addresses immediate programmatic concerns;
4. The collaboration requires staff time or resources proportionate to the expected outcome;
5. Availability of the staff member(s) best positioned to participate meaningfully.

Attachment C summarizes activities from late 2013 and those scheduled for the first quarter of 2014. Subject to council feedback, staff will be providing an update in this format as part of information packets each quarter.

VII. NEXT STEPS

Energy Services and "Utility of the Future:" How We Get To There from Here

1. Define the city's commercial and industrial energy efficiency strategy through an inclusive process of engagement with property owners, businesses and local energy experts, including refinement and expansion of related energy services, upon hiring a new Energy Services Program Manager/Lead Strategist.
2. Continue to refine and support delivery of EnergySmart services to achieve annual targets and support SmartRegs implementation.
3. Complete a community greenhouse gas inventory (planned for completion in 2014), assuming data issues around the acquisition of community electricity and natural gas usage can be resolved.
4. Update council on outcomes of Solar and Natural Gas working groups.
5. Apply lessons learned from the Community Power Partnership and Boulder Energy Challenge Grant Program in planning 2015 priorities, and to inform program design and delivery.
6. Refine "utility of the future" vision and consolidate community energy-related goals through a public process.
7. Use "utility of the future" vision to establish criteria, metrics, and a timeline for prioritizing new initiatives and pilot projects that support energy services development.
8. Apply "utility of the future" vision to functional areas of the municipal utility transition plan (such as ratemaking, customer service, and operations), identifying where best practices can be incorporated and where additional research and piloting may be required.

Municipalization

1. Proceed with condemnation and regulatory filings 2nd and 3rd quarter.
2. Develop budget and finalize transition work plan:
    a. Present draft plan to City Council in May;
    b. Community engagement process for envisioning the "utility of the future" incorporating the city's climate commitment goals in May/June;
    c. Form transition plan working groups and initiate public outreach to support development of the transition plan in May/June; and

   d. Present final work plan in June.
3. Implement the transition plan beginning the 2nd quarter of 2014.

VIII. ATTACHMENTS

A. Boulder's Energy Future Goals and Objectives
B. The Cadmus Report
C. Regional and National Partnerships

Boulder's Energy Future

Purpose, Framework, Goals and Objectives

Purpose of the Energy Future Project

In 2011, the city will collect, analyze and present data related to its energy options to inform a potential decision by Council and the community regarding alternative paths for the city's energy future. The purpose of this effort is *to ensure that residents, businesses and institutions have access to reliable energy that is increasingly clean and remains competitively priced.*

Strategic Framework: Energy Localization

To guide this planning effort, and in response to initial input from residents and businesses regarding Boulder's energy future, the city is adopting an **"energy localization"** framework that is defined by three primary goals:

- **Democratize Energy Decision Making:** customers should have more direct control and involvement in decisions about their energy, including opportunities to invest in their long-term energy needs and to have a say in energy investments made on their behalf.

- **Decentralize Energy Generation and Management:** energy should be generated locally or within the region to the maximum extent feasible, reducing reliance on external fuel sources; customers should be able to manage and reduce their energy use as directly and effectively as possible; and energy service companies should be empowered to compete and innovate within a diverse and robust local energy economy.

- **Decarbonize the Energy Supply:** renewable and clean fuel sources should be maximized as much as possible, as quickly as possible, minimizing both short- and long-term environmental impacts and maximizing energy independence over time.

Goals and Objectives

The purpose statement and strategic framework provide the basis for defining and evaluating energy options based on the community's vision and values. The options that Boulder will consider include a new agreement with Xcel Energy (in the form of a new franchise or a new form of partnership) or formation of a municipal utility. There may also be hybrid options that emerge over the course of the planning process.

The following goals and objectives serve to "unpack" the purpose statement and localization strategy into discrete, tangible outcomes important to Boulder. These will serve as draft evaluative criteria as the project goes forward, to guide development of proposals and the ultimate evaluation of options. They will be refined as additional analysis is completed and discussions with Council and the community progress.

Goal Area 1 Ensure a stable, safe and reliable energy supply

Objective 1a: System Management, Maintenance and Customer Care
Provide experienced and professional management of the local utility grid, including ongoing investment in maintenance and system improvement, and a

strong customer service ethic in responding to emergencies, daily maintenance and long-term grid investment.

Objective 1b: System Redundancy, Supply Quality and Load Management
Achieve high resilience in the energy system through redundancy management[1]; create and maintain generation resources that provide a high quality electrical supply; and manage the peak load through effective demand-side programs to minimize necessary investment in new generation resources.

Objective 1c: Fuel Source Stability
Reduce reliance on external and/or unreliable fuel sources that may be subject to supply shortages, price volatility and/or unmanageable levels of intermittency; take into account potential fuel supply risks and disruptions; and provide suitable mechanisms to manage such risks.

Objective 1d: System Reliability
Model and ensure system reliability using industry standard criteria: Customer Average Interruption Duration Index (CAIDI), Customer Average Interruption Frequency Index (CAIFI), System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI).

Goal Area 2 Ensure competitive rates, balancing short-term and long-term interests

Objective 2a: *Rate Competitiveness*
Offer Boulder customers competitive pricing or customized pricing and services options; position Boulder ratepayers to benefit from competitive energy rates and greater choice of service options and suppliers.

Objective 2b: Rate Transparency and Predictability
Position Boulder residents and businesses to receive predictable energy prices; and provide a structure and process for continuous rate management to meet the changing needs of the community; ensure transparency and fairness in the charges that are included in energy rates and in the evaluation of fuel cost price risks.

Objective 2c: Technology Investment and Managing Price Volatility
Create renewable energy investment opportunities for Boulder residents and businesses, ensuring access to the associated benefits; reduce, to the extent possible, exposure to market-based price fluctuations and the potential impact of changes to current regulations and subsidies; and minimize the risk from potential future carbon costs and other environmental regulations on pollutants such as mercury, particulates, NOX, SOX, etc.

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[1] Redundancy focuses on important system design issues, such as identifying and eliminating single points of failure and establishing good maintenance procedures to maintain high availability.

Goal Area 3 **Significantly reduce carbon emissions and pollutants to improve environmental quality**

Objective 3a: Reduction of Greenhouse Gas Emissions
Consider all environmental and health costs of the associated fuel mix; maximize utilization of the least carbon intensive fuel sources; support local development of new, innovative "carbon-free" and pollution-reducing technologies; and provide the ability to accurately predict and set specific future targets for emission reductions based on demand-side efforts and fuel source mix along with the flexibility to continually decarbonize Boulder's fuel mix over time.

Objective 3b: Reduction of Toxic Pollutants
Reduce other pollutants such as mercury, particulates and various nitrous and sulfurous emissions; and consider the full range of environmental and health risks and costs associated with the fuel mix.

Goal Area 4 **Provide Boulder energy customers with a greater say about their energy supply**

Objective 4a: Democratizing Local Decision Making
Allow Boulder residents and businesses to have greater control over their energy resources by influencing which power and heat generation facilities are built in the Boulder region as well as resource planning and procurement; involve local workers and businesses in local energy decision-making; and create opportunities for local input and decision making about rates, generation mix, efficiency and demand management efforts, distributed generation, and implementation of innovative technologies.

Objective 4b: Democratizing Local Ownership
Create new opportunities for local ownership in distributed energy generation through innovative program designs (clean energy clusters, zero energy districts, solar gardens, etc) and new forms of financing vehicles (general improvement districts, PPAs, third party models, innovative rate design, revenue bond financing, on-bill and PACE financing, etc).

Goal Area 5 **Promote local economic vitality**

Objective 5a: Support for Local Business Innovation
Maximize opportunities to partner with local companies to implement innovative energy saving and pollution-reduction technologies; reduce financial out-flows to purchase fuel and technology from external sources; and allow local businesses to become part of the local energy supply infrastructure.

Objective 5b: Economic Competitiveness
Stimulate Boulder's economic competitiveness by ensuring stable and predictable energy rates; make Boulder an attractive location for clean energy businesses and start-ups; capitalize on the proximity of Boulder's university and Federal research laboratories and other private sector and institutional partners;

and provide incentives and benefits for clean energy clusters and innovative energy start-up companies.

Goal Area 6 **Promote social and environmental justice**

Objective 6a: Energy Equity
Provide programs and incentives for all populations to participate in efficiency programs and distributed generation through efforts such as Community Solar Gardens, on-bill financing and greater customer choice among energy products within the rate structure.
.

Objective 6b: Impacts to Vulnerable Populations
Shelter Boulder citizens from projected short and long-term rate increases through fuel supply choices and demand-side programs; provide additional resources for affordable housing and multi-family units; optimize local energy-related employment opportunities; and consider the full range of social impacts of energy generation, transmission and distribution, including jobs created or lost and health risks to energy workers.

Objective 6c: Energy Literacy
Help communicate the links between personal choices, community choices and environmental and economic impacts; provide assistance to understand energy conservation and efficiency measures and their impact on economic concerns; support neighborhood energy planning; and advance the community's "energy literacy," including an overall understanding of energy efficiency, renewable generation and workforce development.

Recommendations for Boulder's Residential Energy-Efficiency Program

September 15, 2013

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CADMUS

Executive Summary

On behalf of the City of Boulder, Cadmus conducted research to identify a strategy to facilitate the continued sustainability and financial viability of EnergySmart and SmartRegs over the next four years. Cadmus assessed several big-picture issues associated with program implementation, particularly focusing on identifying barriers to EnergySmart program participation and SmartRegs compliance as well as identifying strategy recommendations aimed at increasing adoption of energy efficient measures.

Cadmus conducted both secondary research (i.e., literature review) and primary data collection, including:

- Staff and stakeholder interviews
- Interviews with participant and nonparticipant landlords
- Participant and partial-participant surveys
- Nonparticipant/general population surveys

Cadmus' analyzed this data to draw conclusions using methods such as benchmarking, analysis of survey frequencies and interview results, and an assessment of budget and spending allocations.

Summary of Findings

With a 74% conversion rate, EnergySmart is a successful, well-designed program that has served more than 1,300 City residents. With only two and one-half years' delivery history, the EnergySmart program enjoys awareness levels nearing 50% and SmartRegs awareness is estimated at nearly 100%. The SmartRegs program achieved steady compliance levels in the first two years, with participation slowing only recently in 2013. A summary of key findings and recommendations follows.

Market Barriers and Motivators

Cadmus' research revealed that while financial barriers play a significant role in both EnergySmart and SmartRegs participants' adoption of energy-efficiency upgrades, the market may bear a slightly higher cost for EnergySmart assessments. Key findings are:

- While many respondents indicated cost is a predominant market barrier for both programs, supplementing available incentives may not be an effective way to drive sustained action.
- There are no common customer characteristics that indicate some segments may be more likely to participate than others.
- Financing, although available, is not a driving force behind participation.
- Technical assistance provided by EnergySmart Energy advisors is a critical factor in driving customer action.
- Trade allies are a valuable asset to EnergySmart and SmartRegs, and can be further leveraged to increase participation.

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Marketing and Outreach

The City's marketing approach is appropriate for its audiences and effective, with about 45% of the target population demonstrating some awareness of EnergySmart, and nearly all the landlords we interviewed aware of SmartRegs. However, an awareness gap remains for EnergySmart. Furthermore, as the City's compliance deadline nears, it will become particularly important for SmartRegs to overcome a general lack of urgency associated with compliance and emphasize resources available to help landlords.

- The EnergySmart and SmartRegs marketing strategies rely on appropriate channels and tactics, but consistent deployment is needed to maintain momentum.
- While the City's marketing approach is consistent with best practices, a refined messaging strategy and adjustments to resource allocation priorities could help increase awareness.

Allocation of Funding

Given the distortions created by co-funding with multiple entities and the overlap between EnergySmart and SmartRegs, Cadmus was not able to draw definitive conclusions regarding budget allocations. However, based on available data, the costs for both programs are in line with typical per participant costs. The SmartRegs regulatory compliance deadline makes it a resource allocation priority for the City.

- A lack of detailed budget tracking does not allow for an in-depth assessment of cost metrics.
- At the current funding levels, SmartRegs can remain economically viable and achieve its goals within the compliance deadline. However, EnergySmart funding at current levels is not sufficient to achieve the City's goals within 15 years.

Program Design and Delivery

With a 74% overall conversion rate, EnergySmart is a successful, well-designed program. The technical support provided by Energy Advisors to participants in both programs is likely a key factor in driving market adoption of energy efficient measures. However the City does not fully leverage appropriate trade allies and other program partners for promotion and to capture non-energy benefits.

- Technical assistance provided by EnergySmart Energy Advisors is a critical factor in driving customer action.
- Trade allies are a valuable asset to EnergySmart and SmartRegs, and can be further leveraged to increase participation.

Recommendations

Based on its analysis of existing program operations and activities, Cadmus developed the following recommendations to help the City reach its programmatic goals.

Marketing and Outreach

- Focus on increasing word of mouth promotion between friends, family and co-workers.
- Revise marketing messages to highlight the financial benefits of EnergySmart.

- Explore local partnership opportunities for promotion.
- Capitalize on participant satisfaction.
- Utilize rental license inspectors as SmartRegs marketers, targeting non-compliant landlords and landlords due for renewal by 2015.
- Use messaging to create a sense of urgency and seriousness for SmartRegs.
- Publish SmartRegs case studies online.

Allocation of Funding

- Develop a detailed annual budget and track all program spending.
- Prioritize SmartRegs for funding allocation.
- Adopt a 15-year EnergySmart goal with interim five-year goals and one-year targets.
- Maintain funding for Energy Advisor services, for both EnergySmart and SmartRegs customers.
- Eliminate or reduce the subsidy for EnergySmart assessments.
- Offer a lower cost participation option for EnergySmart.
- Limit incentives to short term promotional events and consider bonus incentives to encourage deep energy savings.
- Maintain investment in marketing.
- Explore new funding sources to supplement the existing budget.

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Introduction

On behalf of the City of Boulder (City), Cadmus conducted an appraisal of various aspects of the EnergySmart and SmartRegs programs. The purpose of this effort was to obtain information on three City-defined research areas, as this information would be used to develop recommendations that would support the programs' long-term sustainability and ability to meet their specified goals.

To obtain data for the three primary research areas, Cadmus used various methods considered to be industry best practices. This report provides an overview of our findings regarding each program's performance associated with a range of attributes such as:

- Program design,
- Delivery and implementation features,
- Marketing strategy,
- Funding allocations, and
- Customer participation characteristics.

Research Objectives

The City's primary objective associated with this research was the identification of a strategy to maintain the programs' financial viability and achieve their goals over the next four-year program cycle. To facilitate the continued sustainability of the EnergySmart and SmartRegs programs, Cadmus assessed several big-picture issues associated with the program implementation, and these issues served as our primary areas of research:

- Research Area 1: Work within the existing industry to identify barriers to energy-efficiency implementation in the residential sector.
- Research Area 2: Identify barriers preventing rental-property owners from reaching SmartRegs compliance.
- Research Area 3: Identify and document viable strategies for market adoption of residential energy-efficiency services and support that leverage existing industry resources.

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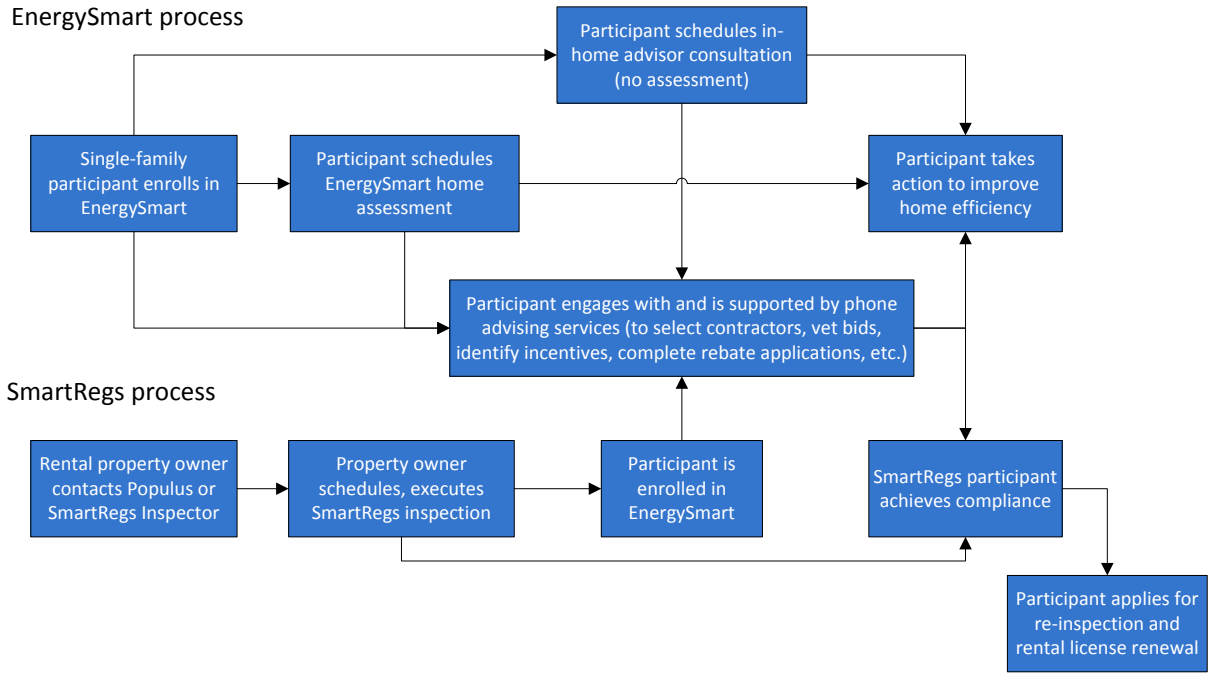
Program Operations and Delivery Strategies

As shown in Figure 1, the City's EnergySmart and SmartRegs programs are designed to work in concert to address the needs of both the single-family and rental property markets in Boulder.

Figure 1. EnergySmart and SmartRegs Process Flow



EnergySmart

EnergySmart is a collaborative program between Boulder County, the City of Boulder, the City of Longmont, and Xcel Energy. The program provides Boulder county residents with two primary benefits: (1) the opportunity to identify and address energy saving opportunities in their homes; and (2) incentives and low-interest loans to offset the initial cost of installing energy-efficient upgrades.

The City supplements the basic program funding, which is provided by the County. The parties jointly fund activities such as marketing and outreach; however, they have separate outreach staffs and program managers. Both parties contract independently with the primary implementer, Populus Sustainable Design Consulting (Populus), which provides home energy assessment and advisor staff and maintains the SmartRegs hotline. (SmartRegs is discussed in detail in the next section.) Populus also subcontracts with local auditors who have attended program orientation training.

All installation contractors currently participating in Xcel Energy's Trade Ally program are eligible to assist residents obtain Energy loans and refer participants for Energy Advisor services. Additionally, on the EnergySmart website, the City provides a list of trade allies who meet more restrictive qualifications

specified by the County.[1] The qualifications for inclusion on the website are: (1) submitting the Contractor Partnership application, which has limited enrollment; (2) being listed on Xcel Energy's Home Performance with ENERGYSTAR® (HPwES) contractor list[2]; and (3) obtaining appropriate certification, as shown in Table 1.

Table 1. City Installation Contractor Requirements

Contractor Type	Certification Required[3]
All	BPI Envelope
	BPI Building Analyst
	BPI Whole House Air Leakage Control
Heating and Water Heating	BPI Heating
	NATE Gas Furnace
Air Conditioning	NATE Air Conditioning
	ASHP
Ground Source Heat Pump	NATE Ground Source Heat Pump
Solar PV	NABCEP Solar PV Installer
Solar Thermal	NABCEP Solar Thermal Installer

To ensure program efforts are not duplicated and to provide complementary approaches, key staff members from the County, the City (both Boulder and Longmont), and Populus attend weekly program management meetings. These meetings are a venue for discussions on marketing and outreach efforts, changes to incentive amounts, and other key programmatic issues.

EnergySmart provides City of Boulder residents with the following services.

- **Home Energy Assessment (cost: $90-$135)[4]:** This assessment provides in-home diagnostic testing to identify energy-saving opportunities; installation of free energy- and water-saving equipment; a comprehensive personalized report highlighting recommendations to improve the home's energy use; assistance with evaluating project bids from installation contractors; and help in finding and applying for relevant rebates and financial incentives.

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1 http://www.energysmartyes.com/

2 Allows contractors to leverage access to Xcel Energy's HPwES rebates.

3 Having certification is required of at least one manager on staff per participating company,

4 During our review, the cost per assessment was reported to range from $90 to $135, depending on occasional promotions. At the time of this report, the stated cost on the EnergySmart website is $135; however, it was listed as regularly $120 on the City of Boulder website (https://bouldercolorado.gov/climate/energy-efficiency-for-residents).

- **In-Home Advisor Consultation Only (cost: $50)[5]:** During an in-home visit by an advisor, customers receive installation of free energy- and water-saving equipment; assistance with evaluating project bids from installation contractors; and help in finding and applying for relevant rebates and financial incentives.[6]
- **Phone Advisor Consultation (Free):** Phone advisors answer energy-related questions regarding home energy use and possible savings opportunities; help identifying installation contractors; and support finding and applying for relevant rebates, financial incentives, and low-interest financing.
- **Rebates:** The City's Climate Action Plan (CAP) tax funds a number of rebates available to residents who install recommended energy-efficiency upgrades. City residents may also take advantage of rebates provided by Boulder County (EnergySmart rebates) and Xcel Energy.

SmartRegs

SmartRegs establishes baseline energy-efficiency standards for existing rental housing in Boulder, which comprises over half of the housing stock in the City. In September 2010, the City Council approved the ordinance, with the goal of contributing to community greenhouse gas reduction objectives in the hard-to-reach rental housing sector. To receive or renew a rental license, property owners must achieve compliance with the new energy-efficiency standard by January 2, 2019.

The eight-year implementation period allows rental property owners to achieve voluntary compliance over time. During the first three years of this period (2011-2013), local, state, and federal funding was—and continues to be—available to property owners to decrease the cost of installing the energy-efficiency upgrades needed to achieve compliance. Property owners may also utilize the incentives offered by EnergySmart program as well as the Energy Advisors to facilitate compliance.

Rental property owners can achieve SmartRegs compliance through two pathways:

- ***The Performance Path*** requires that the property achieve a Home Energy Rating System (HERS) score of 120 or less[7], as measured through a test performed by a Residential Energy Services Network (RESNET)-certified rater.
- ***The Prescriptive Path*** requires property owners to achieve a score of 100 (or more) on the SmartRegs checklist (created by the City) and achieve two mandatory water-conservation

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5 Cost for this service was increased from $30 to $50 as a result of a decrease in County grant funding during Q2 of 2013.

6 Does not include the Home Energy Assessment or recommendations report.

7 On the HERS index, a lower score indicates a more efficient building.

points. Property owners must hire a Class "G" inspector[8] (as designated by the City) perform a baseline inspection and any follow-up inspections needed to verify compliance.

Property owners may use Energy Advisor support and incentives to help them comply with the SmartRegs Prescriptive Path. EnergySmart offers the same services to rental property owners that they provide to owner-occupied residences, which includes dedicated Energy Advisors who assist property owners to:

- Understand the SmartRegs process;
- Schedule inspectors;
- Develop a compliance strategy based on baseline inspection results;
- Identify incentives;
- Track compliance documents; and
- Contact contractors for bids.

When SmartRegs was first rolled out at the beginning of 2011, the City contracted with Populus to conduct intensive outreach to rental property owners, property managers, and inspectors. Populus invited landlords to attend one of several demonstration inspections and conducted educational sessions on SmartRegs requirements and process at Boulder community centers that were well-attended. While the education effort is less intensive today, Populus still has a staff dedicated to providing advice and training inspectors.

[8] Inspectors who possess a Class "G" license from the City of Boulder have been trained and certified as Rental Energy Efficiency Inspectors. Some of these inspectors also do baseline and renewal rental license inspections. As of August 2013 there are 17 G-licensed inspectors.

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Research and Analysis Methodology

To assess the performance of the EnergySmart and SmartRegs programs in the three primary research areas, Cadmus developed a series of questions that guided data collection and analysis activities. For each question, we identified specific data-collection activities, performance metrics, and/or an analysis methodology for measuring outcomes.

Data Collection Activities

To collect data for this project, Cadmus performed secondary research, conducted participant and nonparticipant surveys, and interviewed a variety of stakeholders.

Secondary Research

Cadmus conducted secondary research and reviewed the program materials listed in Table 2.

