Energy Efficiency and Conservation Block Grant (EECBG)
Better Buildings Neighborhood Program

Final Report

Award Number: DE-EE-0003554
Grant Recipient: Boulder County
Project Title: Colorado Better Buildings Project

Report Date: December 30, 2013

Name of Project Director / Grant Manager:

- Susie Strife, Boulder County

Grant Subrecipients:

- City and County of Denver
- Garfield Clean Energy
- Metro Mayors Caucus
- Denver Regional Council of Governments

All data in this report reflects cumulative results through September 30, 2013.

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EXECUTIVE SUMMARY

The Colorado Better Buildings project intended to bring new and existing energy efficiency model programs to market with regional collaboration and funding partnerships. The goals for Boulder County and its program partners were to advance energy efficiency investments, stimulate economic growth in Colorado and advance the state's energy independence. Collectively, three counties set out to complete 9,025 energy efficiency upgrades in 2.5 years and they succeeded in doing so. Energy efficiency upgrades have been completed in 11,784 homes and businesses in these communities.

Boulder County and its partners received a $25 million BetterBuildings grant from the U.S. Department of Energy under the American Recovery and Reinvestment Act in the summer of 2010. This was also known as the Energy Efficiency and Conservation Block Grants program.

COLORADO BETTER BUILDINGS PROJECT GOALS
Increase energy efficiency investment in Colorado
Create jobs & stimulate local economic growth
Advance energy independence through energy upgrades
Leverage federal seed funding to generate at least a 5:1 match in energy efficiency upgrades
Complete 9,025 upgrades in homes and businesses

With this funding, Boulder County, the City and County of Denver, and Garfield County set out to design programs for the residential and commercial sectors to overcome key barriers in the energy upgrade process. Since January 2011, these communities have paired homeowners and business owners with an Energy Advisor – an expert to help move from assessment to upgrade with minimal hassle. Pairing this step-by-step assistance with financing incentives has effectively addressed many key barriers, resulting in energy efficiency improvements and happy customers.

An expert energy advisor guides the building owner through every step of the process, coordinating the energy assessment, interpreting results for a customized action plan, providing a list of contractors, and finding and applying for all available rebates and low-interest loans. In addition to the expert advising and financial incentives, the programs also included elements of social marketing, technical assistance, workforce development and contractor trainings, project monitoring and verification, and a cloud-based customer data system to coordinate among field advisors and across local governments and local service vendors.

Funding Recipient	Grant Dollars
Boulder County[1]	$11,595,314
City and County of Denver	$4,945,595
Loan Loss Reserve for two counties above	$7,144,496
Garfield County, including revolving loan fund	$1,154,566
MMC / DRCOG	$160,029
Total	$25,000,000

A portion of the BetterBuildings grant went to the Metro Mayors Caucus (MMC) who worked in partnership with the Denver Regional Council of Governments (DRCOG) to conduct a series of 10 energy efficiency workshops for local government officials and other interested parties. The workshops helped showcase lessons learned on energy efficiency and helped guide other local governments in the establishment of similar programs. The workshops covered a wide range of energy efficiency and renewable energy topics such as clean energy finance, social mobilization and communications, specific case studies of Colorado towns, energy efficiency codes, net zero buildings and solar power. Presentation materials and other workshop information can be seen at the DRCOG website (www.drcog.org) or Metro Mayors Caucus website (www.metromayors.org).

This model is proving to be very effective. Since the programs launched, the three counties have collectively:

- Provided energy assessment and/or advising to nearly 18,400 homes and more than 4,600 businesses, with an average of 55% and 42% respectively going on to implement energy efficiency upgrades.
- Supported the completion of upgrades in 10,000 households and 1,770 businesses for a total of over 11,700, exceeding the grant goal of 9,025.
- Issued rebates worth more than $5.7 million. These rebates have spurred local investment in energy efficiency upgrades of more than $37.2 million, sustaining jobs and economic vitality locally. On average, for every $1 spent in program rebates, $6.5 was invested in the community towards energy efficiency.
- Nearly $1.9 million in Energy Loans have been funded in Boulder County, the City and County of Denver, and Garfield County since the loan products launched in August 2012, helping over 150 homes and businesses in just one year overcome cost barriers to energy efficiency investment.
- Saved an estimated 45,996,600 kWh and 1,831,300 therms annually.
- Reduced 46,540 metric tons of carbon dioxide equivalent (CO2e) annually, equivalent to taking 9,700 cars off the road.

[1] Boulder County Public Health received $209,000 of the total allotted to Boulder County.

- Saved residents and businesses an estimated $5.9 million annually in utility expenses, supporting a healthy economy and environment.
- Worked with more than 400 contractors and created or retained an estimated 85 jobs.[2]
- Provided technical, business development and sales training to contractors, supporting a robust local energy contractor community.
- Conducted workshops to showcase success and lessons learned on energy efficiency and helped guide other local governments in the establishment of similar programs.
- Proved out viable and replicable program models that local utilities and other communities are adopting, with long lasting market transformation.

Table 1 highlights the collective accomplishments of these three communities.

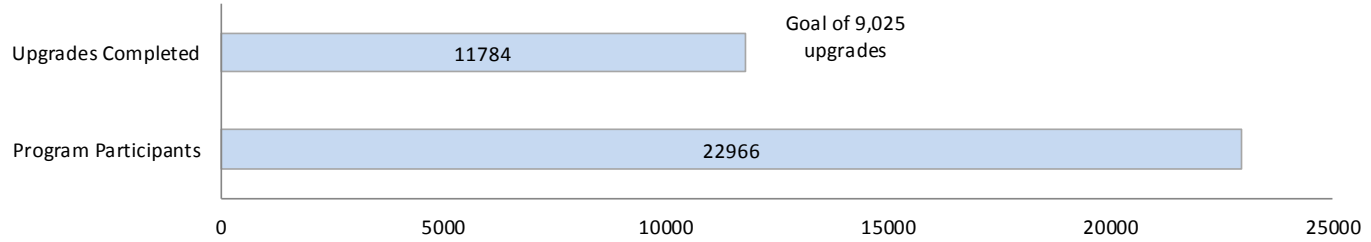
[2] At the height of the overall 3-year grant, an estimated 85 jobs have been created or retained, but not all jobs had been retained with grant dollars by September 30, 2013.

Table 1: Accomplishments by Colorado Better Buildings Project through Sept 30, 2013

This page summarizes the accomplishments since October 2010 of the BetterBuildings grant received by Boulder County and in partnership with the City & County of Denver, Garfield County, Metro Mayors Caucus and the Denver Regional Council of Governments. This covers the U.S. DOE BetterBuildings Program grant funding.

PROGRESS TOWARD GOALS

PARTICIPATION BY RESIDENTS AND BUSINESSES



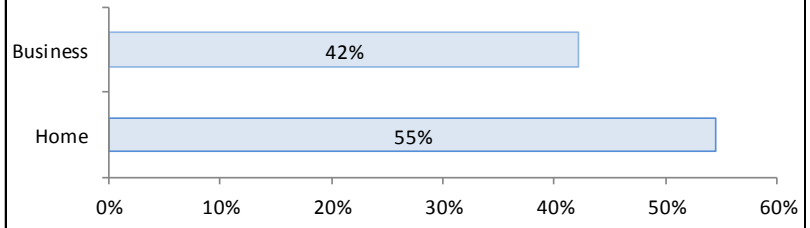
IMPACT

WORK COMPLETED			DEEMED ANNUAL SAVINGS FROM UPGRADES			
Total Project Investment		Number of Loans	kWh	Therms	Cost Savings	$mtCO_2e$
$37,195,791		157	45,996,582	1,831,345	$5,938,128	46,540
Total Rebates Paid	Private Investment	Total Loans Financed				
$5,689,506	$31,506,285	$1,893,336				
Total Investment:Rebates*		Active Contractors	Energy and emissions savings to date from commercial EnergySmart are equivalent to taking 9,696 cars off the road.			
6.5 to 1*		417				

HIGHLIGHTS

- The 3 counties exceeded its BetterBuildings goal of 9,025 upgrades of homes & businesses, increasing energy efficiency investment and advancing energy independence state-wide.
- *For every $1 spent in rebates, $6.5 were invested in the community towards these efficiency projects, exceeding the grant goal of generating at least a 5:1 match.
- Local economic growth and jobs: More than 400 contractors have completed at least 1 energy efficiency upgrade. An estimated 85 full time equivalent jobs created or retained.

CONVERSION FROM ENROLLED/ADVISED TO ACTION



Dashboard design credit: City of Boulder & Boulder County

PART I – BOULDER COUNTY

EXECUTIVE SUMMARY

Of the $25 million BetterBuildings grant through the U.S. Department of Energy, $12 million was allocated to Boulder County. The Boulder County Commissioners' Office, in collaboration with Boulder County Public Health, the City of Boulder Local Environmental Action Division and the City of Longmont's Power and Communication Division, developed the EnergySmart services for businesses and residents in all Boulder County communities. After a small pilot in the fall of 2010, full EnergySmart services launched January 2011. These partners demonstrated leadership by contributing time, resources and commitment to help Boulder County establish a successful energy efficiency service. The cities also contributed municipal funds, leveraging those provided by the grant, to reach the goals identified for residents and businesses in the cities of Boulder and Longmont, the two largest cities in the county. Additionally, Boulder County worked with Elevations Credit Union to launch a financing product in August 2012 to address cost barriers to energy efficiency upgrades.

EnergySmart aimed to reach 3,000 businesses and 10,000 homes by June 2013. These goals represent 43% of Boulder County business sites and approximately 10% of county housing stock, making them some of the most robust participation-to-building-stock goals of any energy efficiency program in the country.

As previously mentioned, the goals for EnergySmart also included the following:

- Increase energy efficiency investments, stimulate the local economy, and advance energy independence.
- Leverage federal seed funding to generate at least a 5:1 match in energy efficiency investment.

Boulder County served its 10,000th household in April 2013 and served its 3,000th business in August 2013. Nearly 75% of homeowners (owner-occupied) who participate and over 30% of businesses served have gone on to complete energy efficiency improvements. EnergySmart's Advisor model has attracted attention for its success and is being replicated in Colorado, by utilities across the country, other government-led demand side management programs and programs elsewhere.

Over half (53%) of Boulder County's greenhouse gas emissions come from commercial and residential buildings, thus creating a program to increase energy efficiency across these sectors was critical for the reduction of Boulder County's greenhouse gas emissions. EnergySmart has reduced an estimated 19,350 metric tons of carbon dioxide equivalent (CO2e) annually in Boulder County, equivalent to the emissions of 4,030 passenger vehicles.

EnergySmart has also made progress in creating jobs and supporting local economic development. EnergySmart has leveraged the federal grant funding to encourage private investment in energy efficiency. Every $1 spent by EnergySmart in the form of rebates corresponds with roughly $6 invested in the community for energy efficiency upgrades.

Table 2 in the accomplishments section of this report provides further details of the results of the EnergySmart program in Boulder County.

EnergySmart has connected with 260 local contractors and has held many trainings for the local contractor community to establish high industry standards for work done through the EnergySmart service. Training topics have included technical and installation skills, sales/marketing skills and business development. The effect of these trainings is becoming apparent, as local residents look to EnergySmart contractors for quality service and installation. Many EnergySmart projects have come in directly from contractors working with EnergySmart Advisors. Boulder County performed verifications of approximately 5% of the EnergySmart rebates awarded to guard against fraud and to ensure that rebate dollars were being allocated appropriately.

EnergySmart worked with local consultants to develop innovative outreach strategies based on social marketing principles. EnergySmart has focused on reducing customers' key barriers to energy improvements – these included: lack of trusted contractors; time and hassle involved in upgrades; lack of upfront capital; and confusion around rebate forms. EnergySmart has also increased the awareness of upgrades as a path to consumer benefits, such as comfort, health and safety, and reduced energy bills. Reaching out to businesses and residents through trusted sources was one of the main outreach strategies that have supported program participation.

Boulder County's long-standing commitment to energy efficiency forms a solid backbone for ongoing support for EnergySmart services. The financing, in partnership with Elevations Credit Union and supported by the federal grant funded loan-loss reserve, established long-term access to capital for EnergySmart participants. Future funding sources include Boulder County general funds, City of Boulder Climate Action Plan (CAP) tax funds and City of Longmont funds. EnergySmart will continue to offer its services and build on best practices to guide continual improvement and effectiveness, with the ultimate goal of establishing new social "norms" around energy efficiency.

BACKGROUND, HISTORY AND POLICY SUPPORT

Boulder County is home to nearly 300,000 residents and includes some of the most diverse, natural landscapes and sustainable development along the Front Range. From visionary open space, land use and sustainability policies to forward-thinking public service programs, Boulder County helps foster a vibrant, healthy and active community. Boulder County includes ten diverse municipalities and towns that feature everything from farmland and rolling grasslands in the plains to the high peaks of the Continental Divide. Located in north-central Colorado, northwest of Denver, the county's landscape includes several dense urban centers surrounded by rural buffer zones and mountain communities, plus portions of Rocky Mountain National Park.

Boulder County's leaders have long held a deep commitment to environmental sustainability. The Boulder County Board of County Commissioners (BOCC) formalized the county's commitment to environmental sustainability in 2005 by launching the Boulder County Sustainability Initiative, which involves the teamwork and expertise of all county employees working cooperatively to implement environmental practices and policies that promote a sustainable work environment and community. During this same year, the Boulder County Commissioners passed an energy resolution calling for the reduction of greenhouse gas emissions and the creation of an action plan to identify the strategies and activities needed to achieve this goal. The Boulder City Council had also passed a similar resolution and in 2006 became the first city in the nation to pass a carbon tax ballot measure to provide the resources to support a Climate Action Plan.

Boulder County conducted a Greenhouse Gas Inventory in 2006 to identify the main emission sources and a Mitigation Study in 2007 to identify the most promising opportunities to reduce emissions. Subsequently, county staff drafted a Sustainable Energy Plan and in 2008, Boulder County Commissioners and all of the cities/towns in Boulder County adopted the plan by resolution. The plan identifies 20 key strategies to reduce greenhouse gas emissions 11% below 1990 levels by 2020. With this plan, the county set out to implement actions to significantly reduce greenhouse gas emissions.

Boulder County and the partnering municipalities of Boulder and Longmont have a long history of implementing energy efficiency programs at varying levels. In 1993, Boulder County Public Health (BCPH) began a business certification program called Partners for a Clean Environment (PACE). Having certified more than 300 businesses for their environmental achievements over the years and conducted site visits with nearly 1,000 businesses a year, the BCPH PACE team members already had been identified by businesses as a trusted environmental advisor. Furthermore, the City of Longmont received a grant in 2009 that was implemented by BCPH and successfully demonstrated the energy advisor model as enhanced by incentives. This model became the backbone of the commercial EnergySmart service.

For the residential sector, Boulder County began in 2006 to work with local non-profit agencies to offer energy audits and implementation assistance, reaching about 400 homes per year with the Residential Energy Action Program (REAP). At the same time, the City of Boulder's Local Environmental Action Division began researching and designing a full-service advisor model to integrate energy assessments and upgrade assistance. The plan for this model was completed shortly before Boulder County's BetterBuildings grant application was submitted, and formed the basis for the residential EnergySmart program.

PROGRAM NAME	RESIDENTIAL	COMMERCIAL
Partners for a Clean Environment (PACE) 1996 – 2010	N/A	1,000 business site visits/year Approx. 20% conversion rate (advisor visit to implementation of environmental project)
Residential Energy Action Program (REAP) 2006 – 2010	465 Energy Audits in 2009 311 Energy Audits in 2010 Less than 15% conversion	N/A
EnergySmart 2011 – now	6,700 participating households/year 70% conversion rate (single family households)	1,120 participating businesses/year 33% conversation rate (advising to upgrade)

In 2009 when Energy Efficiency and Conservation Block Grant (EECBG) funds became available to communities across the country, Boulder County was ready to move directly into implementation, having already conducted significant program planning and evaluation.

Partnerships Critical to Success

The success of EnergySmart is highly attributed to the partnerships that were created across the communities of Boulder County and these communities' wealth of experience and contributions to thoughtful program design.

Each municipality could have developed their own unique programs with individual names, logos, and branding. However all partners quickly realized that this approach would lead to confusion among businesses, residents and local contractors across the county. Many meetings and compromises have been required to bring all of the parties together to create one unified program that would meet the diverse and distinct needs of each community. Given the Board of County Commissioners wanted to encourage as many businesses and residents to participate as possible, they made the executive decision that the program would be on a first-come, first-serve basis and that if any one community wanted to encourage greater participation they could do so through additional funding and/or building code regulations (i.e. SmartRegs).

In addition to key local city partners and local utilities, EnergySmart competitively selected vendors for the various components needed to successfully implement a robust energy efficiency program. The following table lists the key city partners, utility partners and vendors as well as their roles in the program.

KEY PARTNER NAMES	ROLE WITH ENERGYSMART
City of Boulder	The City of Boulder had developed a program plan for an advisor-model residential energy efficiency service. The City's Climate Action Plan (CAP) tax funds energy efficiency services in the City, including enhancements to residential and commercial EnergySmart services. The City also leveraged funding from the City's EECB grant through the Department of Energy.
City of Longmont	The City of Longmont received a grant in 2009 that was successful in working with businesses using the energy advisor model and incentives, and became the backbone for the commercial EnergySmart service. The City supported EnergySmart with funding from the city's general funds as well as their respective EECB grant.
Platte River Power Authority (PRPA)	PRPA was an active participant providing technical expertise, program design guidance, and support marketing the program to potential participants.
Xcel Energy	Xcel Energy supported EnergySmart by donating compact fluorescent light bulbs and energy-efficient showerheads for EnergySmart customer within Xcel territory. Xcel Energy offered a $200 rebate to the market rate cost of $335 for a home energy audit, including a blower door test and infrared imaging. The Xcel rebate lowered the audit cost to a palatable $135. Xcel provided technical expertise as well.
VENDOR NAMES	**ROLES WITH ENERGYSMART**
Boulder County Public Health (BCPH)	Implementation of the commercial program
Populus, LLC DBA Populus Sustainable Design Consulting	Implementation of the residential program
Cadmus Group	Design of EnergySmart brand, logo and tagline, as well as the first iteration of the EnergySmart website. Marketing plan included messaging strategies to homes and businesses, baseline survey of awareness to various brands in the energy field, and innovative outreach strategies.
Walden Hyde	Marketing designs & outreach materials for ongoing program

Franklin Energy Services	Design, pilot and implementation of business energy sweeps; Pilot database development for business tracking; and Design and pilot of commercial refrigeration and air compressor optimization
Nexant	Implementation of commercial building HVAC and refrigeration optimization services; Conducted commercial project measurement & verification; and Developed commercial case studies
Group14	Technical support to the commercial team
Cypress, LTD	Processing and management of rebates
EnergyLogic	Contractor trainings for residential sector
Colorado Green Building Guild	Contractor trainings for commercial sector, as well as marketing of all contractor trainings
ICF International, previously known as Symbiotic Engineering	Database management, primarily for the collection and analysis of energy usage data
Salesforce	Licenses for staff to utilize the cloud-based customer tracking database
Vertiba	Technical support and training to BCPH for business customer tracking database
BBC Research	Survey and analysis to understand demand for commercial and residential loan products within Boulder County and within City and County of Denver
Harcourt Brown & Carey, Inc	Support for the design and ongoing technical assistance for an energy efficiency loan product
Elevations Credit Union	Loan servicing and marketing for loans
Colorado Housing and Finance Authority	Management of escrow, reflow, and loan loss reserve accounts for Boulder County and City/County of Denver financing products

PROGRAM DESIGN & CUSTOMER EXPERIENCE – ENERGYSMART

Before EnergySmart, energy efficiency programs and incentives were offered, but the goal of reducing energy consumption through widespread permanent upgrades was not being achieved. Many previous energy audit programs in Boulder County and elsewhere saw strong levels of participation, but low follow-up to completed energy upgrades. While many utility companies offer rebate incentives, the uptake of these incentives is often low due to the complexity of the application process. The team of energy advisors made available to

businesses and residents through EnergySmart drove program success. The energy advisors work one-on-one with businesses and residents to identify, prioritize and implement energy efficiency projects. The program provides a variety of services including step-by-step energy advising, personalized energy assessments, rebates, loans, assistance with finding contractors, technical assistance, data tracking, and project monitoring and verification for quality assurance. The combination of the Advisors' step-by-step assistance along with rebates and financing has effectively addressed many key barriers, resulting in energy efficiency improvements and happy customers.

PROGRAM DESIGN & CUSTOMER EXPERIENCE – RESIDENTIAL

The residential side of EnergySmart serves all households in Boulder County including single family and multi-family properties. Residents connect with a home energy advisor by phone or in person. There are three service options:

- An energy assessment for $135[3] to understand where energy is lost in the home, including a blower door test and infrared imaging. The following services are also included:
    - The advisor installs instant energy-saving items such as CFLs, water-saving showerheads and faucet aerators, water heater pipe insulation and a programmable thermostat when appropriate.
    - Step-by-step implementation assistance includes Advisor guidance to explain the assessment results, find contractors, apply for rebates and financing.
- A home visit for $50 with an advisor consultation, including the direct installs described above, guidance in finding contractors, and assistance with rebates and financing.
- Phone advising for free is available to answer questions and get tips based on results from similar homes, for those homeowners who aren't ready for a full energy assessment or who prefer help in upgrading one measure.

For all service options and to maximize the rate in completion of energy upgrades, the Energy Advisor will provide assistance to the resident in finding contractors and reviewing bids, and applying for all available incentives, at no additional cost.

The residential EnergySmart service works with each homeowner to assess their personal goals and the status of their home energy systems. The most frequently selected option is the full home energy assessment, to evaluate opportunities for savings and reduce energy waste.

[3] If a homeowner already received an energy audit within the previous three years, they can receive energy advising to move forward in the implementation of those audit recommendations.

EnergySmart also has great success offering an "advisor-consultation only" service for people that are not interested in a thorough assessment of their home and only want assistance finding a contractor or navigating rebate requirements on an already-identified upgrade project.

CITY OF BOULDER SMARTREGS

The City of Boulder SmartRegs ordinance, adopted in September 2010, requires all rental housing to meet a basic energy efficiency standard by 2019. Rental housing represents about half of this City's housing stock. EnergySmart provided an easy, voluntary way to achieve the SmartRegs requirements. As a result, many of EnergySmart's residential participants have been property owners working to comply with SmartRegs.

A frequent customer type is rental property owners. The City of Boulder has established a first-of-its kind policy, called SmartRegs (see description to left). EnergySmart rose to the opportunity to create and manage an extremely innovative compliance pathway to this policy – working with landlords and property managers to upgrade rental properties easily and affordably.

> "My advisor made it easy to prioritize what could be done to make my home more comfortable year round."
>
> - Tom, Lafayette resident

PROGRAM DESIGN & CUSTOMER EXPERIENCE – COMMERCIAL

The commercial side of EnergySmart serves business owners, commercial property owners and managers. It is open to any business in Boulder County but was designed to target small to medium sized businesses, which are generally underserved by existing utility programs and tend to have fewer resources to pursue energy efficiency upgrades. The success of the program derives from its flexibility in targeting business with the level of assistance they need. While businesses may jump right into the upgrade stage because inefficient equipment is readily apparent, such as T12 fluorescent lighting or inefficient roof-top units, energy assessments are a great place to start to ensure all opportunities are identified and prioritized. The program launched with a three-prong design that (1) engaged businesses to discover energy-saving opportunities through energy Assessments, (2) addressed existing heating and cooling systems, refrigeration equipment and air compression through

Optimization, and (3) moved businesses to Upgrade outdated lighting, HVAC, motors, and other equipment. Businesses entered at any stage in the process, depending on their needs.

- EnergySmart offers free energy assessments to business owners and commercial property owners to "Discover" energy- and cost-saving opportunities. An EnergySmart Advisor completes this assessment, doing a walk-through and using a checklist as a guide to survey the building's equipment efficiency and any operational improvement opportunities.

- EnergySmart offers the often-overlooked option to "Optimize" existing equipment, in cases where businesses have equipment that is poorly maintained or performing inefficiently. The equipment is not yet at end of life and the business may not have the capability to invest in new capital equipment. EnergySmart offered three optimization services: (1) Refrigeration, (2) Heating, Air Conditioning and Ventilation (HVAC), and (3) Air Compressor Optimization. For the HVAC optimization, businesses could qualify to receive up to 75% off the cost of a building optimization, resulting in an out-of-pocket cost typically less than $4,000.

- The third service area assists businesses who are ready to "Upgrade" equipment that is no longer performing efficiently or is at the end of its useful life. While rebate programs are commonly offered by utilities to medium and large companies, the involvement of Boulder County energy advisors in the identification and distribution of rebate funds on the scale of EnergySmart is truly innovative. EnergySmart commercial energy advisors have identified and created rebates for more than 120 energy-efficient measures. Rebates were offered for lighting, delamping, sensors and controls, furnaces, boilers, roof-top units, split systems, air side economizers, evaporative cooling, food service and grocery equipment, refrigeration, motors, fans/pumps, variable frequency drive compressors, computer servers, window film, and renewable energy.

For all service options and to maximize the rate in completion of energy upgrades, the Energy Advisor provides assistance to the business or property owner in finding contractors and reviewing bids, and applying for all available incentives, at no cost.

> "We couldn't have done it without the support of the EnergySmart Advisor."
>
> - The W.W. Reynolds Companies, local property owner

OUTREACH & DRIVING DEMAND

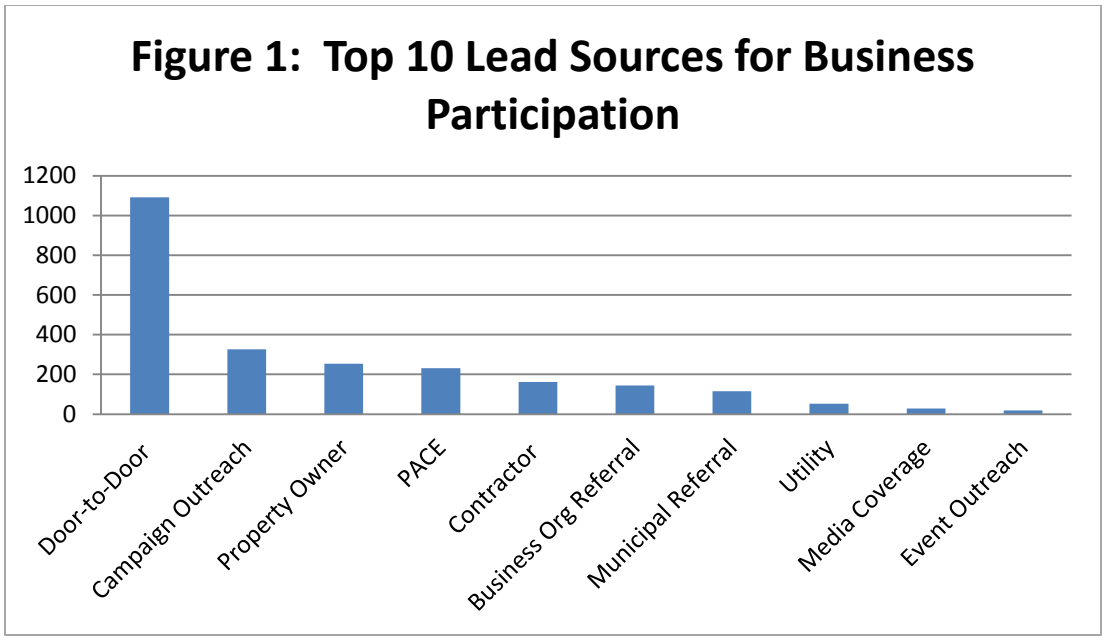
A crucial objective of the EnergySmart program in Boulder County is to begin establishing new social "norms" around energy efficiency. Previous local efforts have involved several hundred homes and businesses in assessments, upgrades or rebates, but have done little to reach beyond the crowd of "early adopters." EnergySmart set and achieved ambitious goals to reach 10,000 households and 3,000 businesses, certainly impacting far more than the previously active early adopters. This larger base of "normal" residents and businesses participating in energy-related upgrades gives a foundation for increased local discussion and interest in other future energy or related projects.

EnergySmart has based its marketing efforts on national research indicating the need to move energy upgrade programs away from purely environmental messaging, which inspired staff to create outreach messages around more universal wants such as comfort, ease, health, and saving money. By attaching environmental benefits as a "bonus" feature to these more basic desires, energy efficiency was expanded from the "hero" or environmentalist realm to the normal realm for any resident or business.

EnergySmart worked with local consultants to develop innovative outreach strategies based on social marketing principles. Social marketing combines traditional marketing with socially desirable goals. The focus is therefore to promote behavioral changes within target audiences to achieve positive social change. While these tactics are beginning to gain traction across the country, there are still few energy-related programs using social marketing outreach and messaging strategies. EnergySmart has focused on reducing customers' key barriers to energy improvements, including lack of trusted contractors, time and hassle involved in upgrades, lack of upfront capital, and confusion around rebate forms – and increasing the awareness of upgrades as a path to consumer benefits, such as improving comfort, increasing health and safety, and reducing energy bills.

Reaching out to businesses and residents through trusted sources is one of the main outreach strategies that have supported program participation. The Boulder County Public Health PACE team members already had been identified by businesses as a trusted environmental advisor. This was the initial vehicle that was used to get the word out to business on the program and the roster of existing PACE participants was the first set of businesses EnergySmart approached through door-to-door outreach. Business Advisors also completed targeted outreach campaigns (i.e. property owners, office buildings, businesses with refrigeration).

EnergySmart has worked closely with local residents to reach out through existing community clubs and organizations to reach them where they already gather with trusted friends. Figures 1 and 2 demonstrate the top 10 ways that businesses and residents hear about EnergySmart and participate. Most enrollments come from face-to-face outreach (i.e., contractors, local county and city staff, Populus staff, property owners and friends).



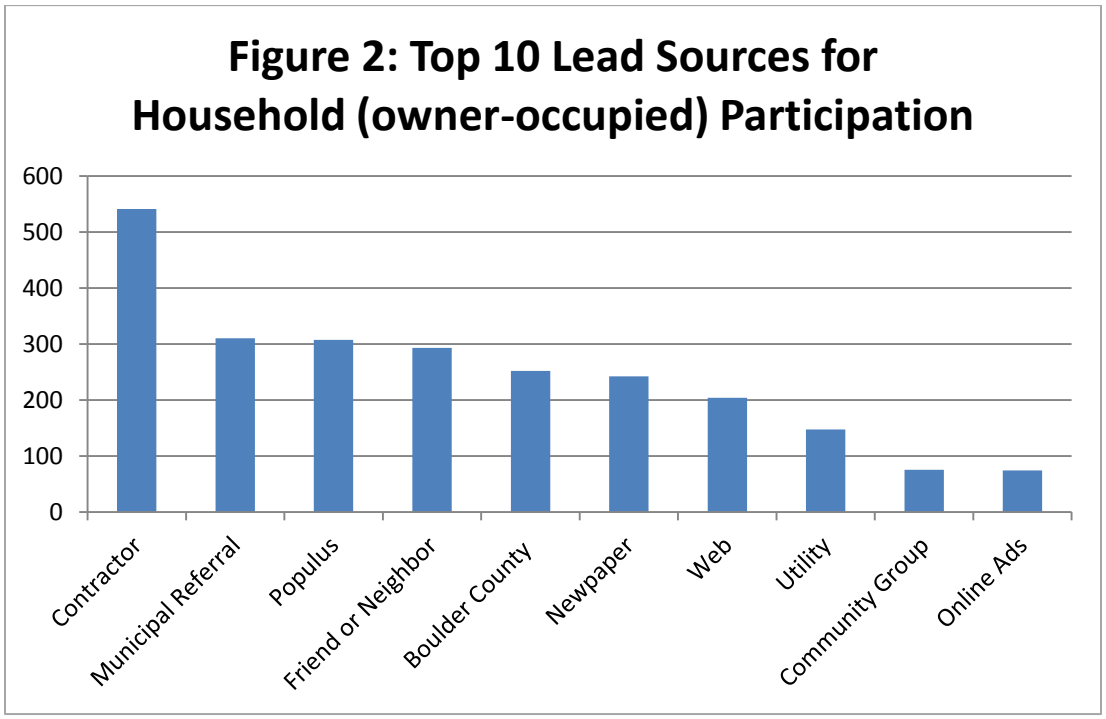


Figure 2 shows how owner-occupied households heard about the EnergySmart program. For tenant-occupied households, over 54% of the residents heard about EnergySmart and enrolled due to the SmartRegs ordinance.

The following marketing and outreach methods were completed during the EnergySmart three-year grant period.

Face-to-face outreach:

- Presentations to more than 250 local club, chamber, and community organization meetings
- Presence at more than 170 local festivals, fairs, farmers markets, etc.
- Door-to-door outreach, including trusted PACE staff contacting businesses and door hangers distributed by volunteers around County
- Cold call phone campaigns to businesses, with targeted program offerings by sector


LIGHTING UP ENERGY SAVINGS AT THE KANSAS AVENUE OFFICE PARK

energySMART Your Efficiency Solutions

KANSAS AVENUE OFFICE PARK
1500 Kansas Avenue, Longmont, CO

BUILDING USE: single story office/light industrial

SQUARE FOOTAGE: 57,600 (total building) 28,800 (upgraded areas)

"It was a significant improvement to the overall lighting and the energy efficiency of each space. Where we did the upgrade in vacant space, it was a selling tool to future tenants. They will get the benefit of cost savings, better lighting, and not have to worry about the obsolete bulbs and ballasts for future repairs."

— LYNN JOHNSON, ETKIN JOHNSON GROUP

LIGHTING UPGRADES

PROJECT COST	$10,567
REBATES	$10,237
UTILITY	$8,700
ENERGYSMART	$1,537
PROJECT COST AFTER INCENTIVE	**$330**
ENERGY COST SAVINGS/YEAR*	$2,300
PAYBACK (YEARS)	**0.1**
LBS. OF CO_2 SAVINGS/YEAR	65,500

CALL 303-441-1300 EMAIL signupbiz@EnergySmartYES.com VISIT www.EnergySmartYES.com

Case studies and testimonials, collected from past participants, used online and at events.

- Hosted several Community Energy Parties with past participants showcasing home to potential participants
- Outreach to large and medium-sized employers to arrange presence at employee fairs, lunch-and-learns and brownbag presentations
- Featured home stops of local sustainable home tours and public events

Articles:

- Press releases prepared internally and distributed to local publications
- Articles written in partnership with local reporters
- Op-eds written by program participants and published locally


EnergySmart for Businesses

PACE

September 2012

Announcements

Businesses Receiving Advising & Rebates:

2,213

EnergySmart Business Awards Winners Announced!

The Boulder County Commissioners andEnergySmart program staff hosted the first EnergySmart Business Awards on Tuesday, August 28, 2012, at the Hotel Boulderado to congratulate businesses for their achievements in energy efficiency. Click here to find out more on the awards and this year's winners.

Rebates Available through Energy Loan

While EnergySmart rebate funds for commercial upgrades are fully expended for 2012, EnergySmart received $25,000 in rebate funds available to businesses and commercial properties that are approved for an energy loan. Click here to learn more.

Helpful Resources

Featured Case Study

The Etkin Johnson Group has always been interested

Digital communications:

- Public facing program website, including success stories and testimonials collected from past participants
- Social media presence on Facebook, Twitter, YouTube
- Geographically and interest-targeted ads on Yahoo.com and local news sites
- Direct email campaigns sent to >40,000 emails addresses of Boulder County homeowners and businesses
- Email newsletter posts sent to members of many partnering clubs and organizations

- Email blasts sent to employees of internal program partners (Boulder County, cities of Boulder and Longmont)
- BoCo deal enrollment coupon run with local email-discount site

Television or video:

- Segment with state-wide “Colorado and Company” on Channel 9 news station
- Ongoing interview segments on City of Boulder local access news
- Shared program-created video content of recorded meetings, program presentations, promotional videos, leader participation videos and peer-to-peer panel recordings on public access stations in several municipalities

Traditional ads:

- Paid advertisements in newspapers
- Paid advertisements in magazines and green publications
- Online advertisements
- Radio spots on public and private stations

Direct mail:

- Direct mail letters from elected officials and utilities
- Direct mail brochures sent to targeted commercial sectors (i.e. restaurants, offices, property owners) with customized messaging and featured success stories

Outdoor:

- Public bus post and banner ads, on side and back of busses as well as bus stop shelters
- Yard signs posted in yards of opted-in participating homes
- Decals displayed in windows of opted-in participating businesses
- Promotional signs posted in partnering hardware stores
- Large program stand-alone displays in public spaces, including libraries, rec centers, museums and city buildings.

Boulder County used traditional marketing and social media to have a steady public presence of the EnergySmart brand. EnergySmart has also taken several innovative approaches to drive demand for energy improvements:

Carrotmob Boulder was a campaign started by students at the University of Colorado, Boulder and CoPIRG Energy Service Corp., that sought to influence local businesses to promote environmentally friendly and sustainable practices. A carrotmob is a contest among businesses in the University Hill district to see which one will make the biggest commitment to a social cause (in this case, reducing energy use). Customers were then encouraged to patronize the

business that won the contest over a period of time. This "buycott," as opposed to a "boycott," used a "carrot" rather than "stick" approach.

Many businesses in Boulder County do not own their properties, but do pay the energy bills. Although the property owner has the capital and responsibility to upgrade building-wide energy technology, efficiency does not top their priority list. EnergySmart and its partners in the cities of Boulder and Longmont reached out to property owners directly and through commercial brokers' groups. The City of Boulder organized and hosted a design charette with large property owners located within the City. At this forum, large property owners expressed their interests, ideas and concerns regarding investment in energy efficiency improvements to their properties. Their suggestions were incorporated into the EnergySmart offerings. With support from EnergySmart, forward-thinking property owners decided to replace large quantities of lighting and HVAC equipment, with the support of a dedicated Energy Advisor and EnergySmart rebates. The example and competition of these respected community leaders soon brought other property owners to the table.

Boulder County conducted a Home Energy Makeover contest and through a rigorous application process, five homeowners were awarded energy efficiency improvements. In partnership with the trades, contractors donated materials and services in support of these sweepstakes and received some marketing recognition. The Home Energy Makeover was intended to help promote the program to others.

EnergySmart also reached students and their families with the Kilowatt Kidz program. Students learned about energy-saving behaviors through characters like Kilowatt Kid, Count Plugula, and Dr. Drafty. This program has reached thousands of students in Boulder County and has resulted in greater awareness of energy efficiency throughout Boulder County.

Several large employers partnered with EnergySmart to offer their employee "points" toward their institutional wellness initiatives for participation in an EnergySmart "Healthy Home" seminar. This initiative helped drive additional enrollments for an EnergySmart home energy assessment. This innovative initiative was also offered to employees of Boulder County, integrating into the existing employee wellness program. This effort was successful in integrating home health, safety and efficiency into existing, successful, wellness-focused programs.

WORKFORCE DEVELOPMENT & CONTRACTOR TRAINING

EnergySmart has worked with the local contractor community to establish and enforce high industry standards for work done through the EnergySmart program. Residential contractors are screened for licenses, certifications and insurance before being able to do any work for the program, and after being approved, agree to have a percentage of their work inspected for accuracy and compliance with standards. Many residential contractors have sought new certifications and licensing to continue to compete under these new local standards. EnergySmart communicated regularly with the commercial contractor network on the program's latest incentive information and trainings.

Because many residential contractors did not have the necessary skills to adequately comply with these high standards, EnergySmart staff has worked with local organizations to offer trainings that help contractors in every phase of their business. Training topics have included technical skills and installation, sales and marketing skills, and business development. EnergySmart has offered several sales and business development courses, aimed at assisting contractors to create business plans and budgets, improve customer service skills, and positively market their services to new customers.

Boulder County offered three training sessions call "BPI Lite" early in the EnergySmart program. This was a basic building science 101 class that was designed for residential installers that didn't have any building science exposure. Boulder County hired Energy Logic who conducted the hands-on training, including one day in the field and one day in the classroom. Commercial contractor trainings were also offered and covered technical advances in lighting, heating and cooling as well as sessions on rebates, financing, sales training and using success stories. Boulder County partnered with the Colorado Green Building Guild to market these trainings, tapping into their strong trade ally network.

A new CAZ testing and House-As-A-System training for HVAC contractors was launched later in the EnergySmart and Denver Energy Challenge programs. A 2-day subsidized class was offered, including classroom and field instruction, and the training was augmented with mentorship from the programs' Contractor Manager. Furthermore, these contractors had access to the interplay CAZ simulation so they can practice the CAZ procedure and not put any homeowners at risk. The process ends with the trainer coming out to observe each contractor perform the procedure and verify competency. This is offered to both Boulder and Denver County residential contractors.

By instilling high performance standards, with technical training to support acquisition of skills, EnergySmart and program partners are helping to raise installation and operations standards in the local industry. The effect of these trainings is beginning to be apparent with local residents, who know to look to EnergySmart contractors for quality service and installation.

EnergySmart offered the following trainings, often in conjunction with trade ally and utility partners.

Contractor Trainings					
Topic	**Residential**	**Commercial**	**Length of class**	**# of times**	**Class size**
2011 Trainings					
Condensing Boilers		x	90 min	1	15
Lighting - LED's, Delamping		x	90 min	1	28
Access to Capital		x	90 min	1	10
Rebate Training		x	90 min	2	60
EnergySmart Info Session		x	90 min	1	27
Business Planning, Budgeting	x		4 wk series	1	10
Air Sealing and Insulation Training	x		2 day	2	10
Sales Training	x		2 hrs	1	15
2012 Trainings					
Evaporative Cooling		x	90 min	1	14
Secrets of Successful Energy Efficiency Contracting		x	90 min	1	30
Success Stories: Showcase and Secrets		x	90 min	1	17
Rebates 2012 Information Session		x	90 min	2	60
New Limited Time Rebates, Financing for Energy Efficiency		x	90 min	1	20
Business Planning, Budgeting	x		4 wk series	1	10
Air Sealing and Insulation Training	x		2 day	3	10
2013 Trainings					
Commercial HVAC Contractor Training - Heating and Cooling Optimization		x	90 min	1	43
Rebates 2013 Info Session		x	90 min	1	30
Sales Training	x	x	3 hours	1	25
CAZ Training for Mechanical Contractors	X		16 hours	1+	5
Blower Door Guided Air Sealing	X		4 hours	1+	10
Advanced Blower Door Training	X		8 hours	1+	5
HVAC Energy Efficient Service for More Profits	x		4 hours	1+	10

FINANCING & INCENTIVES

Boulder County recognizes that incentives (such as rebates or grants) and financing need to be available in the local market to overcome the cost barrier to energy efficiency investment and to balance the subsidy already embedded in fossil energy sources, contributing to low energy prices in Colorado. Three different financing mechanisms have been offered over the time that Boulder County kick-started EnergySmart under the BetterBuildings grant.

#1 Property Assessed Clean Energy (PACE)

Before the launch of EnergySmart, a Property-Assessed Clean Energy (PACE) financing mechanism had been implemented, and it was the first of its kind in the country. During 2009 and 2010, ClimateSmart Loans were offered to Boulder County residential and commercial property owners to fund energy efficiency and renewable energy property improvements. Voters gave Boulder County the authority to issue up to $40 million in bonds to finance these loans. Borrowers pay back the loans through their annual property tax payments. Boulder County originated $1.48 million towards 29 commercial loans and $9.78 million towards the issuance of 612 residential loans. The experience yielded valuable case studies and lessons learned for the consumer loan product that succeeded the ClimateSmart Loans. The appendix includes additional results and reports from the PACE loans.

To drive awareness in the ClimateSmart loans within the bonding timeframe, a rebate of up to $10,000, using BetterBuildings funds, was offered to each eligible commercial property that applied for a loan.

In July 2010, the ClimateSmart Loan Program for the residential sector was put on-hold due to PACE-related issues with the Federal Housing Finance Agency and federal mortgage regulators, Fannie Mae and Freddie Mac. Boulder County started to explore other options for financing to continue to help residents and businesses afford energy efficiency improvements.

#2 Microloans for EnergySmart Residential Program

From May 2011 until May 2012, the EnergySmart residential program offered microloans ranging from $500 to $5,000 to homeowners to encourage the adoption of selected energy efficiency upgrades. Microloans were offered to homeowners, excluding tenants and landlords, at an interest rate of 2.5%, payable over 1 to 3 years. Boulder County was the originator of the microloans. The 2.5% interest rate was calculated to cover the administrative costs of running the loan program only.

Microloans were successful in serving as an interim financing product while Boulder County identified a financial institution partner. $290,000 of allocated BetterBuildings grant funds was distributed to 75 households. To date, this program has had zero defaults in the repayments of these unsecured loans. Microloans were discontinued with the launch of the subsequent consumer energy loans (described in the next section).

#3 Consumer Loans Backed by Loan-Loss Reserve

After PACE was put on hold at the federal level, Boulder County recognized that the local market needed significant and sustained financing to overcome cost barriers to energy efficiency investment. In an effort to determine the participating markets' appetite to take on debt for efficiency upgrades, Boulder County commissioned a market demand study from local consulting firm BBC Research. The study found that 42% of residential respondents would at least consider applying for an energy loan in 2012 if it met or exceeded all of their needs. The mean likelihood rating of those who said they would seek energy loans in the future came out to almost 2/9, which, scaled out to the greater population of Boulder and Denver Counties was enough to warrant moving forward with a loan product. Boulder County then decided to move forward with issuing a Request for Proposals (RFP) to seek a lending partner to underwrite, fund and service the loans to support efficiency upgrades.

As a result, EnergySmart partnered with Elevations Credit Union and the City and County of Denver to develop and deliver low-interest, accessible financing for eligible energy efficiency improvements for homes and businesses. These loans are available to residents and businesses, for projects starting at $500 for homes and $1,000 for businesses. Launched in August 2012, the Elevations Energy Loans offer interest rates starting at 2.75% APR for homes and 3.75% APR for businesses, with the option of 36, 60, 84 and 120 month terms. The eligible measures list for energy loans primarily includes upgrades that reduce energy demand and consumption. However, homes and businesses are eligible for financing of renewable energy installations if they reduce energy consumption by 15% or more through EnergySmart or the Denver Energy Challenge

The launch of the financing on August 8, 2012 was accompanied by launch parties in both Boulder County and Denver and a full marketing campaign. Marketing and outreach included the following:

- An Energy Loan-dedicated webpage on the credit union's existing website, social media including facebook, twitter and blog promotion, in branch promotion, direct mailers, special events, bus ads, B-Cycle (bike sharing) ads, print ads and a large radio campaign.
- Successful engagement with and outreach to the contractor community occurred through several outlets:
    - contracting with a community engagement specialist who outreaches to high-performing contractors specifically about the loan
    - collaborating with the largest local utility to continue to utilize their outreach channels and trade ally network to increase awareness and use of the Elevations Energy Loan
    - continuing communication and education to the respective program's contractor lists, in Boulder County and City and County of Denver.

Boulder County's grant funds in combination with leveraged credit union funds have made $35 million available for local projects. The financing was structured and backed by a loan loss reserve of $7.1 million dollars, funded by Boulder and Denver Counties through a portion of the DOE's BetterBuildings grant. The grant-funded loan loss reserve was critical to making the partnership with a financial institution possible by reducing exposure to risk in the new market of energy efficiency investments. The Energy Advising paired with the financing overcomes the cost barrier to energy efficiency upgrades and eases the often confusing, time-consuming implementation process for existing homes and businesses.

Commercial Rebates

Boulder County established the following goals when designing and distributing the EnergySmart commercial rebates:

- Transform the energy efficiency contractor, trades, and manufacturing sectors so that they better understand, recognize, value, and promote the use of energy efficient equipment.
- Effectively provide rebate opportunities for energy efficiency and renewable energy improvements to businesses across Boulder County.
- Maintain and create partnerships with utilities, the State of Colorado's Energy Office, and communities that will allow for sustainable funding when ARRA funds are depleted.
- Secure the faith and trust of stakeholders and citizens, integral to the new energy economy, that ARRA funds were utilized prudently and successfully.

Boulder County had significant experience prior to the grant working with businesses to encourage utilization of utility rebates for energy efficiency. This experience made it evident that the utility rebates alone did not provide a strong enough incentive to motivate most businesses to install high performing equipment. In the year preceding the BetterBuildings grant, Boulder County worked with Longmont Power and Communications (LPC) to offer a matching grant program to their customers (Longmont is the second largest city in Boulder County). LPC customers could receive up to $5,000 in funds to match the existing rebates offered by Platte River Power Authority (LPC's electrical provider). The additional funding brought total incentives to between 50% and 75% of total project costs and was highly successful. The program formed the basis for the EnergySmart commercial rebate program.

In developing its rebate measures, Boulder County started with Xcel Energy's list of prescriptive rebates. Xcel Energy is the largest electrical and natural gas provider in the county. Xcel Energy's rebates are designed for demand-side management. Boulder County added measures to fill gaps in Xcel's measures list. Boulder County also raised the efficiency requirements on some equipment – most notably natural gas boilers and air conditioning units. Boulder County then set the rebate dollar amounts such that they would cover up to 70% of the average project costs for lighting upgrades and up to 50% for HVAC projects when combined with utility rebates.

Through a competitive selection process, Boulder County contracted with Cypress, Ltd. in Hemet, California to review rebate applications and process rebate checks. Cypress is an energy consulting firm with over twenty years of experience and a focus on working with utilities to develop and deliver rebates. Boulder County relied on Cypress to verify that both the participants and the equipment met the eligibility requirements.

EnergySmart conducted four rounds of commercial rebates between October 2010 and June 2013. There were adjustments to the rebates in each round to address market changes (i.e., improved efficiency, new LED products) and feedback from contractors and businesses. Figure 3 and Table 2 show the results from the EnergySmart commercial rebates.

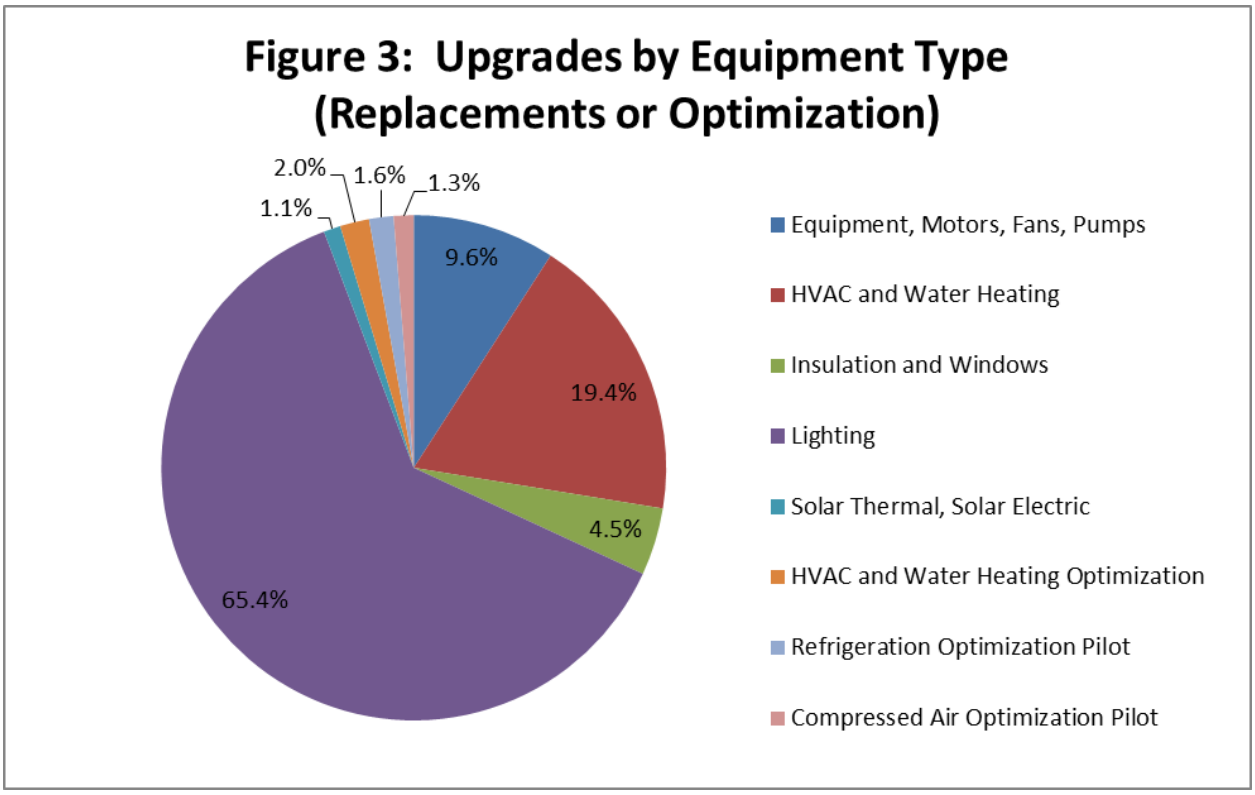


Table 2: Results from EnergySmart Commercial Rebates				
Number of Business Sites who received rebates	Number of Rebates Distributed (#)	Total Project Cost ($)	Business & Utility Investment ($)	Total Rebates Distributed ($)
896	964	$8,863,946	$6,908,759	$1,955,186
Total Savings (kWh)	**Electric Savings (kWh)**	**Gas Savings (therms)**	**Energy Cost Savings ($)**	**GHG Savings (mtCO2e)**
14,053,626	13,694,456	12,258	1,213,439	10,974

Residential Rebates

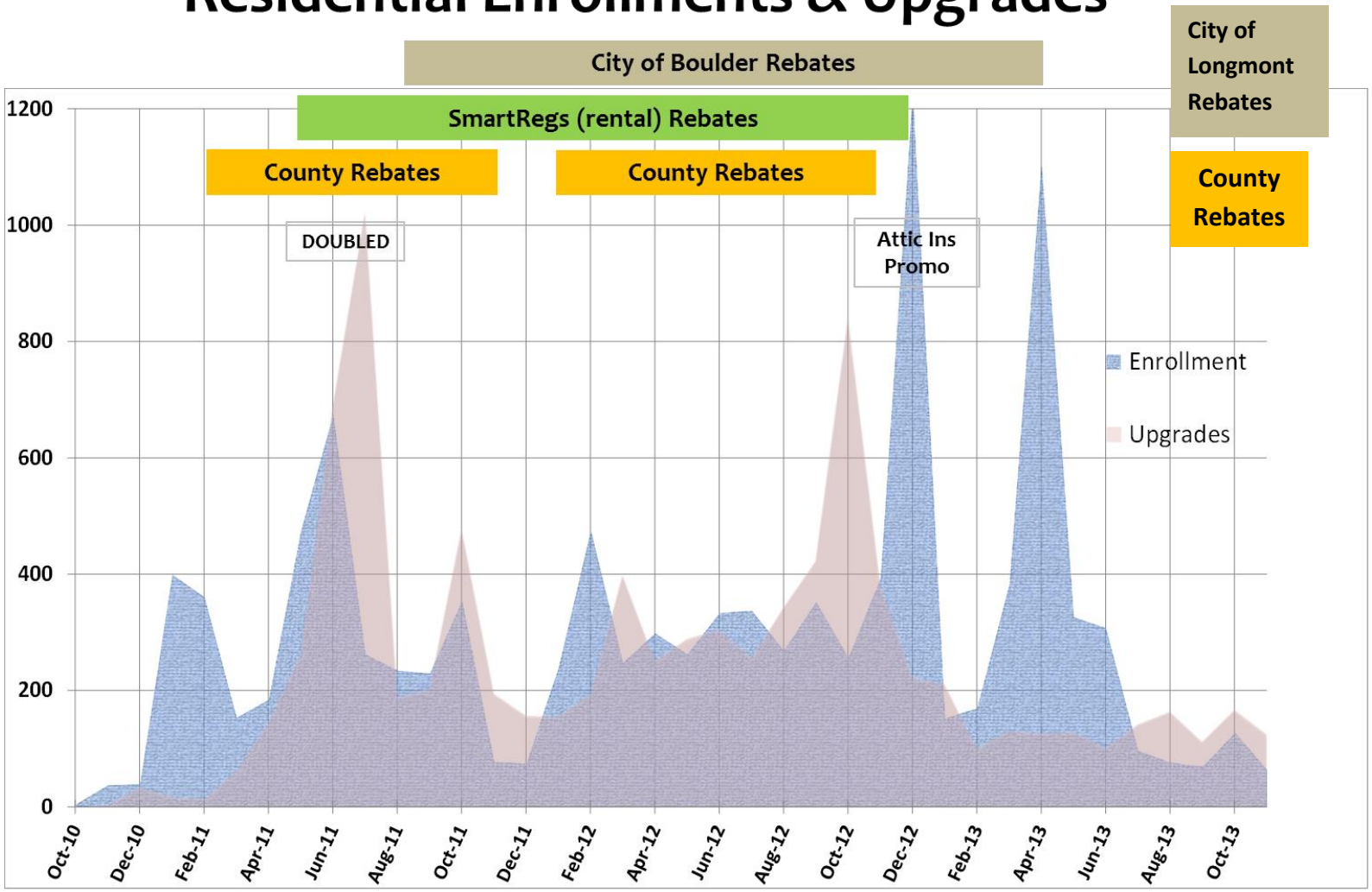
The residential EnergySmart program has employed a number of rebate strategies and rebate levels to address the anticipated seasonal changes in interest by property owners for investing in energy efficiency upgrades. EnergySmart utilized a prescriptive approach and awarded rebates to customers based on the measures implemented. As such, the program attempted to provide continuity through its eligible measures list with other city and utility incentives that were available to Boulder County residents at that time.

Chronologically, in developing its rebate measures, Boulder County tied its prescriptive rebates to the deemed savings of the eligible measures. Due to customer confusion and their assumption that these deemed savings would correspond directly to actual energy and cost savings, the program adopted the method of rebating eligible measures based on a percentage of the total invoiced cost with a maximum cap paid for a specific measure. Program rebate amounts per measure and per household (i.e. when combining one or more measures) have changed or been terminated for brief periods for both single family units (4 units or less), as well as multi-family units ($\geq$ 5 units). The program always endeavored to notify participants, 30 days or more, before a change took place.

One rebate initiative to note during the grant was when the residential program instituted a "Double Rebate" promotion from May 1-July 31, 2011. During this period, the rebate levels increased from a maximum of $250 per measure to $500 per measure (with a $1,000 per home cap for multiple measures). Coupled with existing utility and city (Boulder and Longmont) rebates, this made a compelling case for a homeowner to go forward with an upgrade. However, as the deadline for completing these upgrades approached, the contractors in the EnergySmart pool were overwhelmed with work orders to be completed by the end of July. As a result some allowances were made to enable the work to be conducted after the deadline. Contractors gave the program feedback that this was not the most favorable way to conduct business.