Table 2. Program Materials Review

Document Reviewed	Purpose of Review
2Techs and a Truck Implementation Plan	Sources of funding, marketing strategy, implementation process overview
Populus Energy Assessment Report	Energy assessment process and the information available to customers
EnergySmart Corrections Notice example	QC background
EnergySmart and DEC Contractor QC process	QC background
QC Checklist with Point Deductions	QC background
EnergySmart Org Chart City & County	Roles background
EnergySmart Org Chart Populus	Roles background
SmartRegs Business Process flow	Program process background
Populus SmartRegs EnergySmart Workflow	Program process background
Local Environmental Action Division (LEAD) residential Outreach Plan (2012)	Marketing background
SmartRegs Marketing Plan	Marketing background
Residential Energy Efficiency Communications Plan	Marketing background
Dan Estey Monthly reports	Marketing background
EnergySmart Program Progress Review 2012, (Navigant)	History of program, milestones
City of Boulder Climate Action Plan Analysis Report: Final Report for the City of Boulder (RMI)	Background, climate action targets
2011-2013 (2013 to date and 2013 planned) Budget Breakdown	Budget allocation analysis
Populus City of Boulder 2013 Contract Budget Summary	Budget allocation analysis
Participation Count 2011-2013 To Date: EnergySmart and SmartRegs	Participation including measure level analysis
Reported Energy Savings: EnergySmart (inclusive of SmartRegs)	Energy savings analysis
List of SmartRegs Nonparticipants	Informed calculation to estimate cost per year to bring all units to compliance by 2019
EnergySmart upgrades complete and non-complete	Sample for EnergySmart surveys
County survey	Inform EnergySmart baseline survey

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Program and Implementation Staff Interviews

Cadmus conducted interviews with a range of City staff, key staff from the City's implementation firm (Populus), and other program stakeholders regarding:

- Program design considerations,
- Basic program implementation and delivery details,
- Performance,
- Customer characteristics, and
- Market nuances.

For this effort, we developed customized interview guides for each category of program staff and stakeholder. Then, we conducted in-person and telephone interviews of approximately one hour each. The table below summarizes the interviews we conducted.

Table 3. Interviews Conducted

Interviews	Number of Participants	Participant Role(s)
City Program Staff	4	Program management and oversight; coordination with internal and external stakeholders; compliance review; and strategic planning
Implementation Staff	2	Program management and oversight of Energy Advisors and subcontractors; coordination with internal and external stakeholders; inspector training and mentoring
Energy Advisors	4	Assistance to EnergySmart and SmartRegs participants
Inspectors	2	Inspect rental properties to establish SmartRegs baseline and assess compliance
County Staff	1	Program management, oversight, and coordination

Our interviews with program stakeholders were designed to gather key information associated with the research areas identified for this project. Interviews covered the following topic areas, as appropriate:

- Roles and responsibilities,
- Program marketing and support,
- Program partnerships, and
- Budget allocation.

Landlord Interviews

Cadmus conducted brief telephone interviews with three types of landlords: (1) those who achieved compliance with the SmartRegs ordinance; (2) those who completed a baseline SmartRegs inspection but were not yet compliant; and (3) nonparticipants. Our interviews included landlords who participated in EnergySmart and those who achieved compliance outside the EnergySmart program.

Our work plan called for the completion of 18 participant landlord interviews. The City provided us with a list of all properties with active rental licenses, which totaled 11,105 addresses. From this sample, we

filtered out SmartRegs participants and then selected a random sample of 40 nonparticipants. Also, at the request of the City, Populus provided us with a useable sample of 22 landlord participants. Table 4 lists the landlord interviews we conducted.

Table 4. SmartRegs Interviews

Interview Subjects	Number of completed interviews
SmartRegs participants: Fully Compliant*	6
SmartRegs participants: Partially Compliant**	9
Nonparticipant landlords	9

Notes: three landlords from the sample refused to participate and we were unable to coordinate a convenient time to conduct interviews with four participating landlords.

*Three of the six respondents have both fully compliant and partially compliant properties.

**These have started but have not yet completed the SmartRegs compliance process

Our interviews with landlords were designed to gather information on topics associated with the research areas identified for this project:

- Motivations for pursuing SmartRegs inspection and compliance before the 2019 deadline;
- Rental property characteristics;
- Satisfaction with the process of obtaining baseline inspection, understanding the results, collecting contractor bids, and selecting contractors, and achieving compliance;
- Sources of information about the SmartRegs ordinance and steps to achieve compliance; and
- Importance of energy advising services and rebates.

Surveys

To enhance our assessment of the EnergySmart program, we worked with a survey research firm to complete three separate residential surveys:

- **Full participants**, defined as single-family homeowners who participated in an EnergySmart assessment and installed at least one recommended efficiency measure through the program.
- **Partial participants**, defined as single-family homeowners who participated in an EnergySmart assessment, but did not install any recommended efficiency measures through the program.
- **Nonparticipants/General Population**, defined as nonparticipants in EnergySmart.

Working with Populus, we identified samples of full and partial participants for each survey. For the nonparticipant survey, we worked with an outside survey research firm to identify a sample from the general population within Boulder County. Table 5 lists the survey samples and results.

Table 5. EnergySmart Sample Design and Results

Survey	Sample Design	Completions
Full participants	70	175
Partial participants	70	73
Nonparticipants	70	269

For each survey, we designed a custom survey instrument for collecting the information needed to analyze the EnergySmart program's performance.

Participant and Partial Participant Surveys

The participant and partial participant surveys focused on the following key topics:

- Customer price sensitivity associated with program costs and equipment installation costs;
- Types of financial and technical support customers find most valuable;
- Awareness of, interest in, and use of financings support;
- Market barriers and the effectiveness of marketing to address barriers;
- Most effective marketing channels/customers' preferred outreach methods;
- Trade ally involvement in program promotion and customer education; and
- The program's value to customers.

Nonparticipant/General Population Surveys

For the nonparticipant/general population survey, we modified the baseline survey that Cadmus developed and conducted in January 2011 on behalf of the City of Boulder and Boulder County. The design of the original survey focused on gathering general information related to program awareness, satisfaction, customer demographics, and price sensitivity. By replicating the 2011 baseline survey, we were able to analyze changes and identify trends in the Boulder market. The results helped shape our conclusions regarding general program delivery components and the most relevant ways in which the City conducts marketing and outreach.

In addition to asking the original baseline survey questions, we gathered data about these topic areas, which are directly relevant to our analysis of barriers and our development of strategies to increase market penetration for the EnergySmart program and for energy efficiency in general:

- Barriers to program participation and the adoption of efficiency measures
- Price sensitivity associated with program costs
- Decision making factors around investment in energy efficient equipment

Analysis Methods

Cadmus' conducted benchmarking, budget analysis, and survey analysis of the research results.

Benchmarking

To provide context for the programs' performance on specific metrics, Cadmus gathered comparative data from similar programs in other jurisdictions, where appropriate and available. To gather comparative data on the identified metrics and program features, we drew from our proprietary benchmarking database, which contains information on hundreds of utility energy-efficiency programs, and secondary research.

We frequently use benchmarked data to provide both comparisons to similar programs and context for achievements and results. Benchmarking data is most useful when comparative programs have similar program design and market characteristics, particularly with regard to metrics that are most susceptible to fluctuations based on small variances. Thus, in our analysis of EnergySmart, we largely drew on comprehensive residential energy assessment and retrofit programs (such as Home Performance with ENERGY STAR®) that were sponsored by both utilities and cities and that contained similar basic design elements.

However, the SmartRegs program is unique in terms of its regulatory and compliance approach. Thus, for certain metrics, we used utility multifamily energy-efficiency programs as a proxy for SmartRegs' broader rental housing target market, but those programs did not provide a useful comparison in all metrics due to their lack of a regulatory driver or because of differences in either program design or target market.

Budget Analysis

The City provided Cadmus a cost breakdown by activity/task for EnergySmart and SmartRegs for 2011, 2012, 2013 (January to the end of July), and total planned budget for 2013. The budget grouped each task into one of four categories (which were confirmed by City staff): Implementation, Administration, Marketing and Education, and Incentives. See Table 6 for the definition of each budget category.

Table 6. Budget Category Definitions

Budget Category	Definition
Implementation	On the ground program support, such as inspections
Administration	On-going program support, such as application processing
Marketing and Education	Outreach efforts
Incentives	Incentives offered

We used the budgets to determine the allocation of each budget category as a percentage of total program expenditures for the program years we assessed. To support budget projections given current resource levels—and to develop future spending scenarios for long-term strategic planning—we also analyzed program spending on the basis of cost per participant and cost of savings.

Survey Analysis

For each question, Cadmus tallied the survey responses from participants, partial participants, and nonparticipants. Where appropriate, we also sorted results by household income level to show comparative results for each category of program involvement. In addition, to understand changes in program awareness, attitudes, and customer demographics over time, we compared nonparticipant survey data against the results from the nonparticipant baseline survey conducted in 2011.

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Research Results and Analysis

This section contains the results of Cadmus' findings and analysis of the EnergySmart and SmartRegs programs associated with the City's three research areas. For each research area, we identified key topics of investigation and developed questions to guide our investigation.

EnergySmart

The Cadmus assessment of the EnergySmart program largely drew on data and information gathered for Research Area 1 and Research Area 3.

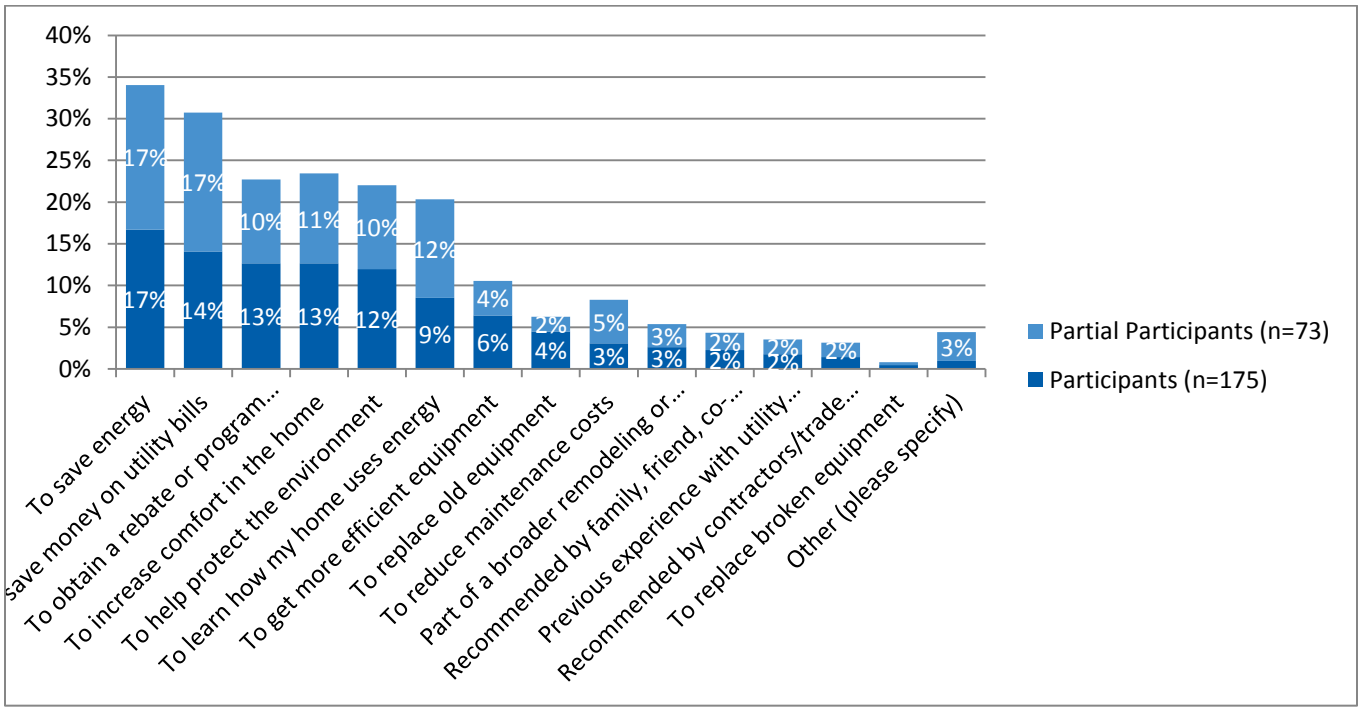
Research Area 1: Market Barriers

Why do some homeowners move forward with upgrades and others do not?

To assess Research Area 1, Cadmus conducted residential surveys that focused on identifying motivations for participating and factors that might foster greater follow-through. In addition, we looked at potential barriers to installing recommended energy efficiency measures.

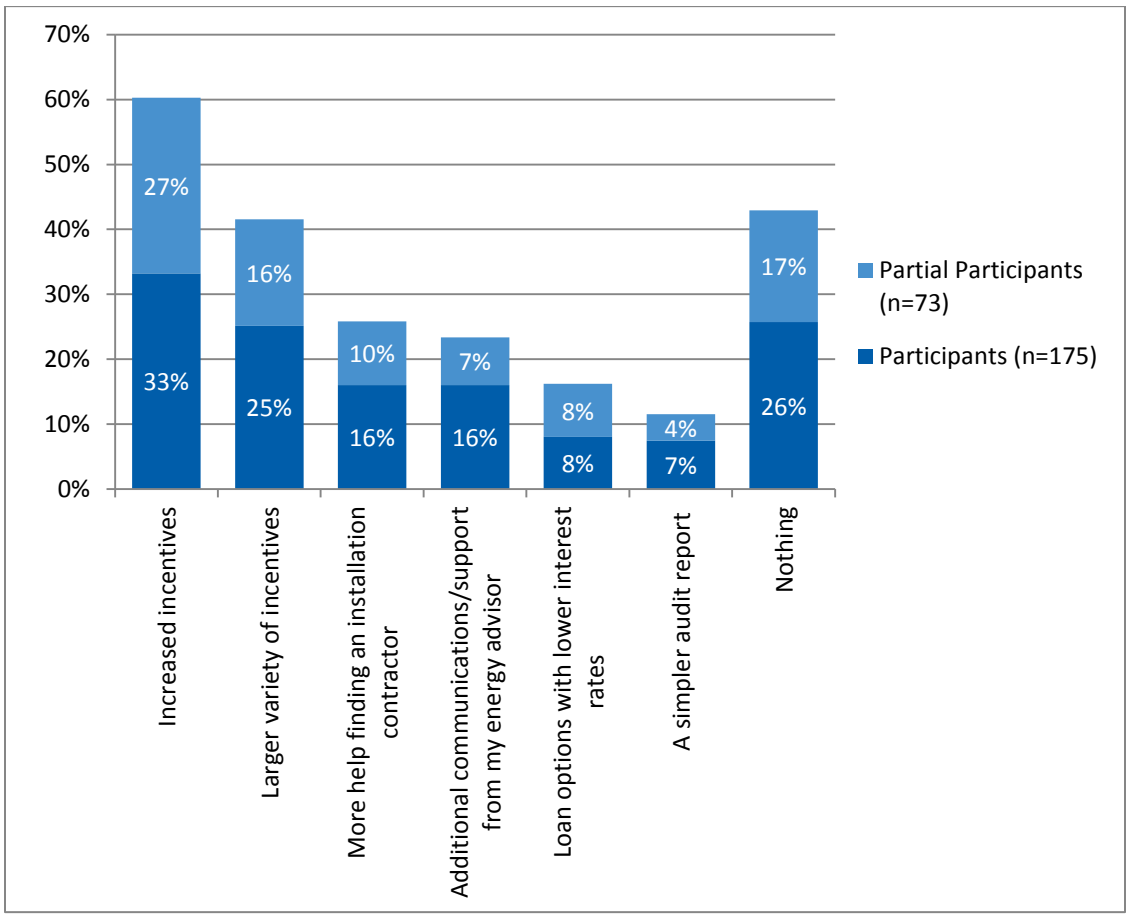
Respondents reported that the primary motivation to engage in the EnergySmart program was to save energy. As shown in Figure 2, the opportunity to save money on utility bills was equally important to partial participants and nearly as important for participants.

Figure 2. Motivations for Participation in EnergySmart



Respondents were also asked what would encourage them to complete recommended measures.[9] They indicated that incentives—both increased amounts and a larger variety—would encourage them to adopt more measures. However, as Figure 3 shows, the second largest factor respondents reported was "nothing." As this question was asked of all survey respondents, regardless of whether they had installed measures, "nothing" could include respondents ranging from those who perceived that the program met all of their needs to those who thought there was nothing the program could do to convert them from partial to full participation. Without further research, we cannot specifically comment on why this segment of the population is unable or unwilling to take action.

Figure 3. Support Required for Increasing the Installation of Recommended Measures

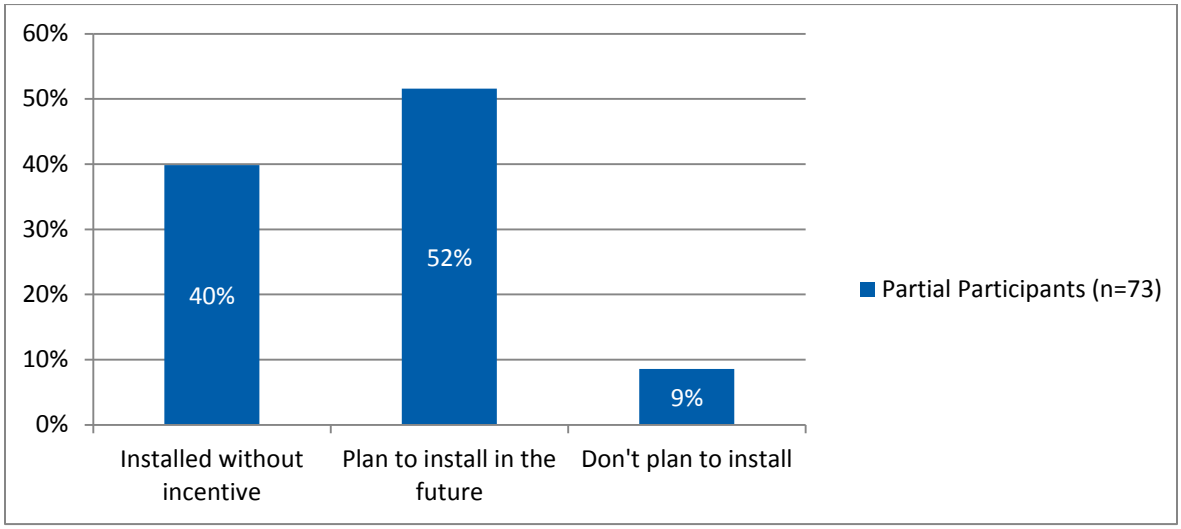


It is also important to note that assessment participants took action outside the program or intend to take action as a result of their participation. As Figure 4 shows, 40% of partial participants reported they installed recommended measures, although they did not receive a rebate through the EnergySmart

[9] In the case of participant who had already completed at least one recommended measure, the question was what might encourage them to complete all recommended measures.

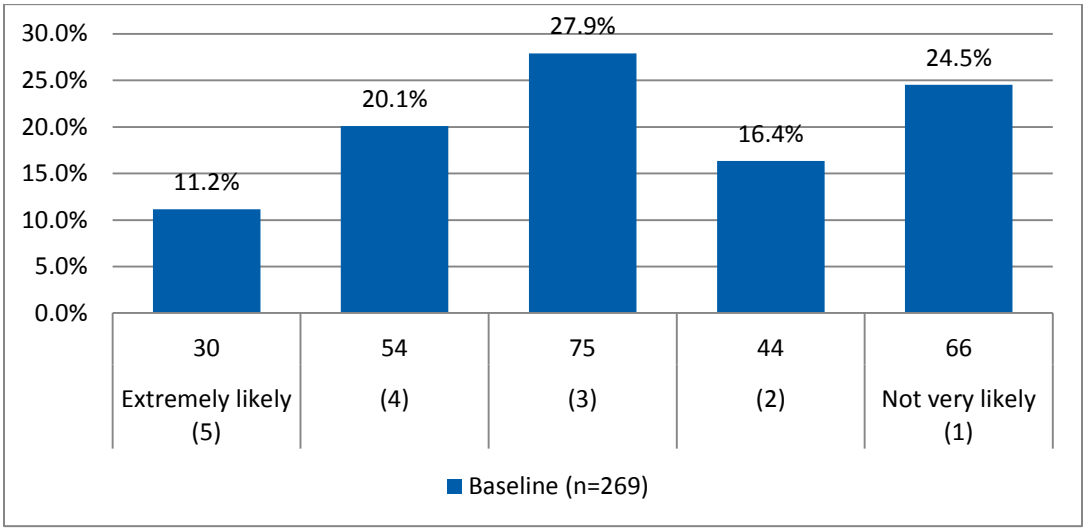
program.[10] Another 52% of respondents indicated that they plan to install recommended measures in the future. (Note that multiple responses were allowed.)

Figure 4. Partial Participant Likelihood of Future Energy Efficiency Investments*



This finding is not surprising, given that partial participants have indicated a willingness to engage in energy-efficiency by participating in an EnergySmart assessment. We compared this finding to nonparticipant (baseline) survey results, in which 31% of respondents reported they were either extremely likely somewhat likely to invest in an improvement in the next 12 months (Figure 5). Although the response scales in the 2011 and 2013 surveys are not consistent (and, therefore, do not provide strictly comparative results), we note a greater commitment to installing measures in the future among partial participants than nonparticipants in the baseline survey.

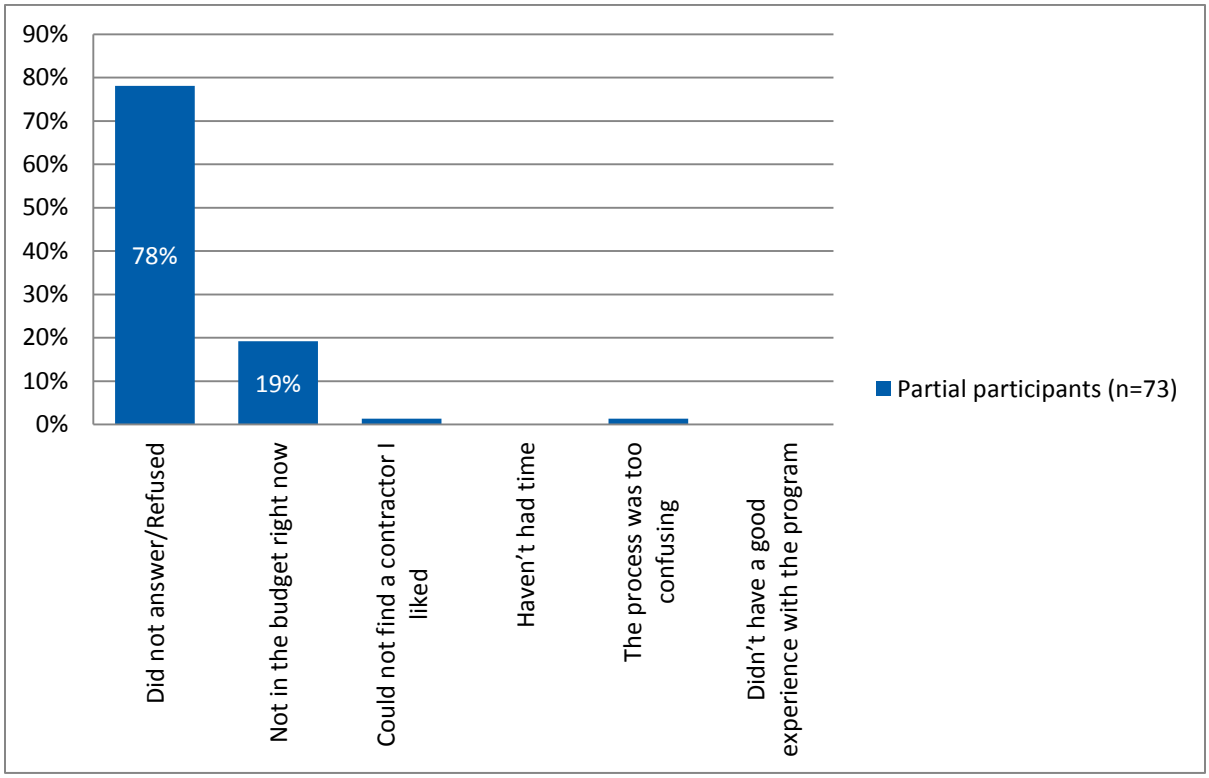
Figure 5. Baseline Likelihood of Future Energy-Efficiency Investments



[10] Installations included self-installs as well as those performed by a non-program or EnergySmart contractor.

To obtain a better understanding of the barriers to installing recommended measures, we asked partial participants about factors impacting their decision not to install measures. While a large majority of survey respondents chose not to answer the question, the majority of those who responded indicated that the cost of upgrades was their primary barrier, as shown in Figure 6. As this represents only 16 respondents, the finding is not statistically significant. Interestingly, the high percentage of refusals may correlate to the numerous partial participants who indicated that they had installed measures outside the program or plan to install recommended measures at a later date.

Figure 6. Barriers to Installing Recommended Upgrades



Through our data collection activities, we assessed the degree to which these common market barriers and participation barriers could affect the EnergySmart program's performance:

- Economic (costs and financing)
- Availability of skilled technical support
- Awareness
- Satisfaction

Our findings relative to each of these areas of investigation are described here.

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Economic Barriers

Do available incentives meet market needs?

To assess the impact of incentives on program participation, Cadmus analyzed survey responses regarding participants' price sensitivity to program costs. The following figures show survey responses from both participant groups regarding their cost to participate in an EnergySmart assessment and the amount they would be willing to pay for equivalent services.

As shown in Figure 7, the majority of respondents said they paid between $100 and $200 for their home energy assessment; however, more than a third of both participant groups reported that they paid under $100. These lower costs are likely due to auditor discounts or limited time promotions.

Figure 7. Cost Per Assessment

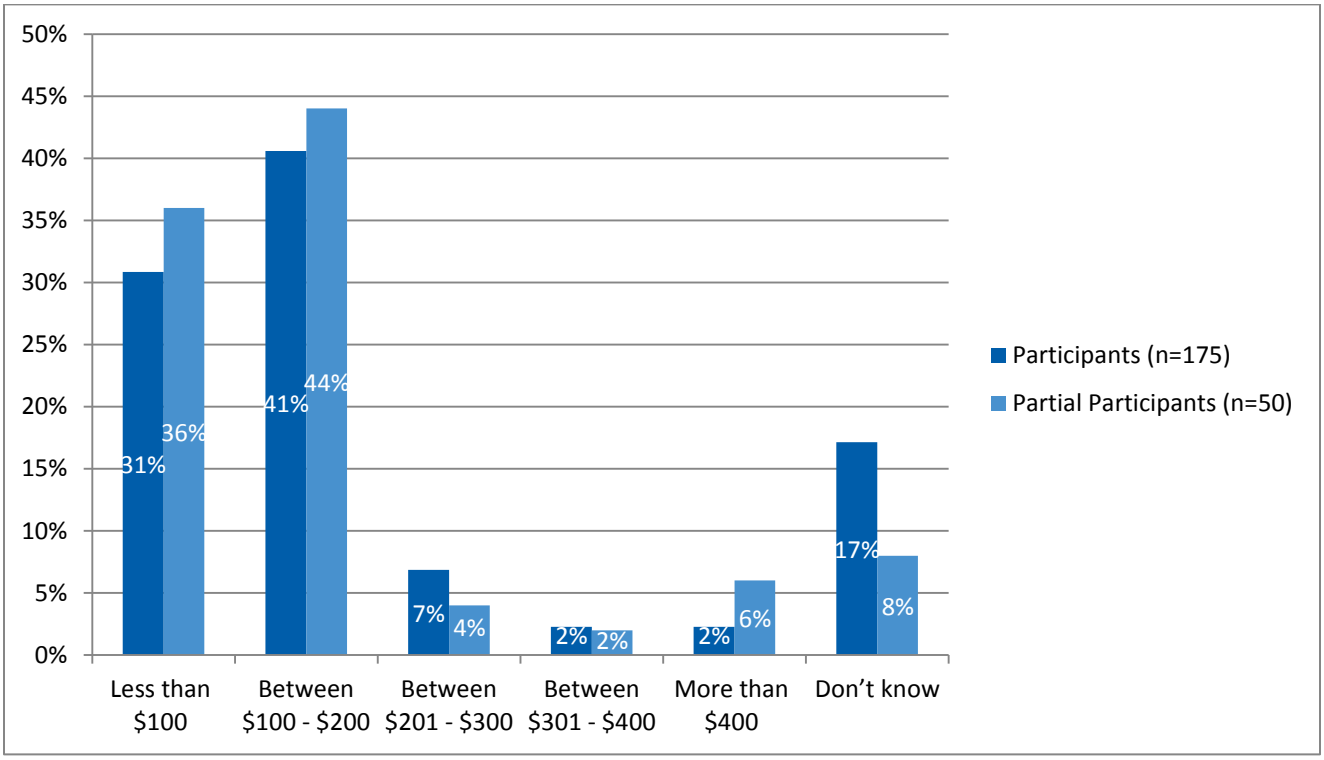
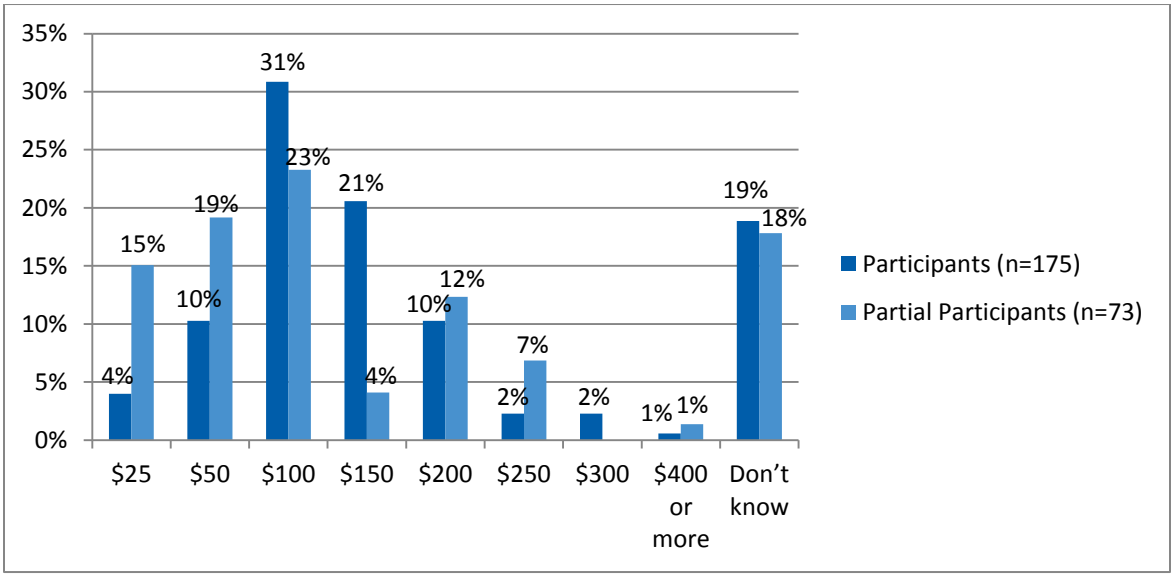


Figure 8 shows the respondents' reported willingness to pay for an EnergySmart assessment.[11] Approximately one-third of participants (31%) and just under one-quarter of partial participants (23%) said they would pay $100 for the services. Although five times as many participants (21%) reported a higher cost threshold ($150) than partial participants (4%), very few respondents indicated a willingness to pay market rates.

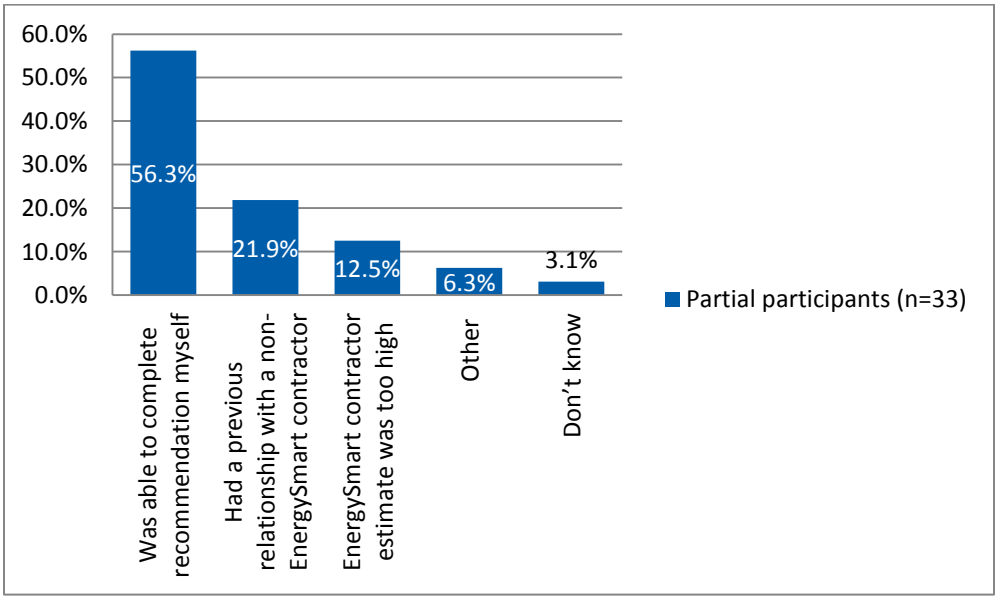
[11] This assumes no subsidy.

Figure 8. Willingness to Pay for Assessment Services



To assess the importance of incentives, Cadmus asked partial participants who installed recommended measures without leveraging program incentives, what factors led them to take action outside the program. Fifty-six percent reported they had installed the measures themselves and about 22% said they installed measures using a non-EnergySmart affiliated contractor (Figure 9).

Figure 9. Partial Participants Who Installed Measures



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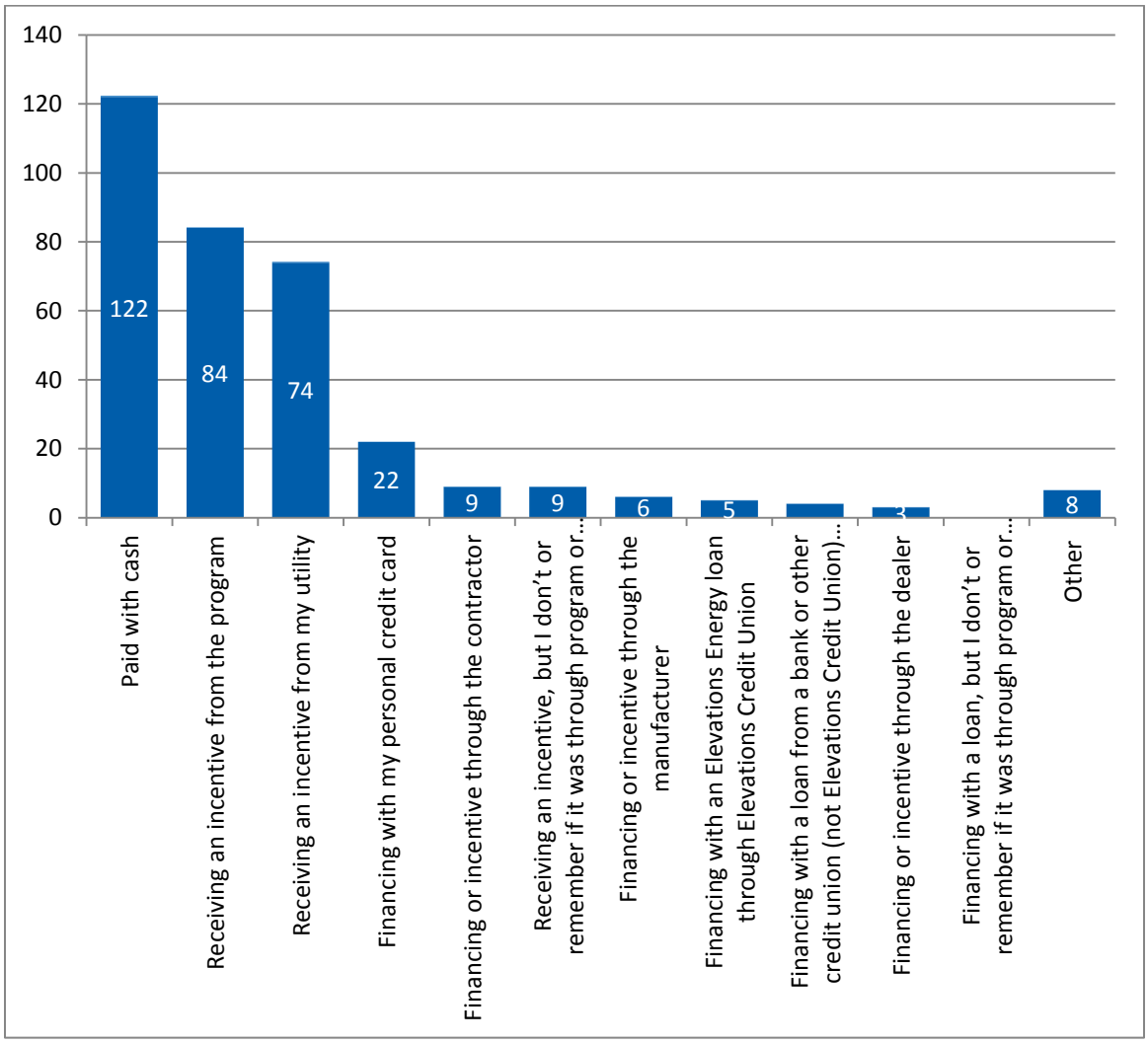
Does available financing meet market needs?

Cadmus analyzed survey responses regarding participants' use of and interest in financing and their awareness of financing options available through the program. As shown in Figure 10, of the 175 EnergySmart participants:

- 122 paid with cash;
- 84 reported using EnergySmart incentives , and
- 74 reported using a utility incentive.

Figure 10. Equipment Payment (n=175)



The predominant form of financing reported was self-financing with personal credit cards (22). Only five respondents said they used the Elevations Energy Loan. Of these five, all rated their satisfaction with the terms of the loan as "very satisfied" or "somewhat satisfied." When asked how they learned about the loan, four cited their EnergySmart advisor or auditor and one cited their installation contractor.

When participants were asked why they were not interested in a loan,

- The majority (134) said they did not need it.
- 10 respondents said they did not want to go through the process
- 1 said he did not have a good experience with the program.
- Of the 19 "other" responses, most said they did not want to take on debt when they had the cash, while one said the Elevations HELOC as a better fit, and one reported using a Boulder County loan.[12]

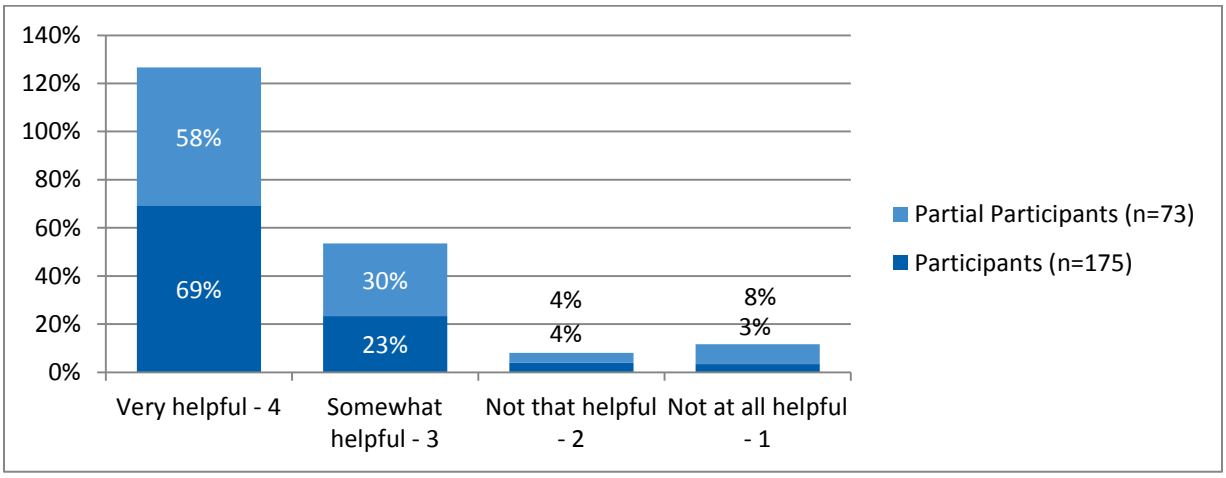
Availability of Skilled Technical Support

Do customers receive adequate technical assistance to facilitate decision-making and support to achieve desired results?

To assess whether the level of technical support is adequate to achieve program goals, Cadmus analyzed survey results regarding the perceived helpfulness of the Energy Advisors. We disaggregated the data based on the use of the EnergySmart Energy Advisors by both participants and partial participants and reviewed the conversion rates for these two groups.

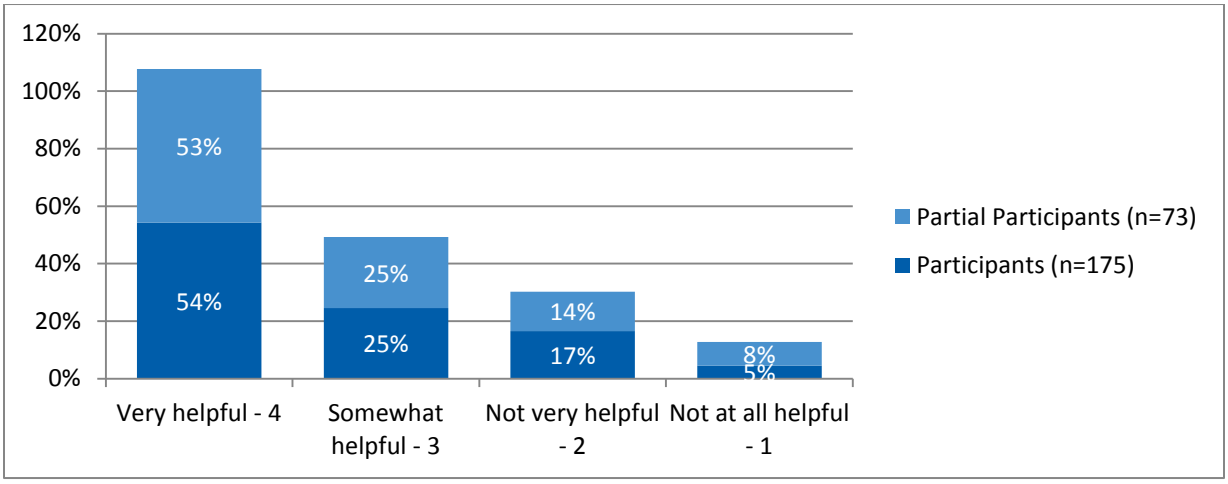
As shown in Figure 11, a majority of the participants (92%) and partial participants (88%) reported that the Energy Advisor was very helpful or somewhat helpful during the assessment. Respondents reported only slightly lower results regarding the Advisors' helpfulness after the assessment (Figure 12).

Figure 11. Helpfulness of Energy Advisor during Assessment



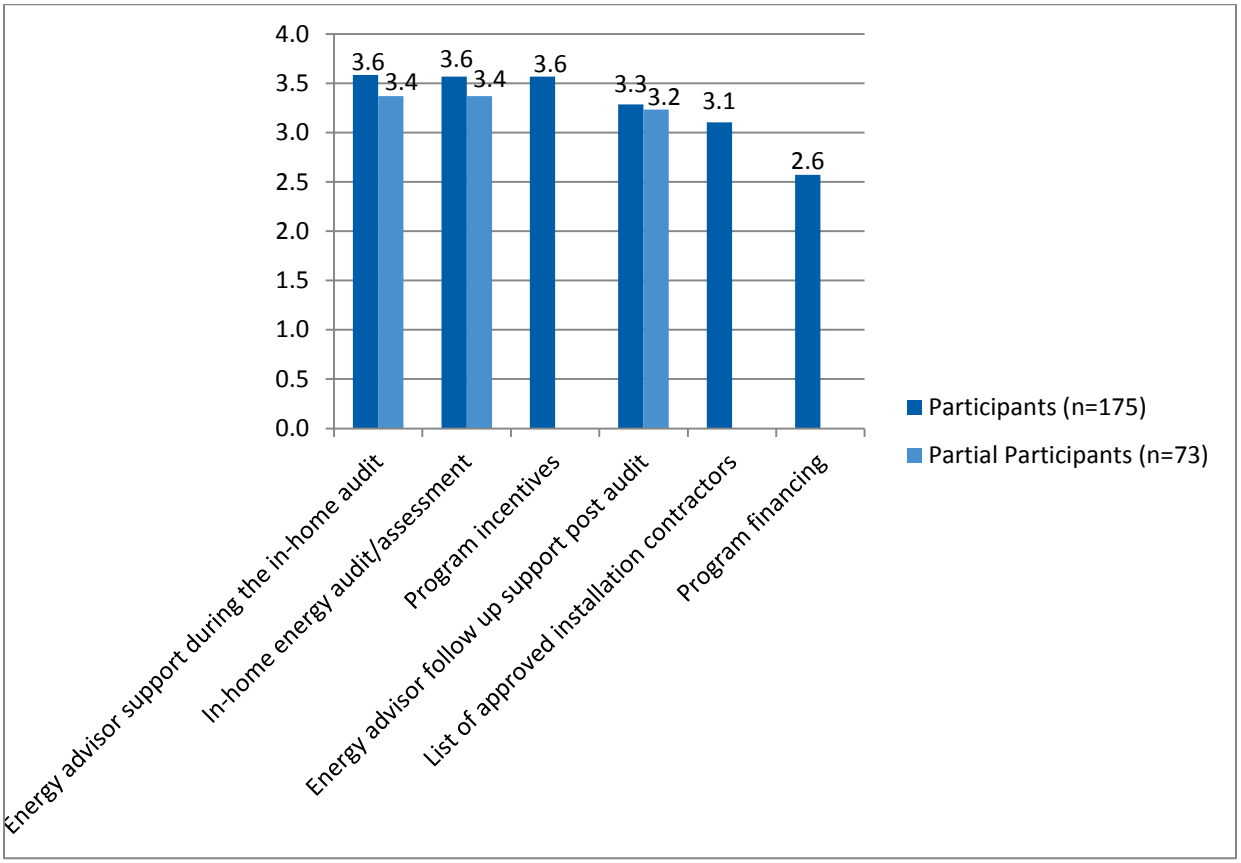
[12] Five respondents skipped this question and five answered, "don't know."

Figure 12. Helpfulness of Energy Advisor Post Assessment



As shown in Figure 13, when asked to rank EnergySmart services on a scale from not helpful to very helpful, EnergySmart's technical support was highly valued by both participants and partial participants.

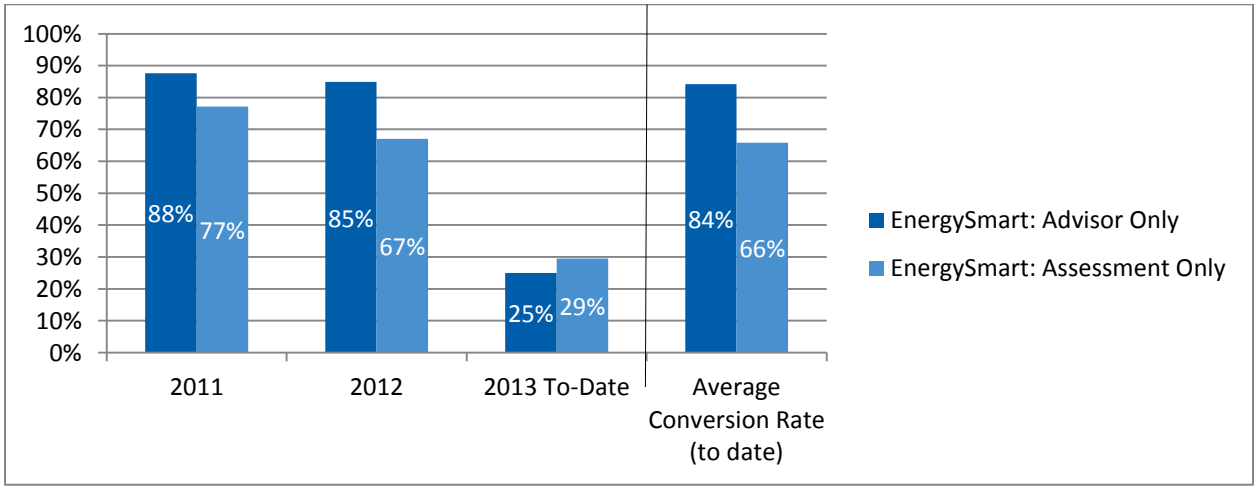
Figure 13. Service Ranking



As an indication of the impact of Energy Advisor support on the conversion rate, Cadmus compared the likelihood of investment in energy-efficiency measures by participants who received Energy Advisor

support to those who did not. While both participants and partial participants gave similar satisfaction scores to the Energy Advisor service and assessment (Figure 13), the support provided by EnergySmart advisors results in a higher conversion rate. Specifically, 84% of participants who only engaged in the program through the Energy Advisor subsequently installed recommended measures; however, only 77% of those only receiving the EnergySmart assessment subsequently installed measures (Figure 14). We note that the program overall achieved a 74% conversion rate; this is very high in comparison to utility residential assessment programs, particularly when compared to the Home Performance with ENERGY STAR model, and is indicative of a well-designed program that offers a high level of technical support.