Figure 4 provides a timeline showing the rebate rounds, enrollment trends and the completion of residential upgrades.

Figure 4
Residential Enrollments & Upgrades



For residential upgrades supported by EnergySmart rebates, the residential program originally also contracted with Cypress, Ltd to process rebate requests. Cypress processed a check request for a customer, after the accuracy of the request was reviewed by the residential program administrator (Populus, LLC).

DATA & EVALUATION

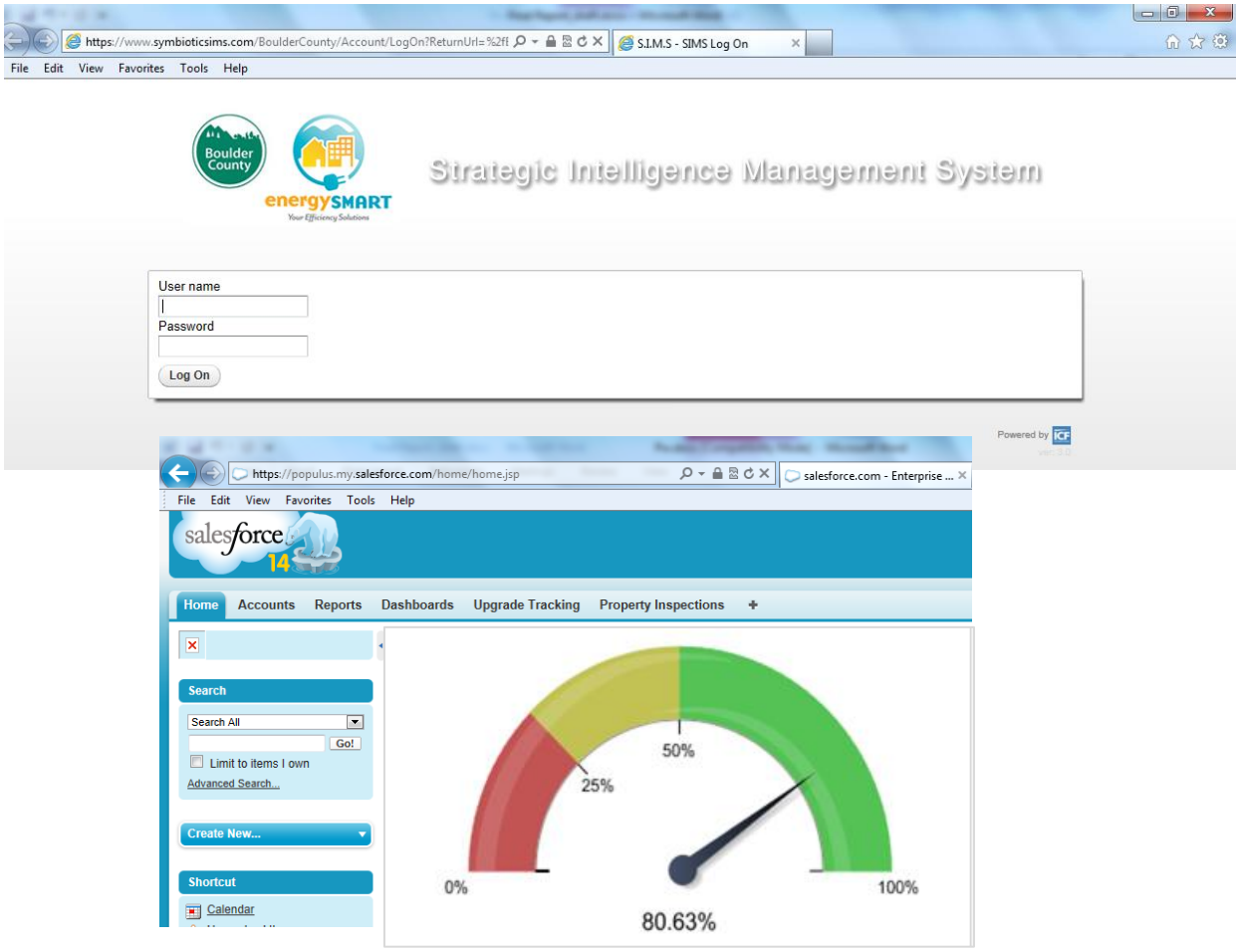
Boulder County has used three databases for data collection, customer tracking and evaluation under the BetterBuildings grant. Two cloud-based databases were established using the Salesforce platform for the residential and commercial programs that accomplish the customer service function, the estimated energy reduction tracking (based on deemed energy savings) and reporting functions of the programs. The design of the database architectures was supported by consultants with Salesforce expertise, and they are managed by the respective residential and commercial program administrators. The third database, Strategic Intelligence Management System, is used to collect and store energy consumption data based on actual utility billing data for the EnergySmart participants who complete upgrades.

Previously, spreadsheets were used to manage data for the predecessor energy efficiency programs. Under this BetterBuildings grant, EnergySmart pursued the more user-friendly, real-time, cloud-based Salesforce system for tracking customers through the implementation process and viewing dashboards of progress. The Energy Advisors access the Salesforce system with iPads or tablets in the field to enter basic customer information, building baseline information, assessment findings for upgrade opportunities, completed upgrades with associated energy and cost savings, rebates and financing received, and the supporting documentation. The Salesforce system also receives data from other systems including the rebate processor. The data is compiled for reporting to various stakeholders including DOE, County Commissioners, and city staff and leaders.

These sophisticated systems allow tracking of many metrics in a much more consistent, accurate and organized fashion than previously. Advisors simultaneously access the system in the field, allowing much greater efficiency and accuracy than the static logging of data upon returning to the office or merging multiple data sheets. In addition to quantitative metrics, EnergySmart logs how customers heard about the program, consistently identify the barriers to action and collect happy customer testimonials.

Customer utility release waivers are forms signed by energy efficiency program participants to release their energy consumption data (electric and natural gas) to a third party. Boulder County requested each participant in EnergySmart sign a customer utility release waiver so that staff could evaluate the program's progress, continue program elements that are working and make adjustments when the desired impacts are not being achieved.

Boulder County has used in-depth systems for customer management and data analysis. These systems provide a base for ongoing programming with significantly lower ongoing costs after this initial development.



Portfolio Manager (specific to commercial sector)

Benchmarking building performance is recognized as a valuable tool for identifying upgrade opportunities, as well as building types for targeted outreach. Public disclosure of benchmark scores allows potential lessees to compare various properties on the basis of their efficiency and likely utility costs. Neither Boulder County, nor any of the municipalities within the county, currently requires benchmarking, although such regulations have been discussed and will likely be considered in the future as a means to encourage efficiency upgrades.

EnergySmart advisors have worked with property owners to benchmark their building portfolios as a way to determine where efficiency efforts should be focused. If the building owner has an existing Portfolio Manager account, EnergySmart advisors collect their login name and password and encourage them to be part of the Building Performance Database. If the business does not have a preexisting account, advisors set up an account for the building and

ask the owner to share their properties with our Boulder County Shared account. Advisors then collect and enter all data necessary to obtain a Portfolio Manager score.

Verifications

Boulder County performed verifications of approximately 5% of the commercial rebates awarded to guard against fraud and to ensure that rebate dollars were being allocated appropriately. The terms and conditions of the rebate application required that businesses allow inspections of completed projects for verification purposes.

Boulder County contracted with Nexant Energy to conduct the verifications for commercial projects. Nexant reviewed the entire rebate application package to ensure that all required documentation had been collected (e.g., utility waivers, historical preservation affidavits, invoices, product specification sheets). Nexant verified that both the participant and the equipment met the eligibility requirements and that the proper rebate amount was awarded. Nexant would then perform an onsite inspection to confirm that the quantities and models of equipment installed matched what was recorded in the application.

Nexant reported the findings from all verifications to Boulder County. Onsite counts of lighting fixtures did not match the rebate application on several large projects. In each case, the contractor was notified and the discrepancy was quickly corrected. Only one case of fraud was identified. A mechanical contractor installed equipment that was both older and different than what was recorded on the invoice. The installed equipment did not meet the efficiency requirements for the rebate. Boulder County attempted to pursue legal recourse, but the contractor had already gone out of business and could not be located.

The residential program administrator, Populus, LLC, reviewed the accuracy of rebate check requests by residential program participants who applied for EnergySmart rebates. Boulder County's finance department conducted further verification review prior to the invoice approval for payment by Cypress. Additionally, the county finance department also conducted random sampling (5%) of rebates to ensure that these payments were appropriate.

ACCOMPLISHMENTS

Since the program launched, EnergySmart has achieved the following:

- Provided energy assessment and/or advising to over 10,900 homes and more than 3,100 businesses, with nearly 75% of owner-occupied households and over 30% of businesses going on to implement energy efficiency upgrades.
- Supported the completion of upgrades in 4,156 households and 896 businesses.
- Issued rebates worth more than $3.75 million. These rebates have spurred local investment in energy efficiency upgrades of more than $23.1 million, sustaining jobs and

economic vitality locally. On average, for every $1 spent in program rebates, $6.2 was invested in the community towards energy efficiency.

- Over $1.7 million in Energy Loans have been funded in Boulder County and the City and County of Denver since the loan product launched in August 2012, helping 150 homes and businesses in just one year overcome cost barriers to energy efficiency investment.
- Saved an estimated 17,471,500 kWh and 1,010,200 therms annually.
- Reduced 19,350 metric tons of carbon dioxide equivalent (CO2e) annually, equivalent to taking 4,030 cars off the road.
- Saved residents and businesses an estimated $2.6 million annually in utility expenses, supporting a healthy economy and environment.
- Worked with more than 260 contractors.
- Provided technical, business development and sales training to contractors, supporting a robust local energy contractor community.
- Proved out viable and replicable program models that local utilities and other communities are adopting, with long lasting market transformation.

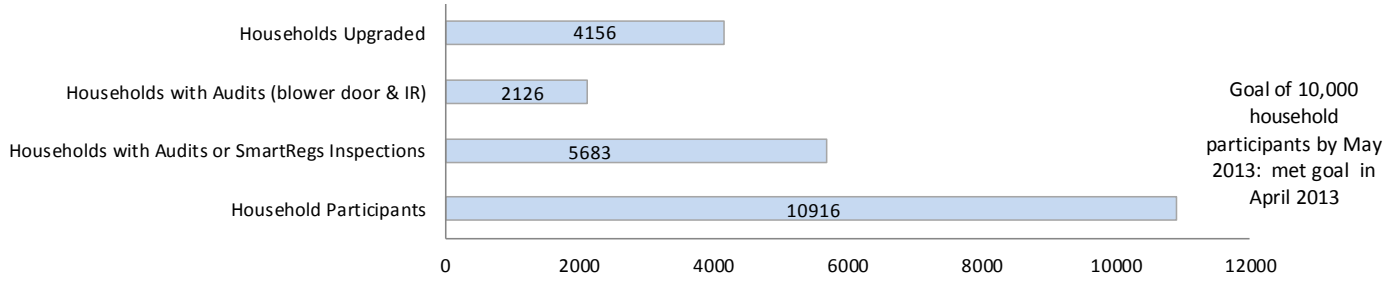
The following tables summarize progress from October 2010 through September 2013 in achieving the goals of the EnergySmart service. EnergySmart was designed, developed and implemented through a joint effort of the Boulder County Commissioners' Office of Sustainability, Boulder County Public Health, the City of Boulder and the City of Longmont. Table 3 reflects the residential accomplishments and Table 4 shows the accomplishments in the commercial sector.

Table 3: Accomplishments by Boulder County Residential EnergySmart through Sept 30, 2013

This summarizes the accomplishments since Oct 2010 in achieving the goals of the residential EnergySmart service. EnergySmart was developed through a joint effort of Boulder County Commissioners' Office, Boulder County Public Health, City of Boulder and City of Longmont. Populus LLC administers the residential service. For more info, visit www.EnergySmartYES.com.

PROGRESS TOWARD GOALS

PARTICIPATION IN ENERGYSMART BY RESIDENTS / HOMEOWNERS



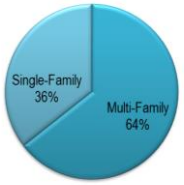
IMPACT

WORK COMPLETED		FUNDING BREAKDOWN	DEEMED ANNUAL SAVINGS FROM UPGRADES & QUICK INSTALLS			
Total Project Investment		Number of Loans	kWh	Therms	Cost Savings	$mtCO_2$
$14,278,909		89	3,777,015	997,933	$1,368,681	8,477
Total Rebates Paid	Private Investment	Total Loans Financed				
$1,792,168	$12,486,741	$928,740				
Total Investment:Rebates*		Active Contractors	Energy and emissions savings from residential EnergySmart are equivalent to taking 1,736 cars off the road.			
7.8 to 1*		95				

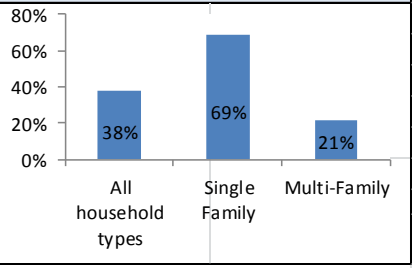
HIGHLIGHTS

- EnergySmart has exceeded its BetterBuildings goal of 10,000 households participating.
- Owner-occupied households have a 73% conversation rate from enrollment to upgrade.
- Since the loan product launched Aug 2012, 89 loans financing $928,740 in energy efficiency upgrades have been issued. The average home project size is $10,700.
- Market Transformation: 95 contractors completed at least 1 energy efficiency upgrade.
- EnergySmart has been recognized by EPA's Climate Leadership Award, and has received the Colorado Environmental Health Association's Innovation Award.

TYPES OF HOUSEHOLDS ENROLLED



ENROLLED TO ACTION



** For every $1 spent in rebates, nearly $7.8 was invested in the community towards these efficiency projects.*

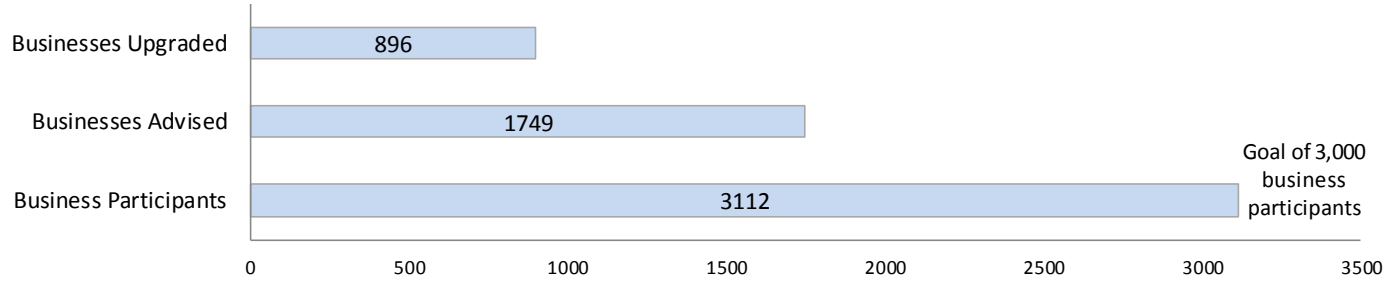
Dashboard design credit: City of Boulder, Boulder County

Table 4: Accomplishments by Boulder County Commercial EnergySmart through Sept 30, 2013

This summarizes the accomplishments since Oct 2010 in achieving the goals of the commercial EnergySmart service. EnergySmart was developed through a joint effort of Boulder County Commissioners' Office of Sustainability, Boulder County Public Health, City of Boulder and City of Longmont.
For more info, visit www.EnergySmartYES.com.

PROGRESS TOWARD GOALS

PARTICIPATION IN ENERGYSMART BY BUSINESSES OR PROPERTY OWNERS



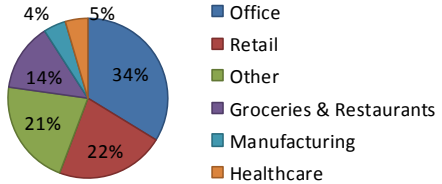
IMPACT

WORK COMPLETED			DEEMED ANNUAL SAVINGS FROM UPGRADES & QUICK INSTALLS			
Total Project Investment		Number of Loans	kWh	Therms	Cost Savings	$mtCO_2$
$8,863,946		5	13,694,456	12,258	$1,213,439	10,974
Total Rebates Paid	Private Investment	Total Loans Financed				
$1,955,186	$6,908,759	$107,510				
Total Investment:Rebates*		Active Contractors	Energy and emissions savings to date from commercial EnergySmart are equivalent to taking 2286 cars off the road.			
4.5 to 1*		167				

HIGHLIGHTS

- EnergySmart has exceeded its BetterBuildings goal of 3000 businesses participating.
- Nearly 900 businesses made upgrades since the beginning of the program.
- Market Transformation: 167 contractors have completed at least 1 commercial energy efficiency upgrade and the availability of high efficiency HVAC equipment has improved dramatically.
- EnergySmart has been recognized by EPA's Climate Leadership Award, and has received the Colorado Environmental Health Association's Innovation Award.

USES OF BUILDINGS ENROLLED



ADVISING TO ACT

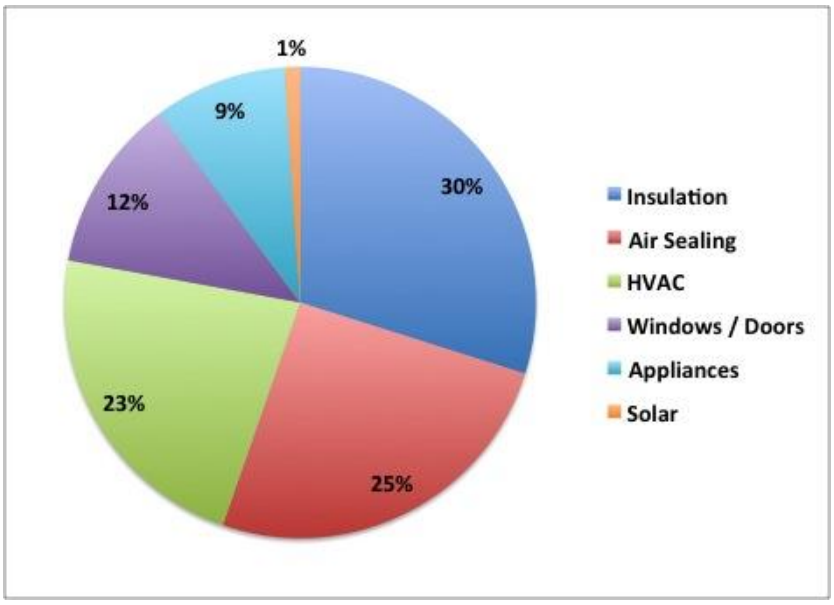
Businesses that make upgrades after receiving EnergySmart advising services:

33%

** For every $1 spent in rebates, $4.5 were invested in the community towards these efficiency projects.*

Dashboard design credit: City of Boulder, Boulder County

The types of measures installed or tuned-up by household participants are shown in the following pie chart. Insulation and air sealing are the most popular improvements, at a combined 55% of the total. These improvements are prevalent because residents discover that their homes have inadequate insulation and air sealing through educational assessments (i.e., blower doors and infrared imaging). Advisors often recommend these upgrades because they tend to be more cost-effective than other potential upgrades and they improve comfort in the home. Figure 3, shown in the previous Financing and Incentives section, depicts the types of equipment installed or tuned-up by business and commercial property owners.

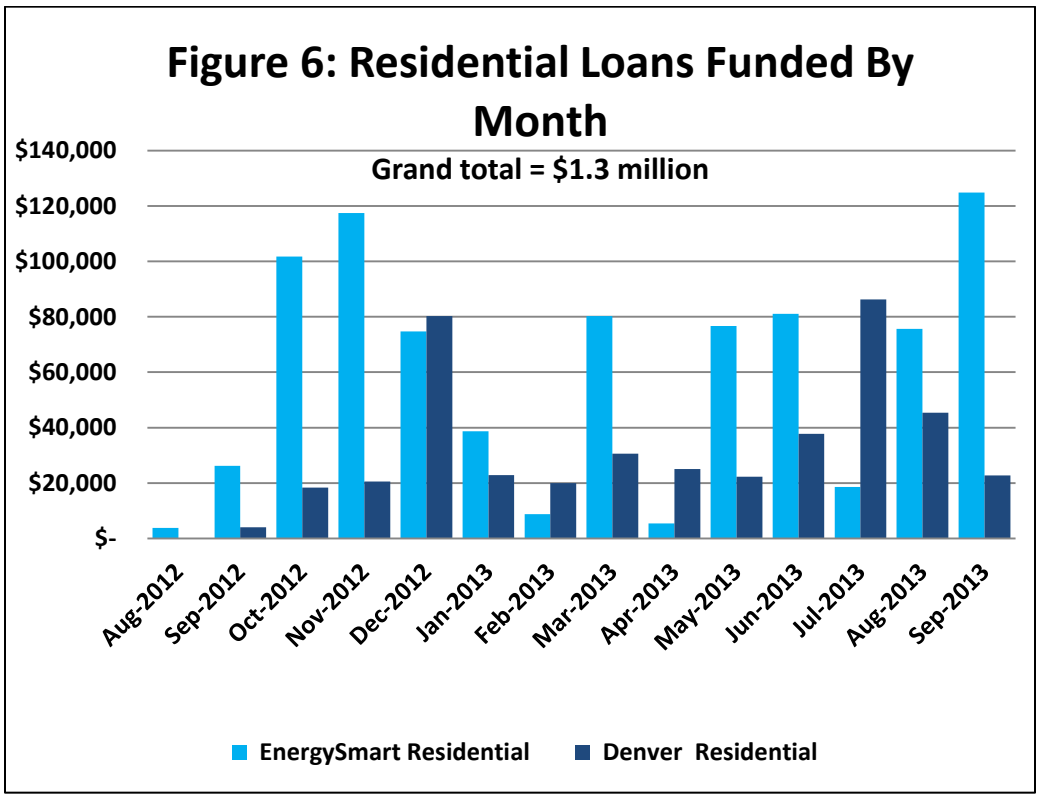


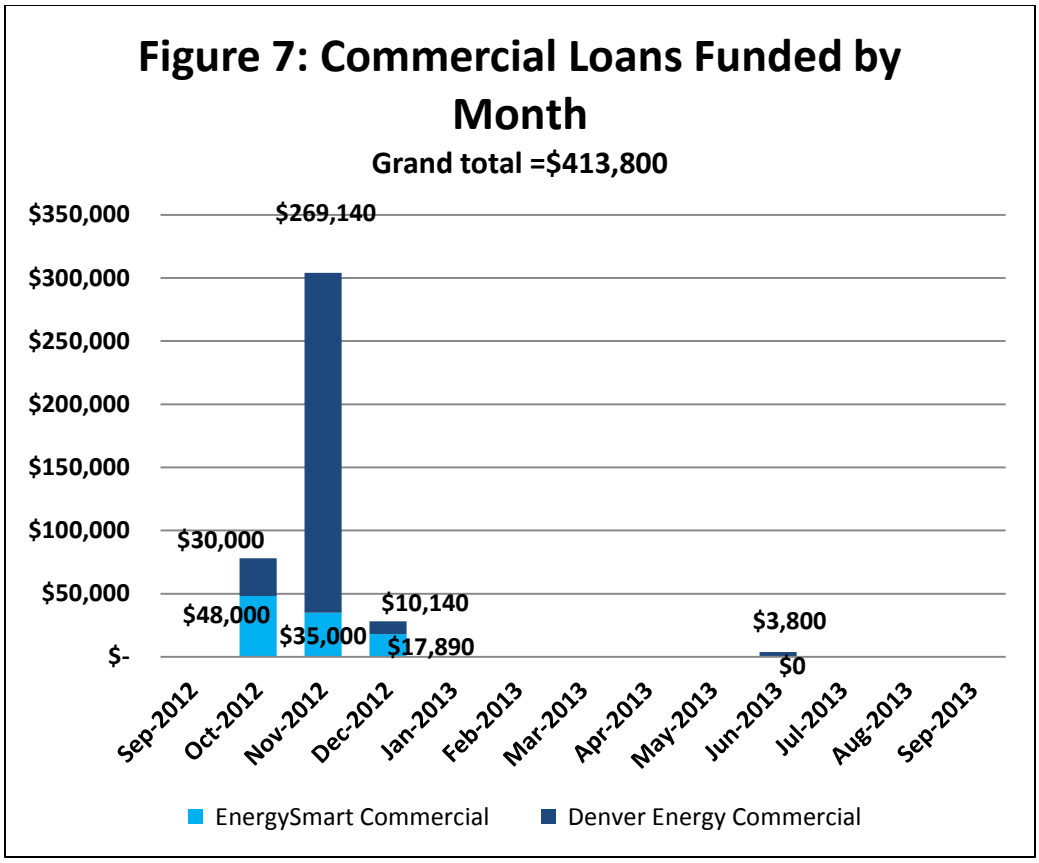
In only a year's time, over $1.78 million in Energy Loans has been funded in Boulder County and the City and County of Denver. Table 5 and Figures 6 and 7 below show the results for the financing product offered by Elevations Credit Union in partnership with EnergySmart and the Denver Energy Challenge since the launch in August 2012.

Table 5: Accomplishments in the Distribution of Energy Loans in Boulder County and the City and County of Denver

	Loan Funds Originated	Number of Loans	Average Loan Size
Both Boulder & Denver Counties	**$1.78 million**	**142**	
Residential	$1.37 million	131	$10,000
Commercial	$413,970	11	
Boulder County Total	**$982,420**	**88**	
Residential	$881,530	82	$10,500
Commercial	$100,890	6	

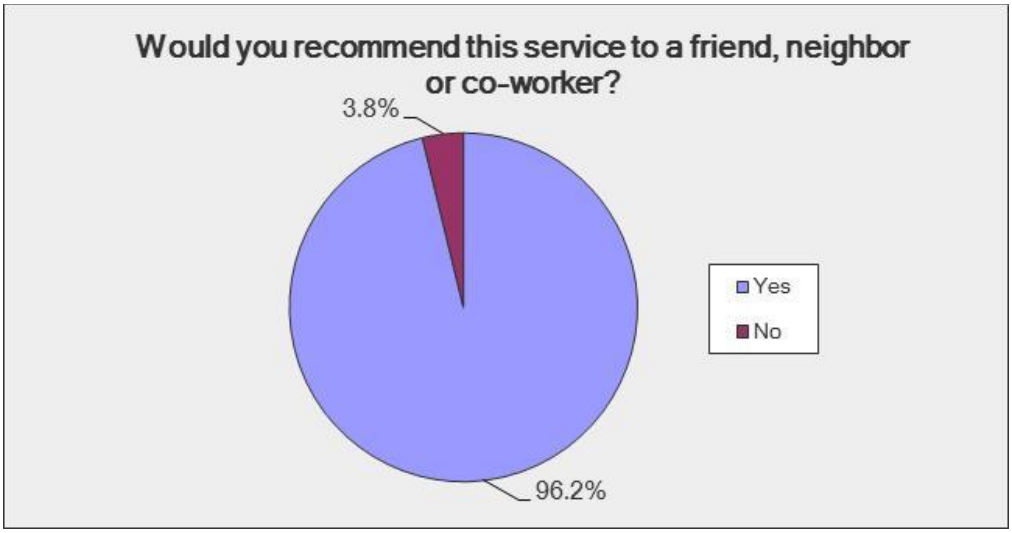
Denver Total	$803,451	54	
Residential	$490,371	49	$10,000
Commercial	$313,080	5	



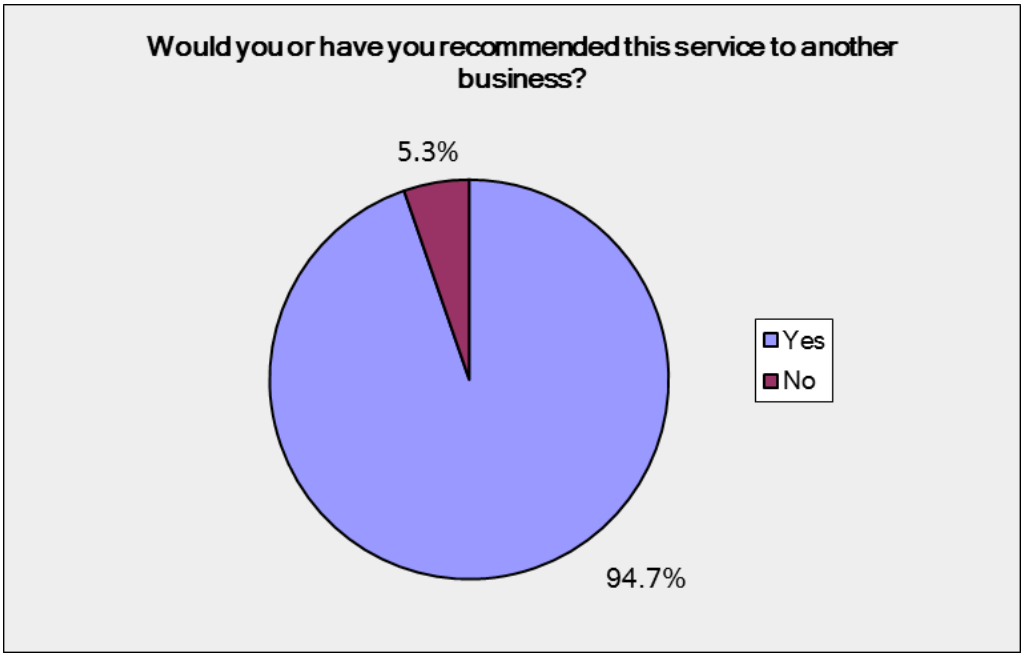


Customer Satisfaction

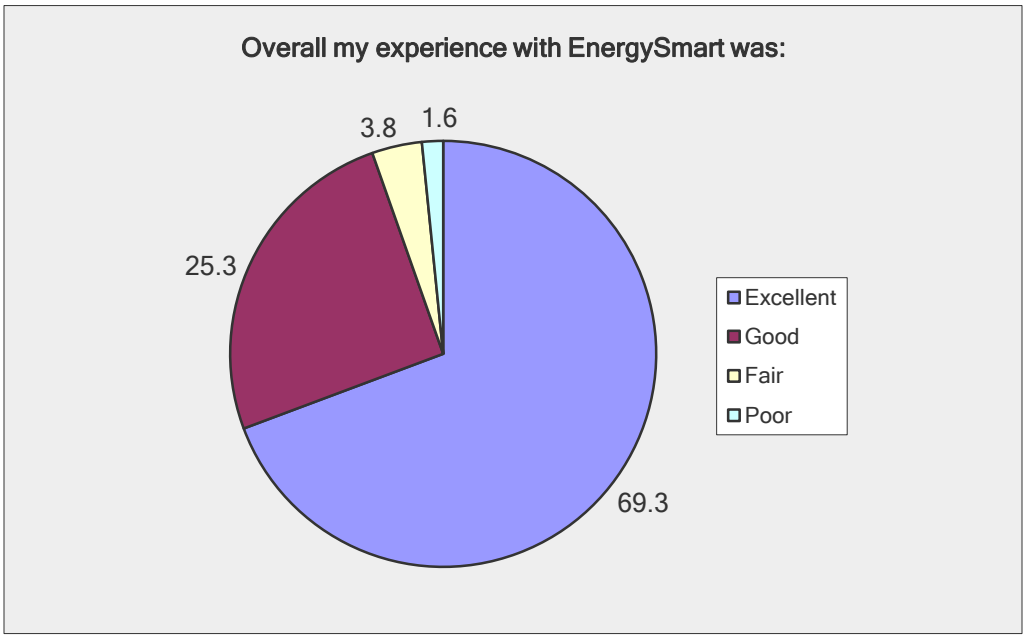
Over 96% of clients would recommend the EnergySmart home service to a friend. The following chart shows the customer satisfaction survey results, with 7% of participants completing the survey.



Over 94% of businesses who participated in EnergySmart have recommended or would recommend EnergySmart service to another business. The following chart shows the customer satisfaction survey results, with 3% of participants completing the survey.



Over the 3 years since EnergySmart launched, 96-98% of residents are satisfied with the overall EnergySmart service.



Success Stories

Lyons Fork achieves greater comfort overnight

"Our building was impossible to heat or cool. We stuck our heads in the attic one day wondering why. It was obvious that the attic had never had any insulation, not in 130 years," says Wayne Anderson. Wayne and Debbie Anderson co-founded the Lyons Fork restaurant in 2010. The Lyons Fork occupies the building at 450 Main Street in Lyons which was the original 1881 McCallister Saloon Building.

Driven by a desire to increase the comfort of their restaurant for customers and employees, this simple poking around lead to a collection of energy efficiency improvements. "Our project was really nuts and bolts, nothing too complicated. There was not a stitch of insulation in our entire building so we had a contractor blow in R-60 insulation. That was huge, for both the efficiency and comfort in the building," says Wayne.

They also added solar hot water which has helped to trim down energy costs. "The electric bill has noticeably decreased since we added it," says Wayne. The Lyons Fork added LEDs and CFLs, removing the hot, inefficient incandescent bulbs. They were happy with the new lighting which accentuated the building's historic character.

Wayne heard about Boulder County's ClimateSmart Loan Program from a restaurant customer, then County Commissioner Ben Pearlman. Wayne contacted the county and they came out and made recommendations. "Everyone was very helpful. Nothing was a giant project. All of it was practical and easy," says Wayne. "We were able to use local contractors, able to give business to locals in the area."

QUICK STATS	
Project cost	$24,224
Rebates	$10,000
Total cost after rebates	**$14,224**
Est. energy cost savings / yr	$1,500
Est. simple payback	**9 yrs**

The building improvements, completed in spring 2011, had a total project cost of $24K. Boulder County provided $10K in rebates. The remainder of $14K is paid by the property owner through annual property taxes. "We've seen an average of 25% annual restaurant growth yet our energy usage has stayed about the same since the upgrades were

completed. And they just raised the rates in Lyons so we're avoiding costs," says Wayne. "We noticed an immediate difference from a comfort standpoint. The building had been drafty, and it became tight overnight."

EnergySmart helps HOA renters, owners, to warmth and savings

In July 2011, Jason Gray, a resident in the Arborwood HOA in north Boulder, called EnergySmart to get help upgrading his attic insulation. Attics at Arborwood are commonly owned by the HOA, which meant that the upgrade would need to be approved by the HOA board. The Arborwood Board thought that more than just Gray's space should be improved. Matt Wilmoth, an EnergySmart Advisor working for Populus, was assigned to the team to help oversee the project.

More than seven months and hundreds of conversations later, Arborwood completed a major improvement to their attic insulation, working with Larry Meeks of Thermal Craft Insulation to upgrade all 88 top-floor units from about R-21 to either R-38 or R-49.

The Stats	
88	Total units added attic insulation & air sealing
42	Rental units
46	Owner-occupied units
11	Individual buildings and attics to insulate & seal
73,000	Square feet of total insulated attic space
$77,364	Total project cost
$30,000	Total rebates received
32%	Expected reduction in total energy use
1	Energy Advisor helping HOA and residents through the upgrade process

The process involved more than a hundred individuals coming together to save energy, reduce heating bills, improve their comfort, and add value to their community. All 88 residents had to sign their approval of the upgrade. A dozen members of the work crew spent over three weeks completing the jobs in each unit. Two maintenance staff coordinated access and parking space for the semi-trailer full of insulation.

Though the board initially approved the upgrade in fall of 2011, when winter hit, Thermal Craft hit its busiest months. The project lost some momentum and began to fizzle.

EnergySmart helped get things moving again. Wilmoth and Meeks arranged a re-energizing meeting in January, inviting the board and all the residents to learn about the plan for

upgrades. With a few hours of in-person conversation, they started to get group buy-in. "Everyone was pretty skeptical up front, but it's amazing how grateful everyone was once they understood that we were really there to help them," said Wilmoth.

Meeting face-to-face and addressing resident questions turned the project around. Over the following two months, Wilmoth and Meeks spent hours knocking on doors to get approval forms signed, and more hours on the phone discussing options and details with each of the 88 residents involved. "It took a lot of questions and a lot of patience," said Meeks, "the number of people that worked together to pull this off was really amazing."

EnergySmart can assist any resident or business owner in Boulder County, and has several Advisors on staff who specialize in assisting multi-family dwellings.

Energy Usage Data

Over the three years of grant funding, Boulder County received multiple batches of energy consumption data for the residential households and commercial properties who completed upgrades through the EnergySmart program.

In Boulder County, of the 4,180 households who completed one or more upgrades, 60% signed customer utility release forms and the program is evaluating the results. Similarly 40% of the 896 businesses who completed upgrade(s) signed the release form and data has been received.

The highlights from utility data analysis so far of program participants include the following:

- An analysis of homes in Boulder County showed that for every 1,000 square feet increase in home size, electricity use and natural gas use on average increased 40% and 29%, respectively.
- Observed natural gas savings in Boulder County homes have benchmarked well with the natural gas savings estimates used by the state utility regulatory agency.
- The deemed savings for electricity and natural gas based on DOE's calculator appear to be over estimating energy savings compared to the weather normalized energy savings observed to-date.
- The installation of solar voltaic systems reduces electricity demand and therefore reduces greenhouse gas emissions.

Market Transformation in the Commercial Sector

Boulder County helped move the market towards the adoption of more efficient equipment through information, driving demand (i.e., social marketing and outreach) and rebates. The county and trade ally partners offered trainings on rebates and efficient technologies to inform local contractors of new developments in the market. Rebates for the most energy-impactful

technologies help contractors to sell these projects, and standardize these installations in their practices. EnergySmart increased the efficiency requirement for rebate eligibility for Heating, Ventilation and Air Conditioning (HVAC) equipment replacements later in the program. Demand for the EnergySmart HVAC rebates remains high, customers increasingly select premium-efficiency equipment, and manufacturers have been good about supplying the more efficient equipment. Boulder County expended its rebate funds ahead of schedule despite the increased efficiency requirements.

This BetterBuildings grant allowed Boulder County to expand its influence in utilities' approaches to demand-side management (DSM) programs. The county and its city partners recognized that extending Refrigeration Optimization and Heating, Ventilation and Air Conditioning (HVAC) Optimization to the small- and medium-sized building stock could greatly increase energy efficiency opportunities in the local community. As a result, the county and city partners developed and piloted optimization services, which are now being implemented in current utility DSM programs by the following two utilities:

- Platte River Power Authority (PRPA) applied the lessons learned and best practices to its Building Tune-up Program starting in 2012.
- Xcel Energy approved a refrigeration optimization program in 2013, using the same model and contractor as the county's refrigeration optimization pilot.

Success Story: The W.W. Reynolds Companies

- Invested in energy efficiency upgrades for one million square feet of commercial property space (saving 2.0 million kWh)
- 60 lighting projects and 18 rooftop heating & cooling equipment replacements
- Estimated to save enough energy to power 235 Colorado homes per year

LESSONS LEARNED

Program Design and Implementation

The Energy Advising model is crucial to the success of EnergySmart. The impact of having an expert energy advisor assigned to each program participant through the energy efficiency upgrade process cannot be underestimated. Homeowner conversion rates from enrollment to action have stayed between 60-70%, despite changes in the program and rebate levels. The value of the advisor has also been quantified through post-upgrade surveys, where 96% of the respondents would recommend the EnergySmart service to a friend or neighbor. Furthermore 97% of customers rate their advisor as professional, knowledgeable and timely, and that "working with my Energy Advisor has been worth my time and effort." These customers see the advisor as a trusted, unbiased, third party consultant. Because of this relationship, participants often return to their advisor with future questions and projects after they have completed their first upgrades.

The motto is "People First, Buildings Second." This is a shift from the historical approach of focusing on the building and audits, with very little focus on meeting the needs and desires of customer at the time of engagement. Instead, the People First model focuses on advisors' interpersonal skills as well as their building science knowledge to communicate effectively and compassionately with a customer to address their priorities and circumstances (comfort, finances, etc.) related to energy usage in the building. Finally, a high-level of sales training is crucial to help advisors understand how to create a customer-focused service.

Maintain a one-to-one relationship between Advisor and business owner (or homeowner). The Advisor builds trust and relationship with the customer during the initial visit and subsequent interactions. It is critical to maintain one program contact throughout the process and for future sustainability service opportunities.

The EnergySmart Advisor model is replicable and is being replicated.

- Boulder County launched EnergySmart and contracted with Populus, LLC to administer the residential advising service and contractor management. The City and County of Denver, as sub-grantee to Boulder County, adopted a similar advisor administration and contractor management model, and through a competitive selection process, awarded a contract for these duties to Populus. Populus has gone on to manage residential energy efficiency services in the Bay area of California. The CEO of Populus, Laura Hutchings, described how ARRA funding has positively impacted their small business and many local contractors. See Appendix for the eloquent speech by Laura delivered to Boulder County on July 2012.

- In Colorado, various communities have adopted the advisor model. Eagle, Pitkin, Gunnison, Garfield and Summit Counties are also successfully using advisors or energy coaches in mountain communities. Adams County in the Denver metro area is also piloting this model.
- In Boulder County, the advisor model was modified as a wildfire mitigation tool to assist residents in high wildfire risk areas.

Conduct research to understand the market penetration of measures already installed, if possible. The EnergySmart program offered "direct installs" to any business customer who participated in the Assessment component of the program during 2011. Direct Installs involved the installation of compact fluorescent light bulbs, 1.5 and .5 gallon per minute faucet aerators, low-flow pre-rinse spray valves, and LED exit sign kits for immediate energy savings. Franklin Energy field technicians completed direct installs for 51% of the customers who received energy assessments in 2011. A higher direct install-to-assessment ratio was anticipated but, as the program progressed, the team realized that many customers had already installed the low cost measures.

The split incentive barrier can be successfully tackled. While the split-incentive between property owners and tenants continues to be an important issue, EnergySmart Advisors worked directly with property owners to demonstrate the benefits of energy efficiency.

Ensure that all parties involved have goals that are aligned with the ultimate objective of the program. Identify whether program outreach should target customers with energy efficiency opportunities or whether outreach should reach the largest number of businesses possible for education, assessments and brand awareness. The program must also decide whether to achieve deep retrofits with fewer program participants or to assist many residents and businesses with fewer measure installations per building.

Partnering is critical to success and cost-effectiveness. The success of EnergySmart was only possible due to the partnerships with the cities of Boulder and Longmont, and the local utilities of Platte River Power Authority and Xcel Energy.

- Customers in the cities of Boulder and Longmont were able to take advantage of city specific rebates, and dedicated city staff actively contributed to the program design and promotion.

- The City of Boulder's "SmartRegs" energy conservation ordinance for rental properties, which is voluntary until 2019 but currently incentivized, was a large driver for residential enrollments.
- The Optimization services offered through EnergySmart were designed to improve the operations of existing equipment in the hard-to-reach smaller commercial buildings market. Throughout the design, pilot and implementation phases, the county worked closely with utility representatives as they too were very interested in the opportunities. When it came time to launch the respective Refrigeration and HVAC Optimization services, the county co-promoted the program and trainings with utilities. Platte River Power Authority (PRPA), the electrical provider in the northern region of Boulder County, participated in the design of the pilot and HVAC Optimization program.
- The local utility offers rebates for eligible energy efficiency measures – these were pre-existing and in addition to EnergySmart rebates. Uptake of utility rebates increased greatly when paired with EnergySmart rebates.
- Co-marketing the utility and EnergySmart offerings was a clear way to message all energy-related services to businesses and residents, as well as to leverage the expense of direct mailings.
- Utility data was shared with Boulder County to evaluate the program's effectiveness and impact in reducing energy consumption and greenhouse gas emissions from existing buildings.

Small to medium size DSM offerings can have impressive savings potential when results are aggregated. Utilities have previously restricted their building optimization programs to large businesses or buildings (over 50 kW demand). A streamlined DSM optimization model for smaller buildings and refrigeration systems should be offered by utilities to assist in meeting their energy savings goals, and utilities are beginning to incorporate them.

It is critical to have renewable energy as a part of a DSM program in order to have significant impacts in Greenhouse Gas (GHG) emission reductions, especially in areas that largely get their electricity from coal. Achieving reductions in electric consumption, and therefore GHG emissions, has been challenging unless building owners install solar photovoltaic systems.

Use sticks and carrots to drive participation and upgrades. The development and implementation of policy and program offerings in unison led to household participation in EnergySmart. A voluntary program can make positive contributions towards the effectiveness and acceptance of policy in the community.

Outreach and Driving Demand

To drive participation, work through the most highly trusted source that is accessible. For example, a newspaper article is more effective than an ad. A local participant who shares their experience is more effective than a program staff member explaining the program offerings.

Prioritize attending events that use existing networks and/or when people are in the "improvement mode" mindset. EnergySmart prioritized attending events that either used pre-existing networks (i.e., events with recurring or established crowds that were already on people's calendars) or places and times when people are thinking about their building or direct benefits. Successful examples include the Home and Garden Fairs, neighborhood or HOA meetings, existing Chamber of Commerce meetings with a focus on business savings, health or safety fairs and hardware stores.

"It's almost never about energy efficiency." The EnergySmart team learned the following:

- Successful outreach focuses on tangible benefits, including home comfort, business bottom line improvement,
  indoor air quality and safety, employee productivity and reduced maintenance.
- A powerful subconscious motivator is the idea of "keeping up with the Joneses." People are not aware of this consciously, but events result in far more sign-ups when a friend, neighbor or colleague speaks up about their own experience and savings. This goes to the tune of "once someone like me says it works, then I can get on board too."

Developing brand awareness in the public takes time. Despite using traditional marketing and social media for the last 3 years to have a steady public presence of the EnergySmart brand, many businesses and residents in Boulder County still have not heard of the EnergySmart program. Awareness of a brand takes time. It also could be that the public now accesses information from so many sources that simply marketing through local print and online avenues is no longer as effective. The public now collects information from non-point-source, geographical-neutral sources.

Door-to-door business outreach drove many enrollments but is time intensive. During the first year of the EnergySmart program, a private consultant, Franklin Energy, completed over 1,000 energy assessments for business customers within Boulder County. Much of the effort included cold calling and door-to-door outreach, which was difficult, but often very effective at reaching customers that wouldn't have been reached via traditional marketing means. Door-to-door outreach should be used, but it should be used as a means to supplement other marketing tactics. Door-to-door outreach would be most effective when targeting businesses that are most likely to be owner-occupied and/or have a decision maker on site.

Workforce Development and Contractors

Manage the program's contractor pool to match market demand. Throughout much of the grant, when funding levels supported high participation goals, Boulder County had a large pool of qualified residential contractors that EnergySmart enrollees could pick from for both quality assurance and to qualify for EnergySmart rebates. As the grant concludes and with new, less ample funding, the program is reducing its participation goals and the size of the contractor pool. The latter was done because the program recognizes the need to balance customer needs (rapid scheduling and completion of projects) with those of the contractor (enough leads to make adopting higher work standards worthwhile).

Raise the bar for a qualified workforce and therefore high quality work performance. As the contractor management aspects of the program evolved, the philosophy of contractor engagement became more oriented to support the professional development of their staff and to mentor those contractors working to meet the high standards that the program required. The residential program promoted and subsidized sales training to increase the competitiveness of these businesses, safety-oriented classes (e.g. Combustion Appliance Zone testing) to meet the health and safety demands of the customer, and basic building science and material application instruction. As a result of this focus on advancing the skill base of the local workforce, and as utilities and the industry have started to require similar levels of expertise in

order to leverage financial incentives and certifications, these contractors are better prepared to position themselves to be the industry leaders.

Rebates and Financing

Rebates needn't be the focus and shouldn't be the focus (residential lesson learned). Rebates can be used to generate a sense of urgency to complete energy upgrades, when the message is "first come, first serve" and "only available for a limited time." EnergySmart found this to be true but the downside is that this creates a fluctuating and irregular market for contractors. EnergySmart has found that the Advisors' gentle reminders and knowledgeable help on project prioritization and finding contractors can also be effective at keeping forward momentum with homeowners, in a more controlled and consistent fashion. Furthermore, despite the relatively low residential rebate levels and uptake in the last few months of the BetterBuildings grant, household conversion rate remained high. The leveraging of non-utility rebates (i.e. DOE funds and city rebates) to gain private investments for household upgrades has been 1:31. This is higher than the overall 3-year average of 1:8 for the Boulder County residential sector.

Loans are a tool, but a loan program on its own is not a solution. A loan is a tool within a larger energy program, and advising is essential within the energy program to help target appropriate projects. In the commercial sector, financing may have a limited market without other drivers such as rebates and advisor-identified opportunities, as many businesses are debt-averse, and many large property owners have their own sources of funding.

Driving participation through the Advisors is more effective than loan advertising. Marketing is critical at the beginning to build awareness, but program outreach is most important for continued participation. The marketing campaign specific to Energy Loans ended in August of 2013, yet levels of Energy Loan uptake by homeowners was higher in the fall of 2013 than the fall of 2012, when loan marketing was in full swing. This is likely a result of better contractor understanding and promotion of the financing as well as better sales and loan product integration into the advising process.

While advertising creates awareness, few people will be sold on the idea of "debt" as a product they desire. It is easier to sell widgets. Debt becomes an instrument to help customers get the upgrades they believe they "need" in their home or business. Communicating debt by monthly payment vs. total loan value makes the number more accessible and easier to understand.

Energy Loan uptake tracks closely with other lending products offered by Elevations Credit Union (and debt-trends nationally). The shoulder seasons see much more uptake, while the

beginning of the year (i.e., January and February) and during the summer (i.e., July and August) see the lowest levels of uptake.

Energy Loans have a much higher uptake level in Boulder County than in the City and County of Denver. Possible reasons include the following:

- The lending partner, Elevations Credit Union, is based in Boulder County without any branches in Denver.
- The income levels and credit scores tend to be higher on average in Boulder County than in the City and County of Denver, and those trends may or may not also be represented in program participants
- There may be a reduced appetite for debt in Denver populations.

Commercial lending is difficult, and the underwriting is onerous. Perhaps credit unions are not the best entity, by design, to handle commercial energy lending. As a result, program and loan team members often refer commercial property owners to other loan programs such as TIPS Capital and US Bank's Green Loans.

Data and Evaluation

Establish clear reporting expectations at the outset. Before beginning database development, reach agreement from stakeholders on what reporting will be expected, and design the database to facilitate building, exporting and sending the reports. Reporting needs will change, but set expectations with report recipients as to the system's reporting capabilities. Plan to deliver initial reports manually and check them carefully before using any automatic delivery functions (such as Conga Courier for Salesforce).

Choose a database platform that is popular and well-supported. Ideally, select one that is likely to be around and be compatible in the future, even at the expense of the database not precisely fitting every program need.

Design the database system to be as simple as possible. It may be difficult to find a platform that performs equally well as a "customer management system" and an "energy upgrade tracking tool." It seems that most are one or the other, so it is necessary to customize the platform in the simplest way possible for the functions it doesn't perform naturally.

Provide adequate time for database development, testing and training. Plan for 4-6 months (full-time) for a single database developer and coding consultant to create, test, migrate, integrate and debug a system, particularly for systems with a high level of customization and complexity. It is important to test the system with real inputs and real reporting requirements

by real users but not to expect full-scale use and reporting while the system is still in development. This ensures better data quality and user-friendliness.

"Integrations" with external systems are extremely difficult to perfect, and require custom code. Use simple file upload functions (i.e., Dataloader for Salesforce) where possible to avoid coding an integration. The quality and completeness of data coming from other systems is difficult to control, and requires extensive coordination to get the necessary format and quality of input. Set expectations with any external data providers early.

Third party energy efficiency program administrators must be pro-active for energy usage data access. Becoming involved in public utility hearings will influence whether customer usage data is available, the data format and data quality.

Identify what resolution of data is needed for program evaluation and driving program enrollments. Aggregated data that is void of customer-identifying information is valuable for commercial building benchmarking, normative behavioral customer engagement messaging, and comparing program results to a local control group. The importance for third party energy efficiency administrators to receive useful and measurable data, whether from an energy utility or an individual meter, is critical to the transparency and effectiveness of a program. For program managers, funders, stakeholders and program participants, actionable data is imperative for evaluation purposes and the sense that these investments were "worth it." The relationship of the utilities and the state PUC is critical as to whether qualify data is forthcoming to third party administrators.

FUTURE PLANS

The long-standing local commitment to energy efficiency and conservation in policy and practice throughout Boulder County forms a solid backbone for long-term support for EnergySmart services. Having built the program on the foundation of 20 years of successful energy programs, the team is confident in the sustainability of the program. EnergySmart has proven that the energy advisor model achieves high participation and conversion rates and results in local economic vitality, and improves the health of buildings, neighborhoods, and the environment. The lessons learned through this grant will be a long-lasting source of information and strategic guidance. While rebate funding levels will likely vary in post-grant years, utility rebate funds will likely continue.

The Elevations Energy Loans offer a stable source for ongoing financial support, and will include the following future efforts:

- Drive customer demand through communication via advisors and contractors.

- Revise the messaging of loan payments from total loan amount and interest rates to a monthly basis, and integrate a better method of calculating those payments while integrating rebates and incentives into overall costs.
- Continue to educate contractors about the loan and customize the sales process for contractor sales teams.
- Introduce a new de-federalized portion of the loan program that will enable a 15 year term and loans to solar without energy efficiency requirements. Energy efficiency improvements will still be recommended first, but this flexibility will accommodate customers' needs and simplify the process in order to install solar PV.

While the split-incentive between property owners and tenants continues to be an important issue, EnergySmart was successful in demonstrating the benefits of energy efficiency to property owners. One of Boulder County's largest commercial property owners implemented lighting upgrades for all of their tenants. Because of the case studies, education and relevant timing, property owners will be more likely to implement efficiency upgrades during tenant finishing work.

Boulder County and partners will collaborate and evolve to include broader sustainability services to the community, building upon the success of EnergySmart. This includes not only energy efficiency but renewable energy, water quality and conservation, waste reduction and diversion, and transportation. Boulder County will explore innovative approaches to streamline financing, such as the incorporation of financing of energy efficiency at the time larger lending occurs for home or business remodels and purchases. This presents exciting opportunities to increase the demand and effectiveness of all sustainability services through partnerships and unified program branding, leveraged financial resources, continued expansion and improvement of the advisor model, strategic use of incentives, and data collection to track progress relative to existing goals.

"The savings in power along with the overwhelming appreciation from the tenants makes this one of the best investments I have made in commercial real estate."

- BC Properties, local property owner

PART II – CITY AND COUNTY OF DENVER

EXECUTIVE SUMMARY

The Denver Energy Challenge has produced truly amazing results. In less than 3 years, and 3 months ahead of schedule, the program met all of its goals under the BetterBuildings grant.

Advisors provide neutral guidance for customers, from examining contractor bids to creating a detailed Energy Action Plan. Customers can feel confident in the decisions they make, knowing they were fully informed on their options by a neutral and unbiased expert. In fact, Councilmembers Nevitt, Shepherd, and Ortega have even taken advantage of the program and are working with advisors.

The Denver Energy Challenge also has a robust workforce development program, which includes contractor trainings on BPI, the standard for efficiency certification, health and safety training, business sales training, and more. We work closely with Xcel Energy to co-deliver trainings to its over 1200 trade allies.

Denver offers low-cost financing to residents and business owners in collaboration with Elevations Credit Union and Boulder County's EnergySmart program. Rather than fronting the entire cost of an upgrade at the time of install, or charging the cost to higher interest rate credit cards, participants can take out an Elevations Energy Loan in person, through their contractor, or on-line.

BACKGROUND, HISTORY AND POLICY SUPPORT

Denver has 254,181 households, of which 53% are owner occupied, and 67,515 businesses, according to the 2010 census and 2007 data from the U.S. Department of Commercial, respectively. Residential energy use accounts for 15% of energy use in Denver. An estimated 19% of Denver's population is at or below poverty level. 42% of Denver businesses employ between 5-100 employees. These small businesses are 44% of the total workforce.

As early as 1990, Denver began investigating opportunities to reduce overall greenhouse gas emissions through various initiatives. At the top of the list was energy efficiency in the built environment. Even as early as 1992, the City had committed to upgrade lighting in municipal buildings to reduce energy consumed and realize financial savings. Most of the City's successes in energy efficiency occurred within the walls of city buildings and were unable to penetrate broad community-wide action. Efforts such as RECO, Energy Efficient Mortgages, and passive solar credits were not widely accepted and remained conceptual.

Beginning in 2005, Denver began the process of developing a greenhouse gas inventory and climate action plan to reduce overall community carbon emissions. As was the case in the early 1990's, building energy use again dominated the percentage of total emissions. Within its first Climate Action Plan Denver identified multiple strategies to address energy efficiency in the commercial and residential sectors. Specifically, a residential and commercial climate challenge was issued that sought to reduce carbon emissions through efficiency measures, incentives, and renewables purchases.

In 2010, Denver began a residential neighborhood blitz program intended to galvanize volunteers and neighborhoods through door to door canvassing. At the door services included sign-ups for recycling, porch bulb swap outs, and other "on the spot" services. Success of the neighborhood blitz program was limited to services that could be completed or implemented at the door, such as recycling signups, junk mail opt-outs, or single porch bulb replacements with energy efficient CFLs. Although homeowners were presented with the option of signing up for home energy audits, the conversion rate generally stayed less than 10% due to a cessation of contact between the homeowner and an additional information source.

Commercial programs were implemented slightly later than the initial residential programs but were designed around an advisor program that offered significant incentives for lighting upgrades. Funding for commercial programs originated from Departmental funds and then an EPA Climate Showcase Communities grant. The Small Business Energy Program, as it was originally known, partnered with Business Improvement Districts, trade organizations, and other small business representatives to conduct outreach to small business on how to improve energy and resultant energy savings. The commercial program was widely popular and successful with immediate savings and improved lighting as the focal point. The program remained primarily focused on lighting and as such was somewhat limited to small businesses where lighting costs dominated the energy bill.

With imminent funding from the DOE BetterBuildings program, both residential and commercial programs sought to learn from our initial successes and opportunities for improvement and leverage those with additional program evaluations from our partners in Boulder County, regional partners in the mountain west and nationally through workshops and other forums. As a result of our initial work in both residential and commercial sectors, we were well poised to develop the programs that addressed the barriers for uptake of energy efficiency: lack of information, lack of trained workforce, and lack of financing options.

Regardless of policy development, technological advances, incentives or other tactics, these three key components are essential to building a successful and sustainable energy efficiency program. The Denver Energy Challenge Advisor Program has addressed all three of the barriers identified by the U.S. Department of Energy.