Figure 14. Conversion Rate by Support Type



Awareness

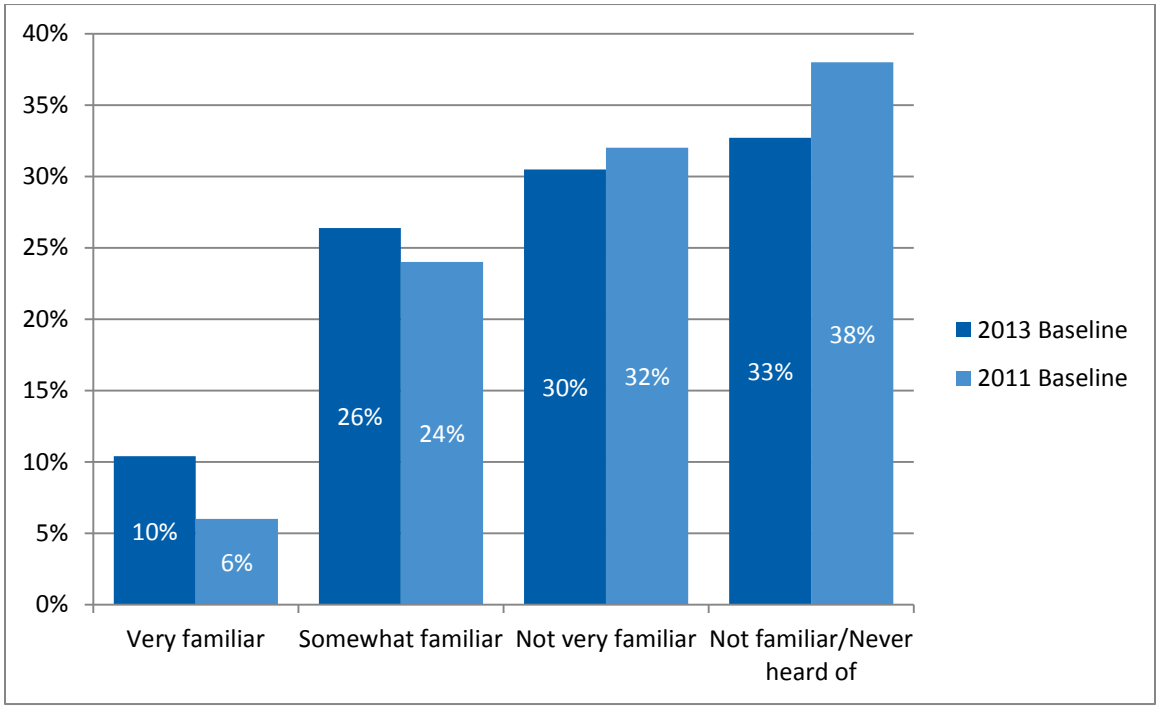
Does the program's marketing strategy align with customer needs and participant potential?

To aid the development of effective marketing strategies, Cadmus assessed survey responses regarding how participants first heard of EnergySmart and participant motivations for making improvements. We also conducted a nonparticipant survey from a cross-section of Boulder residents regarding their awareness of the EnergySmart program. We then compared 2013 nonparticipant awareness to findings from the 2011 baseline survey.

Familiarity with the EnergySmart program and services increased from 2011 to 2013. In the 2011 survey, 38% of respondents reported they had never heard of the program, as compared to 33% in 2013. However, there is still room to increase program awareness; because less than 50% said they were either very familiar or somewhat familiar (Figure 15).[13]

[13] Surveys were given in January of 2011 and in August of 2013.

Figure 15. Baseline Familiarity with EnergySmart Services

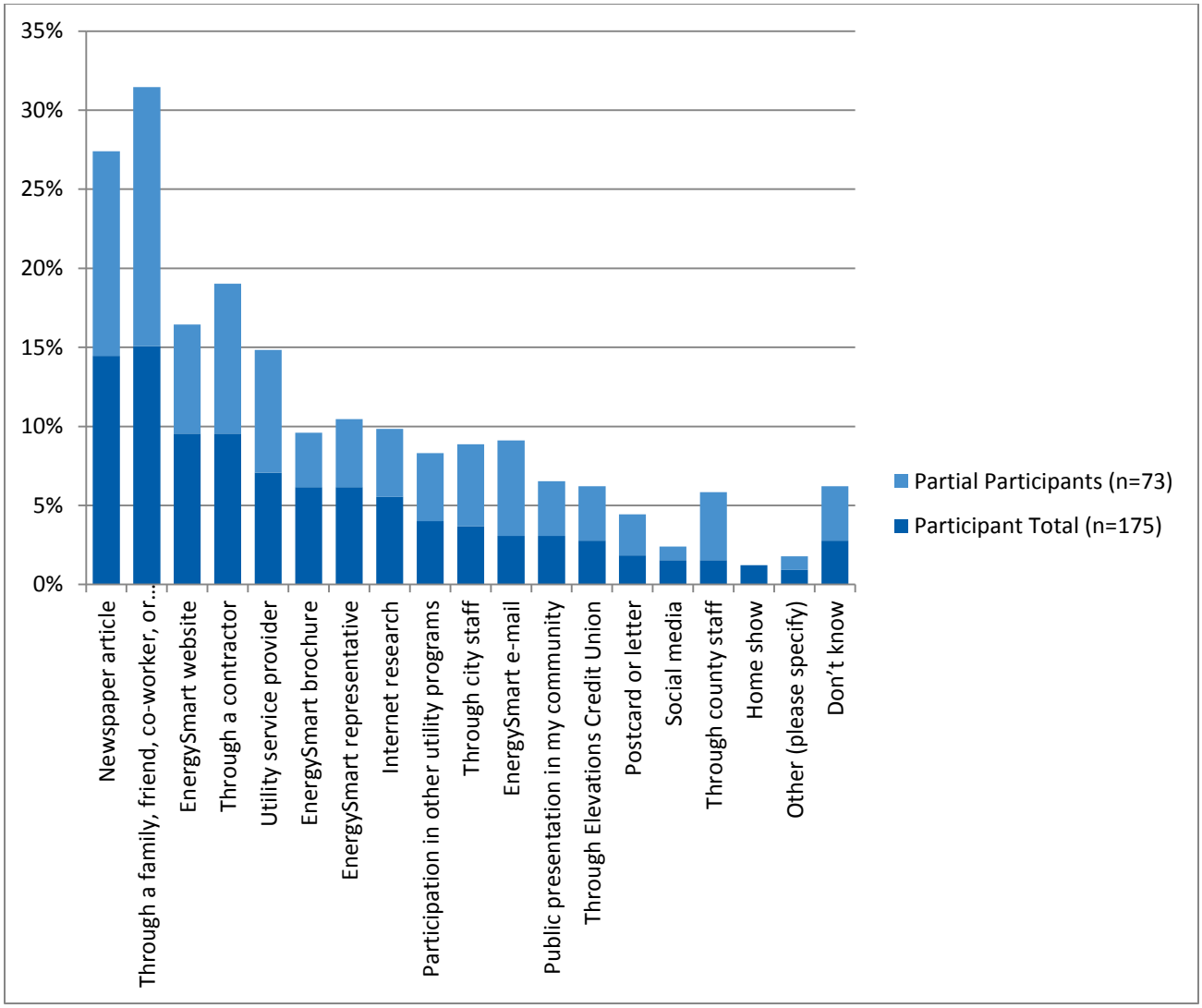


The survey responses regarding how participants learned of the program revealed that friends, family, or co-workers were the primary sources of information for 15%, while newspaper articles were the primary resource for 14% (see Figure 16). The next two most-common sources (each mentioned by 10% of participants) were contractors and the program website.

Among partial participants, 16% reported learning about the program through friends, family, or co-workers, and 13% referred to a newspaper article. Partial participants were also somewhat more influenced by contractors (9%) than by the program website (7%).[14]

[14] The "other" category included yard signs, the Farmer's Market, and realtors.

Figure 16. First Heard About EnergySmart

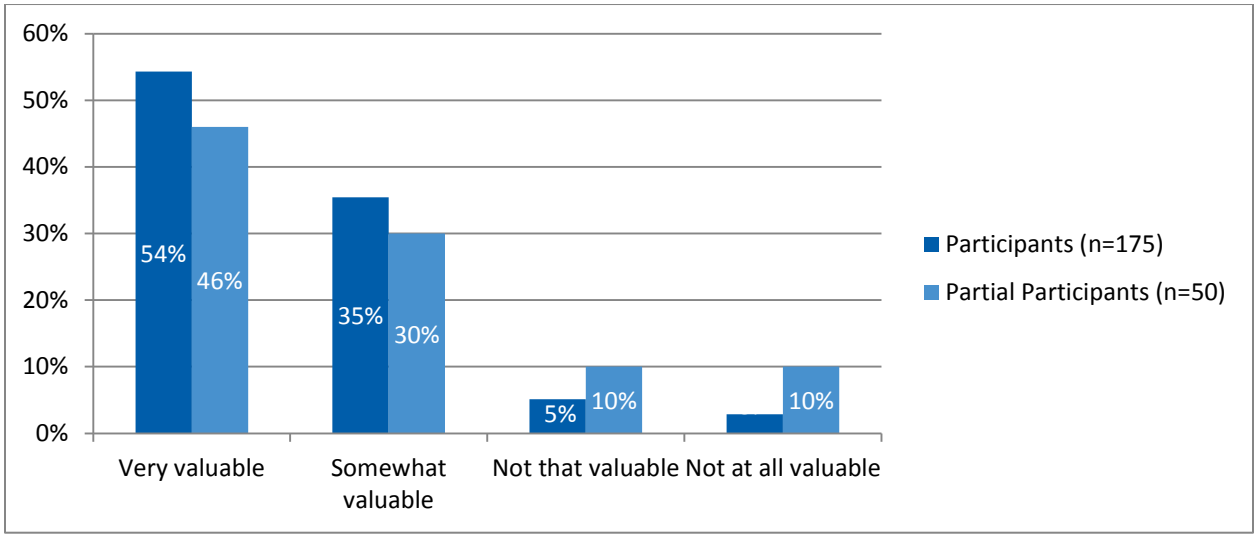


Satisfaction

How satisfied are EnergySmart participants and partial participants with the program overall and with various aspects of the program delivery process?

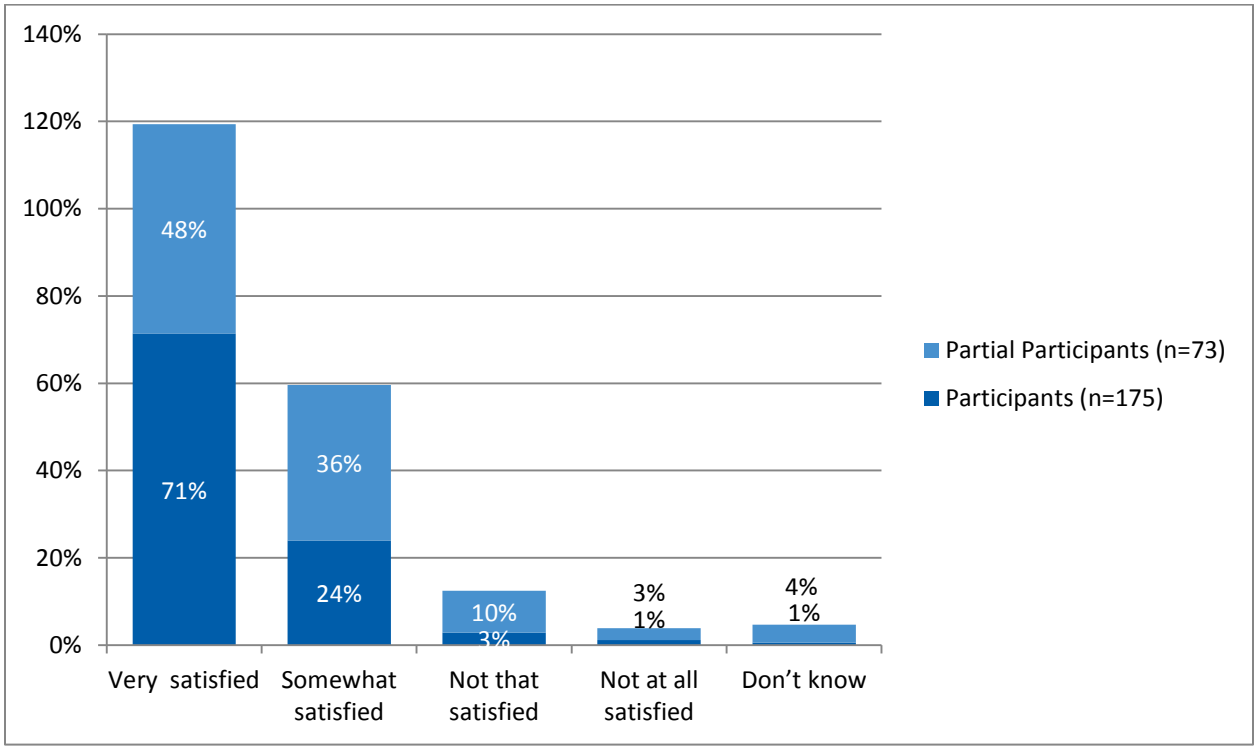
Cadmus compared the results of both the participant and partial-participant surveys to assess: (1) satisfaction with the sign-up process and incentives, and (2) to learn whether respondents would recommend the program to others. We also looked for significant differences between the perceptions of each group as to the program's value. As shown in Figure 17, over half of the participants (54%) and nearly half (46%) of the partial participants said the home energy assessment was very valuable. Among both groups, approximately one-third said the assessment was somewhat valuable.

Figure 17. Perceived Value of Assessment



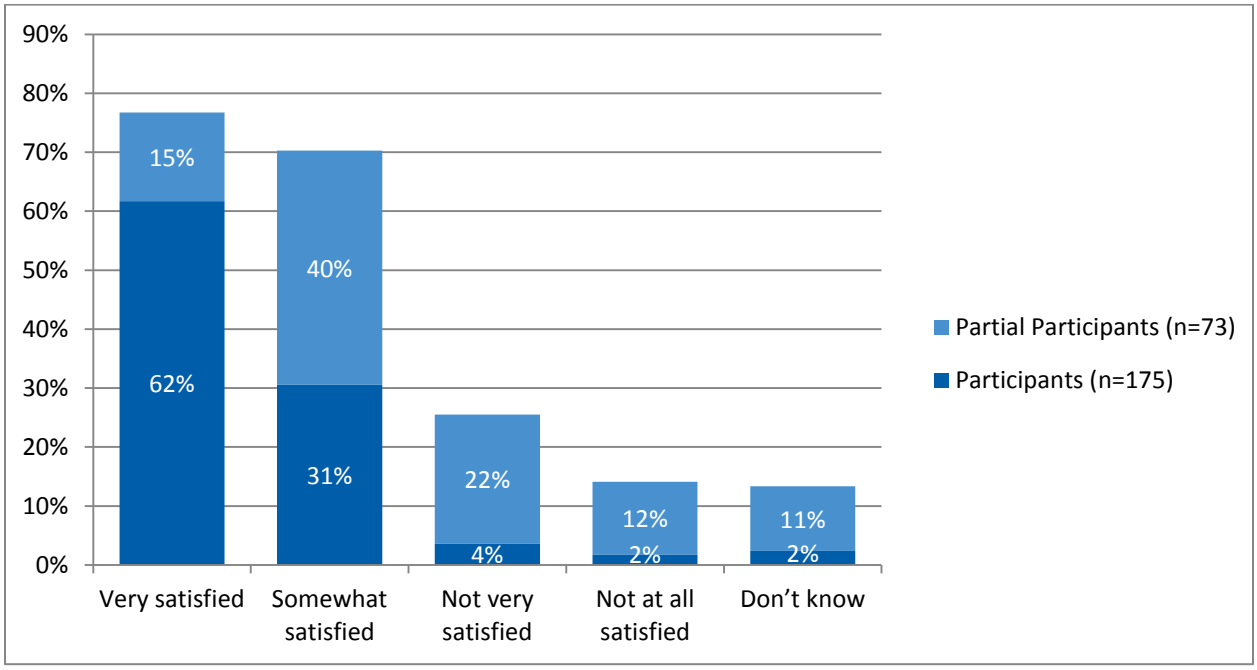
The majority of participants (71%) and nearly half of the partial participants (48%) reported they were very satisfied with the sign-up process for the energy assessment (Figure 18). Of the nine partial participants who expressed frustration with the program, all said that they had either been confused regarding an aspect of the program process or that they needed more assistance in finding a contractor.

Figure 18. Satisfaction with EnergySmart Sign-Up Process



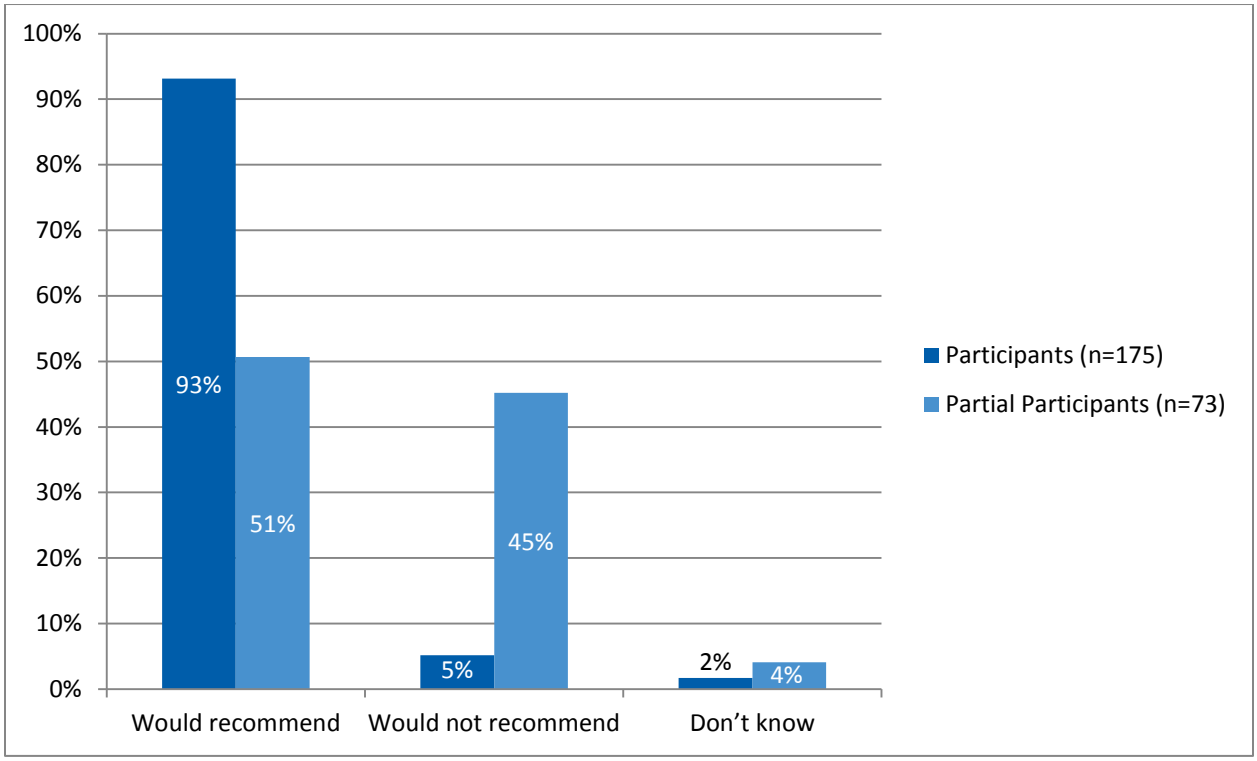
Regarding the incentives received through the program, 62% of participants said they were very satisfied, while only 15% of partial participants gave the same rating (see Figure 19). However, a large proportion of partial participants (40%) were somewhat satisfied with incentives. The majority of respondents who said they were "not very satisfied" or "not satisfied at all" were also partial participants.

Figure 19. Satisfaction with Incentives



Finally, the vast majority (93%) of participants said they would either "highly recommend" (69%) or "somewhat recommend" (24%) the program to a friend or family member. However, among the partial participants nearly half (45%) reported they would not recommend the program (Figure 20).

Figure 20. Would You Recommend the Program?



Research Area 3: Opportunities to Increase Market Adoption of Energy Efficiency

To determine whether the program is currently achieving its goals, Cadmus analyzed EnergySmart's performance for the program's first three years of implementation. We then looked at critical program drivers to identify untapped or underutilized opportunities for increasing market adoption of the EnergySmart program and energy-efficiency upgrades in general. Our findings are described in this section:

- Funding allocation
- Marketing and outreach strategy
- Availability and use of outside/partner resources
- Incentive levels and other customer resources

Allocation of funding

Are allocated program resources sufficient to meet program goals?

According to City staff, the goal for the EnergySmart program is to reach 10,000 homes, but in a currently undefined time period. Using available spending data, we calculated an approximate annual budget of $100,000 for EnergySmart, which has historically funded about 600 participants (although actual spending varies considerably each year). A shown in Table 7, given current participation trends,

the City could achieve this goal in slightly less than 15 years. To achieve this goal at the City's current average cost per participant would require a 15-year annual budget commitment of $132,856, an additional funding allocation of approximately $33,000.

To reach its goal of 10,000 homes within five years, the City would need to identify an additional $298,567 per year and nearly triple participation. To achieve the goal in 10 years, the City would need to allocate an additional $99,284 per year and reach about 260 additional participants per year (Table 7). These totals assume that services and rebates remain intact at current levels.

Table 7. EnergySmart Participation and Budget Required to Achieve Goals in 5, 10, and 15 years

Program, Participation, and Funding	2029 (15 Yrs.)	2024 (10 Yrs.)	2019 (5 Yrs.)
Average Cost per Participant, 2011 to 2013 (through the end of July)	$231	$231	$231
Number of Remaining Participants	8627	8627	8627
Participants Needed Per Year	575	863	1725
Total Funding Needed	$1,992,837	$1,992,837	$1,992,837
Annual Funding Needed	$132,856	$199,284	$398,567
Additional Annual Funding Allocation Needed*	$32,856	$99,284	$298,567
* Based on an estimated annual budget of $100,000.			

It is important to note that during its first two delivery years, EnergySmart provided services to more than 600 households (628 and 618 in years 1 and 2 respectively); however as of the time of this study, the program had served only 123 households in the first half of 2013. Thus, while the City's average annual participant rate is 460, that number reflects fairly wide variation in annual participation.

To assess funding allocations, Cadmus analyzed the City's EnergySmart program budget to determine:

- Allocation of budget and expenditures in each of four budget categories as a percentage of total program spending;
- Cost per kWh achieved; and
- Cost per participant spent[15]

We then benchmarked this data against similar programs in other jurisdictions. Our findings are provided below.

Budget Allocation. The City was unable to provide consistent, detailed, or comprehensive budget-tracking data for the requested program years. Specifically, the data provided did not include allocations for administrative labor by City staff members, it provided administrative spending for only one year, and provided implementation spending for only one year. Therefore, our analysis and the associated findings are limited. Based on the data we received, allocated spending in every budget category has

[15] Note "participant" is classified here as participant unit. For example one participant equals one home.

varied considerably throughout the evaluated program years, as shown in Figure 21. (Note that 0.3% of the total 2012 budget contains administration costs.)

Figure 21. Annual Budget Allocation: EnergySmart

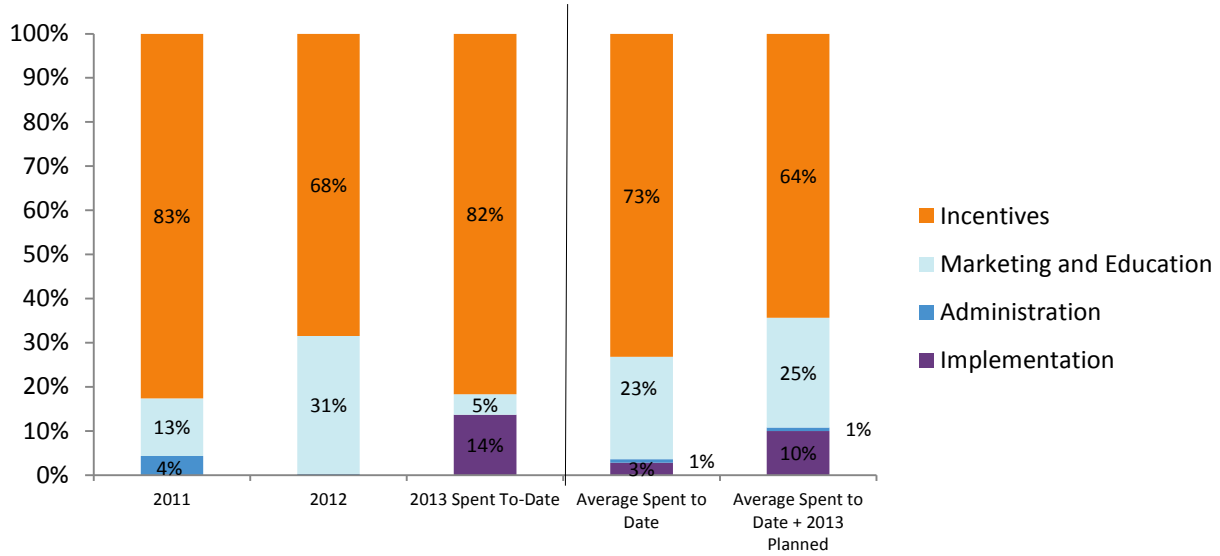


Table 8 lists the benchmarked results of EnergySmart average program spending allocations over the three-year evaluation period against those of utility-sponsored assessment and installation programs. We also included the "rule of thumb" budget allocations we typically recommend for similar programs.

Table 8. Benchmarked Yearly Budget Allocation

Program	Incentives	Administration & Implementation	Marketing & Education
EnergySmart (average, to date)	**73%**	**4%**	**23%**
Rule of Thumb	70%	5% to 10%	10% to 15%
Utility 1:HPwES	86%	14%	0%
Utility 2:Home Energy Audits	94%	4%	1%
Utility 3:HPwES	39%	50%	4%

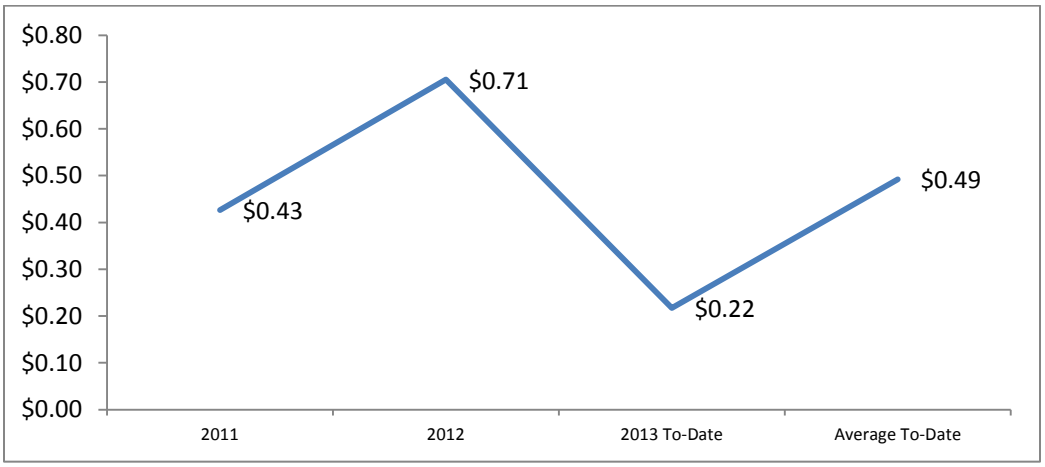
Although overall, EnergySmart's allocation for incentives is within industry standards, we note that these allocations represent only the City's portion of expenditures for incentives, which are layered on top of incentives provided by both Xcel Energy and Boulder County. Given the likely impact of these additional incentive dollars, the total allocation as a portion of total program spending may be beyond those offered by programs in other jurisdictions. Additionally, these comparisons use a two-and-one-half year average; a comparison of spending in any given year would yield decidedly different results. For example, the marketing allocation in 2011 is well within industry standards, while spending on marketing in 2012 is approximately twice typical program spending for marketing.

Given the spending information provided, we also found that, in comparison to other similar programs, the administration budget is on the low end. This may be due to the collaborative effort between the County and City or to incomplete data.

Finally, the program appears to spend significantly more than other similar programs on marketing and education. However, utility programs often benefit from general-awareness marketing efforts that may not be classified under specific program marketing budgets.

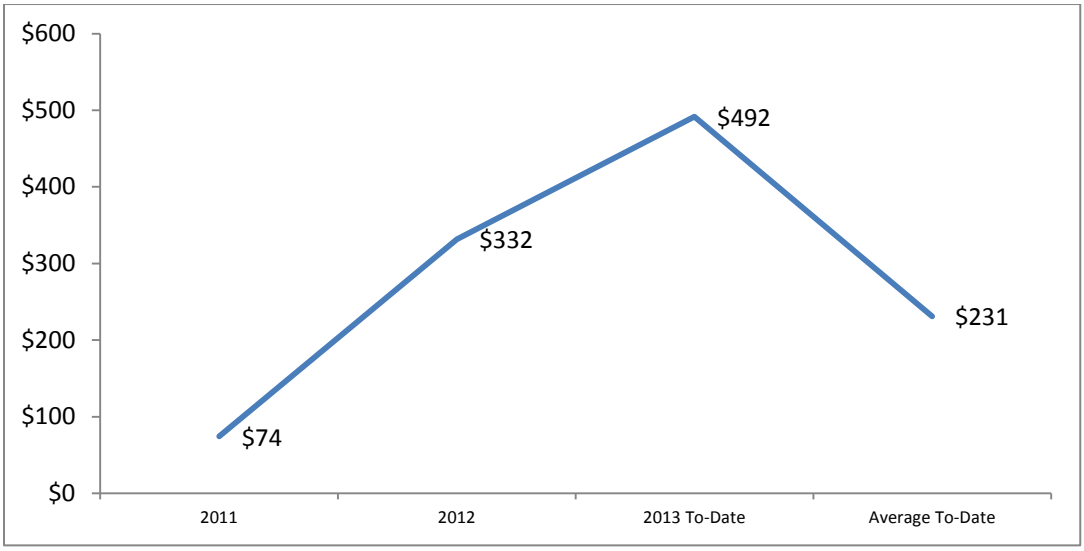
Cost per kWh and Cost per Participant. The City of Boulder does not separate savings associated with EnergySmart versus SmartRegs. Based on the data provided by the City, the cost per kWh has been fluid throughout the program years (Figure 22), with the three year average at $0.49 per kWh.

Figure 22. EnergySmart and SmartRegs: Cost per kWh



As shown in Figure 23, the cost per participant for the EnergySmart program has steadily increased, with the three-year average at approximately $231 per participant.

Figure 23. EnergySmart Total Cost per Participant[16]



To compare cost per kWh and cost per participant, we sought out similar energy assessment-and-install programs. Of the four that provided budget data, three were Home Performance with ENERGY STAR® Programs, which had far higher costs per participant than even the City's highest cost year ($492 in 2013 to date), ranging from $706 to $1,834 (Table 9). The City's cost per captured kWh is more consistent with an energy assessment-and-installation program not affiliated with ENERGY STAR.

Table 9. EnergySmart Total Cost per Participant

General	$/Participant	$/kWh	Program Maturity
Utility 1: HPwES Program	$706	$0.67	Year 2
Utility 2: HPwES Program	$764	$0.40	Year 2
Utility 3: HPwES Program (2011+2012)	$1,834	$0.21	Years 1 and 2
Utility 4: Home Energy Audit Program	$190	$0.23	Year 5
EnergySmart (Average 2011+2012+2013 To Date)	$231	$0.49	Year 3
*Note: $/kWh is based on EnergySmart and SmartRegs. Tracked savings are not separated by program			

It is important to note that each program uses different incentive structures and offers different rebated measures. For example, a program that has a lower cost per participant program may offer an assessment with air sealing and insulation as rebated measures.[17] In contrast, the Home Performance with ENERGY STAR program, which is closest in delivery and design to EnergySmart, typically provides a more comprehensive technical assessment that entails extensive diagnostic testing and a wider variety of rebated measures (such as appliances, HVAC, and lighting upgrades) and thus a higher delivery cost.

[16] Excluding SmartRegs.

[17] Aerators and CFLs or other free direct installations may also be included as part of the program.

Is the allocation of funding effective and sustainable?

To identify correlations between participation and the City's investments in marketing and incentives, we analyzed marketing-and-education costs per participant and incentive spending per participant. We then looked at the resources the City currently uses to fund EnergySmart activities, and we conducted secondary research to identify both untapped sources of potential funding and possible in-kind resources that may be available.

As shown in Figure 24, total participation in EnergySmart appears to be correlated with marketing investment, revealing a significant drop in both in 2013. The divergence between marketing spending and participation in 2011 at the program's initiation may be attributed to pent-up demand for program services. A similar correlation is not apparent with incentive levels. As shown in Figure 25, a comparison of incentive levels to EnergySmart participants who installed recommended measures indicates that higher incentive levels do not necessarily correlate to increased customer action. Note that 2.5 years of data are not sufficient to show a robust correlation, yet the findings are nonetheless instructive.

Figure 24. EnergySmart Marketing/Education Cost per Participant vs. Participant Count

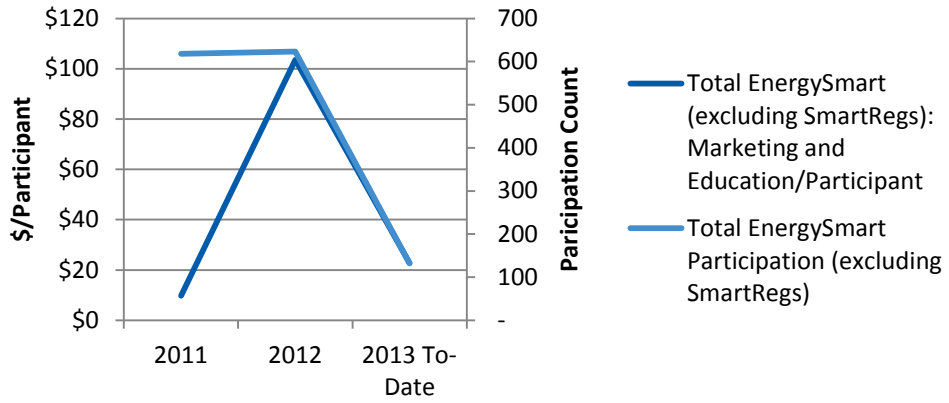
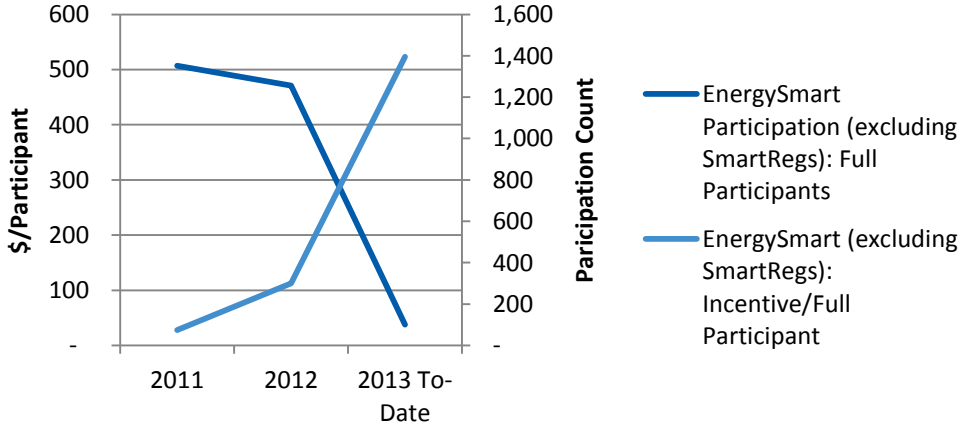


Figure 25. EnergySmart Incentive Cost per Participant vs. Participant Count



To identify additional sources of funding, Cadmus conducted secondary research on other Better Buildings Neighborhood Program (BBNP) grantees, as the strategies they've developed for sustaining their programs may be applicable to EnergySmart. We found that some program administrators now collect fees for services, while others have identified third party funding. For example:

- In the Southeast region, a few BBNP grantees sought and won additional federal funding through the State Energy Program, which provides funding complementary to the BBNP. This has allowed the BBNP programs to extend their community energy-efficiency services and incentives.
- One BBNP grantee received a $250,000 grant from the Home Depot Foundation.
- Two BBNP programs leveraged their loan products by arranging to collect a 1% administrative fee on every loan made by their lender partner through the program.

Other programs have discussed the possibility of charging contractors a nominal fee to be a part of the program's trade-ally network on an annual basis, but no programs have instituted this policy to date.

Marketing and Outreach Strategy

Do the program marketing strategies include tactics, channels and messaging aimed at overcoming barriers and encouraging adoption of energy efficiency?

Cadmus reviewed EnergySmart marketing materials and strategy documents. We also gathered information through interviews with city and implementation staff and through participant surveys to determine the extent to which the City's marketing strategy is aligned with the following:

- The customer segments most likely to participate in EnergySmart;
- The customer segments that offer the greatest "bang for the buck" in terms of energy savings potential; and
- The marketing channels and messages that most resonate with customers.

Although did not develop a strategic marketing campaign that was tailored to specific segments, City and implementation staff confirmed that the target audience for the EnergySmart program is all single-family residential homeowners. Program staff used a multi-faceted marketing approach that entailed a significant amount of direct outreach, which is consistent with both program best practices and the most effective outreach channel found in Cadmus' research.

The City's direct outreach strategy included a range of tactics including attendance at local venues (such as the farmers market, faith-based groups, and neighborhood meetings) to promote the program through word-of-mouth. In addition, staff worked closely with the Colorado University Green Team to build awareness through face-to-face outreach (with 87 homeowners) and the use of door hangers (692) in specific neighborhoods—Mapleton Hill, Martin Acres, and Newlands.[18] The City also attempted to

[18] These areas were selected because of the age of housing stock (ranging from 50 to 100 years old).

implement neighborhood competitions, but staff reported that despite several good will efforts, the targeted neighborhoods did not want to compete.

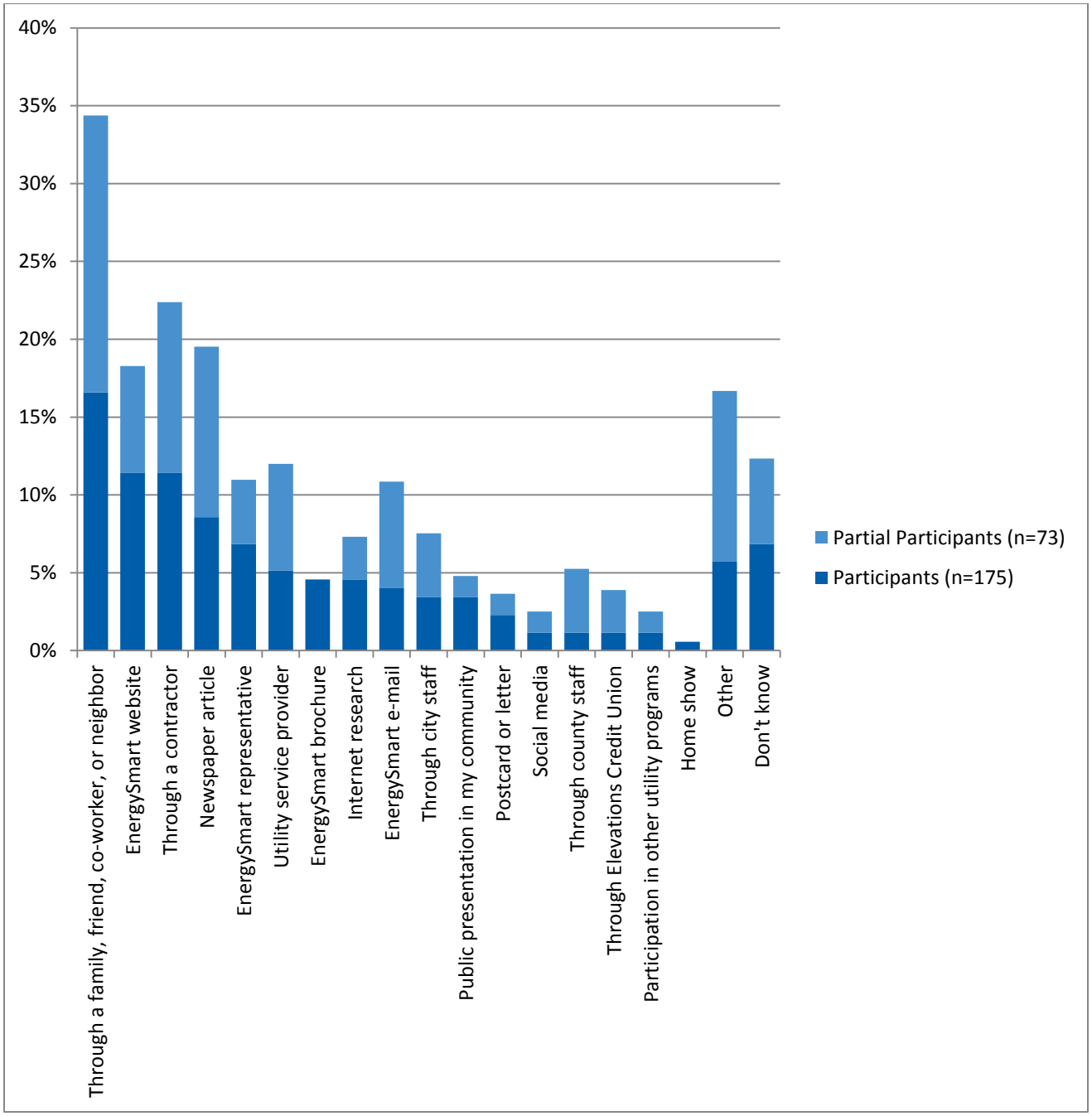
Of the 87 face-to-face contacts, only two were confirmed as signing up for the program; as a result of door hangers, eight signed up. Still, despite the minimal direct-correlation response, it is impossible to determine the degree to which this effort may have raised overall awareness of EnergySmart.

The City also employed print ads, social media, program brochures, and a website that contained participant testimonials. It also provided coupons to reduce the initial cost of the energy assessment; for example, an auditor could provide a $90 coupon to interested residents.

As was shown in Figure 16, a majority of participants and partial participants first learned about the program from a friend, family member, or co-worker, and the second-most-commonly cited resource for participants was the newspaper (either an article or print ads).

As is shown in Figure 26, respondents also said that friends, family, co-workers, or neighbors were the most helpful source of information regarding the program (reported by 17% participants and by 18% partial participants). Participants and partial participants (11%) also agreed that contractors (another direct outreach channel) were the second-most-helpful source of program information, and participants said that the program website (11%) was equally important.

Figure 26. Most Helpful Sources of Program Information



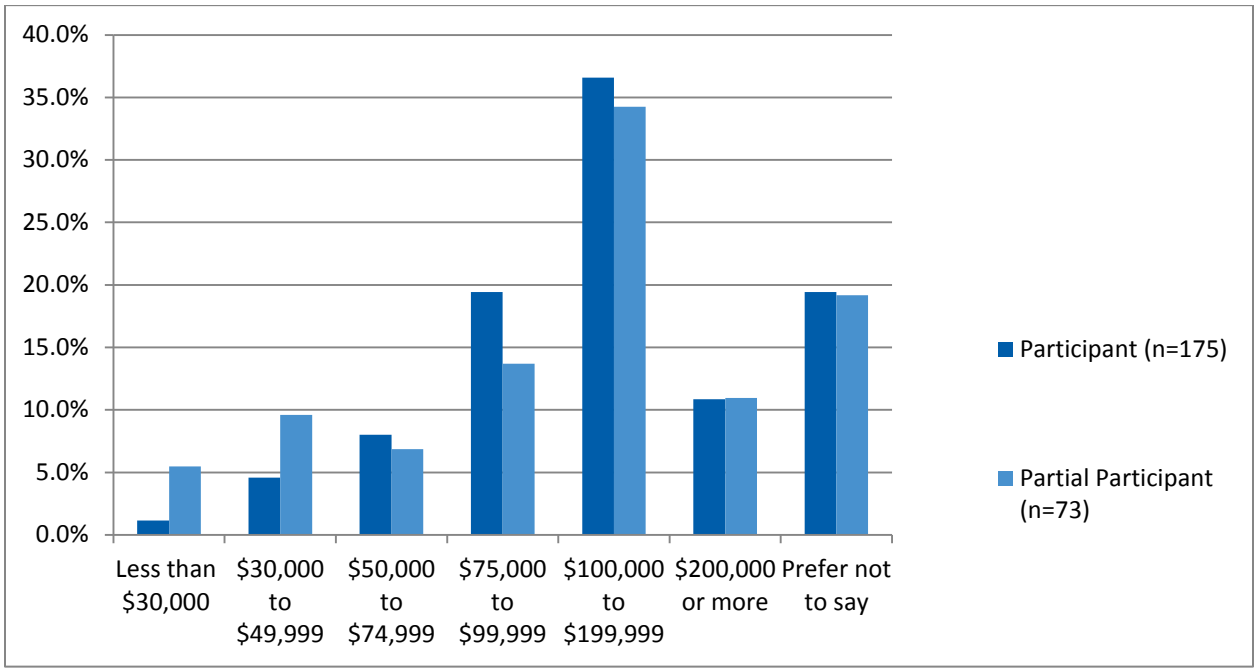
Messaging. City staff reported that the key messages in the program's marketing collateral focused on these factors: (1) increasing comfort; (2) becoming more energy efficient; and (2) easy of participation is for residents.

The City's message to become more energy efficient is consistent with our survey findings that saving energy was a primary motivation for both participants and partial participants (17% each; see Figure 2).

However, the messaging lacks an emphasis on saving money or controlling utility costs, which respondents indicated was a principal driving factor (14% of participants and 17% of partial participants). The financial barrier/motivator was also evident in our analysis of participation barriers, where the largest portion of partial participants said that installing efficient equipment was not in their budget (Figure 6). Also, when asked what additional support was needed to facilitate investment in energy-efficiency upgrades, the majority of respondents said larger and a greater variety of incentives (Figure 3).

We note that in both surveys, income-driven barriers and motivators correspond with the majority of respondents having reported annual incomes in the income categories of $100,000 to $199,999. Those in the income category of $75,000 to $99,999 comprised the second-largest group (Figure 27).

Figure 27. Respondent Income Profile[19]



Availability and Use of Outside/Partner Resources

To identify potential gaps in promotional resources and supporting resources, Cadmus evaluated trade allies and other community partners.

Do trade allies promote the program to their customers?

Trade allies (both auditors and contractors) who provide residential energy-efficiency upgrades are a valuable resource for efficiency-upgrade programs around the country. Through interviews with

[19] All survey respondents are homeowners.

EnergySmart staff, implementers, and other stakeholders, Cadmus assessed the types of trade allies who currently promote the program to their customers and who could help engage potential customers.

EnergySmart trade allies were identified by participants (10%) and partial participants (9%) as the third-most-mentioned resource for learning about the program (Figure 16). Additionally, participants reported that contractors were the second-most-helpful sources of program information by both (11%) participants and partial participants (Figure 26).

We compared the types of support provided by EnergySmart to trade allies who offer promotional services to the best-practice trade-ally support mechanisms offered by similar programs (Table 10). The EnergySmart program is consistent with industry best practices for engaging trade allies.

Table 10. EnergySmart Trade Ally Support

Trade Ally Support Best Practices	EnergySmart Program
Program training offered annually or as needed for program trade allies	City provides program orientation to interested contractors; Occasional training such as sales, finance, legal, or hiring are offered as interest arises
Technical training offered to increase trade allies' knowledge and capabilities regarding energy efficient equipment and installation practices	Participating assessment contractors are required to be Builder Performance Institute certified; Air sealing and insulation installation contractors are required to attend a free two-day technical training (if BPI certified they are exempt for attending)
Co-branding opportunities	City provides brand toolkit to participating contractors
Marketing materials provided at no cost, upon request	City provides program materials to interested contractors when requested, at no cost
Preferred contractor list published in program materials or online	Participating contractor list is provided to customers by the Energy Advisors as well being available online

To ensure residents receive high-quality energy assessments and measures installations, the City continues to refine EnergySmart's trade ally network. Although all contractors listed on the Xcel Energy trade-ally list qualify, Boulder County has additional requirements to ensure that the contractors associated with EnergySmart are recognized for their knowledge of building science.

What partner resources can be leveraged to enhance program success?

The City's EnergySmart implementation plan identifies a range of potential partner organizations having missions and objectives that match the City's sustainability goals. These organizations offer a variety of opportunities for leveraging program promotion; they also provide services that support the City's energy-efficiency and greenhouse gas mitigation goals.

To assess how the program currently leverages outside resources for promoting and enhancing the EnergySmart program services, Cadmus reviewed program documents, conducted interviews with City and implementation staff, and asked questions in the participant and partial participant surveys.

The program encourages trade allies (both auditors and installation contractors) and Energy Advisors to identify all of the relevant energy upgrade incentives for interested participants. Additional partnership

and program resources, such as those listed in Table 11, may offer participants further opportunities to decrease both greenhouse gas emissions (a key program objective) and other natural resources.

Table 11. Example Program Partnership Opportunities[20]

Potential Partners	Partnership Benefits	Current Usage
Center for Resource Conservation (CRC)	Promote the program through events, web page, etc.	No formal relationship
CRC: Slow the Flow Colorado Programs	Recommendation to help participants conserve water indoors as well as out	No suggested or required inclusion in recommendations for participants
CRC: Garden in the Box	Recommendation to connect participants with xeriscape gardening opportunities	
Ecocycle (Free) Compost program	Behavioral recommendation to help participants reduce solid waste greenhouse gas emissions	
Ecocycle CHaRM	Behavioral recommendation to help participants recycle appropriate materials and safely dispose of non-recyclable materials	
Go Boulder	Behavioral recommendation to help participants reduce greenhouse gas emissions associated with driving by leverage mass transit, as well as biking and walking	
eGo CarShare	Behavioral recommendation to help participants reduce greenhouse gas emissions associated with driving by engaging in a car share program	
Elevations Energy Loans	Low interest energy-efficiency loans to enable participants to complete comprehensive energy-efficiency upgrades	Energy Advisor and trade allies provide participants with information on relevant financing options
Boulder County Rebates	City rebates leverage existing EnergySmart county rebates	Energy Advisor and trade allies provide participants with relevant rebate opportunities
Xcel Energy rebates and programs	Efficiency upgrade recommendations matched to available Xcel rebates and programs (e.g., SaverSwitch, Windsource)	

Incentive levels and other customer resources

What additional resources would encourage homeowners to enter the program and install measures?
To identify areas where the EnergySmart program could adjust current practices to increase program participation (or to capture new or additional sources of energy savings), Cadmus reviewed several key

[20] This table provides an example, and it is not a full partnership list.

drivers of energy-efficiency program savings. As shown in Table 12, we benchmarked the City's program incentive levels to those offered by programs in other jurisdictions.