PROGRAM DESIGN & CUSTOMER EXPERIENCE - RESIDENTIAL

The Denver Energy Challenge residential program uses an energy advisor model, paired with low-interest loans, contractor training, and quality assurance to help residents achieve greater energy efficiency. Energy advisors walk residents through the upgrade process, help prioritize installations, find qualified contractors, and identify tax credits, rebates, or financing. Program specific rebates for residents were available from February 2012 through November 2012. Advising can happen primarily over the phone or email, or residents can choose to have an advisor come in person to do a walk through assessment. The program can also schedule energy audits for residents.

Starting in May of 2011, energy advisors offered walk through assessments of homes that could help the resident understand basic characteristics about their building envelop, mechanical systems and appliances. Advisors would also gather information about the customer's needs, concerns and motivations for energy efficiency. Not all customers opted for an in-home advising visit, with many receiving support primarily over the phone and via email. Customers were not required to obtain an energy audit (with blower door and/or infrared imaging). Over time, the program developed a simplified Energy Action Report for customers (whether or not they received an audit) that listed the top 5 recommendations for upgrades for their home.

Energy advising in the residential program has continually evolved since the program's inception. In May of 2011, Shaw Environmental Group, the Center for Resource Conservation (CRC), and ReVision International were the 3 organizations selected to provide advising services in Denver. Shaw and CRC had 2 separate and distinct territories in Denver that provided advising primarily to moderate, and middle income customers, while ReVision International worked primarily in west Denver with low-income residents who did not qualify for other free weatherization services. From May through September 2011, the program saw almost no enrollments, and very few upgrades, as customers were required to get an audit before proceeding to advising. Additionally, no centralized process for advising had been developed by the City, leaving each advising provider to develop their own processes.

The Denver Energy Challenge brand and new programmatic approach was launched in October of 2011. A new website, outreach materials, and processes were put in place. Audits were no longer required before customers could proceed to advising and Salesforce became a critical tool for advisors to track both customer engagement and data for the Program Administrator.

Another RFP to bring on a central administrator for the program was announced in February of 2012. Populus was selected to be the central administrator to ensure quality control of all data and program processes and to help oversee the various energy advising providers the City had under contract. Groundwork Denver, a nonprofit, was also brought on board to do a moderate income (80% of AMI) insulation group buy pilot program.

With Populus on board, the advising process became more streamlined and advisors shared ideas and strategies across their organizations to improve program outcomes. The new DEC brand and marketing also brought in many more new enrollments. With increasing enrollment, processes, advisors training, and data tracking, the program began to see a significant uptick in our conversion rate and number of upgrades.

Rebates were also launched in February of 2012. Initially, this led to a significant influx of new customers. While normally, this would be an exciting development, we also began to see significant issues with unlicensed contractors who seemed to be targeting seniors and low-income residents. The rebate program launched without a contractor partnership program in place, and no restrictions were placed on who could offer the rebate to customers. This began to pose a problem for the program, as customers were being misled and were confused about what they were signing up for when they called the Denver Energy Challenge to enroll. As a result, the program went back to the legal department to ask if we could develop and implement a contractor partnership program to set certain parameters on who could offer the program rebates.

A contractor partnership program was launched in July of 2012, requiring that contractors utilizing rebate in DEC be licensed in Denver, have BPI certified staff, proper insurance, and be EPA lead paint certified. A quality assurance program was also initiated to spot check 5% of all completed jobs. Please see the Contractor Engagement and Workforce Development Program Design section for more details.

Following the launch of this contractor partnership program, customers were more familiar with the program offerings, more pleased with their contractor, and more likely to rate the energy advisor service as good or excellent. Please see below for more details from our customer satisfaction survey.

Rebates continued to be available through November 2012, when all budgeted funds were exhausted. Rebates were a significant driver of enrollments during this time period. The transition after rebates was particularly difficult, as they had created an expectation of higher incentives in the marketplace. DEC made a programmatic decision not to offer rebates in the future, regardless of funding, in order to create other market demand forces and to shift the messaging around energy efficiency. Monthly enrollment moving forward went down by about 10% for market rate customers, but continued to be strong for low-income customers.

In August of 2012, the low-interest financing program was launched in partnership with Elevations Credit Union and Boulder County. The financing program became the key incentive tool for DEC, replacing rebates. Uptake in the loan program has gradually increased over time. Please see the Financing and incentives section below for more information.

From April through October 2013, energy advising was only available on the phone. Reduced budgets and the success of phone advising (conversion rate at 75%) were the driving factors in deciding to eliminate the in-home advising component of DEC. At half the cost and with results

as good as in-home advising, the decision to make this change seemed obvious. The downside as seen throughout 2013 was reduced interest in the program due to the appeal of in-person advising. Moving forward, DEC will offer limited in-home advising as a way to drive program enrollment and interest. In-home advising can also be particularly beneficial for certain customers, including seniors or those who need additional assistance in understanding our services.

Group-Buy Summary

We focused the moderate income (80% AMI) group-buy concept on the Bear Valley, University Hills, West Washington Park, and Virginia Village neighborhoods with predominantly pre-1970s housing. We had canvassers going door-to-door in these neighborhoods offering the group-buy, with the first step being an attic check. The baseline assumption was that we would identify a number of people who knew they needed attic insulation, but had put off getting started for a variety of reasons, and that the group-buy concept would facilitate their acting. We intended to schedule multiple households for attic insulation in a short period of time with our pre-approved contractors.

Our canvassers found that most people did not fit within these parameters (of knowing they needed attic insulation AND being inspired by the group-buy). So, if people seemed confused by this concept (attic check and group-buy), we instructed the canvassers to offer a more comprehensive assessment.

Of the 5,100 households canvassed, fewer than 40 expressed interest in the attic check and over 300 expressed interest in a more comprehensive assessment. Interestingly, of the people who signed up for a simple attic check and the group-buy, only one turned out to be a good candidate for this approach. Of the rest who were contacted:

- about one-third wanted information about all available upgrades or other programs;
- another third had already recently had weatherization/contractor bidding/energy consultations and were looking for guidance; and
- the final third decided that the timing for insulating the attic did not work financially.

Once households needing insulation were identified, we tried to get people scheduled into a two-week period as part of the group-buy concept, but it turned out to be impracticable. People wanted to schedule at the times that worked for them, which for some was right away while others needed to schedule further out. In the end, most residents scheduled the insulation jobs directly with the contractor, typically with our pre-screened contractors that offered the negotiated group-buy pricing. That part of the group-buy concept – pre-approved contractors with pre-agreed-upon costs – worked well.

We also found that there seemed to be a reverberation effect the more we worked in a neighborhood. Residents seemed to become more open to the services being provided the more work (canvassing, advising, assessments) we were doing in a neighborhood.

Of the 219 Groundwork Denver accounts, 55% were surveyed to discuss follow-up actions. (Every account was called multiple times, and 55% were actually talked to.) The most common barriers mentioned were lack of money and/or time, money being the most frequently-mentioned barrier. For the money barrier, the most often cited reason was that available rebates were not enough of an incentive to make the decision to insulate. For the time barrier, residents generally expressed reluctance in spending time working on the project.

Multi-Family Services

Prior to March of 2013, DEC provided very few services tailored specifically for multi-family buildings. Buildings with a single property owner or with common areas on a commercial meter could receive services from the commercial program on a limited basis. Unit owners in HOAs could also sign up for residential advising services, but were not eligible for DEC rebates. The MFU service launch in 2013 was developed to tailor our services in a comprehensive way to meet the needs of HOA and single property owner buildings by seamlessly merging residential and commercial customer services.

Currently, an MFU signs up for DEC through Populus and is assigned a main advisor. That advisor communicates with the property owner or manager throughout the advising process. Populus coordinates the production of customized reports for MFUs and brings in our commercial advising team as needed on each project. They also provide tips for tenants or advising for individual unit owners. The initial pilot has been very successful and has attracted 8 new MFU buildings to the program.

Denver has also been pushing Xcel Energy (through the PUC regulatory process) to offer multi-family services in 2014. As part of the Settlement Agreement for the 2014 DSM Plan, Xcel will offer a multi-family pilot and will engage Denver and other stakeholders in the development process.

PROGRAM DESIGN & CUSTOMER EXPERIENCE - COMMERCIAL

The program was designed to support businesses throughout the entire process of education, outreach, sign-up, consultation, direct installs of efficient lighting, and project implementation. After the initial free consultation by the energy advisors, businesses receive recommendations for specific actions that can reduce energy consumption. Additional support to the business included answers to technical questions, referrals to qualified contractor, and support with completing rebate applications. Projects that meet specific program criteria may be eligible for additional rebates once completed and verified by the energy advisor. Finally, program participants receive a post-project survey to gain insight into how best improve the program for future business participants. Denver enrolled 1320 small to medium sized businesses, the majority of which are located in leased spaces. The program was designed to advise both tenants and building owners concerning energy efficient upgrades, rebates and occupancy behavior to reduce overall energy usage.

The program began by engaging local small businesses through direct outreach through program staff and the Mile High Business Alliance (MHBA). A website was developed where businesses could learn more about the programs offerings and services, and to sign up to have an Energy Advisor visit for an energy assessment. Businesses were offered free efficient light bulbs and installation as a lead-in to energy saving measures. This allowed businesses to realize the value of energy efficiency and in many cases was more inclined to pursue additional energy upgrades. Next the program offered rebates in line with industry standards to incentivize these upgrades. Contractor engagement and training was critical to help educate business owners on the program and utility rebates offered for energy upgrades. As utility rebates fluctuated and the cost of upgrades decreased, program rebates were adjusted accordingly to maximize the value of program funds. Energy Advisors provided regular follow-up to reengage past customers for additional upgrade opportunities. As rebates were winding down, the loan program was established as replacement incentive to efficiency projects.

OUTREACH & DRIVING DEMAND

In Denver, a strong partnership between the program and the local utility, Xcel Energy, has been critical to driving demand. We help customers take advantage of utility rebates and the energy loans. We also work to train contractors and enforce standards, while informing customers of what they need to look for in a qualified contractor. When the residential program officially launched, the program organized a few contractor meetings to explain the program and rebates associated with certain upgrades. Over time, Denver chose to create a vetted contractor list rather than compile a lengthy list of names making it difficult for homeowners to decide who they would hire for installations.

The Denver Energy Challenge used bus stop ads to raise awareness and result in some sign-ups.

Neighborhood specific targeting has been a staple of the program's outreach strategy. The outreach team organized a home tour and energy workshops with various themes (general energy efficiency, historic/older homes, energy loans) and residents could attend free of charge. The home tour at a single location had over 30 people attend and was successful because attendees were already interested in home improvements and décor. Presentations at

neighborhood meetings have also been a method for residential outreach. We utilized existing events to provide awareness on the program and initially to obtain sign-ups, and also organized our own workshops when looking for a more captive audience. If the event was focused around the home we had better conversations. Through trial and error, it was possible to identify which organizations were well organized, and which were not. DEC included posts in monthly newsletters via neighborhood organizations, City Council and internal City publications.

Moving forward, additional workshops in community centers will be organized as well as single home tours and an energy expert will be invited to talk about building science and a representative from the City will talk about the program services.

Direct mail letters have shown to be the most successful in lieu of having more staff able to be out in the community. The residential program composed a letter from the department head outlining the program offerings in a way that would not be seen as advertising, but valuable information to the resident. These direct mail pieces resulted in a significant number of enrollments. When the program offered rebates Xcel Energy helped with a joint mailer to Denver residents providing information on the dual rebates offered and how to take advantage. This also resulted in a significant number of enrollments for our program. Xcel Energy has since taken on informing their customers (which include Denver residents) on energy efficiency financing offered through the Denver Energy Challenge.

Messaging

Messaging focused on advising and the independent nature of their advice, as well as benefits like reduced energy costs, ROI, improved comfort, and indoor air quality. Additionally when targeting neighborhoods we pulled number of participants and used this as a way to show that others were already doing it. Example: “Over 850 of your Park Hill neighbors are enjoying the comfort of energy efficient and cost efficient home. You can too.”

Denver launched a large campaign titled “Oblivious” in 2012 with a series of faces promoting the fact that many people may not know what to do in order to improve them homes and that DEC can help.

When are folks thinking about home improvements? Improvements tend to be thought of during the hot and cold months, along with incentives to motivate people. Many sign-ups have come from word of mouth, which is great, but it’s

hard to force. Obtaining details on why a homeowner made improvements is a challenge but commercial case studies were easy to do, and the businesses welcomed the promotion.

We also did numerous tabling days outside of Home Depot and a few inside ACE Hardware. It can be a good place to talk with homeowners, assuming the live in Denver, but contractor outreach is not successful because the sales teams pushing our program or loans are not the ones shopping at the store. In 2012 we did drop boxes for people to sign up in ACE but there was very little interest. Online sign-ups or calling directly seem to be the way to go.

Website and Social Media

Website, Facebook, Twitter and YouTube pages were created to promote the program and advisor service. We chose to open an external website for the program giving us the ability to quickly make changes, and expand on more than a single page site as part of denvergov.org. We used the website to outline what the program provides, how to get information on rebates and loans, success stores and an easy online sign up form and or direct number.

Importance of Community-Based Outreach

Denver worked under "community based social marketing" strategies to engage and reach residents. CBSM is defined as: based upon research in the social sciences that demonstrates that behavior change is most effectively achieved through initiatives delivered at the community level which focus on removing barriers to an activity while simultaneously enhancing the activities benefits. While there are many concepts we used social norming to show that others were participating, incentives, as well as addressing barriers and benefits for participating to understand it from our target audience side. While we did not find it successful in Denver, for a portion of the residential program we had yard signs made and delivered to residences in the program. On a small scale this type of norming could work but we did not have the capacity to keep this effort going, especially when we stopped in-person advising on a regular basis.

Engaging Community Leaders

We engaged our City Council members and have had 5 participate to date. Continued messaging in their newsletters helped get information out about our program. We created a few videos which can be found at www.youtube.com/denverenergy.

Business-specific Outreach

We used a multi-pronged approach to reach businesses by reaching out to business organizations, campaigns, videos, mailings & co-marketing with Xcel. We partnered with business improvement districts, ran some targeted mailers on our own from the City and through Xcel Energy. We are co-marketing with our energy loans through Xcel to increase visibility of energy efficiency financing. Below are the commercial videos we created. Please note that they are no longer live online but we would be happy to provide with any you wish to see. The program hosted smaller business focused workshops and did door to door canvassing in order to obtain enrollments. When the program offered commercial rebates, many

businesses would come through the program either via a rebate application or a contractor they were already working with. As the program grew with participants, we hosted business recognition events in order to highlight participating businesses, and engage new businesses unaware of the program or services we provide. We partnered with an already existing business program to provide bike racks with our logo at certified green businesses. Businesses with bike racks were required to achieve excellence in energy in order to receive the rack. In an effort to achieve deeper energy-saving upgrades and utilize grant funds wisely, we offered limited building tune-ups through a contracted partner as well. Every business that participated in the commercial program, and made some type(s) of upgrade, received a certificate and a window decal to be displayed in their business. This was an extra way for the business to receive extra recognition around their energy saving efforts.

WORKFORCE DEVELOPMENT & CONTRACTOR TRAINING

Since the inception of the Denver Energy Challenge, the program has provided training to fill skill gaps and ensure contractors are following the latest workforce standards and building codes. Trainings have covered topics such as CAZ testing, proper air sealing, consultative sales techniques, commercial benchmarking, commercial preventative maintenance, using financing to drive sales, and more. Our program also provides QA in the residential program, with feedback to contractors if issues are found. This process provides a mentoring opportunity where contractors can see how their work can be improved and where a pattern might be emerging where additional training for staff could be useful.

Residential Contractor Partnership Program

The DEC Residential Contractor Partnership Program requires that contractors have industry-recognized certifications, such as Building Performance Institute (BPI), North American Technician Excellence (NATE) or North American Board of Certified Energy Practitioners (NABCEP), depending on trade, as well as proper licensure and insurance. The contractor pool ensures that contractors have all the credentials to be operating legally and remain informed about the industry's best practices and standards.

Through its contractor management, the Denver Energy Challenge:

- Has touched 55 residential energy efficiency companies
- Performed 3 trainings in 2013; Performed 2 group orientation sessions; provided numerous one-on-one orientations
- Performed 116 Quality Control checks on residential projects
- Sent 48 Corrections Notices
- Provided mentoring and support to all program contractors and contractors wishing to join the pool
- Helped identify contractor companies taking advantage of residents or committing fraud

Current contractor program structure:
Tier 1: Primary list of enrolled contractors

- Home Performance Contractors, Insulators, Mechanical, Windows
- Clear application process with objective criteria with scored interview
- 10 Contractors

Tier 2: Contractors who do not quite meet program standards

- Contractor Manager informed each contractor of factors keeping them off Tier 1 list
- Includes contractors who are working to meet program standards
- Contractors still access Contractor Manager and Trainings for support and mentoring

The program offered several contractor trainings to educate contractors on programmatic details, including checklists for required elements, paperwork, and rebates and loans available from the program.

Commercial Contractor Engagement

The commercial side never organized a vetted contractor list. With rebates available for numerous commercial upgrades, advisors worked with the contractors but a lot of their interaction was post-work and we processed rebates more than collaborated on projects. We organized contractor trainings in partnership with Xcel Energy and promote the program in line with our energy loans as well.

FINANCING & INCENTIVES

The Denver Energy Challenge partnered with Elevations Credit Union and Boulder County to develop and deliver low-interest, accessible financing for eligible energy efficiency improvements for homes and businesses. The energy loan product launched in both Denver and Boulder County in August of 2012. The loans, provided by Elevations Credit Union, give homeowners and businesses access to low-interest financing for a broad array of energy efficiency measures, from insulation and air sealing to lighting and mechanical equipment. Refer to Figures 6 and 7 in the Boulder County accomplishments section to view the results under the joint financing program offered in both counties.

Since the launch of the loan product, Denver has lent $490,371 in residential loans and $313,080 in commercial loans. The most popular residential loan measures are:

- Air-Sealing (professional)
- Ceiling/Attic Insulation
- Windows
- Floor-crawl insulation
- Wall insulation
- Gas furnace

Solar is also a popular measure, funded only when a home can demonstrate 15% energy savings through efficiency first. In Denver, we continue to see consistent uptake with most active our pool contractors. We continue to see little loan uptake from Xcel Energy Trade Partners not affiliated with our program.

Commercial loan measures have included insulation, lighting and HVAC equipment, as well as solar. The commercial program has not seen as much success in driving demand for loans. The primary factors that affect commercial loan uptake include lack of income history for many small businesses, the need to join the credit union to get a loan, the fact that Elevations is not local, and hesitation to take on debt in the small business sector.

DATA & EVALUATION

Both the residential and commercial programs utilize Salesforce as a data management tool, as well as a customer management tool.

Residential Program

The residential program has uploaded the entirety of the Denver Assessor's record into a separate record type, so that when new customer sign up for the program, data on the size and type of house they live in can easily be pulled up and imported into new accounts. Advisors verify this data is accurate with the homeowner. Following the initial creation of an account, advisors will track the customer's utility account information in order to obtain their actual monthly usage data. Once we receive that data in a batch from Xcel Energy, a third party contractor analyzes it to compare pre and post data with the upgrades tracked in our system. Weather normalization and other techniques are used to determine whether our estimations of savings reflect accurately the actual savings achieved.

As customers progress through the program, communications, including email and phone calls, are tracked in the system so advisors know exactly what was discussed, customer motivations, customer needs or concerns, and next steps.

We constantly analyze metrics such as conversion rates among each advisor, average energy savings by home, where customers are in the pipeline towards upgrades, and much more. This allows us real time insight into how the program is performing and the success of energy advising.

In addition to all the required DOE fields for reporting, we track numerous additional data points, such as roof type and propensity for solar, as well as how customers heard about the program, their top motivations and if they are interested in other sustainability programs.

Commercial Program

The commercial Sales Force database included business specific details such as business type, square footage, historic designation energy and financial savings, project details, and marketing information. In addition, the database also included follow-up tasks to implement additional upgrades. Email and phone conversations were logged into the database in order to have a history of communications with each business in case an alternate staff member needed to assist the business at any given time. Energy efficiency improvements were tracked in good detail. Associated energy savings estimates were calculated according to the local utility's Demand Side Management (DSM) program. The savings estimates of the broadly reaching DSM program allowed the Energy Challenge programs to attach these 'deemed' savings for a variety of common improvements and also enter specific savings estimates for less common projects. Cumulative savings estimates were then summarized for each business and for the program as a whole. Reports were easily generated for a large number of metrics and outcomes.

ACCOMPLISHMENTS

The residential program surpassed all the goals set out in its grant application in March of 2013, 3 months ahead of schedule. The program has enrolled over 6,000 residents and has a portfolio average energy savings of over 16%. The conversion rate is 80%. The commercial program met its goals, enrolling over 1,300 businesses. The conversion rate to upgrades is nearly 60%.

Since the program launched, the Denver Energy Challenge has achieved the following:

- Provided energy assessment and/or advising to nearly 7,000 home participants and more than 1,300 business participants, with an average of 80% and 58% respectively going on to implement energy efficiency upgrades.
- Supported the completion of upgrades in 5,593 households and 764 businesses.
- Issued rebates of nearly $1.4 million. These rebates have spurred local investment in energy efficiency upgrades of more than $11.5 million, sustaining jobs and economic vitality locally. On average, for every $1 spent in program rebates, $8.2 were invested in the community towards energy efficiency.
- Over $1.7 million in Energy Loans have been funded in Boulder County and the City and County of Denver since the loan product launched in August 2012, helping 150 homes and businesses in just one year overcome cost barriers to energy efficiency investment. Table 5 and Figures 6 and 7 shown in the previous Boulder County section highlight the results for the financing product.
- Saved an estimated 26,327,700 kWh and 726,900 therms annually.
- Reduced 24,675 metric tons of carbon dioxide equivalent (CO_2e) annually, equivalent to taking 5,050 cars off the road.

- Saved residents and businesses an estimated $3.1 million annually in utility expenses, supporting a healthy economy and environment.
- Worked with more than 150 contractors.
- Provided technical, business development and sales training to contractors, supporting a robust local energy contractor community.

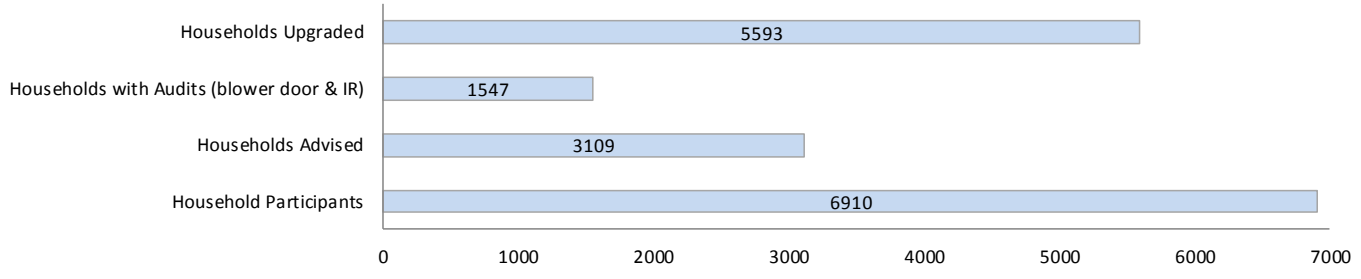
Table 6 reflects the residential accomplishments and Table 7 shows the accomplishments in the commercial sector.

Table 6: Accomplishments by City/County of Denver Residential Program through Sept 30, 2013

This page summarizes the accomplishments since October 2010 of the residential Denver Energy Challenge service. The Denver Energy Challenge was developed by the City and County of Denver's Dept of Environmental Health. Populus LLC administers the residential service. For more info, visit www.denverenergy.org. Denver was a subrecipient to the BetterBuildings grant.

PROGRESS TOWARD GOALS

PARTICIPATION IN DENVER ENERGY CHALLENGE BY RESIDENTS / HOMEOWNERS



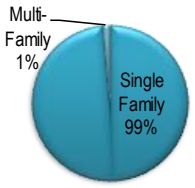
IMPACT

WORK COMPLETED		ECONOMIC IMPACTS	DEEMED ANNUAL SAVINGS FROM UPGRADES & QUICK INSTALLS			
Total Project Investment		Jobs Created	kWh	Therms	Cost Savings	$mtCO_2$
$5,049,991		11 FTE jobs	2,948,949	632,770	$886,814	5,685
Total Rebates Paid	Private Investment	Worker Earnings				
$461,480	$4,588,511	> $1,000,000				
Total Investment:Rebates*		Local Sales Tax Generated	Energy and emissions savings from residential Denver Energy Challenge are equivalent to taking 1050 cars off the road.			
10.9 to 1*		$78,000				

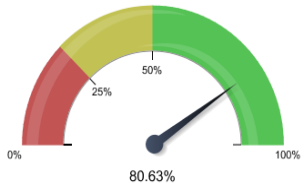
HIGHLIGHTS

- The Denver Energy Challenge has exceeded its participation goal of 6,000 households.
- Nearly 5,600 households made upgrades since the beginning of the program.
- Single family homeowners have an 80% conversation rate from enrollment to upgrade.
- Since Aug 2012, 52 loans financing $423,435 in energy efficiency upgrades have been issued. The average loan-funded home project size is $8143.
- Market Transformation: 155 contractors have completed at least 1 residential upgrade.

USES OF BUILDINGS ENROLLED



ENROLLMENT TO ACTION



** For every $1 spent in rebates, over $10 was invested in the community towards these efficiency projects.*

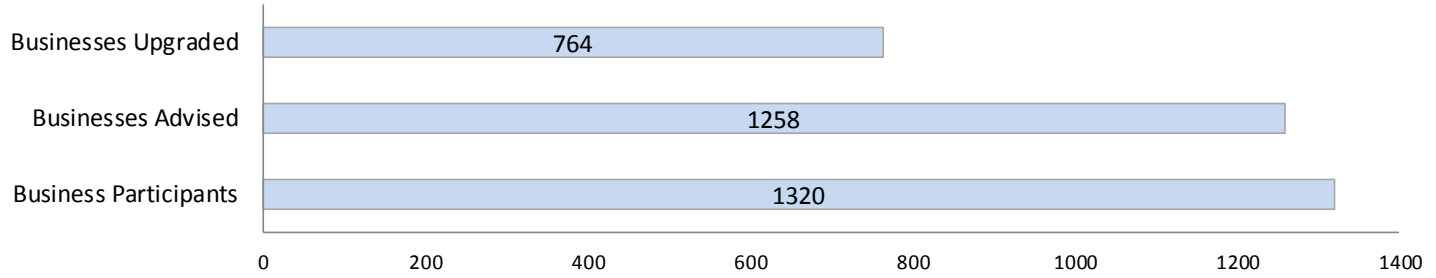
Dashboard design credit: City of Boulder, Boulder County

Table 7: Accomplishments by City/County of Denver Commercial Program through Sept 30, 2013

This page summarizes the accomplishments since October 2010 of the commercial Denver Energy Challenge service. Denver Energy Challenge was conceived and developed by the City and County of Denver, Dept of Environmental Health. For more info, visit www.denvergov.org/CGD. Denver was a subrecipient to the BetterBuildings grant.

PROGRESS TOWARD GOALS

PARTICIPATION IN DENVER ENERGY CHALLENGE BY BUSINESSES OR PROPERTY OWNERS



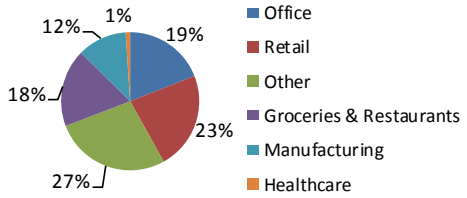
IMPACT

WORK COMPLETED		DEEMED ANNUAL SAVINGS FROM UPGRADES & QUICK INSTALLS			
Total Project Investment		kWh	Therms	Cost Savings	$mtCO_2$
$6,433,600		23,378,800	94,100	$2,196,000	18,990
Program Rebates Paid	Total Private Investment				
$929,969	$4,413,783				
	Utility Rebates Paid	Energy and emissions savings to date from commercial EnergySmart are equivalent to taking 4,000 cars off the road.			
	$1,089,848				

HIGHLIGHTS

- DEC exceeded its goal of 1200 businesses participating.
- Over 800 project upgrades were made.
- DEC successfully merged into the Certifiably Green Denver program to provide full service sustainability advising.
- DEC received a USGBC Public Interest Design Award – one of 6 recipients statewide.