Table 12. Benchmarked Programs

Program Sponsor	Program	Prescriptive or Performance	Rebate Values	Rebate Maximum	Notes
Boulder County[21]	EnergySmart	Prescriptive	Up to $250 per home per project phase (not per measure)	$1,000 per home	Maximum $250/home, with a lifetime EnergySmart maximum of $1,000/home and $4,000 per owner of multiple properties (includes all past and present EnergySmart rebates).
Xcel Energy, Minnesota	Home Performance with ENERGY STAR	Prescriptive	Ranges $60 - $400	No Maximum	Rebate varies by measure and efficiency level
Xcel Energy, Colorado	Home Performance with ENERGY STAR	Prescriptive	Range $15 - $1,000	No Maximum	Rebate varies by measure and efficiency level
Arizona Public Service,	Home Performance with ENERGY STAR	Prescriptive	$250/measure	$1,000	Rebate is the same for all measures
Salt River Project	Home Performance with ENERGY STAR	Prescriptive	Up to $250 or 75% of the cost	No Maximum	Rebate is the same for all measures
Baltimore Gas and Electric (EmPOWER)	Home Performance with ENERGY STAR	Prescriptive	50% of cost for some measures	$3,150	Up to 50% of the project cost, and a maximum of $2000, for air sealing, insulation and gas tankless water heaters

[21] The City provided additional rebates in addition to those jointly offered by the County through the program.

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Program Sponsor	Program	Prescriptive or Performance	Rebate Values	Rebate Maximum	Notes
EmPOWER Maryland	Home Performance with ENERGY STAR	Prescriptive	Up to 50% of project cost	$2,000	Up to 50% of the project cost, and a maximum of $2000, for air sealing, insulation and gas tankless water heaters
Mass Save	Home Energy Assessment	Prescriptive	Up to 75% of cost for insulation	$2,000	75% of cost, up to $2,000, for insulation Other rebates and maximums depend on customer area or utility
HomeFree Nevada	EnergyFit Nevada	Performance	15% - 19% = $500, 20% or higher = $1,000	$1,000	Rebate is based on modeled level of energy efficiency
NYSERDA	Home Performance with ENERGY STAR	Prescriptive	10% of cost for approved measures	$3,000	
Vectren	Home Performance	Prescriptive	Up to 50% of cost	No Maximum	
Austin Energy	Power Save Program, Home Performance with ENERGY STAR	Prescriptive	Standard Rebates can be up to 20% of cost Bonus rebate is $250 - $500 depending on standard rebate total	No Maximum	Many of the standard incentives are on a per-unit basis (e.g., duct sealing rebate = $.12 per sq. foot, and external combustion air rebate = $20 each
Puget Sound Energy	Home Performance with ENERGY STAR	Prescriptive	HPwES Incentive = $400. Stand-alone rebates range $4 - $1,500	No Maximum	

At $1,000 per home, the EnergySmart program provides base rebates—not including additional City or Xcel Energy rebates— within the low end of the industry standard. However, after adding in rebates from Xcel Energy and, possibly, from the City, the participant's maximum rebate may be significantly higher.

It is important to note that the incentive levels through the City have been applied inconsistently, so the total amount possible per participant is not static. For example, in fall 2012, the City conducted an insulation promotion that offered a higher-than-usual incentive, the number of upgrades completed jumped from 50 in August to 250 in October, before dropping to below 50 by December.

As shown in Table 13, Cadmus compared the EnergySmart program's key design elements to those of best-practice programs offered in other jurisdictions.

Table 13. Design Best Practices Comparison

Best practice	EnergySmart
Use customer's actual 12-month billing history to inform upgrade measure recommendations and calculate energy savings.	All auditor attempts to obtain a 12 month history, when this is not possible they rely on monthly averages provided by Xcel Energy.
Provide tools and resources for customers to take post assessment action, e.g., lists of qualified installation contractors , tips on contractor selection, simple rebate applications (with online submittal options), technical support hotline, tips for do-it-yourself energy-saving opportunities and behavioral actions, FAQs, and other educational materials.	Participants are provided access to and are encouraged to communicate with an assigned Energy Advisor. Advisors provide lists of local installation contractors, energy efficiency tips, identification of rebate opportunities and assistance in completing rebate applications, as well as general support to encourage resident to complete recommended upgrades.
Use an advanced, software-based, energy assessment and analysis tool to enter data on site and generate energy assessment reports that can be delivered within 48 hours.	All auditors use SnuggPro software; reports are electronically mailed unless otherwise requested by participant; All reports are QC'd by Populus and provide to the homeowner within five business days.
Couple weatherization measures with OBF or low-cost financing mechanism. Structure financing to result in positive cash flow	Direct installs are provided during in-home visits. Elevation Credit Union provides low-interest energy loans.
Partner with other utility, state, or local incentive programs to present a unified program to customers.	City collaborates with Boulder County and Xcel Energy to leverage funding and provide multiple rebate opportunities.
Use simple rebate forms and program rules.	Rebate forms vary based on source e.g., Offer from City, County, or Xcel Energy.
Refund some or all of assessment cost if customer follows through on recommended actions.	Highly subsidized comprehensive home assessment offered; no requirement to follow through on recommendations
Solicit customer commitment to install recommended measures. Offer to help customers develop a phased implementation approach and generate work orders on site for immediate installation measures.	The City contracts with Populus to provide on-going outreach to enrolled residents including assistance to select contractors and sort installation bids and identify rebate opportunities.
Provide performance-based incentives that offer greater incentives and interest subsidies the more measures a customer implements.	Rebates are per measure.
Provide simple, visually appealing energy assessment reports that clearly articulate priority measures and estimated energy savings.	Home assessment reports are visually appealing and provide appropriate engagement point for interested residents.
Use community-based marketing approaches to create a word-of-mouth effect.	City attends local events such as the farmers market, faith-based groups, and community gatherings. Program hosts a very informational and easy-to-use website. Primary reported awareness is from word-of-mouth.

The EnergySmart program structure is both sound and consistent with a majority of program best practices. It offers participants cost-effective savings opportunities identified through an on-site energy assessment that is conducted by a qualified technician. The assessment includes diagnostic testing and free direct installation of energy-saving measures. Contractors also use the same software tool to demonstrate to customers the financial benefits of energy-efficiency improvements.

EnergySmart also offers participants sufficient incentives, and it leverages relevant rebate opportunities. To negotiate the program processes (assessment, installation, and rebate), participants receive personal contact and support from the Energy Advisor.

To determine where the City should direct its incentive dollars to achieve the greatest impacts, Cadmus reviewed the recommendations from the energy assessments conducted for all participants. We matched these recommendations to the end uses most-commonly installed by participants. As shown in Table 14, the three most-commonly recommended measures are insulation, air sealing, and lighting. These measures were also reported to be the most-commonly installed.

Table 14. End Use by Recommendation, Installation, and Savings

End Use	Recommendation Frequency[22]	Installation Frequency[23]
Insulation	20%	90%
Air Sealing	18%	85%
Lighting	65%	49%
Heating system upgrade	4%	94%
Cooling system upgrade	2%	71%
Heating system tune-up	5%	75%
Cooling system tune-up	1%	83%
Duct sealing/insulation	14%	79%

[22] Recommendation frequency is calculated from survey responses and includes recommendations to both participants and partial participants (total number of recommendations made by EnergySmart advisors to both participant groups, divided into measure groups)

[23] Installation frequency is calculated from survey responses and is calculated only out of EnergySmart participants (number of installations/total number of eligible survey respondents for that recommendation)

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SmartRegs

Cadmus' appraisal of the SmartRegs Program largely drew on data and information gathered to inform Research Area 2 and Research Area 3. For each Research Area, we identified key areas of investigation and developed researchable questions to guide our investigation, and we present our findings in this section.

Research Area 2: Market Barriers

Why do some property owners move forward with upgrades while others do not?

To assess the reasons why some property owners move forward with upgrades and identify the program services they found most helpful, Cadmus interviewed both SmartRegs-compliant landlords (with or without EnergySmart) and noncompliant landlords. We also investigated why nonparticipant landlords had not initiated the SmartRegs compliance process, and we reviewed the potential barriers to installing recommended energy-efficiency measures.

Through interviews with 24 landlords (participating and nonparticipating), we assessed the extent to which common barriers affect property owners' willingness and motivations to participate in SmartRegs. We used landlord responses regarding their choices to make rental-property improvements as a proxy for motivations.

Both landlord types reported many of the same influences regarding making improvements to their property. The most-commonly mentioned factors were these: return on investment, property "rentability" and resale value, and immediate maintenance needs. Only three of the 24 landlords cited energy savings as a factor.

With respect to the SmartRegs compliance process, the landlord types expressed different reasons for choosing whether to initiate the process early.

Among the nine nonparticipating landlords in general, there was either a lack of urgency or a lack of awareness.

- Six said either that initiating the SmartRegs compliance process was not a priority or that they were not aware of the ordinance.
- One expressed skepticism that the ordinance would remain in place.
- Two voiced frustration that the ordinance would force them to sell the property because they did not have funds to cover any costs associated with compliance.

The responses from the nonparticipating landlords for not pursuing SmartRegs varied:

- One said: "City is fickle and overreaching; City may change their mind about the ordinance and now money is wasted"
- Three said it is not a top priority
- One said 2019 is still "far enough out"

- One had not heard of SmartRegs before the interview call
- One said his property was already energy efficient, so he did not need to research program requirements
- One did not want to disrupt the historic character of the property, and does not have disposable cash to make upgrades

The responses from the 15 participant landlords exhibited a more proactive attitude about the compliance process.

- Six said that they began the compliance process because SmartRegs is required.
- Seven said they thought it was "a good idea" to start the process early to plan for any energy-efficiency upgrades that might be required.
- All 10 landlords who completed upgrades said that cost was the only factor preventing them from installing the upgrades identified in the SmartRegs checklist that would achieve more than the minimum 100 points.

Cadmus analyzed commonalities among SmartRegs participants and nonparticipants to discern characteristics that may influence landlords' likelihood to participate. Specifically, we explored the following property characteristics to assess findings:

- Number of properties owned
- Property type (single family, duplex, multifamily, etc.)
- Owner-managed vs. third-party managed properties
- Rental rates
- Types of leasing and/or ownership structures

Our analysis of the 15 participants did not reveal a specific pattern regarding property characteristics.

- Two manage properties with a large number of units;
- Three participants both manage and own their properties.
- The remaining 10 own property with four or fewer units: 6 own single-family homes and 4 properties are a mix of duplexes, townhomes, and a single-family property converted into three units.

Our analysis of the 9 nonparticipants did not reveal a specific pattern either.

- Three did not feel comfortable disclosing property characteristics;
- Six mainly own three or more units, and only 2 of the 6 have one- and/or two-bedroom units.

Only a few participant and nonparticipants were comfortable disclosing electric and gas utility metering and payment structures. As illustrated in Table 15, only one of the 24 landlords pays for the tenant's utilities.

Table 15. Disclosed Utility Structure

Response	Full and Partial Participants	Nonparticipants
Total Interviewees	15	9
Total replies to this question	8	4
Tenant pays	6	2
Owner pays	1	0
Utility bill split between tenant and owner	1	2

Reported rents ranged from $775 for a one-bedroom to $1800 for a three-plus bedroom unit. Table 16 shows the average rental rates for the 15 full participants and the nine partial participants.

Table 16. Average Rental Rate: Full and Partial Participants

No. of Properties Owned	Average Rent	Min; Max Rent Range
One Bedroom	$1,035	$775; $1500
Two Bedroom	$1,409	$1,105; $1,560
Three-plus Bedroom	$1,870	$1,700; $1,800

The data collected from landlord interviews do not indicate landlords are motivated to initiate the compliance process based on the property characteristics listed above. However, when SmartRegs participants and nonparticipants were asked if they thought certain rental characteristics make the route to compliance easier, many indicated that they thought condos and apartments with shared walls would have an easier time complying. One inspector confirmed this assumption, noting that condos tend to have a much higher initial compliance rate than single-family homes.

Table 17 lists landlord feedback regarding property characteristics that might make SmartRegs compliance easier.

Table 17. Property Characteristics That Might Make it Easier to Comply

Advantage	Participants (n=15)	Nonparticipants (n=9)
No opinion	6	2
Age of Unit (newer is easier)	4	1
Higher number of units	2	2
Smaller number of units	1	1
High turnover	1	0
High Rental Income	0	1
Single Family Home	0	1
Short payback period	0	1

*Note: multiple responses per person were allowed, and 2 respondents did not reply

Two participant landlords cited cost disadvantages associated with owning older or historic properties, as the cost of compliance was perceived to be much higher for older properties. Both said that the

recommended upgrades would disrupt the historic character of the units, potentially decreasing resale value. However, neither mentioned the support offered by Populus for addressing the often-complex process of historic property upgrades.

Nonparticipants and participants gave mixed responses regarding the perceived advantages of properties having either large or small unit counts.

- Some reported that if landlords only own one to two properties, managing the needed upgrades may be not complicated, and the overall investment would be smaller.
- Many landlords noted that large complexes offer the advantage of economies of scale. For instance, shared wall space is easy to "tackle" as multiple units are simultaneously applicable for updates, such as for insulation.
- One landlord mentioned that a peer landlord recently bought new boilers for each complex and was able to make an energy upgrade for multiple units at once.

Several landlords said that rental units generate more income were more likely to be made compliant with SmartRegs because the property owners have more money to spend on upgrades. A few landlords said they are barely breaking even in current conditions, which suggests that their properties are not high-margin rentals.

Through our data collection activities, we assessed the degree to which these common participation barriers could affect the SmartRegs Program's performance:

- Economic (costs and financing)
- Availability of skilled technical support
- Awareness
- Satisfaction

Our findings relative to each of these areas of investigation are described here.

Do available incentives meet market needs?

To assess the impact of incentives on participation, we analyzed the responses of the 15 participating landlords regarding satisfaction with the program incentives, the influence of incentives on their decisions to install program measures, and their price sensitivity regarding program costs and equipment installation costs.

- Six said the limited-time availability of incentives was a motivator for beginning the SmartRegs process right away.
- Five who completed upgrades with the assistance of incentives described the incentives as being either "very influential" or "somewhat influential" in their decision-making. (Note that these five are all of the landlords who completed upgrades.) This response is consistent with

information provided by implementer staff, which shows that spikes in energy-efficiency upgrades followed promotions to rental property owners for windows or insulation.

- Of the five participants who received incentives:
  - One said he would not have completed the upgrades if the incentive amount had been less.
  - Three said they would have completed the same upgrades for $300 less, and
  - One said he would have completed the same upgrades for $100 less.
- Nine landlords said that having larger incentives would have been helpful in completing more energy-efficiency upgrades.

Several said that while the incentives were appreciated, they did not make a big difference in either the measures the landlords chose to install or the timing of the upgrades. For many, the incentives covered only a small amount of the overall cost. One landlord said he deliberately did not pursue incentives through EnergySmart or Xcel because he was concerned that the time and effort required would not be worthwhile. This individual was the only full participant who did not receive incentives.

Of the four landlords who said that a wider variety of incentives would have been helpful, one said he would like to replace windows—both to achieve compliance and to improve the property's appearance—but windows did not always qualify for EnergySmart incentives.

To help determine where the City should direct incentive dollars for maximum impact, Cadmus looked at the measures SmartRegs participants typically installed. Participant landlords reported that their most-common energy-efficient upgrades entailed installing insulation, performing air sealing, and adding weather stripping. Occasionally, they replaced the furnace or air conditioning units.

Does available financing meet market needs?

We analyzed participant interview responses regarding: (1) awareness and use of available program financing; and (2) reasons for not using the financing options available through the program. Our findings were:

- Awareness of the Elevations Credit Union energy loan is higher among participants than nonparticipants, with 13 of 15 participants saying they knew about the loan product.
- Participants heard about the loan product through a variety of mechanisms, with no one source emerging as dominant. Participants mentioned the SmartRegs brochure, Populus Energy Advisors, community presentations, SmartRegs inspectors, and City website as ways in which they heard about the Elevations loan.
- Three participants used the Elevations loan.
- The participants who did not utilize an Elevations loan paid for their upgrades with cash.
- The nine nonparticipants exhibited less awareness about the Elevations loan. Only one said he was aware of the loan product because of his membership in Elevations Credit Union.

- Two nonparticipants said that they were either "very likely" or "somewhat likely" to use the financing offered through the program.
- Nonparticipants who said they were unlikely to use the product primarily cited a desire to avoid taking on debt.

Availability of Skilled Technical Support

Do customers receive adequate technical assistance to facilitate decision-making and support to achieve desired results?

To assess whether the level of technical support is adequate to achieve program goals, Cadmus disaggregated the landlords into two groups: those who participated in an inspection only and those who participated in the EnergySmart program with advisor services. We reviewed feedback from these groups to determine the degree of influence that either element had on a landlord's decision to install recommended measures.

EnergySmart Advisors. Of the 15 participants interviewed, only two indicated they did not use EnergySmart services. While neither of them obtained rebates or formally enrolled in EnergySmart, both benefitted from advisor services for some level of guidance throughout the process.

Comments from the 11 participant landlords in the inspection-only group about the value of the Energy Advisor included:

- Eight said that their Energy Advisor was very effective in helping them understand the results of the baseline SmartRegs inspection.
- Two said the Energy Advisor was somewhat effective.
- One said the Energy Advisor was not that effective.

Participants noted the following advantages to working with Energy Advisors:

- "She knows our properties and keeps an eye on the rebates"
- "You have to have somebody like [the Energy Advisors] to hold your hand"
- "Populus was very helpful and is the main reason for my satisfaction[with the SmartRegs process]"
- "Process felt individualized"

Participants also noted a few areas in which Energy Advisors could have been more effective:

- More help understanding the multiple contractor bids
- More assistance or knowledge in dealing with historic properties
- Simplifying the selection of contractors for obtaining bids
- More guidance on alternative ways to gain points at a low cost

SmartRegs Inspectors. City and implementation staff said that the capabilities and capacity of inspectors available to support SmartRegs program services is currently sufficient to achieve the program's

compliance requirements by 2019. Initially, the City set a low bar to entry for inspectors, requiring one of several certifications such as RESNET, ASHI, or Architect or Engineer registration; attendance at SmartRegs training; and successful completion of an exam created by Populus. Inspectors are required to retake the exam on an annual basis. In 2012, Populus increased the difficulty of the exam to reflect more situational questions, and the number of qualified inspectors decreased slightly.

Currently, 17 inspectors are qualified to perform SmartRegs inspections. Some inspectors choose to be affiliated with EnergySmart, which means that they agree to a set price for the inspection (typically $120). The SmartRegs inspection is similar to the EnergySmart assessment, but it is more tailored to the SmartRegs checklist and does not include blower door or infrared tests unless requested by the landlord. If a landlord calls Populus directly for help scheduling an inspector, Populus can schedule an EnergySmart-affiliated inspector or an independent G-licensed inspector on the call list. Independent inspectors set their own rates.

Implementation staff noted that the current pool of inspectors is highly qualified and very familiar with the SmartRegs checklist. Inspectors and inspector trainers noted that the communication between inspectors and Populus staff allows for a collaborative, problem-solving environment in which inspectors can consult with Populus experts on unique property issues that arise during inspections. Implementation staff stressed their philosophy of using continuous mentorship as a training model, especially now that the inspector pool is experienced with SmartRegs.

Seven of 15 participants said their inspector was “very effective” in helping them understand how to comply with SmartRegs, and five of 15 said they were “somewhat effective.” Only three respondents said the inspector was “not that effective” or “not at all effective.”

Inspectors mentioned that they automatically refer clients to Populus if their baseline SmartRegs inspection is below 100 points. They describe the advising service, direct install measures, and incentives that landlords can get through EnergySmart.

Awareness

Does the program’s marketing strategy align with customer needs and participant potential?
Through interviews, we collected feedback regarding nonparticipating landlords’ awareness of the SmartRegs ordinance and availability of support services through the EnergySmart program.

Eight of nine nonparticipant landlords indicated they were aware of the SmartRegs ordinance; only one had never heard of it. Of the eight landlords who knew about SmartRegs, five did not know about the requirements of the ordinance. Of the three landlords who indicated awareness about the requirements, two said they learned about the requirements through a contractor or inspector, and one said they learned about it through an industry organization. Only three of nine landlords had visited the SmartRegs page on the City website to learn about SmartRegs.

Inspectors said rental property owners who contact them for a renewal inspection have low awareness of or confusion about SmartRegs. One inspector said landlords have enough difficulty understanding the rental licensing process, and adding SmartRegs requirements increases their confusion. He said many property owners do not understand that they will not receive a rental license in 2019 if they are not SmartRegs compliant.

Only three of nine nonparticipant landlords were aware that EnergySmart offers incentives and Energy Advisors to help landlords identify and implement energy-saving improvements needed to comply with SmartRegs. When asked if they were likely to use an Energy Advisor service to help comply with SmartRegs, five of nine said they were very or somewhat likely to use an advising service. Only one said he or she was not at all likely to use the service. When asked what types of support other than financial incentives could help them get through the SmartRegs process, nonparticipant landlords described many of the services offered by Energy Advisors: help with paperwork, education, question-and-answer support, and help understanding the process.

Satisfaction

How satisfied are participants with the program overall and with various aspects of the program delivery process?

We assessed program satisfaction among SmartRegs participants who participated only in an inspection and those who participated in the EnergySmart program and received Energy Advisor services.

About one-third (five of 14) of participant landlords said they were very satisfied with their SmartRegs experience, and about half (seven of 15) were somewhat satisfied. Of this group, one participant commented that he was as satisfied as he could be “for a program that makes you spend a lot of money.” Just two participants said they were not that satisfied. These participants said they were dissatisfied because the incentives decreased significantly and that achieving compliance costs one year’s worth of rental income.

In addition to overall program satisfaction, Cadmus reviewed findings associated with quality assurance and quality control (QA/QC) protocols. The ordinance was carefully designed to not disrupt tenants for quality assurance checks or for updating the SmartRegs checklist to verify compliance. As a result, the inspectors are not required to conduct a second on-site inspection after a landlord completes upgrades. SmartRegs inspectors can update checklists based on receipts for work performed by a contractor or equipment purchased by a landlord. While this process minimizes inconvenience and cost to the landlord and tenant, inspectors expressed concern with this process because they are asked to do additional work without compensation.

When the first rental properties achieved SmartRegs compliance, Populus performed a QA review of seven properties to compare the inspectors’ checklists with their results. If Populus found a major discrepancy, they would work through the differences in assumptions with the inspector.

Implementation staff said they did not encounter major issues during the QA inspections. After the initial properties completed QA testing, the QA process was discontinued.

Research Area 3: Increasing Market Adoption of Energy Efficiency

Cadmus analyzed the SmartRegs program's performance over its first three years of implementation to determine whether the program is currently achieving its goals.

The City's overall goal is to have all rental properties achieve SmartRegs compliance at some point during the eight-year implementation period between 2011 and the end of 2018. There are approximately 22,000 rental units in the City of Boulder. Based on interviews with City Staff, SmartRegs' goals for the first three voluntary years, 2011 to 2013, totaled 9,700 units. As shown in Table 18, as of June, 2013, SmartRegs was falling short of these interim goals, but its compliance totals are equivalent to about a quarter of the rental housing stock. Based on our analysis, discussed in greater detail below, the SmartRegs needs to maintain an average participation rate of approximately 2,200 participants per year to achieve full compliance by the 2018 deadline; at its current rate, the program is well positioned to meet compliance.

Table 18. SmartRegs Compliance 2011-2013

Year	Goal	Actual
2011	1,500	2,205
2012	6,000	2,845
2013	2,200	691 (as of June 2013)
Total	9,700	5,741

In order to better understand and identify untapped or underutilized opportunities to increase market adoption of the SmartRegs program and energy efficiency upgrades in general, Cadmus looked at the following critical program drivers:

- Funding allocation
- Marketing and outreach strategy
- Availability and use of outside/partner resources
- Incentive levels and other customer resources.

Our findings relative to each of these areas of investigation are outlined below.