USES OF BUILDINGS ENROLLED IN DEC



ADVISING TO ACTION

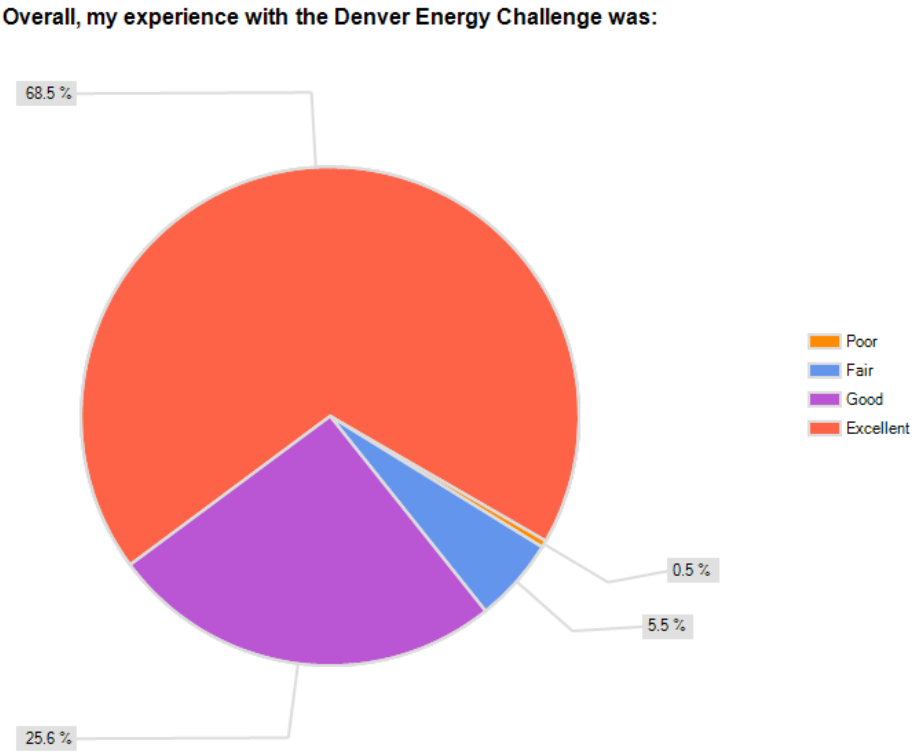
Businesses that make upgrades after receiving EnergySmart advising services:

58%

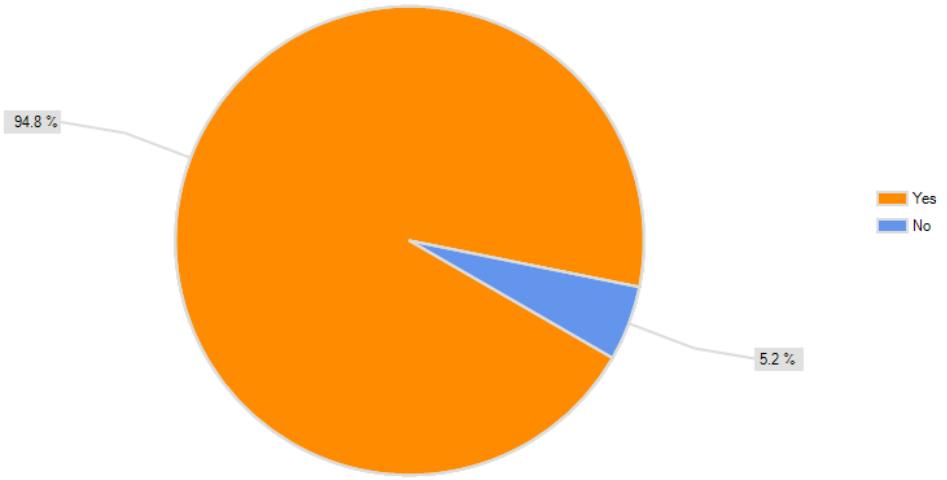
Dashboard design credit: City of Boulder, Boulder County

Customer Satisfaction

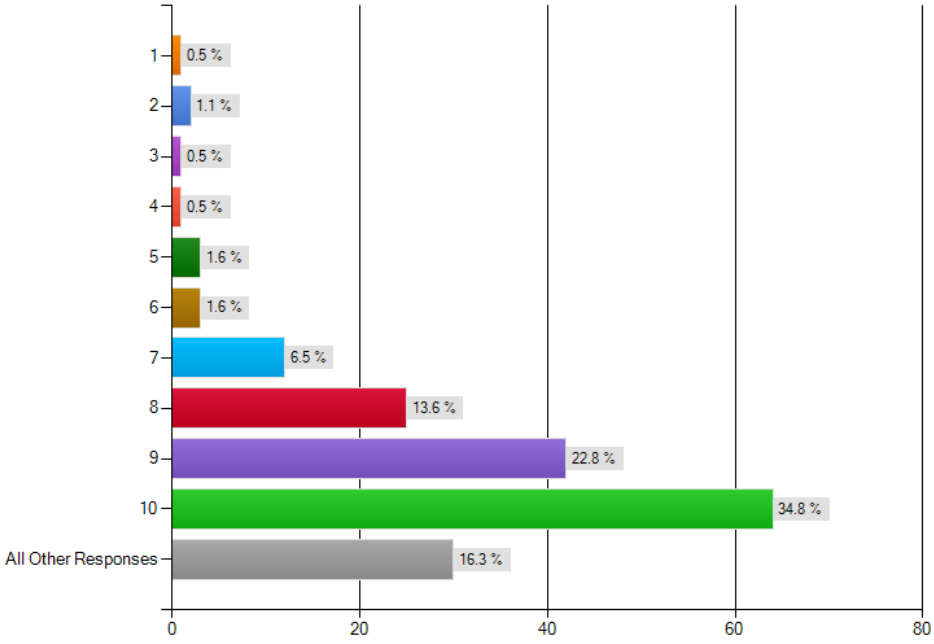
The following three charts show the customer satisfaction survey results of Denver Energy Challenge participants.

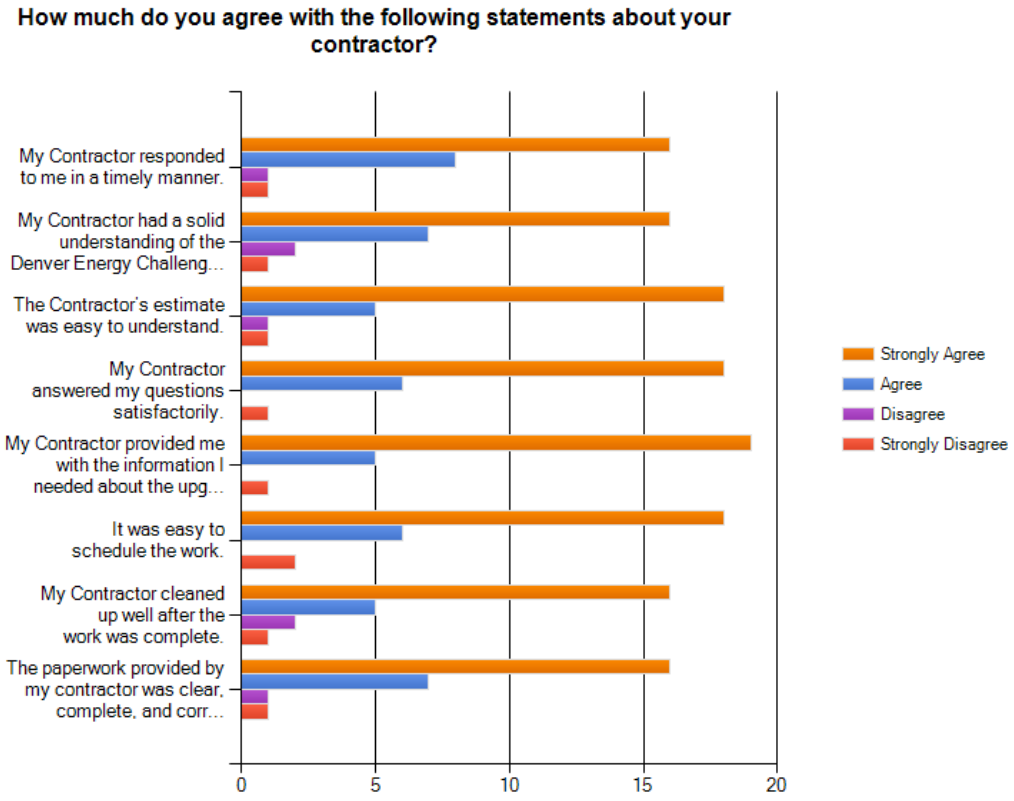


Would you recommend this service to a friend, neighbor or co-worker?



If you have already pursued an upgrade, please rate your experience with your contractor. 1 = very poor; 10 = excellent





Success Stories

Denver Councilwoman Ortega

In February of 2012 the Denver Energy Challenge contacted Councilwoman Debbie Ortega to participate in the City's residential energy program. With a late 1800's home in the Highlands, Councilwoman Ortega welcomed the opportunity to have an energy advisor visit her home and support one of Denver's programs. "It's always important to take advantage of programs when we have them at the City. It gives me the ability to speak about the program having had direct experience and knowledge with it," said Ortega.

When a homeowner chooses to participate in the Denver Energy Challenge they have the option to schedule a phone call with an advisor, or receive a home visit based on

availability. Within an hour the advisor was able to take a surface level assessment of her home and sit down and talk with the Councilwoman about any concerns or questions she had related to her home's energy performance.

After her advising visit, Councilwoman Ortega's energy advisor sent an energy action plan with recommendations for improving her home's performance. Attic insulation and air sealing were the two top recommendations to improve the home's comfort and energy efficiency. The Councilwoman needed a new roof as well and chose to add the insulation at the same time. "As a homeowner, maintenance is ongoing, so it's important to do the kinds of things that improve your home and can make a huge difference. I've already noticed a difference since my insulation was added," said Ortega.

Ortega also has an old chimney that was sealed quite some time ago, however she continued to feel drafts even with a pillow shoved up inside. Her advisor recommended a quick fix: a chimney balloon (average cost $40), which fits neatly into the chimney to prevent drafts. "Having the right thing really makes a difference," Ortega said.

Now with winter just around the corner, the Councilwoman and her home are confident that the cold temperatures will stay outside all year long.

Charapata House

The Charapata household was able to reduce energy usage by an estimated 32%. In order to make the best decisions for his home, Mr. Charapata met with an energy advisor to see what his options were. He chose to add insulation and air sealing (received program rebate along with Xcel rebate) and finally installed a solar PV system. After receiving a few energy bills it appears the Charapata family is over-producing and is able to receive a credit back from Xcel.

Startz House

When the Startz family bought their historic Baker home in July 2012, they knew there might be issues with energy efficiency due to noticeable drafts and older systems, however it wasn't in their budget to tackle as new homeowners, nor did they know what measures made sense.

In September of 2012 they were curious what measures would improve their home's efficiency so they decided to get an energy audit. The audit was full of good information and the cost for the audit was offset by Xcel Energy rebates, so it only cost them $135 to identify how their home was wasting energy and what improvements made sense for them.

Knowing they had options was a great start but the holidays were rapidly approaching and they figured they would just wear sweaters inside and deal with improvements when something broke. Little did they know, while having friends over for Christmas dinner, their 30 year old furnace would break forcing their guests to sit on heating pads to stay warm! After three weeks without a furnace, their electricity bills skyrocketed to $350 in one month due to individual electric wall heaters. "We didn't know we were uncomfortable until our house became comfortable!" said the Startz family.

Using their energy audit report, they had a qualified energy efficiency contractor do some of the recommended low-cost measures which included air sealing (in the unfinished basement and on the interior exposed brick) and duct sealing. These improvements were virtually impossible to see so their home could still maintain its beautiful historic character while feeling more comfortable inside. They also chose to replace their washer (and dryer) with an efficient model that now uses 1.5 gallons per load versus their old washer at 20 gallons per load.

While getting two estimates for a replacement furnace they found out about the Denver Energy Challenge, which provides free energy advising and low-cost energy loans for residents who live in the City and County of Denver. Additionally, their evaporative cooler was failing so they were pleased to find out that loans offered through the Denver Energy Challenge had a 5 minute online application process, very low interest rates (starting at 2.75% versus 14-25% with other lending institutions), and no early payment penalties. They thought they would have to wait until they had the capital to do any of the projects on their to-do list but that was no longer true!

When they applied for their loan, they were assigned an energy advisor through the Denver Energy Challenge. The program also provided them with a historic preservation reviewer to ensure they were doing projects that did not affect their delicate and historic home. It was recommended that they replace some of their non-historic windows, because they would not close, and their advisor and historic preservation reviewer helped them determine the best method for doing this. In this instance it was easier to approve replacements however original windows in a historic home do not always need to be replaced, they can be restored. "Our advisor was awesome and we didn't have to worry about historic preservation issues because the advisor took care of it, which was a huge plus for us," said the Startz family.

"The rebates from Xcel Energy made a big difference for us, too. We were able to pay down our loan faster by receiving the rebate checks and signing the extra money over to our loan," said the Startz family.

Old Western Paint Company

Old Western Paint Co. has been in operation since 1961 and remains family owned and operated. Prior to an in-depth energy analysis, Old Western had noticed spikes in their energy use which put them into a higher energy tier costing the company a significant amount in utility costs. The in-depth assessment showed that the energy spikes were happening because their variable frequency drives (VFDs) and compressors were turning on and cycling at the same time. It was identified that eventually they should replace their VFDs. However, until they can do that, it was recommended that they adjust the timing to keep each system cycle 15 minutes apart, preventing energy spikes.

Old Western had been concerned about their monthly utility bills prior to this discovery and this process revealed that they weren't in the correct category for utility billing. This discovery helped Old Western become aware of the basics on their utility bill and equipped them to take action and get it corrected.

In addition, one of the most cost-effective upgrades identified in the analysis was Old Western's lighting. Old Western received a $2,500 rebate as part of their lighting upgrade. A portion of that rebate came from the City under the BetterBuildings grant, while another portion came from Xcel Energy rebates, for commercial businesses to upgrade their lights from T12 to T8. It is estimated that with the lighting upgrades and operational changes for the variable speed motors, Old Western is saving $100/month.

LESSONS LEARNED

Residential

- Additional program rebates helped drive enrollment, but were very disruptive to the marketplace. They attracted less reputable contractors from out of state and created confusion for homeowners.

- The absolute hardest goal to achieve was shifting the workforce to a whole home/home performance approach and building a more skilled workforce. Many homeowners are still driven by lowest cost and contractors fear being outbid. Many will do low-cost, low-quality work and will barely profit from this model. Training in good building science must accompany training in consultative sales techniques and approaches for building your business.
- Phone advising was as effective as in person advising for the majority of customers, resulting in an equivalent conversion rate around 75%.
- Community leaders and decision influencers can help drive sign ups more than traditional advertising. Earned media is also extremely effective. The most effective are word of mouth referrals and contractor referrals.
- You need to meet people where they are. We do not require an audit because it can be a barrier for some people. We do whatever we can to get people to sign up and then use consultative sales, social norming and other techniques to encourage their engagement and participation.
- Some customers will do a comprehensive improvement involving multiple measures in a short time frame. They are ready and willing and have the financial means to do so. Others will do 1 measure, call back in 6 months for help with something else, and continue on that path over a period of time. Still others will first look for DIY projects before hiring a contractor to do work. We meet each customer where they are and, over time, achieve more upgrades than if we tried to push everyone into a comprehensive improvement upfront.

Residential Moderate Income Group Buy

- In signing people up, residents are generally drawn in by the idea of a more comprehensive assessment rather than a simple attic check.
- In interacting with residents who wanted services (attic check or assessment), it became apparent that most people do need a more comprehensive assessment.
- Scheduling within a constricted time block is challenging for the contractors and residents.
- The longer we work in a neighborhood, the rate of interest goes up.
- The most common barriers to taking action noted by surveyed participants were a lack of time and/or money.

Commercial

- Skin in the Game- We learned that it is best for a business to have some skin in the game as far as an investment in their upgrade and potential energy savings. Too much of a rebate can actually detract from the appeal of efficiency when the business perceives it as cheap or almost free. Our jobs as advisors are to have the investment make sense in the form of ROI. An upgrade usually sells itself when a payback is short (1-3 years).
- Advisor Value- Meeting in person is the best way to help sell energy efficiency. Putting a face with our program and explaining its benefits has a lot more impact than an email or

a website. Different factors attribute to that. Having a more human way of approaching their energy consumption and potential upgrade plans lets people feel more at ease with a decision to invest capital for efficiency improvements. It's also peace of mind when you let people know that you are there to assist them from start to finish including the assessment, contractor selection, and paperwork as well knowing that you will be there six months down the road to assist them.

- Businesses are more likely to take action when they receive:
    - Personal support and guidance
    - A clear path to saving money
    - Persistent encouragement
    - Promotion of their accomplishments

FUTURE PLANS

Policies to drive greater efficiency in various sectors

Evaluation of energy efficiency programs and services has led to further consideration and review of policy and program development that, when developed in unison, leads to improved penetration of energy efficiency within the market. Our success in service availability for both residential and commercial small business has been evident in our metrics of conversions and total energy saved. However, as we compare our initial successes to long term goals of energy efficiency to meet climate and sustainability goals, we are cognizant that we will need additional leverage to move energy efficiency to the levels needed to meet those goals. Policy level implementation has been utilized in many major cities and has shown the ability to bring pragmatic solutions that meet the triple bottom line and present opportunities for leadership and growth.

The commercial program transitioned over in 2013 to a broader sustainability program to include energy efficiency and conservation, water conservation, waste minimization and diversion, and transportation alternatives. The commercial Denver Energy Challenge has merged with an existing program, Certifiably Green Denver to increase the outreach to the overall sustainability efforts in Denver. The overall 1300 businesses reached by the Denver Energy Challenge can now be leveraged to offer the full service sustainability assessments and certification. In addition to the full certification, Certifiably Green Denver plans to offer recognition to businesses that meet set criteria in "Excellence in Resource Conservation" in one or more of the priority categories in the certification. This will further incentivize businesses through public recognition by reaching each milestone.

Part III – GARFIELD COUNTY

BACKGROUND, HISTORY AND POLICY SUPPORT

Garfield County is a rural county in western Colorado. It neighbors are the ski resorts of Aspen and Vail, and it has been one of the state's top three natural gas-producing counties for more than a decade. The county's 56,000 residents live in 17,317 households, and there are 1,693 commercial properties.

The county had limited access to energy efficiency programs prior to 2009, when the Colorado Department of Local Affairs (DOLA) awarded a $1.6 million New Energy Communities Initiative grant to the county, its six municipalities, the library district and a regional transportation authority. The DOLA grant was funded by revenue from the state energy severance tax, with $500,000 in matching funds from the nine participating local governments.

The grant application was initiated and written by CLEER, Clean Energy Economy for the Region, in 2008. CLEER is a Carbondale organization that sought to expand the types of energy efficiency programs to the residents and businesses of Garfield County, that were already being offered in Boulder County, Denver and neighboring Pitkin County, and its efforts to do so were funded in 2008 by a grant from the Aspen-based Community Office for Resource Efficiency (CORE).

In October 2008, DOLA awarded the New Energy Communities Initiative grant to Garfield County government, which served as the fiscal agent for what was originally called the Garfield New Energy Communities Initiative (G-NECI). Garfield County contracted with CLEER to carry out the programs and services of G-NECI, and an Advisory Board of representatives from the nine member governments guided the program.

G-NECI used the $2.1 million in funding for the demonstration of solar PV projects for each partner government, transportation and fleet efficiency projects, government building energy monitoring and efficiency project implementation, and funding to develop and launch pilot residential and commercial "audit and upgrade" programs. Each component of the project was amplified by a strong marketing and outreach effort and a robust website to achieve widespread public awareness of these projects.

Additional funding sources during the 2009-2011 period included rebate funding through an EECBG-C block grant, a state SEP grant for two western Garfield County zip codes, and the Colorado Governor's Energy Office Main Street Initiative. In 2010, Garfield County was a co-applicant with and subrecipient to Boulder County's BetterBuildings award.

In the formative years of 2009-2010, G-NECI identified three major barriers to energy efficiency success for households, businesses and the organization's own local government partners: a

utility service area puzzle, lack of access to trusted information, and lack of access to rebates and financing. As the organization developed and launched a variety of programs, it looked for ways to overcome these barriers.

- **Utilities**: Three electric utilities and two natural gas utilities serve the grid-tied areas of the county, with electric and gas service areas overlapping in several different ways. The electric utilities are Holy Cross Energy, a rural electric coop, Glenwood Springs Electric, a municipal utility, and Xcel Energy, investor owned. The natural gas utilities are SourceGas and Xcel Energy, both investor-owned.

  With widely varying utility DSM programs, it was challenging to present information to the public and to design programs to meet the needs of different utility customers. The solution was to provide broad marketing aimed at the end result -- home and workplace comfort and lower utility bills – that in turn directed people to the Garfield Clean Energy website. On the site, utility customers could click through a few pages to learn about the rebates being offered by their gas and electric utilities.

- **Access to trusted information:** We determined that many homeowners and businesses would move projects along if they had access to an expert they could count on to help them navigate through their efficiency projects. We call this expert an Energy Coach. The coach helps a busy home or business owner determine the most cost-effective projects to pursue, understand their rebate and tax credit options, make sure they choose upgrades that meet technical efficiency standards required for rebates, work with contractors who may provide apples-to-oranges bids, and file end-of-project rebate application forms.

- **Rebates and financing:** We secured pools of rebates from some federal and state sources, and worked closely with Glenwood Springs Electric to help develop that utility's first-ever rebates for solar PV, energy audits, efficiency upgrades and appliances. We also investigated various means of financing for energy efficiency upgrades, including the Property-Assessed Clean Energy (PACE) model.

Under the initial DOLA grant, G-NECI launched a pilot business efficiency program in Glenwood Springs Electric territory, the Commercial Audit & Retrofit Demonstration project. Businesses had to apply for the six openings in the program, and those that were chosen received an engineering-grade audit and rebates funded by the electric utility that covered up to 80% of project costs. This pilot helped guide the creation of the Garfield Clean Energy Challenge for business program, which launched June 2, 2010.

The residential efficiency program launched initially as a rebate program in October 2010. The rebates were provided by an EECBG-C grant, with very little funding for energy coaching. We were able to launch a more comprehensive residential program that included energy coaching

services in January 2011, as part of the funding we received as a subrecipient to the Boulder County BetterBuildings grant.

Getting a head start developing a plan and running a pilot commercial program put G-NECI and CLEER into a stronger position to participate in more grant programs, including the BetterBuildings Program, to bring more funding to Garfield County.

PROGRAM DESIGN & CUSTOMER EXPERIENCE

Garfield County's BetterBuildings grant was initially awarded in 2011 to Garfield County government, which continued in its role as fiscal agent for what became known as Garfield Clean Energy. Following a competitive bidding process, Garfield County continued to contract with CLEER to manage the program.

After the member governments formed the Garfield Clean Energy Collaborative intergovernmental authority in 2012, Garfield County conveyed the grant portion for financing programs to Garfield Clean Energy in August 2012. Garfield Clean Energy managed the funds for the remainder of the grant period.

The BetterBuildings funding allowed Garfield Clean Energy to dramatically ramp up its Garfield Clean Energy Challenge for Homes and for Business campaigns. The Challenge and its supporting residential and commercial programs employed these primary components to involve hundreds of participants and drive $2.6 million in clean energy investments:

- **Marketing and recruitment:** Efforts included press releases and case studies for earned media, paid advertising with ads featuring commercial participants, hosting booths at community events, going door-to-door in commercial zones, hosting neighborhood energy parties, and promoting rebate deadlines.

- **Energy coaching:** Free technical assistance provided by an energy coach – who has prior experience as a building contractor or home energy rater - helped business and household customers understand their options, make wise choices on energy efficiency investments and work through their projects. This personal assistance resulted in a much higher rate of action by those who initially signed up for the Clean Energy Challenge.

- **Rebates and financing:** Rebates for energy upgrades offered by local utilities and Garfield Clean Energy helped property owners overcome the sticker shock of project costs and shorten their energy payback periods. Financing uptake has been modest, but for those borrowers who have used the loan fund, it made the difference for a project to actually get done.

- **Case studies**: Stories about people, the thought processes they go through, the measures they carry out, and the savings that result, make for a very convincing recruitment message for the rest of the community.

- **Contractor training and networking:** Making sure that local contractors are ready for a surge in business and educating them on required efficiency standards and applicable rebates and tax credits are essential.

> "If it wasn't for the Garfield Clean Energy Challenge, I probably would have never thought of doing upgrades in efficiency to my home. The costs have been reasonable, and the results have been very noticeable in comfort and on the pocketbook."
>
> - Ron Mittleider, Silt, CO

PROGRAM DESIGN & CUSTOMER EXPERIENCE – COMMERCIAL

The Garfield Clean Energy Challenge for Business assisted business and commercial property owners with pursuing energy efficiency projects that helped save energy, improve comfort and become more profitable.

In designing the program, we worked closely with the local gas and electric utilities to leverage the DSM programs they had in place. The coaches researched and stayed current on all the different utility rebates, along with keeping them up-to-date on the website.

We asked businesses to enroll in the Challenge by filling out an application form as their first step. The form included an affirmative statement that they intended to carry out at least one efficiency upgrade, because we wanted businesses to commit to making some sort of improvement. We maintained this requirement throughout the program, as it helped the energy coach assess who was serious about making upgrades.

Once we received the application, an energy coach would create a file and contact the business's representative to get started. Most of the time, the energy coach recommended a free or low-cost walk-through assessment provided by the utility. However, if the customer already had a suitable project in mind, we would move directly forward on that project.

Once the customer and the energy coach figured out what projects to move forward with, the customer would seek bids from their preferred contractor or one or two bids from a list provided by the energy coach. The energy coach would help review bids, and confer with the

contractor if more detail was needed or questions about the equipment came up. The energy coach would also help move the project along by sending friendly check-in reminders to the customer and the contractor if needed.

Upon completion of a project, the coaching team selected candidates to be featured in case studies and in the ad campaigns. We developed an "energy superhero" theme and photographed business owners spreading their shirts open to reveal an undershirt with a Superman-style "S." This theme became so popular that businesses asked to be featured, as it provided their business with additional positive recognition.

PROGRAM DESIGN & CUSTOMER EXPERIENCE – RESIDENTIAL

Like the commercial program, the Garfield Clean Energy Challenge for Homes helped homeowners pursue energy efficiency projects that helped save energy and improve comfort.

Coaching services were provided over to the phone and to customers who visited our office. We did not require an upfront home energy assessment, but we partnered with utilities to promote their energy assessment opportunities and provided a list of local home assessment contractors on the Garfield Clean Energy website. Most of the homeowners who contacted us already had a project in mind. The energy coaches assisted in helping homeowners understand the available rebates, finding contractors, reviewing bids, and filling out rebate paperwork.

Most of our projects were completed in single-family homes. We had a couple of multi-family facilities, which were rolled into our commercial program.

PROGRAM DESIGN & CUSTOMER EXPERIENCE – PUBLIC BUILDINGS

In a slightly different approach, the Garfield County portion of the BetterBuildings grant included an allotment targeted at public building energy savings as part of the campaign. This was done to lead by example and engage the community. Our team felt it was important for the local governments to be working towards savings at the same time as we were asking homeowners and business owners to do the same. This included the development of a publicly-accessible website, called the Garfield Clean Energy Navigator, that automatically analyzes renewable energy production and energy use in buildings. Understanding energy usage is a critical first step in CLEER's Active Energy Management program that is assisting facilities with energy conservation. The BetterBuildings portion of this effort included:

- Finalizing the software development of the Garfield Energy Navigator to make it compatible on all screen sizes from iPhones to display touchscreens, including screen savers to promote residential and commercial programs, regular energy savings displays and weather-adjusted cost avoidance displays (for the technical user and coaches to use).
- Providing technical assistance to facility managers for using the Energy Navigator to engage in Active Energy Management and achieve savings with low- to no-cost improvements.
- Developing case studies on public buildings to share with the public and with fellow facility managers.
- Placing public display kiosks in public buildings across the county to provide energy education opportunities for building users and visitors.

The website is open and available to the public and can be found at: www.garfieldenergynavigator.org.

OUTREACH & DRIVING DEMAND

Garfield Clean Energy utilized a variety of outreach and marketing strategies throughout the program. Thanks to additional support from local communities, we were able to leverage the BetterBuildings grant marketing funds we were awarded with local funds. The following methods were completed during the grant period.

Face-to-face outreach:

- Presentations to existing group such as local clubs (Rotary), chambers, and downtown development organizations.
- Hosted several energy efficiency events, energy coaching open houses, and two neighborhood parties.

- Door-to-door outreach to households.
- Partnered with GroundWork Colorado for their door-to-door effort to change out porch lights in Glenwood Springs and Carbondale.
- Door-to-door outreach to businesses across the county.

Published stories and articles:

- Developed press releases during various stages of the program and distributed to local publications.
- Prepared 37 case studies which were all published in local newspapers. We found this earned media (published articles) yielded more calls compared to the ads running alone. We also packaged the case studies as two-sided printed documents and posted them to the Garfield Clean Energy website for use in continuing recruitment.
- One case study generated a news story on Denver's Channel 9 news station.

Traditional ads:

- Developed a fun "Energy Hero" ad series highlighting local businesses. See the commercial section above for an example.
- Developed a second series of ads partnering with local organization CORE/Energy Smart Colorado to achieve an "everyone is doing it" feeling to encourage more participation.
- Newspaper paid advertisements.
- Radio ads on public and private stations.
- Public interior bus ads during peak ridership season.

Public display and tabling at events:

- The Garfield Energy Navigator is on display at 10 public buildings across the county.
- Created displays at libraries across the region for Earth Day promotion.
- Staffed tables at events that reached large numbers of business owners and homeowners:
    - Chamber-hosted Business Expos and Business After-Hours
    - Sustainability festivals
    - Woman's Health Symposium (targeting women with healthy home message)
    - Farmer's Market

Co-marketing with utility partners:

- Partnered with Xcel Energy on direct mail pieces to businesses and a summer cooling season direct mailing to their residential customers.
- Partnered with Holy Cross Energy to include details about program in their newsletter.
- Partnered with Glenwood Springs Electric to send a mailing to their All-Electric customers to promote programs and services.