Allocation of funding

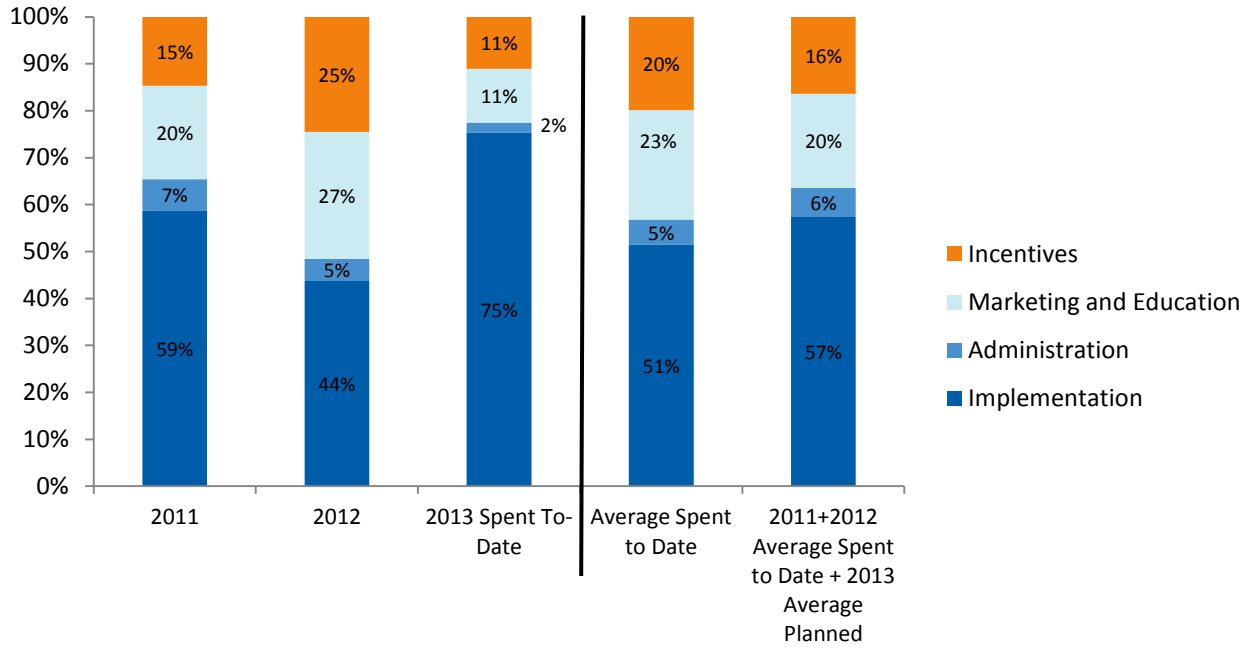
Are allocated program resources sufficient to meet program goals?

To assess the appropriateness of program funding allocations, Cadmus reviewed the City's current SmartRegs budget allocations to assess the reasonableness of allocations to various program functions and overall cost to deliver services to participants. Because the SmartRegs program is unique, we were not able to identify strictly similar programs for benchmarking budget allocations to help inform our

understanding of the City's expenditures for this program. To provide some context, Cadmus identified five programs targeting multifamily efficiency; but these comparisons provide limited information.

The City receives a set amount of funding per year to administer, market, and implement SmartRegs. Since 2011, the City has managed SmartRegs compliance within the given budget allocation. Figure 28 shows the budget allocation from 2011 to 2013.

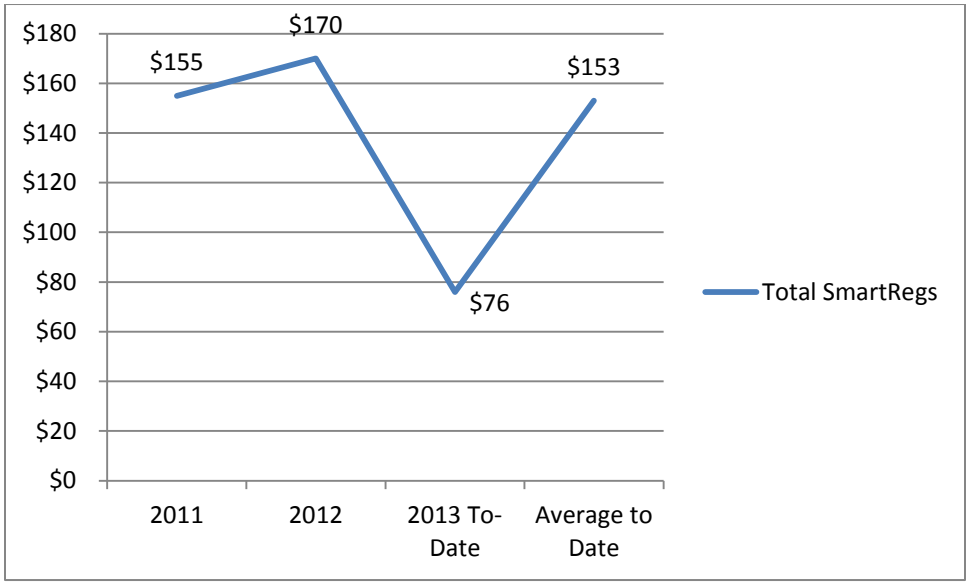
Figure 28. Total Annual Budget Allocation: SmartRegs



The spending data indicates more consistent tracking and spending over time based on established budget guidelines. Due to the significant differences in program design and delivery, we did not benchmark spending levels against utility multifamily programs. In general, SmartRegs spends less on incentives than other energy-efficiency programs, but the incentive budget does not reflect EnergySmart or Xcel Energy incentives that are available to landlords. Administration costs appear reasonable and the higher percentage of funds dedicated to implementation is likely due to the Energy Advisor services provided by Populus which, as our research showed, provides critical support to help landlords navigate the compliance process. Although marketing costs are higher than typical allocations for utility programs, we note that its compliance goals and deadline make driving participation in SmartRegs a higher priority for the City than multifamily efficiency programs typically are for utilities.

Next, Cadmus analyzed SmartRegs' costs per unit of energy savings and per participant unit. The City of Boulder does not separate savings associated with EnergySmart versus SmartRegs. As shown in Figure 22 (presented in EnergySmart above), the City's average cost of achieved energy savings for both programs combined, was $0.49 per kWh. Figure 29 lists the SmartRegs total cost per participant rental unit.

Figure 29. SmartRegs Total Cost per Participant Rental Unit



Similar to the EnergySmart analysis, the marketing and outreach cost per participant for Smart Regs appear to be correlated with participation (Figure 30), whereas the data shows no correlation between the City's investment in incentives and participation (Figure 31). As with the findings in the EnergySmart section of this report, two and a half years is insufficient time to draw a robust trend line; however, these findings are indicative of a link between marketing and participation.

Figure 30. SmartRegs Marketing and Outreach Cost per Participant vs. Participant Count

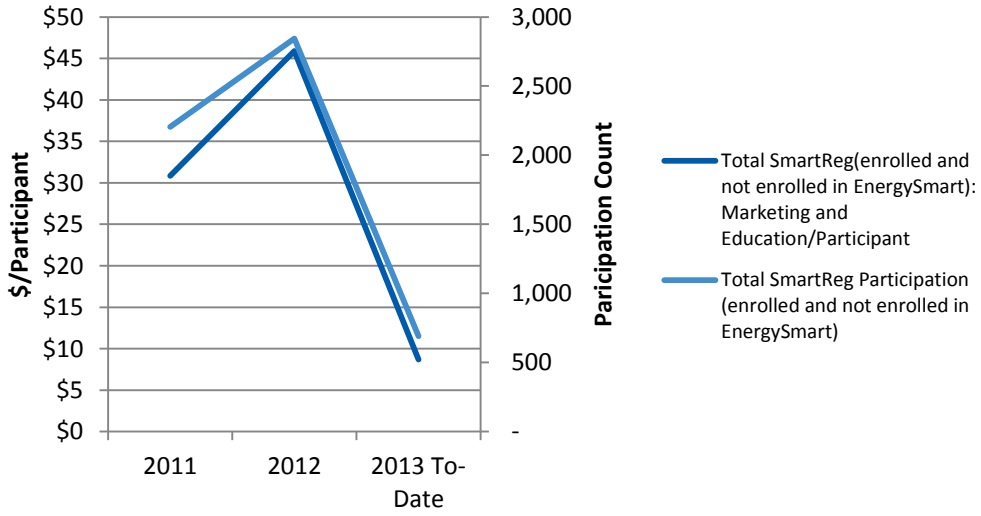
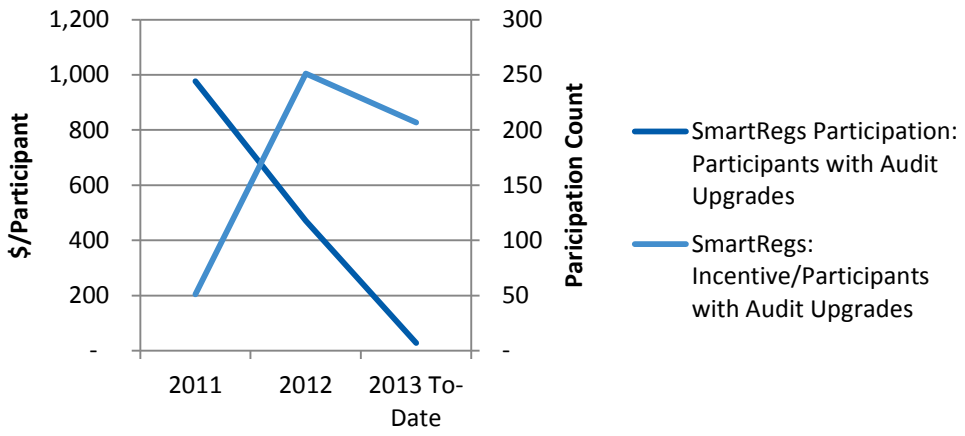


Figure 31. SmartRegs Incentive Cost per Participant vs. Participant Count



Cadmus identified five multifamily efficiency programs offered by utilities and one sponsored by a nonprofit organization to provide comparative data on program costs. Again, because the SmartRegs program design and regulatory context are very different from a typical multifamily demand side management program, these comparisons are illustrative only. In fact, as shown in Table 19, we found little data to support a comparison of cost per participant and the large range between available data points is indicative of the large variation between program designs.

However, because the City's cost per kWh includes savings and costs for both EnergySmart and SmartRegs, thereby including incentives for applicable upgrade measures, these results may be more relatable to similar costs incurred by traditional multifamily efficiency programs. Our findings indicate that the City's average cost of savings are approximately within the range spent by other programs but about 85% greater than the median benchmarked result ($0.27).

Table 19. Benchmarking Results: $/Participant and $/kWh[24]

Organization Type	$/participant rental unit	$/kWh
Utility 1	$26	$0.03
Utility 2	NA: No Participation Data	$0.21
Utility 3	NA: No Participation Data	$0.27
Utility 4	NA: No Participation Data	$0.86
Non-profit 1	$587	$2.86
SmartRegs*Average To Date	$153	$0.49

*Note: $/kWh is based on EnergySmart and SmartRegs. Tracked savings are not separated by program

Finally, Cadmus analyzed funding resources required to achieve full program participation by the 2019 compliance deadline, given the City's average program costs to date. As shown in Table 20, at this rate

[24] The data from four of the five reference organizations stem from evaluation plans; one organization's data stems from a utility planning/forecasting update filed with the state commission.

of spending, the City will need to dedicate at approximately $339,813 per year in each of the next five years (2014 to 2018) for all landlords to reach compliance.

Table 20. Required Yearly Budget Needed to Achieve Full Compliance

Item	Cost
SmartRegs Cost per Participant Unit 2011-2013 to Date	$153
Number of Remaining Nonparticipant Units	11,105
Average Participants Needed per Year through 2018	2,221
Total Cost Needed	$1,699,065
Cost per Year	$339,813

Each of the 17 SmartRegs inspectors would need to perform 130 SmartRegs inspections per year to achieve the City's compliance goal. If only the five inspectors who conduct renewal and SmartRegs inspections completed the work, they would need to complete 444 inspections per year between 2014 and 2018. The most active inspector, according to the City, has performed approximately 340 inspections per year, but is booked two weeks in advance. For many inspectors, SmartRegs inspections are one of many services their businesses offer. However, as the program addressed 2,500 units on average in each of the first two program years, it is clear the inspector capacity is sufficient to handle the required level of service.

Marketing and Outreach Strategy

Do the program marketing strategies include tactics, channels and messaging aimed at overcoming barriers and encouraging adoption of energy efficiency?

To assess this researchable question, we reviewed SmartRegs marketing materials and strategy documents, and gathered information through interviews with city and implementation staff and through landlord interviews. We compared the City's marketing approach to the primary barriers identified by interview respondents and to feedback regarding where property owners heard about the program.

This analysis allowed us to assess the extent to which the City's marketing strategy: (1) identifies a segmentation strategy designed to target property owners; (2) targets customer segments most likely to participate in SmartRegs; (3) uses messaging designed to overcome barriers; and (4) uses outreach channels designed to reach their target population.

Market Segmentation and Target Messaging. All rental properties must obtain a rental property license, which affords the City access to a customer database of all landlords that need to be reached. As described in the previous section, Cadmus found no specific segmentation characteristics that appeared to influence landlords' behavior to act—or not act—to become SmartRegs compliant. However, our staff and landlord interviews did indicate that the City conducts targeted marketing based on property size. Our interviews further indicated that additional sub-segmentation may be useful to inform marketing messages:

- Property management companies
  - Apartments and condos
  - Single family properties
- Independent landlords and smaller property owners:
  - Historic properties
  - Single family properties

According to the SmartRegs Marketing Plan, the primary objective of the marketing effort is to raise awareness of the benefits of the EnergySmart services in helping landlords and property managers achieve early compliance, rather than raising awareness of the ordinance itself. This is an appropriate message for all segments, given our research finding that many landlords are unaware of the availability of EnergySmart services to support compliance.

The City followed many strategies outlined in the SmartRegs marketing plan to target two main customer segments: independent landlords (those operating without the services of a property management company) or small property management companies, and large property management firms. The City's outreach to independent landlords and small management companies, consisting of SmartRegs brochures mailed along with license renewal notifications, has had a small impact. The City had much more success reaching out to the large property management firms, many of which approached SmartRegs as a way to plan needed upgrades over a multi-year period. The marketing plan hypothesized that messages to property management companies, which are profit-centered businesses, would be more successful in emphasizing the business case for using EnergySmart services to achieve early or voluntary compliance.

Outreach Channels. When the ordinance first passed, the City sent landlords a letter informing them about SmartRegs and the availability of limited time incentives through the EnergySmart program. The City also sends a SmartRegs brochure with every rental license renewal reminder letter, which is sent two months in advance of a license's expiration date.

One of the main channels to reach rental property owners is the Boulder Area Rental Housing Association (BARHA). The City prepared an article for the BARHA newsletter, which was distributed in 2011 to the association's members who collectively own more than 10,000 residential rental units in the City and County of Boulder.

In addition to letter campaigns, the City's primary mechanism to generate awareness of SmartRegs and the EnergySmart compliance support services was through outreach conducted by Mr. Dan Estey, a Boulder rental property owner, past President of BARHA, and an opinion leader in the local rental community. Mr. Estey delivered in-person presentations targeted to landlords and property management companies. The City believed that Mr. Estey would be a credible spokesperson in this community, and responses from participant landlords confirms that Mr. Estey's presentations were important sources of information and motivation for landlords.

Availability and Use of Outside/Partner Resources

We evaluated two different sources for leveraging partner resources: trade allies and other community partners, to identify potential gaps in promotional and supporting resources.

Do trade allies promote the program to their customers?

Through interviews with SmartRegs staff, implementers, landlords, and other stakeholders, we sought to identify SmartRegs' primary community of trade allies and assess to what extent they promote the program to their customers. City and implementation staff described SmartRegs inspectors as the program's primary trade allies. These inspectors, who must be registered engineers or possess one of several energy-related certifications specified by the City, must also complete SmartRegs training offered by the City and Populus. At the conclusion of the training, the inspector must pass an exam before becoming a City of Boulder "G" Licensed Inspector, which is the only class of inspector allowed to perform SmartRegs Prescriptive Checklist inspections.

Rental property owners must obtain a rental property license to rent property in the City and renew it every four years.

There are three separate communities of inspectors: 17 are certified to conduct SmartRegs inspections; seven are certified to conduct all parts of the baseline and renewal inspections; five of the seven inspectors are qualified to conduct both baseline/renewal inspections and SmartRegs inspections. Inspectors who conduct both renewal and SmartRegs inspections reported that they try to educate existing clients about SmartRegs requirements when a customer calls them for a rental license renewal inspection. They use this as an opportunity to educate property owners and to gain additional business. Among participant landlords interviewed, only one of 15 said they heard about SmartRegs from an inspector. Two of nine nonparticipant landlords said they heard about SmartRegs from an inspector.

What partner resources can be leveraged to enhance program success?

We reviewed program documents and conducted interviews with City and implementation staff, to identify the ways in which the program currently leverages outside resources to promote and enhance the SmartRegs program. As described above, the City leveraged two key stakeholder groups to help increase awareness of and promote voluntary participation of SmartRegs: inspectors, BARHA, and Mr. Estey.

Eight of 15 participant landlords heard about SmartRegs through an industry association or at a public presentation for rental property owners and managers. Six landlords specifically mentioned attending presentations through the Boulder Area Rental Housing Association (BARHA) to learn about SmartRegs. Five of 15 landlords also mentioned hearing about SmartRegs in a newspaper article.

BARHA has been involved with SmartRegs since the inception of the ordinance, and has been an important outreach partner for the City in reaching representatives of Boulder rental properties.

Two of 15 participant landlords specifically cited Dan Estey's public education efforts as being the most effective source of information in helping them to understand the SmartRegs requirements and to feel

more comfortable proceeding with a baseline SmartRegs inspection. Six of 15 mentioned conversations with Energy Advisors, inspectors, or City staff as the most helpful source of information in understanding the requirements. Two nonparticipant landlords mentioned they learned about SmartRegs requirements through City Council meetings, their apartment association, and various real estate associations.

Incentive Levels and Other Resources

What additional resources would encourage property owners to enter the program and install measures?

Cadmus reviewed data provided by the implementer showing measures installed by landlords who took advantage of EnergySmart services. The most commonly recommended and installed measures were window replacement, attic insulation, and air sealing. While energy savings from both insulation and air sealing can be significant, the popularity of window replacements is surprising considering the payback period for such upgrades is high and incentives typically cover only a small portion of the overall measure cost. However, in interviews, several landlords expressed a desire to install new windows, particularly with the benefit of an incentive. Most participant landlords also cited insulation upgrades as a key part of compliance.

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Conclusions

In this section, Cadmus presents conclusions associated with the key thematic areas, drawn from our research and analysis.

Market Barriers and Motivators

Cadmus' research revealed that, while financial barriers play a significant role in both EnergySmart and SmartRegs participants' adoption of energy-efficient equipment and building upgrades, the market may bear a higher cost for EnergySmart energy assessments. Further, limited-time incentive promotions have been effective for driving short-term participation increases, and many participants in both programs cited incentives as a highly-valued service. But contrary research indicated that, while City incentives are appreciated, they are not necessarily driving participants to install upgrades. Rather, more important drivers for SmartRegs upgrades were return on investment, rentability, and property value.

Thus, funding incentives to supplement existing Xcel Energy and County rebates may not be the most effective use of City resources. Rather than further subsidization of these activities, research indicated that prioritizing the technical assistance provided by Energy Advisors may be a better use of City funds. We provide high-level conclusions with further discussion below.

While many respondents indicated cost is a predominant (but not exclusive) market barrier for both programs, supplementing available incentives may not be an effective way to drive sustained action.

The top three reasons for participating in EnergySmart cited by all survey respondents were saving energy, saving money, and gaining incentives. Partial participants cited financial barriers as their primary reason for not installing recommended measures (although a larger majority opted not to answer this question). Moreover, our research indicated that lack of awareness and lack of a sense of urgency among landlords are bigger barriers for SmartRegs participants to begin the compliance process; however, landlords noted the financial burden as a key barrier to implementing building upgrades.

While these findings largely point toward economic barriers, other findings seemed to contradict this conclusion. Cadmus' analysis of participants' price sensitivity revealed that many EnergySmart participants would be willing to pay an additional 50% or more for their assessment. However, few partial participants indicated a willingness to pay a larger cost for assessments.

Many EnergySmart and SmartRegs respondents indicated that incentives, both increased amounts and a larger variety, would be helpful to encouraging them to complete more of the recommended measures. The City's experience supports this finding: providing short-term incentive enhancements has provided significant short-term increases in participation. However, our analysis of incentives as a factor driving participation produced divergent results for the two programs (as discussed below).

EnergySmart. In the EnergySmart program, although incentives are cited as key to installing recommended measures, participation trends do not correspond with a similar increase in equipment

installation. Respondents acknowledged leveraging utility incentives in addition to program-based incentives, which further skewed the incentive-participant trend.

Nearly half of EnergySmart partial participants reported installing recommended upgrades without pursuing City rebates. It is unknown if these partial participants submitted applications for Xcel Energy rebates. Without a full impact evaluation the City will be unable to claim or track energy or GHG reductions associated with measures installed outside program.

SmartRegs. Our analysis of incentives as a factor in driving participation in the SmartRegs program showed a clear correlation. Many participant landlords cited limited-time availability of rebates for SmartRegs-specific measures as a motivating factor. However, several landlords also acknowledged that while the incentive was appreciated, it did not make a big difference in the measures they installed or the timing of the upgrades and it comprised a very small portion of their overall cost. Most landlords said they would have completed their upgrades even if they received as much as $300 less per project.

Because Cadmus was not able to analyze or benchmark total incentive values by measure type over time, we are not able to draw conclusions regarding the value of incentive levels. In our experience evaluating energy residential assessment and upgrade programs we have found that for higher cost upgrades (e.g., HVAC replacement), incentives of approximately 50% of the measure incremental cost are typical. Surveys confirm this level as a “sweet-spot” for consumers. Many utilities also offer higher incentives for weatherization measures, as they can be a cost-effective source of energy savings. The frequency of insulation and air sealing measure installations by EnergySmart participants suggests that, if the City continues offering incentives beyond those provided by Xcel and the County, insulation and air sealing measures may warrant this additional funding allocation.

Participants also indicated that lighting was a common installation measure; however, recent changes in lighting standards and increasing evidence of market transformation around high-efficiency lighting suggest that this is not a high-priority use of City incentive dollars.

There are no common customer characteristics that indicate some segments may be more likely to participate than others.

While nearly 20% of EnergySmart partial participants said that cost prevented them from moving forward, neither action nor a lack of action correlated to a specific level of income, knowledge or other demographic characteristics. With SmartRegs, no concrete pattern emerged regarding property characteristics such as rental rates, size of property, or age of building. However, many landlords perceived it would be more difficult for historic properties to reach compliance because of added cost and complexity, while some mentioned that apartments and condos may be better positioned than single family rentals to meet compliance due to economies of scale and higher incidence of shared walls.

Our research indicated that the divide between SmartRegs participants and nonparticipants appears largely related to a rental property owner’s attitude. Participants exhibited a more proactive attitude about the compliance process, recognizing that it may take time to complete. Many reported a desire to

learn early on about what they would need to do to become compliant, so they would have several years to plan for necessary upgrades. Nonparticipants, by contrast, exhibited skepticism that the ordinance would remain in place, and noted that 2019 was still far away.

These findings reflect the complex decision-making processes associated with making large investments in a home or property. It may also reflect a desire to learn more about energy use characteristics, with no plans to make major upgrades. For example, when asked what could encourage them to complete more of the recommended measures, the second-most commonly cited factor EnergySmart respondents reported was "nothing." The "nothing" response could indicate opinions ranging from respondents who thought the program met all their needs to those who thought there was nothing the program could have done to convert them from partial to full participation.

Financing, although available, is not a driving force behind participation.

Although the program provides participants access to low-interest energy-efficiency loan products in partnership with Elevations Credit Union, our analysis shows the majority (70%) of EnergySmart participants paid with cash and were uninterested in obtaining a loan. Only five EnergySmart participants and three SmartRegs participants used the loan. However, those who did were satisfied with the terms of the loan and reported learning about the loan from their contractor.

While the loan is not a primary driver for participants to install upgrades, offering financing is typically considered an important best practice and does not negatively impact the program financially.

Marketing and Outreach

The City's marketing approach has largely been appropriate for its audiences and effective. After only two and one half years, about 45% of the target population has some awareness of EnergySmart, and nearly all of the landlords we interviewed were aware of SmartRegs.

However, a significant awareness gap remains for EnergySmart. Furthermore, awareness does not necessarily correlate to sustained participation. Consistent, ongoing marketing and outreach is required to continue both programs' momentum. Targeted marketing will become particularly important for SmartRegs to overcome a general lack of urgency associated with compliance. We provide high-level conclusions and further discussion below.

The EnergySmart and SmartRegs marketing strategies rely on appropriate channels and tactics, but consistent deployment is needed to maintain momentum.

EnergySmart uses a diverse marketing strategy that directs considerable resources toward word-of-mouth efforts, such as the farmers market, door-to-door outreach, or neighborhood competitions. These activities are important, as word-of-mouth is clearly the most effective channel for learning about the program and its services as well as the most helpful source of information. The second-most recognized marketing channel, newspaper articles and print ads, is also a focus for marketing efforts.