WORKFORCE DEVELOPMENT & CONTRACTOR TRAINING

Garfield Clean Energy was already working in 2010 to develop the local workforce to provide home energy assessments, and to prepare the local contractor community for the anticipated surge in demand for insulation, air sealing and HVAC upgrades that was being driven by new rebate funding. The community college serving the area, Colorado Mountain College, offered BPI training courses and refreshers. We collaborated closely to promote those educational opportunities and to make sure newly minted home energy auditors understood the complex array of rebates offered in our area.

In 2011, with the launch of the BetterBuildings program, we partnered with Energy Smart Colorado, which was the BetterBuildings program in neighboring Pitkin, Eagle and Gunnison Counties, to provide a series of workshops for contractors. These training workshops included:

- Marketing energy efficiency and your company
- HVAC best practices
- Air sealing and ventilation best practices
- Two lighting workshop and expo events

During the early months of our commercial program and after the first couple of projects, we realized that local contractors needed a better understanding of energy efficient lighting best practices. We hosted the first Lighting Workshop and Expo in August 2011 and a second workshop in March 2013. We brought in lighting experts from manufacturers, an experienced lighting designer, and a demonstration expo where contractors could see and handle the latest lighting technology. Both events drew more than 80 contractors, business owners and facility managers. Those who attended expressed their appreciation that we brought this level of expertise to the area. After this workshop, we experienced a sharp increase in business participation and contractors engaged in our program. In fact, one local lighting contractor assigned a staff member to work full-time recruiting customers to make lighting efficiency upgrades.

In 2012, we started hosting contractor workshops that are co-sponsored by utilities serving the area. These workshops give utilities an opportunity to get in front of a large number of contractors to explain their rebate programs and any changes for the coming year. We have found January and February to be an excellent time to reach contractors and to kick-start the year.

FINANCING & INCENTIVES

The Garfield Clean Energy Residential Revolving Loan was launched in September 2012, offering homeowners access to capital with low administrative costs and simple terms so they can move

forward with energy saving improvements. These loans of $1,000 to $25,000 help homeowners who would otherwise have difficulty paying for their upgrades. Their loans are repaid over a period of up to seven years, with the expectation that immediate saving on their energy bills will cover most, if not all of the monthly loan payment.

The Residential Revolving Loan Fund was established with $195,500 of the BetterBuildings funds that are specifically designated for financing programs. Garfield Clean Energy partnered with Funding Partners, a nonprofit Community Development Financial Institution (CDFI) certified by the U.S. Treasury, to administer and manage the loan product. Funding Partners had already set up a similar loan product with the neighboring BetterBuildings program in Eagle, Pitkin, and Gunnison counties. By contracting with Funding Partners, Garfield Clean Energy is able to provide a loan program that is consistent across the region.

Garfield Clean Energy also established a Credit Reserve Fund of $303,333 in November 2011 with Colorado Housing and Finance Authority, CHFA, for banks to use for underwriting energy loans for commercial properties. However, local lenders showed only minimal interest in the program, and no loans were backed with this fund. After much work to get more engagement in this financing, the Garfield Clean Energy board terminated the program in June 2013. It reallocated $100,000 to the Residential Revolving Loan Fund, and reallocated the remainder into rebates and programmatic funds for energy coaching, reporting and improvements to the Garfield Energy Navigator.

Throughout the term of the BetterBuildings program, most of the rebate funds were from outside funding sources. We utilized BetterBuildings funded rebates during the final months of the program after the GCE board had reallocated financing funds into rebate funds.

DATA & EVALUATION

CLEER developed the Garfield Energy Navigator to track energy use in public buildings and display building performance through established kiosks and community-engaging screen savers, described above in the Public Buildings section.

For much of the BetterBuildings grant period, Garfield Clean Energy used a series of Excel spreadsheets and hard copy file folders to track participants, their energy upgrade measures and the deemed energy savings. As the number of participants reached into the hundreds, we realized that spreadsheets did not offer the level of searching and sophisticated reporting that we needed to analyze the results of our work.

In 2013, CLEER explored several online customer management systems, and decided to use the Salesforce platform. We contracted with a third-party developer to customize our Salesforce database so it would track building and energy data, energy upgrades, energy contractors, dollars spent, rebates awarded, and deemed energy savings. While the customization and data entry work took several months, Garfield Clean Energy is now able to provide detailed reports

using a wide variety of reporting parameters, and to better analyze the effectiveness of different types of programs.

ACCOMPLISHMENTS

Since the program launched, Garfield Clean Energy has achieved the following:

- Provided energy assessment and/or coaching to over 500 homes and 175 businesses, with an average of 50% and 65% respectively going on to implement energy efficiency upgrades.
- Supported the completion of upgrades in 260 households and 115 businesses.
- Issued rebates worth nearly $551,000. These rebates have spurred local investment in energy efficiency upgrades of more than $2.6 million, sustaining jobs and economic vitality locally. On average, for every $1 spent in program rebates, $4.5 was invested in the community towards energy efficiency.
- Through a revolving loan fund, $53,634 in loans have been funded in Garfield County since the loan product launched in September 2012, helping seven households overcome cost barriers to energy efficiency investment.
- Saved an estimated 2,197,362 kWh and 94,284 therms annually.
- Reduced 2,070 metric tons of carbon dioxide equivalent (CO2e) annually, equivalent to taking 2,440 cars off the road.
- Saved residents and businesses an estimated $360,000 annually in utility expenses, supporting a healthy economy and environment.
- Provided training to contractors, supporting a robust local energy contractor community.

We have observed successful market transformation in the efficient lighting industry and among small-time contractors. We have seen a strong increase in the number of electrical contractors who are focusing at least part of their business on energy efficiency. We have also experienced an increase in the participation and knowledge of efficient lighting at the local distribution centers. Implementing commercial efficient lighting programs has become notably easier.

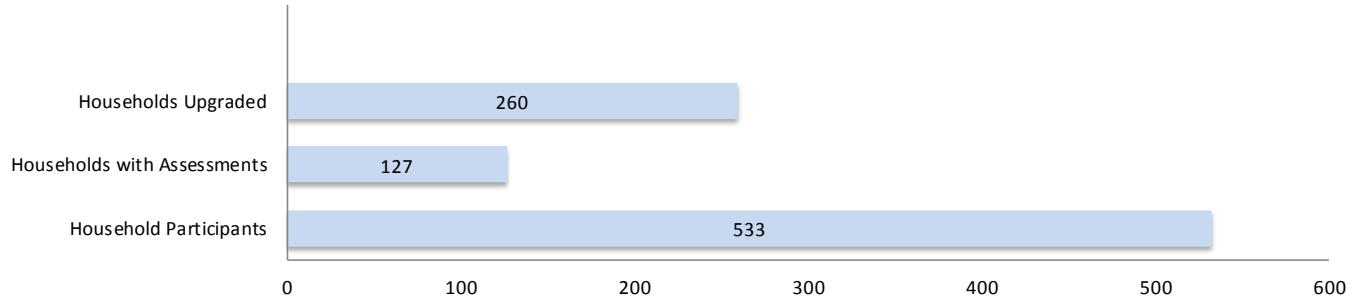
The following tables summarize progress from January 2011 through September 2013 in achieving the goals of the Garfield Clean Energy Challenge. Table 8 reflects the residential accomplishments and Table 9 shows the accomplishments in the commercial sector.

Table 8: Accomplishments by Garfield County Residential Program through Sept 30, 2013

This page summarizes the accomplishments since October 2010 of the residential Garfield Clean Energy service. Garfield Clean Energy Challenge was conceived and developed through a joint effort of CLEER, Clean Energy Economy for the Region, and the partners of Garfield Clean Energy. For more info, visit www.garfieldcleanenergy.org. Garfield County was a subreceipient to the BetterBuildings grant.

PROGRESS TOWARD GOALS

PARTICIPATION IN GARFIELD CLEAN ENERGY BY RESIDENTS / HOMEOWNERS



IMPACT

WORK COMPLETED		DEEMED ANNUAL SAVINGS FROM UPGRADES & QUICK INSTALLS			
Total Project Investment		kWh	Therms	Cost Savings	$mtCO_2$
$969,833		21,506	33,211	$40,455	214
Total Rebates Paid	Private Investment				
$156,703	$813,130				
For every dollar spent in rebates, $6 was spent on assessments and upgrades.		Energy and emissions savings to date from Garfield Clean Energy Challenge for residential are equivalent to taking 44 cars off the road.			

HIGHLIGHTS

- Garfield Clean Energy has exceeded its BetterBuildings goal of getting 75 households to make upgrades and achieve 15% savings.
- 260 households made upgrades since the beginning of the program.
- Market Transformation: Local building analysts have grown their businesses from starting with just energy audits to providing full-scale energy efficiency upgrades for the building envelope. The citizens of Garfield County now have very qualified contractors to call for these services.

ADVISING TO ACTION	
Households that made upgrades after enrolling in program:	48%

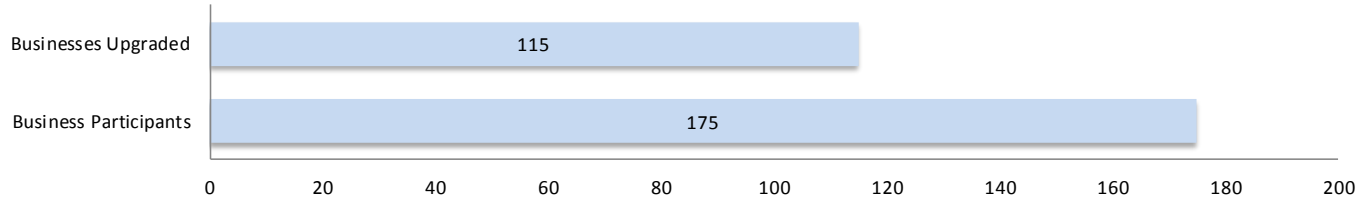
Dashboard design credit: City of Boulder, Boulder County

Table 9: Accomplishments by Garfield County Commercial Program through Sept 30, 2013

This page summarizes the accomplishments since October 2010 of the commercial Garfield Clean Energy service. Garfield Clean Energy Challenge was conceived and developed through a joint effort of CLEER, Clean Energy Economy for the Region, and the partners of Garfield Clean Energy. For more info, visit www.garfieldcleanenergy.org. Garfield County was a subrecipient to the BetterBuildings grant.

PROGRESS TOWARD GOALS

PARTICIPATION IN GARFIELD CLEAN ENERGY BY BUSINESSES OR PROPERTY OWNERS



IMPACT

WORK COMPLETED		DEEMED ANNUAL SAVINGS FROM UPGRADES & QUICK INSTALLS			
Total Project Investment		kWh	Therms	Cost Savings	$mtCO_2$
$1,599,513		2,175,856	61,073	$316,982	1,859
Total Rebates Paid	Private Investment				
$394,000	$1,205,513				
Total Investment:Rebates*		Energy and emissions savings to date from Garfield Clean Energy Challenge for business are equivalent to taking 2400 cars off the road.			
4.0 to 1*					

HIGHLIGHTS

- Garfield Clean Energy has exceeded its BetterBuildings goal of 75 businesses participating.
- Over 100 businesses made upgrades since the beginning of the program.
- Market Transformation: Over six local electrical contractors have changed their business model to pursue energy efficiency projects, compared to none doing so at the start of the program.

ADVISING TO ACTION	
Businesses that make upgrades after enrolling in program:	66%

** For every $1 spent in rebates, $4 was invested in the community towards these efficiency projects.*

Dashboard design credit: City of Boulder, Boulder County

LESSONS LEARNED

Regional or statewide solutions are beneficial to help other rural communities provide a financing tool. It's difficult for one rural county to establish a loan program. Developing financing programs for one rural county was difficult because of a small customer base. We started with a Credit Reserve Fund that multiple banks could tap into for commercial borrowers. We tried to persuade the banks that they could offer a lower interest rate or lower their collateral requirements. However, the two banks that did participate only offered their standard loan product with existing underwriting requirements.

At the same time, we were exploring setting up a residential revolving loan fund, with the goal of offering smaller loans to households. We reached out to Funding Partners, LLC, but it was hard for them to set up a program for a relatively small fund. Once Funding Partners contracted with Eagle, Pitkin and Gunnison Counties to establish a residential EnergySmart loan product in those counties, it was then possible to add our pool of funds and expand the loan product offering to Garfield County residents. We needed the economies of scale of a larger pool of funding and a larger potential customer base.

Building on personal relationships to recruit households and businesses is a strong advantage in small towns. Door-to-door recruiting worked well when we teamed up an influential local person and in the communities where our energy coaches live.

Events and presentations have better turnout when we roll them into existing community organization's meetings compared to setting up our own events. Our best success in presenting to a large engaged audience was at Rotary Club meetings or similar existing meetings.

Highlighting popular local businesses with case studies on their energy upgrades and resulting savings gets people's attention, particularly in small towns. Small-town newspapers appreciate well-written articles and photos, and can become great partners in publishing case studies.

Deadlines help people decide to move forward. While contractors are always asking for long-term consistency with rebates, when rebate pools are dwindling and we are unsure about future funding, participation increases greatly with deadlines. Participants take action in the face of a deadline when coaches convey the urgency, where participants might otherwise have stalled completing their upgrade.

Cost control: Providing residential energy coaching only over the phone, along with opportunities to meet with a coach in our office, kept our residential coaching costs down.

Establish data management systems (and the funding needed) early to provide the level of data required for reporting. The data we were able to collect required a great deal of staff

time to process and analyze because we didn't have an automated system to deal with tracking data.

FUTURE PLANS

Due to the success of the federally-funded program, the local governments see the importance of the programs and services that have been provided, and are now funding the continuation of the programs and services through Garfield Clean Energy. The local government partners formed the Garfield Clean Energy Collaborative as a freestanding intergovernmental authority, which officially launched in January 2012. It is the state's first intergovernmental authority dedicated to advancing the clean energy economy. In addition to the nine original members, the Collaborative added the regional Colorado Mountain College as a tenth member. CLEER continues to manage the programs and services of Garfield Clean Energy under an annual contract.

APPENDIX A - ADDITIONAL RESOURCES & REPORTS

Programs' Websites and Resources

- EnergySmart, Boulder County, program website: www.EnergySmartYES.com
- Denver Energy Challenge, City and County of Denver, program website: www.denverenergy.org
- Elevations Energy Loans, offered to EnergySmart and Denver Energy Challenge participants, website: https://www.elevationscu.com/energyloan
    - Watch the fun and instructive video that describes the financing and advising service: https://www.elevationscu.com/energyloans/about/video
- EnergySmart created videos to describe the service, features of community leaders, and an engaging and entertaining "EnergySmart to the Rescue" series for home and business. These videos are available: http://www.youtube.com/energysmartyes.
- The Denver Energy Challenge created many videos to describe the program, highlight job creation and recognize businesses' participation, and share program success. These are available: http://www.youtube.com/denverenergy
- Garfield Clean Energy program website: www.garfieldcleanenergy.org
- CLEER developed the Garfield Energy Navigator to track and display energy use in public buildings, available: www.garfieldenergynavigator.org.
- The presentation materials and information from the workshops hosted by the Denver Regional Council of Governments and Metro Mayors Caucus are available: www.drcog.org or www.metromayors.org.
- Boulder County's Sustainability Plan is available: www.bouldercounty.org/env/sustainability

The following independent evaluations and community impacts are included in this appendix:

Statewide Economic Impact Analysis of Six Colorado Counties' Energy Programs, Summary Report, September 2013

- Note: This report covers the counties of Boulder, Denver and Garfield as well as three additional counties, Eagle, Pitkin and Gunnison, that received a separate BetterBuildings grant through the U.S. Department of Energy. This report was intended to be a comprehensive state-wide analysis of energy efficiency for Colorado.

"A Tiny Ship Amidst the Rough Seas," by Laura Hutchings, CEO of Populus, LLC, July 2012

- This speech shares firsthand how ARRA funding has positively impacted their small business and many local contractors.

Executive Summary from the EnergySmart Progress Report, June 2012

Post-Bonding Summary of the 2010 Boulder County ClimateSmart Loan Program for Commercial Properties, November 2010

Garfield Clean Energy Progress Report, 2011 - 2013

Energy Efficiency: Productivity Benefits to Power Colorado Jobs and the Economy, for Garfield Clean Energy, October 2012

Statewide Economic Impact Analysis of Six Colorado Counties' Energy Programs

Summary Report

Prepared for

Boulder County Commissioner's Office, Sustainability Office
and Colorado Affiliated Energy Smart Programs in
Denver County, Eagle County, Garfield County,
Gunnison County and Pitkin County

By

Marshall Goldberg
MRG & Associates

September 2013

Purpose

This study was undertaken to analyze the Energy Smart programs in Boulder, Denver, Eagle, Garfield, Gunnison and Pitkin Counties and document the statewide economic impacts that occurred as a result. The analysis reviewed project upgrade costs, including homeowner, business and commercial property owner investments, county and utility rebates, energy loans and estimated energy bill savings to better understand how spending on energy efficiency upgrades and renewable energy benefits residents, business and the Colorado economy. Statewide impacts on jobs, worker earnings[1] and output[2] – the quantity of goods and services produced in Colorado, were evaluated, both for the short-term installation period as well as annually, on an ongoing basis.[3]

Program Descriptions

Boulder County

The *EnergySmart* program provides energy advising and financial assistance to households and businesses in all Boulder County communities, including the cities of Boulder, Lafayette, Longmont and Louisville, the towns of Erie, Jamestown, Lyons, Nederland, Superior and Ward, and unincorporated Boulder County. *EnergySmart* helps residents and businesses identify, prioritize, and implement energy efficiency projects. The program provides a variety of services including rebates, loans, step-by-step energy advising, personalized energy assessments, assistance with finding and working with contractors, technical assistance, and project monitoring and verification.

Boulder County, in collaboration with the City of Boulder Local Environmental Action Division, City of Longmont and Boulder County Public Health, designed the *EnergySmart* program to increase awareness of potential energy savings and to address the barriers that residents and businesses face when considering energy efficiency projects. In addition to addressing these barriers, program goals include:

- Increasing energy efficiency investment in Boulder County
- Creating jobs and stimulating local economic growth
- Advancing energy independence through energy upgrades
- Leveraging federal seed funding to generate at least a 5:1 match in energy efficiency retrofits
- Reaching 3,000 businesses and 10,000 households by June 2013, representing about 26% of business sites and 8% of households in Boulder County

The program was formally launched on January 25, 2011. *EnergySmart* is currently funded by the American Recovery and Reinvestment Act (ARRA) through the U.S. Department of Energy's BetterBuildings Neighborhood Program (BBNP) grant, combined with

[1] Earnings include wages and salaries and employer paid benefits.

[2] Output is a measure of overall economic activity and thus refers to all sales of goods and services, including production, distribution and consumption.

[3] Companion reports for each of the six counties were also prepared to assess the county specific benefits of these programs in each of the respective counties.

contributions from the City of Boulder's Climate Action Plan (CAP) tax and the City of Longmont.

Denver County
The *Denver Energy Challenge* is a free energy program provided by the City and County of Denver's Environmental Health Department. The program was designed to help residents and businesses in the City and County of Denver reduce their energy use by 15% or more. Program participants receive access to free energy advising, rebates and exclusive, low-cost loans to help make much-needed energy improvements. In addition to helping residents and businesses reduce energy use, program goals include:

- stimulating local economic growth
- increasing energy efficiency investment in Colorado
- advancing the state's energy independence through large-scale energy upgrades

The *Denver Energy Challenge* program is currently funded by the American Recovery and Reinvestment Act (ARRA) through the U.S. Department of Energy's BetterBuildings Neighborhood Program (BBNP) grant and local partnerships.

Garfield County
Garfield County's Better Buildings Neighborhood program is run through Colorado's first clean energy inter-governmental authority, the Garfield Clean Energy Collaborative. Its 10 local government members are all working to be more energy efficient for a more resilient local economy. CLEER: Clean Energy Economy for the Region, a nonprofit in Carbondale, administers the program under contract to Garfield Clean Energy.

Garfield Clean Energy's residential, commercial and public facilities programs employ three primary components:

- Measure and manage energy use in public buildings and empower people to make a difference.
- Provide free Energy Coaching services.
- Offer financing for clean energy capital investments.

Energy coaching services are offered to home and commercial property owners to help them make wise choices on energy efficiency investments. Energy Coaches help households and businesses get started with an energy assessment, prioritize the identified efficiency upgrades, evaluate bids from contractors, and apply for Better Buildings and utility rebates.

Eagle, Pitkin and Gunnison Counties
Energy Smart Colorado (ESC) is a regional single-family and multi-family energy efficiency retrofit program established in 2011 in Eagle, Pitkin and Gunnison Counties with $4.9 million in start-up funding from DOE BBNP program to make energy improvements simple and affordable. Founded upon providing access to information, financing, and a skilled workforce, the program hosts local energy resource centers in each county to provide grass roots marketing and outreach, training, owner and contractor assistance, coaching, and administration.

ESC utilizes certified analysts to complete BPI home energy assessments and quick - fix direct install items. Participants are provided access to rebates and Energy Smart loans from their $1 million Revolving Loan Fund. The program is expanding to serve multi-family structures and businesses, and into Lake and Summit Counties. To date, over 3300 homes have been visited and 1700 retrofits have been reported through rebates through the program. In a recent participant survey completed by CCI, 72% of participants completed energy improvements in 2013, up from 60% in 2012.

ESC is currently securing local government and utility partnerships to continue services in 2014 and beyond.

Economic Impact Analysis

The economic tool used to analyze the impacts of the combined six programs is called an input-output (I-O) model. In this instance, the I-O model, designed specifically to analyze in-state expenditures on upgrades[4] and energy efficiency measures eligible for rebates and loans, was used to identify spending patterns and interactions between all sectors of the Colorado economy.[5] For example, the model shows how homeowner spending on attic insulation or high efficiency windows can create business for contractors and vendors, and others in the supply chain, including wholesalers and manufacturers. To the extent these upgrades are installed by Colorado contractors or are purchased from local manufacturers or retail or wholesale vendors, there is additional benefit to the state's economy.

When residents and businesses pay their utility bills, most of the money leaves the local area to purchase fuels, maintain power plants, and support utility operations throughout Colorado and in other areas. When residents and businesses achieve savings on their utility bills they are able to spend some of the savings purchasing other goods and services, on business upgrades, loan repayments and investments in the state's economy.

Key findings of the six county statewide analysis indicate that:[6]

The Energy programs are helping create and support jobs throughout Colorado.

- With almost 99 percent of program spending on residential/single-family and commercial/multi-family building energy upgrades, remodels and quick installs spent in Colorado,[7] this spending supported 320 full-time equivalent (FTE)[8] jobs throughout the state during the upgrade period.[9] These jobs include work for

[4] In some instances, non-energy related improvements (e.g., a home remodel) were undertaken in conjunction with energy improvements. In these instances, since there was no data available to separate the expenditures, the analysis included all spending.

[5] For a more detailed discussion of the methodology used to analyze program impacts see the Appendix.

[6] For more detailed results see tables in the Appendix to this report.

[7] The remainder of the program spending (including payments to contractors and suppliers) occurred outside of Colorado.

[8] Full-time equivalent (FTE) jobs refer to one person (or the equivalent) being employed full time (40 hours per week for 52 weeks) for one year, a total of 2,080 hours. For example, two persons, each working half time for a full year equal 1 FTE job; or 2 persons, each working full time for six months equal 1 FTE job. As a result, the actual total number of people working (part time and or full time) during the installation period may be significantly greater than the FTE number noted.

[9] Jobs created or supported during the upgrade period are considered short term jobs since they only reflect

electrical and window contractors, insulation installers, HVAC contractors, workers at wholesale and retail suppliers (e.g., lumber yards, hardware stores, etc.), as well as jobs at grocery stores, restaurants, clothing stores and other businesses where workers spend their paychecks and businesses purchase goods and services.

- Residential/single-family upgrade spending accounted for 178 of the full time equivalent jobs (56 percent) supported throughout Colorado during the upgrade period.
- Commercial and multi-family property owner upgrade spending accounted for 142 of the full time equivalent jobs (44 percent) supported throughout Colorado during the upgrade period.

The Energy programs increased worker income in Colorado.

- Total program spending in Colorado was responsible for almost $21.3 million in worker earnings[10] for the 320 full time equivalent jobs supported during the upgrade period.
- Residential/single-family upgrade spending accounted for just over $13.2 million of the worker earnings (62 percent) during the upgrade period.
- Commercial and multi-family property owner upgrade spending accounted for just under $8.0 million (38 percent) of the worker earnings during the upgrade period.

The Energy programs stimulated overall economic activity throughout Colorado.

- Total program spending in Colorado was responsible for adding almost $51.2 million in the production of goods and services to the state's economy during the upgrade period.
- Residential/single-family spending accounted for $27.6 million in the production of goods and services to the state's economy during the upgrade period.
- Commercial/multi-family property owner spending accounted for $23.6 million in production of goods and services to the state's economy during the upgrade period.
- Total spending on efficiency and upgrade measures in Colorado generated over $639,000 in sales tax. This included $458,653 in state sales taxes and $180,970 in local county sales tax.

The Energy programs are reducing electricity and gas usage and providing significant utility bill saving for state residents and businesses.

- Reductions in energy usage will save program participants over $5.4 million on their electricity and gas utility bills during the first year measures are in place.[11]
- Residential/single-family residences saved an average of just over $150 each in the first year on their utility bills due to installation of efficiency upgrades.
- Commercial/multi-family buildings saved an average of just over $1,700 each in the first year on their utility bills due to installation of efficiency upgrades.
- Utility bill savings will continue for the full 20-30 year lifetime of the installations.

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spending that occurs during the installation period and do not continue beyond this period.

[10] Worker earnings include wages, salaries and worker paid benefits (health insurance, social security, retirement, workers compensation, Medicare, etc.)

[11] Utility bill savings are based on average electric and natural gas costs in Colorado in 2012. If utility rates continue to rise, the resulting bill savings and related impacts will increase as well.

Spending of utility bill savings support permanent jobs in Colorado and will continue to benefit Colorado businesses for years to come.

- Estimated utility bill savings will support 23 full time equivalent jobs throughout Colorado each year for the next 20 to 30 years. These jobs are in all areas of the economy. They include jobs at retail stores (clothing, grocery, appliance, hardware, lumber, and car dealers, among others), service providers (restaurants, hotels, auto repair, appliance repair, landscapers, real estate and finance, among others), as well as in wholesale and manufacturing sectors.
- Estimated utility bill savings support over $0.6 million in worker earnings each year for the 23 full time equivalent jobs throughout the state.
- Twenty-three jobs is the equivalent of adding two new businesses to the state.[12]
- Estimated energy bill savings contribute just under $0.8 million annually to the County's economy in the production of goods and services.[13]

County program rebates and utility rebates leverage significant private investments.

- For each $1 of rebate provided, on average, another $3.31 in private investment by residents and businesses in the six counties was spent on efficiency and related upgrades, a total of $4.31 in spending.
- Each $1 million of program rebates (county and utility) supported an average of more than 40 FTE jobs during the upgrade period and an average of 3.0 FTE ongoing jobs throughout the state.[14]
- In 5 years, the sum of all annual residential and commercial utility bill savings will be 3.5 times as much as the amount initially paid in rebates.
- In 10 years, the sum of all annual residential and commercial utility bill savings will be 6.9 times as much as the amount initially paid in rebates.
- In 20 years, the sum of all annual residential and commercial utility bill savings will be more than 13.9 times as much as the amount initially paid in rebates.
- For each $1 spent on program upgrades by program participants, just under $0.99 was spent in Colorado, benefitting in-state contractors, suppliers and the state as a whole.

[12] According to the US Census Bureau, in 2011 the average private nonfarm establishment (business) in Colorado had just over 13 employees. See http://quickfacts.census.gov/qfd/states/08/08031.html.

[13] The contribution to the state's economy is less than the actual total energy bill savings because only a portion of the actual spending of the savings occurs in Colorado.

[14] These jobs do not account for public sector jobs associated with actual program administration.

Appendix

1. Methodology

To capture the full economic impacts of the Energy programs in the six counties and throughout Colorado, the economic analysis evaluates all program spending on energy-efficiency measures, renewable energy technologies and other related upgrades that occurred in Colorado.[15] This includes work completed by Colorado contractors, do-it-yourself (DIY) projects, county and utility quick installs[16], equipment tune-ups and measures covered under the county's energy loan programs since November 2010. [17]

The actual expenditures for each measure were first grouped by measure or upgrade type and then sorted by contractor location. This provided the basis for separating expenditures that occurred in Colorado from those that occurred outside of the state. Spending attributed to out-of-state contractors and suppliers was treated as a monetary leakage since the expenditures are spent outside of Colorado. This spending does not benefit Colorado contractors, suppliers or other businesses and therefore is not included in the analysis.