Most respondents indicated that friends, family, and co-workers, and to lesser extent, contractors, were their primary source of word-of-mouth information. Respondents who indicated they had heard about the program through a program representative, staff, or a community event were considerably lower. While it is impossible to say definitively the degree to which the City's word-of-mouth efforts have been effective in increasing general awareness, since survey respondents may not cite every source of program information to which they have been exposed, it is clear there is room for improvement. While EnergySmart program awareness has increased by approximately 6%[25] since Cadmus conducted the baseline survey in 2011, a large awareness gap persists. Sixty-six percent of the surveyed population in 2013 indicated they were not very familiar with or had never heard of the program and its services.

The marketing strategy for SmartRegs differs from the strategy for EnergySmart. The City's initial awareness campaign targeted multifamily complex owners through letter campaigns, the local rental housing industry association, and direct outreach by Dan Estey. The high level of awareness of the SmartRegs ordinance among nonparticipant landlords, and the number of participant landlords who mentioned Dan Estey's presentations as an important source of information about the program, indicate that these marketing efforts have been successful.

Nonparticipant landlords and inspectors both noted that there is confusion about the compliance process and requirements. Many nonparticipant landlords also expressed a lack of urgency about achieving compliance, indicating a general lack of awareness of the potentially long timeline associated with completing the process. Additionally, only about one-third of nonparticipant landlords were aware of the support provided by the EnergySmart program.

Our analysis indicates a correlation between investment in marketing and program participation (see Figure 24 and Figure 30). Although two and one-half years of data are insufficient to draw a robust conclusion, the drop in participation relative to a drop in marketing spending in 2013 provides a stark image. The early momentum both programs experienced has died down since the initial outreach efforts in 2010 and 2011. This finding is not surprising; in Cadmus' experience, an early surge in program participation is not uncommon, reflecting pent up demand and early adopters. However, sustaining long-term growth in program awareness and participation typically requires an equally long-term investment in outreach and education, particularly for immature programs.

The City's marketing approach is consistent with best practices, but a refined messaging strategy and adjustments to resource allocation priorities could help increase awareness.

The City's multifaceted marketing approach with a significant level of direct outreach is consistent with program best practices and correlates well with Cadmus research findings. However, although the EnergySmart programs' message to become more energy-efficient is consistent with our survey findings indicating that saving energy was a primary motivation for both participants and partial participants, the

[25] Total of respondents indicating they were very or somewhat familiar with the program.

messaging lacks an emphasis on saving money on utility bills, which respondents also indicated was a principal driving factor.

The City's SmartRegs marketing approach included some messaging designed to appeal to two individual market segments: smaller, independent landlords and large property management companies. The approach achieved some success targeting the latter group with a message focused on the business case. However, limited success with smaller independent property owners indicates a more refined and perhaps sub-segmented message may be appropriate for this group. Cadmus' interviews with landlords indicated that messaging specifically focused on increasing the urgency of compliance and the need for longer-term planning for costly improvements may be appropriate for this sector. Additionally, the availability of technical resources and incentives are likely to resonate more with this segment. In particular, a message highlighting the specialized expertise available to support historic property owners may help drive participation in this segment.

Allocation of Funding

Given the distortions created by co-funding with multiple entities and overlap between EnergySmart and SmartRegs, Cadmus was not able to draw definitive conclusions regarding budget allocations. However, based on available data, the costs for both EnergySmart and SmartRegs appear to be in line with or below the typical and expected costs per participant and per unit of energy savings, when compared to other programs.

The SmartRegs regulatory compliance deadline makes the program a resource-allocation priority for the City. Given its current funding levels and participation rates, the program is well positioned to meet its goal. EnergySmart, which has a less well-defined target, may be able to meet its goals over a longer time period with a modest increase in budget and/or cost reductions. Our research indicates that priority should continue to focus on offering technical support to participants. We provide conclusions and further discussion below.

A lack of detailed budget tracking does not allow for an in-depth assessment of cost metrics.

The City was unable to provide consistent, detailed, or comprehensive budget tracking, broken out by program and by consistent spending categories for the program delivery period. Spending data provided for EnergySmart did not appear to follow a logical budgetary planning process and did not include allocations for administrative labor by City staff or for administrative activities or implementation during some years. Additionally, some SmartRegs costs appeared to be conflated with EnergySmart allocations when rental property owners leverage EnergySmart services. Thus, the true spending allocations for EnergySmart are unknown. Cost per participant in SmartRegs may be undervalued because many participants receive incentives through the EnergySmart program. The City does not track energy savings results for each program separately.

Without detailed budget and spending data, Cadmus was not able to provide specific assessments of each program's cost of achieved energy savings or a reliable analysis of program spending for various administrative delivery functions.

At the current funding levels and participation rate, SmartRegs can remain economically viable and achieve its goals within the compliance deadline. However, EnergySmart's funding at current levels and average participation rates are insufficient to achieve the City's goal within 15 years.

While the City's goals for SmartRegs compliance is clear—achieve full compliance by the population of 22,000 rental units by January 1, 2019—its EnergySmart goals are less well defined. According to City staff, the initial goal for EnergySmart was to reach 10,000 homes by the end of the first Kyoto Protocol compliance period, 2012. At that time, the program had reached approximately 1,241 participants. As of the date of this report, a new compliance deadline had not been set.

EnergySmart. Based on current budget and participation trends, EnergySmart requires more than 15 years and an additional funding allocation, or cost reduction, of approximately $33,000 annually to achieve the City's stated goals. To achieve the goal in fewer years, the City would need to identify significant additional funding or decrease per-participant program costs by at least 50% and at the same time increase participation by at least 30%. Cadmus' analysis found that the City's costs per participant are already significantly lower than those of similar utility programs in other jurisdictions that offer a similar level of service. Reducing program costs or identifying additional funding needed to facilitate goal achievement in fewer than 15 years, while increasing participation to the required level, would be very challenging.

Additionally, to achieve the goal in 15 years would require the city to maintain a consistent participation rate of approximately 566 households annually. Assuming the program achieves approximately 1,500 total participants by the end of 2013[26], the remaining program goal beginning in January 2014 would be 8,500 homes. The City's average participation to date is 460; however, this average reflects widely ranging program performance (i.e., from 132 participants in the first half of 2013 to 623 in 2012). At this annual participation rate, it would require more than 18 years to achieve the goal of addressing 8,500 households.

SmartRegs. We further estimated the SmartRegs budget allocation at approximately $342,000 annually. The City has used this budget to accommodate about 2,500 participants in each of the first two years. Currently, the average cost per participant is $153. Anticipating that 11,105 rental units still must meet compliance, the City will need to dedicate approximately $339,813 and address an average of 2,200 rental units per year for the next five years to achieve full compliance with the ordinance. Therefore, the SmartRegs budget is sufficient to support the City's goal. However, it is important to note that as the program matures, and the low-hanging fruit is harvested, it will become increasingly costly to engage landlords facing more significant barriers. Additionally, because incentive spending is not tracked

[26] This assumes the City approximately doubled its 2013 participation in the second half of the year.

separately for SmartRegs participants who leverage EnergySmart incentives for upgrades, our budget estimate does not include the full value of incentives offered to SmartRegs participants historically. Conversely, some portion of funding allocation projections for EnergySmart may be conflated with SmartRegs costs.

Historical participation trends indicate that the program maintains sufficient technical resources (inspectors) to complete the required number of rental unit inspections, assuming inspectors maintain a similar level of program activity each year.

Program Design and Delivery

With a 74% overall conversion rate, EnergySmart is a successful, well-designed program. The technical support provided by Energy Advisors to participants in both programs is likely a key factor in driving market adoption of energy efficient measures. Further leveraging appropriate trade allies and potential promotional partners may help further increase program participation and measure uptake.

Technical assistance provided by Energy Advisors is a critical factor in driving customer action.

The technical support and personal contact offered through the EnergySmart Assessment, advanced software tools, and Energy Advisors are central to increasing program awareness, improving customers' understanding of possible upgrades and the associated benefits, and encouraging participant action. Participants and partial participants reported similar value ranking for the in-home energy advisor and assessment support and only slightly lower rankings for post-advisor support. In fact, participants ranked advisor and assessment support as high or nearly as high as they ranked incentives.

Our analysis also showed that participants who worked with an Energy Advisor to facilitate the equipment installation process were slightly more likely (7% average over assessment period) to install recommended energy-efficiency upgrades than those who participated in the assessment without the benefit of Energy Advisor support.

SmartRegs program participants receive technical assistance through Energy Advisors and Inspectors. Participants described a high level of satisfaction with their Energy Advisors, indicating that the services they provide are instrumental in helping landlords complete the compliance process. Inspectors are another valued source of information for landlords and play an important role in referring landlords who have scored below 100 on the Prescriptive Checklist to Populus for Energy Advisor support.

Trade allies are a valuable asset to EnergySmart and SmartRegs, and can be further leveraged to increase participation.

Trade allies are a valuable asset to the EnergySmart program and its participants. They were the second-most reported source for learning about the program for participants (9%) and the third-most common sources for partial participants (5%). They were also the second-most helpful sources of program information reported by both participants and partial participants. While the City already uses best

practice communications and management approaches with their contractor network, there may be additional opportunities to leverage the contractor community for program promotions.

However, with the exception of leveraging incentives, the City has made little effort to partner with local organizations that may offer an opportunity to capitalize on shared objectives. Local organizations and programs focused on environmental goals, and those offering resource conservation and greenhouse gas reduction initiatives, could be a secondary source of program promotion and support services for EnergySmart participants.

Inspectors are an important source of information about SmartRegs, especially as the program nears its compliance deadline. Every landlord will need to renew a rental license during this time period. However, only two of nine nonparticipants said they heard about SmartRegs from an inspector conducting a renewal inspection. Engaging rental license renewal inspectors who are not affiliated with SmartRegs could be a cost-effective way to encourage landlords to pursue early compliance.

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Strategy Recommendations

Cadmus offers the following strategy recommendations to help ensure long-term sustainability for EnergySmart and full compliance with SmartRegs.

Funding Allocation

- **Develop a detailed annual budget and track all program spending**. The City should identify specific program spending categories (for example, marketing and outreach, implementation, administration, and incentives) and track expenditures for SmartRegs and EnergySmart separately and consistently. This will allow the City to conduct annual spending assessments and track metrics such as cost of savings, cost per participant, and cost per pound of CO2 reduction annually to assess and report on spending performance and to quickly identify where spending may not be consistent with programmatic goals.
- **Prioritize SmartRegs for funding allocations.** Given the near-term compliance deadline associated with SmartRegs, it is imperative that the City maintain the budget required by the program. The City should continue to allocate SmartRegs funding consistent with historical spending to maintain the participation rate needed to avoid bottlenecks at the end of the compliance period.
- **Adopt a 15-year EnergySmart goal.** Our analysis indicates that the severe reduction in cost or significant increase in funding that would be needed to meet EnergySmart's goal in an accelerated timeframe is likely not achievable. Adopting a longer-term overarching EnergySmart goal with short-term, five-year interim goals and one-year targets will allow the City to maintain funding for the high level of technical assistance that is the key to EnergySmart's success and necessary for SmartRegs participants to understand and implement compliance strategies. Shorter term goals and targets will also facilitate more frequent evaluations of program performance and market changes. Cadmus recommends adopting an annual participation target of 500 households, which is higher than its current average participant rate but lower than the program achieved in its first two program years, and five year goals of 2,500 participants.
- **Maintain funding for Energy Advisor services**. Although the EnergySmart program design is similar to a utility-sponsored Home Performance with ENERGY STAR program, its conversion rate is significantly higher than utility programs'. One key program difference is the high level of technical support provided by Energy Advisors.
- **Eliminate the subsidy for EnergySmart Assessments.** Although respondents rated the assessment as equally valuable, the EnergySmart services conversion rates were higher among participants who took advantage of Energy Advisors. Additionally, respondents' willingness to pay implies that a higher cost assessment would continue to attract participation, particularly among those most likely to invest in efficiency upgrades.
- **Offer a lower-cost participation option.** For those residents interested in becoming more energy-efficient but not willing to pay market price for an assessment, offer an Advisor-assisted

do-it-yourself assessment called "EnergySmart on the Go." This program option would provide participants with a do-it-yourself assessment backpack (on loan from the library, ReSource Tool Lending Library, or other local venue) equipped with a range of tools and instructions to allow residents to conduct their own assessment. Those requiring additional support navigating the assessment or help identifying priority upgrades would continue to have access to telephone Energy Advisor services. These backpacks may include:

- Easy-to-use tools (e.g., kil-a-watt meters, infrared thermometer, tape measure, water flow rate bag) to conduct a simple home energy and water evaluation
- Step-by-step instructions and worksheets
- Free direct-install measures including CFLs, faucet aerators, and low-flow showerheads (or a mechanism that would allow them to request direct install measures)
- Magnet with the EnergySmart logo, Energy Advisor hotline, and website address
- Local listing of participating installation and assessment contractors
- Program brochure with insert on relevant rebate and financing opportunities

Jacksonville Electric Association offers a DIY assessment kit that has grown from 16 backpacks to 154, and more than 2,000 people have checked them out. Utility surveys found more than 50% of participants took follow up action. (See: http://www.youtube.com/watch?v=Ww2koEBQVs0)

- **Limit incentives to short-term promotional events and consider bonus incentives to encourage deep energy savings.** Our research indicated that, although incentives were highly valued, they may not be driving customers to invest in energy-efficiency upgrades. The City should continue to promote available Xcel Energy and Boulder County incentives, and use City incentives specifically as a promotional tool to direct specific types of upgrades, take advantage of seasonal or topical events, or to stimulate short-term participation increases. Secondarily, based on the availability of funds, the City may want to consider offering bonus incentives targeted to those participants interested in making substantial investments for very deep energy savings results.
- **Maintain investment in marketing.** We know from experience in other jurisdictions that sustained marketing is necessary to sustain participation. Our research, though not robust, indicates an apparent link between the City's investment in marketing and its participation rates.
- **Explore new funding sources to supplement the existing budget.** The potential sources include:
  - State Energy Program funding
  - Private grants, for example, the Home Depot Foundation
  - Collecting a 1% administrative fee through Elevations Credit Union on every energy-efficiency program loan. This approach is currently being applied by two Better Buildings Neighborhood Program grantees.

- Charging contractors a nominal fee to be a part of the program's contractor network on an annual basis. This option is currently under discussion by several Better Buildings Neighborhood Program grantees.

Marketing and Outreach Recommendations

- **Focus on increasing word-of-mouth promotion among "friends, family, and co-workers."** In addition to the City's existing direct outreach efforts such as the farmers market, consider sponsoring "Get Smart" lunch-and-learns co-presented by program staff and an employee who has participated in EnergySmart and can provide testimony to interested co-workers. These face-to-face lunch-and-learns provide opportunity for interested residents to hear about the program from a trusted source (a co-worker), learn about how easy it is to enroll in the program, and ask questions in person. Encourage participants to sign up on the spot. Follow up by phone to schedule services.
- **Use marketing messages that highlight the financial benefits of EnergySmart.** Research indicates that economic barriers are important for a segment of EnergySmart participants. Supplement existing marketing materials with messaging that highlights energy efficiency as a way to save energy and control or reduce energy costs.
- **Explore local partnership opportunities for promotion**. Engage with local environmental, alternative transportation, and waste reduction organizations and companies to discuss promotional partnerships. Promote other organizations' services, (e.g., composting, ride sharing, and water audits) in the assessment recommendations, in exchange for their promotion of EnergySmart services. Not only will this encourage participants to take additional greenhouse gas reduction and resource conservation actions, it will expand the EnergySmart program's promotional reach.
- **Capitalize on participant satisfaction.** Encourage satisfied EnergySmart participants to write letters to the editor about their experience and provide testimonial articles to newsletters at their school, place of worship, or workplace.
- **Use rental-licensing inspectors as SmartRegs marketers.** The 11 rental-licensing inspectors who are not affiliated with SmartRegs have no incentive to promote early compliance with EnergySmart and our research indicates many landlords do not hear about the ordinance from these inspectors. Make an effort to engage these inspectors, ensure that they have a basic understanding of the ordinance, and encourage them to inform landlords of their regulatory obligations at the time of their rental-license inspection. Consider providing an incentive to inspectors for referring landlords for SmartRegs inspections or conducting SmartRegs inspections concurrent with renewal inspections.
- **Target non-compliant landlords for SmartRegs inspections.** Work with the City rental licensing department to refer non-compliant properties to SmartRegs-affiliated inspectors when they seek license renewals.

- **Target landlords due for license renewal in the next year or two.** Use direct-outreach mail followed by phone calls to specifically target landlords whose license is due for renewal. Stress the long timeline needed to plan for and complete upgrades, and the support available to them through EnergySmart, and reiterate the requirements.
- **Use messaging to create a sense of urgency and seriousness.** Many landlords think SmartRegs will disappear prior to 2018 or otherwise indicated that they had plenty of time to comply. Use messaging in direct outreach materials or presentations to reiterate that SmartRegs is here to stay and a delay could cost landlords more through lost incentives and technical support, lost opportunity to capture energy savings or improved rentability resulting from upgrades, the potential for fines, and the need for sound investment planning.
- **Publish SmartRegs case studies online.** Currently, online success stories and testimonies are published only under EnergySmart, but many landlords don't understand the distinction between EnergySmart and SmartRegs and many are unaware of the technical support provided by EnergySmart specifically for landlords. Use case studies to highlight the specific expertise and support SmartRegs offers, including technical support for for historic homes.

ATTACHMENT C

REGIONAL, NATIONAL AND INTERNATIONAL PARTNERSHIPS

Collaboration	Description/Purpose	Relevant Activities in 2014 Q1
Legislative & Regulatory		
Air Quality Control Commission (AQCC) 2014 Natural Gas Rulemaking Local Government Coalition	Coalition of 8 jurisdictions aimed at proposing recommendations in the rulemaking process. Coalition includes: City and County of Denver, Adams County, Boulder County, La Plata County, Pitkin County, San Miguel County, City of Boulder and City of Fort Collins.	The Coalition's comments were presented in the rulemaking process in Feb. 2014.
National Association of Clean Air Agencies (NACAA) Steering Committee	National Association of Clean Air Agencies (NACAA) represents air pollution control agencies in 45 states and territories and over 116 major metropolitan areas across the United States (www.4cleanair.org/).	The city is currently providing comments regarding New Source Performance Standards for greenhouse gas emissions from electric generating units.
Miscellaneous Docket on Data Privacy Rules (13M-1052EG)	Colorado Public Utilities Commission proceeding is collecting feedback on the implementation of the electric data privacy and access rules.	Worked with 7 cities and counties, and 2 municipal utilities, to file comments that described common data requests local governments make in support of climate and energy goals (late 2013/early 2014).
Meetings in Washington, D.C.	Met with American Public Power Association, White House Council on Environmental Quality and Office of Climate Adaptation and Technology Policy, Department of Energy Office of Energy Efficiency & Renewable Energy and Office of Electricity Delivery & Energy Reliability, Environmental Protection Agency.	Meetings in February 2014 to inform federal officials of city's energy and resilience goals, in collaboration with University of Colorado.
Regional Technical and Outreach Working Groups		
Southwest Energy Efficiency Project (SWEEP) Local Government Working Group	Multi-state working group facilitated by SWEEP as part of a Department of Energy contract to help local governments in Western states share information about utility-local government collaboration on energy efficiency programs.	Participated in webinars to learn about successful examples of utility-government collaboration and identify areas for improvement.
Colorado Climate Network, Steering Committee	Support efforts by local governments and allied organizations in Colorado to reduce heat-trapping gases and to adapt to climate change – whether those efforts are styled as climate, sustainability, energy, or adaptation programs. Launched by the Rocky Mountain Climate Organization and local community partners in May 2009, the Network helps its members develop and implement those programs, learn of funding and other resources, and interact more productively with other local and state programs in Colorado (www.coclimatenetwork.org).	December 12, 2013 Conference on "Local Emissions Reductions—Retooling for the Future" (staff presented on SmartRegs, EnergySmart, and municipalization).

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REGIONAL, NATIONAL AND INTERNATIONAL PARTNERSHIPS

Collaboration	Description/Purpose	Relevant Activities in 2014 Q1
Regional Technical and Outreach Working Groups (Continued)		
PUC Local Government Working Group	Working group that hosts meetings to share information about the Colorado Public Utilities Commission and its impact on local governments, with a particular emphasis on sustainability programs and city facilities.	Conducted "PUC 101" webinar; discussed ongoing PUC dockets that impact local governments.
Boulder Sustainability Alliance	Regional agencies passed a "Resolution in Support of Enhancing Collaborative Efforts Between the Boulder Valley School District, the University of Colorado at Boulder, Boulder County and the City of Boulder to Progress Toward Environmental Sustainability."	The group continues to meet on a regular basis to discuss issues and strategies that are cross-cutting and lead to continued collaboration.
Colorado Clean Energy Cluster	Founded in 2006, CCEC is focused on innovative and entrepreneurial ways to grow the clean energy sector through actionable projects and initiatives that directly benefit Colorado clean energy companies. CCEC projects positively impact efficiencies in energy production and consumption, and associated sustainability, when compared to continuation of existing practices in meeting the energy needs of Colorado and the world (www.coloradocleanenergy.com).	
Net Zero Cities Conference	Boulder was a cosponsor in 2013 of the Net Zero Cities conference along with Loveland and Fort Collins. The event was managed by the Colorado Clean Energy Cluster. Boulder will be the host of the conference in 2015.	Initial organizing is underway to support the conference in November in Loveland.
National Technical and Outreach Working Groups		
Applied Solutions, Founding Member and Chair of Technical Advisory Committee	Nonprofit working with local governments to help build a clean economy by undertaking clean energy and water projects that promote local job creation, energy savings, economic development, and greater self-reliance, strengthened by the integration of cleaner energy sources and efficiency measures (www.appliedsolutions.org).	
State and Local Energy Efficiency Action Network (SEE Action), Existing Commercial Buildings Working Group	The U.S. Department of Energy and the U.S. Environmental Protection Agency facilitates working groups in various areas to take energy efficiency to scale and achieve all cost-effective energy efficiency by 2020. The working groups consist of voluntary state and local experts from both the private and public sectors that set priorities, which then will develop resources and offer publications, events, and technical assistance to state and local decision makers as they provide low-cost, reliable energy to their communities through energy efficiency (www1.eere.energy.gov/seeaction/).	

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REGIONAL, NATIONAL AND INTERNATIONAL PARTNERSHIPS

Collaboration	Description/Purpose	Relevant Activities in 2014 Q1
National Technical and Outreach Working Groups (Continued)		
American Council for an Energy-Efficient Economy (ACEEE) Local Energy Efficiency Self-Scoring Tool Beta Test	Participated in the development of Version 1.0 BETA, which gives small- and medium-sized communities the ability to score their energy efficiency efforts by evaluating locally enacted programs and policies across local government operations, communitywide initiatives, building policies, energy and water utility policies, and transportation policies (www.aceee.org/research-report/e13l).	
iUrban Smart City, Advisory Group	The iURBAN tool will address increasing market demands for cheaper, cleaner energy services. It is being designed with the direct involvement of end users: local residents, energy companies and public administration (www.iurban-project.eu).	
The Australian Renewable Energy Agency (ARENA)	ARENA was established by the Australian Government to make renewable energy solutions more affordable and increase the amount of renewable energy used in Australia (arena.gov.au).	City staff has been in a dialogue with members of ARENA who are interested in Boulder's efforts related to clean energy and utility development.
USDN Utility-Data User Group	The USDN Utility-Data User Group was formed in late 2013 to discuss how to improve government access to energy data at the community and sub-community scale to advance local energy programs. The group meets every other month to share best practices and hear from expert speakers and currently represents 22 municipal governments in the U.S. and Canada.	Meets every other month.
International Collaborations		
Carbon Neutral Cities Network	This is a collaboration of 17 cities including both US and international that are working to develop a common framework for achieving deep GHG reduction (>80% reduction by 2050) and create a learning network to accelerate the development of strategies and policy innovations to achieve this goal.	Boulder invited to participate in March of 2014. Gathering of cities to formulate collaboration process in June of 2014.
Conferences/Presentations		
CU Class Guest Lecture	Presentation on Sociology of Climate Change.	January 28
2014 Solar Power Colorado Conference	Presentation on "Solar for All" panel.	February 25
ICLEI USA Sustainable Cities and Towns Webinar: Communicating the Connection Between Climate Change and Extreme Weather	Webinar on extreme weather stories and recommendations, with City of Bridgeport, CT.	March 13

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REGIONAL, NATIONAL AND INTERNATIONAL PARTNERSHIPS

Collaboration	Description/Purpose	Relevant Activities in 2014 Q1
Conferences/Presentations (Continued)		
New Era Open Office	Presentation on Municipalization .	March 20
Maui Energy Conference Program Committee	Served on the Program Committee for "Electric Utilities: The Future is Not What It Used to Be." Information at: http://hightechmaui.com/energyconference/.	March 26-28
CU Class Guest Lecture	Presentation to Energy Policy Class on Municipalization Key Drivers.	April 3
Empower Our Future Presentation	Presentation on Municipalization.	April 9
University of Denver Sturm College of Law Guest Lecture	Presentation on Municipalization.	April 14
Presentation to Boulder County Residents	Presentation on Municipalization.	April 23