The analysis was completed using a Colorado specific input-output (I-O) model in which the Colorado expenditures are matched with appropriate Colorado industry multipliers.[18] The model analyzes three separate effects (i.e., direct, indirect and induced) for each expenditure. The sum of these three effects includes all changes in consumer and business spending during the actual installation of efficiency measures and yields the total effect from a single expenditure.[19]

1. The direct effect refers to the on site or immediate effect produced by expenditures. In the case of installing energy efficiency upgrades in a home, the direct effect is the on

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[15] All program project cost and savings data was provided by representatives of the respective counties. These include: Collin Tomb and Lea Yancey of the Boulder County Commissioners' Office, Sustainability Dept., June 2013; Elizabeth Babcock,Community Sustainability and Energy Administrator, Denver Department of Environmental Health, Environmental Quality Division and Sharon Procopio, Commercial Program Administrator, Denver Energy Challenge, Denver Department of Environmental Health, June 2013; Erica Sparhawk, Program Director, Clean Energy Economy for the Region (CLEER), July 2013. CLEER manages the Garfield Clean Energy programs; and Adam Palmer, Environmental Policy Planner for Eagle County, April 2013, for Eagle, Pitkin and Gunnison Counties.

[16] Cost and staffing data for Denver County residential Quick Installs was provided by Sally Lambert, Project Manager and Audrey Cole, Controller for Populus, LLC, in June 2013. According to Ms. Cole, equipment/measures installed by Populus (CFLs and low flow showerheads) were obtained from suppliers outside of Colorado. Utility and commercial Quick Installs cost and staffing data was unavailable, and thus not included in this analysis. Equipment purchases are assumed to be from suppliers outside of Colorado. Ms. Cole also provided similar cost, staffing and supplier origin data for Boulder County.

[17] Actual program start and end dates for purposes of this analysis varied by program. Most program/project data began sometime in 2011 and ended in the first half of 2013.

[18] In this study we adapted industry multipliers and expenditure ratios derived from the IMPLAN V3 software using 2011 Colorado state data (the most current available at the time the analysis was done). See Minnesota IMPLAN Group, Hudson, WI, www.implan.com.

[19] For a more complete description of the methodology employed in this analysis, see a similar Boulder County study by MRG & Associates undertaken for the National Renewable Energy Laboratory in 2010. *Economic Impacts from the Boulder County Climate Smart Loan Program, Using Property Assessed Clean Energy Financing. 2011.*

site expenditures and jobs of the construction or trade contractors hired to carry out the work.

2. The indirect effect refers to the increase in economic activity that occurs when a contractor or vendor receives payment for goods or services delivered and he or she is able to pay others who support the businesses. This includes the equipment manufacturer or wholesaler who provides the products (solar panels, insulation, heating system, windows, etc.). It also includes the bank that provides financing to the contractor, the vendor's accountant, and the building owner where the contractor maintains its local offices, and so on.
3. The induced effect results from the spending of worker earnings associated with direct and indirect spending related to energy efficiency expenditures. This includes spending on food, clothing, housing, transportation, recreation, and other goods and services that workers typically spend their paychecks on.

In this analysis, the installation-related impacts are based on projects completed during a two to two and a half year period beginning in November 2010 and running into May 2013. The analysis is based on program data which includes $18.4 million in residential/single-family upgrades and $15.5 million in commercial/multi-family property upgrades; a total of $33.9 million in spending.[20] Typically, 85 to 90 percent of construction related projects, including energy efficiency and renewables, are completed by local contractors and supplied by local vendors (wholesale and retail). However, given the proximity to the Denver metro area and large number of contractors and suppliers in Colorado, the analysis found that almost 99 percent of the total, just over $33.5 million, was spent within the state of Colorado. This included payments to Colorado contractors and equipment and materials suppliers.

In addition to the actual spending on upgrades, the analysis also includes spending of utility bill savings.[21] The spending of utility bill savings is ongoing, that is, the efficiency measures and upgrades continue to reduce energy use and utility bills. The analysis assumes residents and businesses have the same or similar level of utility bill savings each year for the life of the measures, typically 20 to 30 years. When residents and businesses pay their utility bills, most of the money leaves the local area to purchase fuels, maintain power plants, and support utility operations throughout Colorado and in other areas. When residents and businesses achieve savings on their utility bills they are able to spend some of the savings purchasing other goods and services, on business upgrades, loan repayments and investments within the Colorado economy.

The ongoing job impacts from these utility bill savings are derived in the same manner as the upgrade investments – matching expenditures with industry specific multipliers, both for consumer and business spending and with the utility sector. The impacts are in large part derived from the difference between jobs that would have been created or supported within the utility and fuel supply sectors, if the utilities received the additional revenues, and jobs that are supported throughout Colorado by the spending of utility bill savings on goods and services in the state's economy. For purposes of estimating current and future energy bill

[20] The analysis does not include costs associated with each county's administration of the program or spending on initial project assessments.

[21] Energy bill savings are based on Deemed savings for electricity (kWh) and gas (therms) for each measure, applied to utility rates. Rates vary by area, but on average vary from $0.09 to $0.10 per kWh for residential and commercial electricity customers and $0.90 per therm for residential gas customers and $0.90 to $0.976 per therm for commercial gas customers.

savings, the analysis assumes energy prices remain at 2012 levels. To the extent energy prices rise in the future, the savings will be even larger.

2. All Projects Summary Data and Impacts

Table A-1 Colorado County Energy Programs – All Projects Data Summary

Measure	Total Project Cost/Investment	Colorado Project Cost/Investment	Percent of Total in Colorado	Total Rebates	Estimated Annual Utility Bill Savings
HVAC	$11,083,999	$11,083,999	100.0%	$1,658,169	$460,965
Lighting	$9,373,889	$9,370,580	99.9%	$3,171,668	$3,113,165
Appliances and other DIY	$803,110	$803,110	100.0%	$130,823	$59,761
Doors and Windows	$3,441,993	$3,441,993	100.0%	$434,050	$170,258
Solar Electric	$1,394,936	$1,394,936	100.0%	$130,541	$52,508
Solar Hot Water	$274,877	$274,877	100.0%	$61,908	$3,290
Insulation	$7,529,967	$7,145,002	94.9%	$2,222,563	$968,471
Assessments	$6,453	$6,453	100.0%	$49,419	$3,384
Office Equipment	$10,634	$10,634	100.0%	$3,051	$5,165
Quick Installs	$175	$175	100.0%	na	$608,627
Total	**$33,920,033**	**$33,531,758**	**98.9%**	**$7,862,193**	**$5,445,596**

Notes:
All dollar values are 2012 dollars.
The energy program data includes Boulder, Denver, Garfield, Eagle, Gunnison and Pitkin Counties. The data includes residential/single-family and commercial/multi-family projects. Colorado Project Cost/Investment refers to the project expenditures spent within Colorado (i.e., on Colorado contractors and suppliers). Totals may not add up due to independent rounding.

Table A-2 Colorado County Energy Programs – All Projects Economic Impact Summary

Upgrade/Installation Phase

Measure	Jobs	Earnings	Output	Sales Tax
HVAC	89	$6,555,724	$16,442,424	$255,064
Lighting	89	$5,050,731	$14,433,928	$192,996
Insulation	87	$6,497,276	$11,736,620	$92,810
Doors and Windows	34	$2,143,949	$5,187,617	$64,471
Solar Electric	12	$653,766	$1,965,820	$5,992
Appliances and other DIY	6	$248,299	$1,053,247	$26,266
Solar Hot Water	2	$137,745	$396,146	$1,726
Assessments	0	$5,016	$11,505	$0
Office Equipment	0	$3,232	$13,887	$300
Quick Installs	na	na	na	na
Total	**320**	**$21,295,738**	**$51,241,194**	**$639,623**

Notes:
All dollar values are 2012 dollars.
Impacts are based on analysis of residential/single-family and commercial/multi-family projects completed during Nov. 2010 and May 2013, and include work done by Colorado (in-state) contractors and purchases from Colorado suppliers (retail and wholesale). Jobs are full-time equivalent (FTE) for 1 year. Earnings are wages, salaries and benefits. Output is economic activity (production of goods and services). Upgrade/Installation Phase impacts are short term (i.e., they are not ongoing). Sales tax includes state and county/local taxes. Totals may not add up due to independent rounding.

Table A-3 Colorado County Energy Programs – All Projects Economic Impact Summary

Annual Utility Bill Saving - Ongoing

Measure	Jobs	Earnings	Output
Lighting	13	$369,604	$455,125
Insulation	4	$114,980	$141,584
Quick Installs	3	$72,258	$88,977
HVAC	2	$54,727	$67,390
Doors and Windows	1	$20,214	$24,891
Appliances and other DIY	0	$7,095	$8,737
Solar Electric	0	$6,234	$7,676
Office Equipment	0	$613	$755
Assessments	0	$402	$495
Solar Hot Water	0	$391	$481
Total	**23**	**$646,516**	**$796,111**

Notes:
All dollar values are 2012 dollars.
Impacts are based on analysis of estimated utility bill savings for residential/single-family and commercial/multi-family projects completed during Nov. 2010 and May 2013. Jobs are full-time equivalent (FTE) for 1 year. Earnings are wages, salaries and benefits. Output is economic activity (production of goods and services). Totals may not add up due to independent rounding.

3. Residential/Single-family Projects Data and Economic Impacts

Table A-4 Colorado County Energy Programs - Residential/Single-family Projects Data

Measure	Total Project Cost/Investment	Colorado Project Cost/Investment	Percent of Total in Colorado	Total Rebates	Estimated Annual Utility Bill Savings
Insulation	$6,793,291	$6,408,326	94.3%	$2,087,082	$890,282
HVAC	$6,672,790	$6,672,790	100.0%	$704,261	$144,309
Doors and Windows	$2,911,462	$2,911,462	100.0%	$336,269	$117,207
Solar Electric	$1,013,956	$1,013,956	100.0%	$119,101	$47,801
Appliances and other DIY	$702,981	$702,981	100.0%	$115,605	$40,182
Lighting	$160,237	$160,237	100.0%	$26,127	$42,572
Solar Hot Water	$128,641	$128,641	100.0%	$18,715	$1,301
Assessments	$6,453	$6,453	100.0%	$49,419	$3,384
Quick Installs	$175	$175	100.0%	na	$428,590
Total	**$18,389,986**	**$18,005,020**	**97.9%**	**$3,456,579**	**$1,715,628**

Notes:
All dollar values are 2012 dollars.
Colorado Project Cost/Investment refers to the project expenditures spent within Colorado.
Totals may not add up due to independent rounding.

Table A-5 Colorado County Energy Programs – Residential/Single-family Projects Economic Impacts

Upgrade/Installation Phase

Measure	Jobs	Earnings	Output	Sales Tax
Insulation	78	$6,023,921	$10,517,675	$46,126
HVAC	53	$4,452,076	$9,912,949	$117,163
Doors and Windows	30	$1,879,298	$4,386,343	$45,709
Solar Electric	9	$489,772	$1,414,266	$0
Appliances and other DIY	5	$217,864	$922,487	$19,812
Lighting	2	$103,430	$241,409	$2,516
Solar Hot Water	1	$74,823	$185,698	$0
Assessments	0	$5,016	$11,505	$0
Quick Installs	na	na	na	na
Total	**178**	**$13,246,201**	**$27,592,332**	**$231,325**

Notes:
All dollar values are 2012 dollars.
Impacts are based on analysis of projects completed during Nov. 2010 and May 2013, and include work done by local (in County) contractors and purchases from local suppliers (retail and wholesale). Jobs are full-time equivalent (FTE) for 1 year.
Earnings are wages, salaries and benefits. Output is economic activity (production of goods and services). Upgrade/Installation Phase impacts are short term (i.e., they are not ongoing). Sales tax includes state and county/local taxes. Totals may not add up due to independent rounding.

Table A-6 Colorado County Energy Programs – Residential/Single-family Projects Economic Impacts

Annual Utility Bill Saving - Ongoing

Measure	Jobs	Earnings	Output
Insulation	4	$105,697	$130,154
Quick Installs	2	$50,883	$62,657
HVAC	1	$17,133	$21,097
Doors and Windows	1	$13,915	$17,135
Solar Electric	0	$5,675	$6,988
Lighting	0	$5,054	$6,224
Appliances and other DIY	0	$4,771	$5,874
Assessments	0	$402	$495
Solar Hot Water	0	$154	$190
Total	**7**	**$203,684**	**$250,814**

Notes:

All dollar values are 2012 dollars.
Impacts are based on analysis of estimated utility bill savings for projects completed during Nov. 2010 and May 2013.
Jobs are full-time equivalent (FTE) for 1 year. Earnings are wages, salaries and benefits. Output is economic activity (production of goods and services). Totals may not add up due to independent rounding.

4. Commercial/Multi-family Projects Data and Economic Impacts

Table A-7 Colorado County Energy Programs – Commercial/Multi-family Projects Data

Measure	Total Project Cost/Investment	Colorado Project Cost/Investment	Percent of Total in Colorado	Total Rebates	Estimated Annual Utility Bill Savings
Lighting	$9,213,652	$9,210,343	99.9%	$3,145,541	$3,070,593
HVAC	$4,411,208	$4,411,208	100.0%	$953,908	$316,656
Insulation	$736,676	$736,676	100.0%	$135,482	$78,189
Windows	$530,531	$530,531	100.0%	$97,781	$53,051
Solar Electric	$380,980	$380,980	100.0%	$11,440	$4,707
Solar Hot Water	$146,236	$146,236	100.0%	$43,194	$1,989
Appliances	$100,129	$100,129	100.0%	$15,218	$19,579
Office Equipment	$10,634	$10,634	100.0%	$3,051	$5,165
Quick Installs	na	na	na	na	$180,037
Total	**$15,530,047**	**$15,526,738**	**100.0%**	**$4,405,614**	**$3,729,967**

Notes:
All dollar values are 2012 dollars.
Colorado Project Cost/Investment refers to the project expenditures spent within Colorado.
Totals may not add up due to independent rounding.

Table A-8 Colorado County Energy Programs – Commercial Projects Economic Impacts

Upgrade/Installation Phase

Measure	Jobs	Earnings	Output	Sales Tax
Lighting	87	$4,947,301	$14,192,518	$131,679
HVAC	36	$2,103,648	$6,529,476	$78,895
Insulation	9	$473,355	$1,218,944	$5,302
Doors and Windows	5	$264,650	$801,274	$8,329
Solar Electric	4	$163,994	$551,555	$0
Solar Hot Water	1	$62,922	$210,448	$0
Appliances and other DIY	0	$30,435	$130,760	$2,822
Office Equipment	0	$3,232	$13,887	$300
Quick Installs	na	na	na	na
Total	**142**	**$8,049,537**	**$23,648,862**	**$227,328**

Notes:
All dollar values are 2012 dollars. Impacts are based on analysis of projects completed during Nov. 2010 and May 2013, and include work done by Colorado (in-state) contractors and purchases from in-state suppliers (retail and wholesale). Jobs are full-time equivalent (FTE) for 1 year. Earnings are wages, salaries and benefits. Output is economic activity (production of goods and services). Upgrade/Installation Phase impacts are short term (i.e., they are not ongoing). Sales tax includes state and county/local taxes. Totals may not add up due to independent rounding.

Table A-9 Colorado County Energy Programs– Commercial Projects Economic Impacts

Annual Utility Bill Saving - Ongoing

Measure	Jobs	Earnings	Output
Lighting	13	$364,549	$448,901
HVAC	1	$37,594	$46,293
Quick Installs	1	$21,375	$26,320
Insulation	0	$9,283	$11,431
Doors and Windows	0	$6,298	$7,756
Appliances and other DIY	0	$2,324	$2,862
Office Equipment	0	$613	$755
Solar Electric	0	$559	$688
Solar Hot Water	0	$236	$291
Assessments	0	$0	$0
Total	**16**	**$442,832**	**$545,297**

Notes:
All dollar values are 2012 dollars.
Impacts are based on analysis of estimated utility bill savings for projects completed during Nov. 2010 and May 2013.
Jobs are full-time equivalent (FTE) for 1 year. Earnings are wages, salaries and benefits. Output is economic activity (production of goods and services). Totals may not add up due to independent rounding.

5. All Projects Metrics Summary

Table A-10 Colorado County Energy Programs – All Projects Metrics Summary

Upgrade/Installation Phase

Measure	Jobs/$Million Rebate	$Earnings/$Rebate	$Output/$Rebate	Total $Investment/$Rebate	$Sales Tax/$Rebate
Solar Electric	92.2	$5.01	$15.06	$10.69	$0.05
Doors and Windows	79.4	$4.94	$11.95	$7.93	$0.15
HVAC	54.0	$3.95	$9.92	$6.68	$0.15
Appliances and other DIY	42.5	$1.90	$8.05	$6.14	$0.20
Insulation	39.2	$2.92	$5.28	$3.39	$0.04
Solar Hot Water	36.1	$2.22	$6.40	$4.44	$0.03
Lighting	28.0	$1.59	$4.55	$2.96	$0.06
Office Equipment	15.5	$1.06	$4.55	$3.49	$0.10
Assessments	1.9	$0.10	$0.23	$0.13	$0.00
Quick Installs	na	na	na	na	na
Average	**40.7**	**$2.71**	**$6.52**	**$4.31**	**$0.08**

Notes:
All dollar values are 2012 dollars.
Metrics are based on residential/single-family and commercial/multi-family project data and economic impacts. They do not necessarily imply a direct cause and effect, but rather a correlation based on the results of the impact analysis. Metric indicates the relationship between the item (jobs, earnings, etc.) and dollars of rebates provided. For example, for HVAC, Jobs/$Million rebates indicates that each $1 million of rebates supports 54.0 jobs, based on the current Colorado County Energy programs economic impact analysis. Similarly, for each dollar of rebates provided for HVAC, $6.68 of total investment (project spending) occurred. Totals may not add up due to independent rounding.

Table A-11 Colorado County Energy Programs - All Projects Metrics Summary

Upgrade/Installation Phase

Measure	Rebate $ Spent/Job	Rebate $ Spent/$Earnings	Rebate $ Spent/$Output	Rebate $ Spent/$Investment
Assessments	$523,123	$9.85	$4.30	$7.66
Office Equipment	$64,452	$0.94	$0.22	$0.29
Lighting	$35,689	$0.63	$0.22	$0.34
Solar Hot Water	$27,711	$0.45	$0.16	$0.23
Insulation	$25,538	$0.34	$0.19	$0.30
Appliances and other DIY	$23,527	$0.53	$0.12	$0.16
HVAC	$18,531	$0.25	$0.10	$0.15
Doors and Windows	$12,601	$0.20	$0.08	$0.13
Solar Electric	$10,849	$0.20	$0.07	$0.09
Quick Installs	na	na	na	na
Average	**$24,585**	**$0.37**	**$0.15**	**$0.23**

Notes:
All dollar values are 2012 dollars.
Metrics are based on residential/single-family and commercial/multi-family project data and economic impacts. They do not necessarily imply a direct cause and effect, but rather a correlation based on the results of the impact analysis. Metric indicates the relationship between each rebate dollar provided and the item (jobs, earnings, etc.) supported. For example, for Lighting, Rebate$ Spent/Job indicates that $35,689 of rebates was provided for each job supported. Similarly, $0.34 of rebates was provided for each dollar of investment (project spending). Totals may not add up due to independent rounding.

Table A-12 Colorado County Energy Programs – All Projects Metrics Summary

Annual Utility Bill Saving - Ongoing

Measure	Jobs/$Million Rebate	$Earnings/$Rebate	$Output/$Rebate	$Annual Utility Bill Savings/$Rebate
Office Equipment	7.3	$0.20	$0.25	$1.69
Lighting	4.2	$0.12	$0.14	$0.98
Appliances and other DIY	2.0	$0.05	$0.07	$0.46
Insulation	1.9	$0.05	$0.06	$0.44
Doors and Windows	1.7	$0.05	$0.06	$0.39
Solar Electric	1.7	$0.05	$0.06	$0.40
HVAC	1.2	$0.03	$0.04	$0.28
Assessments	0.3	$0.01	$0.01	$0.07
Solar Hot Water	0.2	$0.01	$0.01	$0.05
Quick Installs	na	na	na	na
Average	**3.0**	**$0.08**	**$0.10**	**$0.69**

Notes:
All dollar values are 2012 dollars.
Metrics are based on residential/single-family and commercial/multi-family project data and economic impacts. They do not necessarily imply a direct cause and effect, but rather a correlation based on the results of the impact analysis. Metric indicates the relationship between the item (jobs, earnings, etc.) and dollars of rebates provided. For example, for Solar Electric, Jobs/$Million rebates indicates that each $1 million of rebates supports 1.7 ongoing jobs, based on the current Colorado County Energy programs economic impact analysis of estimated utility bill savings. Similarly, for each dollar of rebates provided for Solar Electric, $0.40 of annual utility bill savings occurred. Totals may not add up due to independent rounding.

Table A-13 Colorado County Energy Programs – All Projects Metrics Summary

Rebate Payback - Ratio of Utility Bill Savings to Rebate Cost

Measure	5 Years	10 Years	20 Years
Office Equipment	8.5	16.9	33.9
Lighting	4.9	9.8	19.6
Appliances and other DIY	2.3	4.6	9.1
Insulation	2.2	4.4	8.7
Solar Electric	2.0	4.0	8.0
Doors and Windows	2.0	3.9	7.8
HVAC	1.4	2.8	5.6
Assessments	0.3	0.7	1.4
Solar Hot Water	0.3	0.5	1.1
Quick Installs	na	na	na
Average	**3.5**	**6.9**	**13.9**

Notes:

All dollar values are 2012 dollars.
A value of 1.0 indicates combined annual utility bill savings equal the initial rebate amount.
Metrics are based on residential/single-family and commercial/multi-family project data and the sum total of all annual estimated utility bill savings for the number of years noted. Totals may not add up due to independent rounding.

6. Residential/Single-family Projects Metrics

Table A-14 Colorado County Energy Programs – Residential/Single-family Projects Metrics Summary

Upgrade/Installation Phase

Measure	Jobs/$Million Rebate	$Earnings/$Rebate	$Output/$Rebate	Total $Investment/$Rebate	$Sales Tax/$Rebate
HVAC	75.9	$6.32	$14.08	$9.47	$0.17
Lighting	62.7	$3.96	$9.24	$6.13	$0.10
Appliances and other DIY	44.2	$1.88	$7.98	$6.08	$0.17
Doors and Windows	88.4	$5.59	$13.04	$8.66	$0.14
Solar Electric	71.5	$4.11	$11.87	$8.51	$0.00
Solar Hot Water	62.5	$4.00	$9.92	$6.87	$0.00
Insulation	37.5	$2.89	$5.04	$3.25	$0.02
Assessments	1.9	$0.10	$0.23	$0.13	$0.00
Quick Installs	na	na	na	na	na
Average	**51.5**	**$3.83**	**$7.98**	**$5.32**	**$0.07**

Notes:
All dollar values are 2012 dollars.
Metrics are based on residential/single-family project data and economic impacts. They do not necessarily imply a direct cause and effect, but rather a correlation based on the results of the impact analysis. Metric indicates the relationship between the item (jobs, earnings, etc.) and dollars of rebates provided. For example, for HVAC, Jobs/$Million rebates indicates that each $1 million of rebates supports 75.9 jobs, based on the current Colorado County Energy programs economic impact analysis. Similarly, for each dollar of rebates provided for HVAC, $9.47 of total investment (project spending) occurred. Totals may not add up due to independent rounding.

Table A-15 Colorado County Energy Programs – Residential/Single-family Projects Metrics Summary

Upgrade/Installation Phase

Measure	Rebate $ Spent/Job	Rebate $ Spent/$Earnings	Rebate $ Spent/$Output	Rebate $ Spent/$Investment
Assessments	$523,123	$9.85	$4.30	$7.66
Insulation	$26,678	$0.35	$0.20	$0.31
Appliances and other DIY	$22,602	$0.53	$0.13	$0.16
Solar Hot Water	$16,006	$0.25	$0.10	$0.15
Lighting	$15,961	$0.25	$0.11	$0.16
Solar Electric	$13,983	$0.24	$0.08	$0.12
HVAC	$13,182	$0.16	$0.07	$0.11
Doors and Windows	$11,306	$0.18	$0.08	$0.12
Quick Installs	na	na	na	na
Average	**$19,426**	**$0.26**	**$0.13**	**$0.19**

Notes:

All dollar values are 2012 dollars.

Metrics are based on residential/single-family project data and economic impacts. They do not necessarily imply a direct cause and effect, but rather a correlation based on the results of the impact analysis. Metric indicates the relationship between each rebate dollar spent and the item (jobs, earnings, etc.) supported. For example, for Lighting, Rebate$ Spent/Job indicates $15,961 of rebates was provided for each job supported. Similarly, $0.16 of rebates was provided for each dollar of investment (project spending). Totals may not add up due to independent rounding.

Table A-16 Colorado County Energy Programs – Residential/Single-family Projects Metrics Summary

Annual Utility Bill Saving - Ongoing

Measure	Jobs/$Million Rebate	$Earnings/$Rebate	$Output/$Rebate	$Annual Utility Bill Savings/$Rebate
Lighting	7.0	$0.19	$0.24	$1.63
Insulation	1.8	$0.05	$0.06	$0.43
Solar Electric	1.7	$0.05	$0.06	$0.40
Appliances and other DIY	1.5	$0.04	$0.05	$0.35
Doors and Windows	1.5	$0.04	$0.05	$0.35
HVAC	0.9	$0.02	$0.03	$0.20
Solar Hot Water	0.3	$0.01	$0.01	$0.07
Assessments	0.3	$0.01	$0.01	$0.07
Quick Installs	na	na	na	na
Average	**2.1**	**$0.06**	**$0.07**	**$0.50**

Notes:
All dollar values are 2012 dollars.
Metrics are based on residential/single-family project data and economic impacts. They do not necessarily imply a direct cause and effect, but rather a correlation based on the results of the impact analysis. Metric indicates the relationship between the item (jobs, earnings, etc.) and dollars of rebates provided. For example, for insulation, Jobs/$Million rebates indicates that ach $1 million of rebates supports 1.8 jobs, based on the current Colorado County Energy programs economic impact analysis of estimated utility bill savings. Similarly, for each dollar of rebates provided for insulation, $0.43 of annual utility bill savings occurred. Totals may not add up due to independent rounding.

Table A-17 Colorado County Energy Programs – Residential/Single-family Projects Metrics Summary

Rebate Payback - Ratio of Utility Bill Savings to Rebate Cost

Measure	5 Years	10 Years	20 Years
HVAC	1.0	2.0	4.1
Lighting	8.1	16.3	32.6
Appliances and other DIY	1.7	3.5	7.0
Doors and Windows	1.7	3.5	7.0
Solar Electric	2.0	4.0	8.0
Solar Hot Water	0.3	0.7	1.4
Insulation	2.1	4.3	8.5
Assessments	0.3	0.7	1.4
Quick Installs	na	na	na
Average	**2.5**	**5.0**	**9.9**

Notes:
All dollar values are 2012 dollars.
A value of 1.0 indicates combined annual utility bill savings equal the initial rebate amount. Metrics are based on residential/single-family project data and the sum total of all annual estimated utility bill savings for the number of years noted. Totals may not add up due to independent rounding.

7. Commercial/Multi-family Projects Metrics

Table A-18 Colorado County Energy Programs – Commercial/Multi-family Projects Metrics Summary

Upgrade/Installation Phase

Measure	Jobs/$Million Rebate	$Earnings/$Rebate	$Output/$Rebate	Total $Investment/$Rebate	$Sales Tax/$Rebate
Solar Electric	307.3	$14.34	$48.21	$33.30	$0.00
Insulation	64.9	$3.49	$9.00	$5.44	$0.04
Doors and Windows	48.1	$2.71	$8.19	$5.43	$0.09
HVAC	37.8	$2.21	$6.84	$4.62	$0.08
Appliances and other DIY	29.3	$2.00	$8.59	$6.58	$0.19
Lighting	27.7	$1.57	$4.51	$2.93	$0.04
Solar Hot Water	24.7	$1.46	$4.87	$3.39	$0.00
Office Equipment	15.5	$1.06	$4.55	$3.49	$0.10
Quick Installs	na	na	na	na	na
Average	**32.2**	**$1.83**	**$5.37**	**$3.53**	**$0.05**

Notes:
All dollar values are 2012 dollars.
Metrics are based on commercial/multi-family project data and economic impacts. They do not necessarily imply a direct cause and effect, but rather a correlation based on the results of the impact analysis. This metric indicates the relationship between the item (jobs, earnings, etc.) and dollars of rebates provided. For example, for Lighting, Jobs/$Million rebates indicates that each $1 million of rebates supports 27.7 jobs, based on the current Colorado County Energy programs economic impact analysis. Similarly, for each dollar of rebates provided for Lighting, $2.93 of total investment (project spending) occurred. Totals may not add up due to independent rounding.

Table A-19 Colorado County Energy Programs – Commercial/Multi-family Projects Metrics Summary

Upgrade/Installation Phase

Measure	Rebate $ Spent/Job	Rebate $ Spent/$Earnings	Rebate $ Spent/$Output	Rebate $ Spent/$Investment
Office Equipment	$64,452	$0.94	$0.22	$0.29
Solar Hot Water	$40,563	$0.69	$0.21	$0.30
Lighting	$36,059	$0.64	$0.22	$0.34
Appliances and other DIY	$34,144	$0.50	$0.12	$0.15
HVAC	$26,456	$0.45	$0.15	$0.22
Doors and Windows	$20,794	$0.37	$0.12	$0.18
Insulation	$15,398	$0.29	$0.11	$0.18
Solar Electric	$3,254	$0.07	$0.02	$0.03
Quick Installs	na	na	na	na
Average	**$31,055**	**$0.55**	**$0.19**	**$0.28**

Notes:
All dollar values are 2012 dollars. They do not necessarily imply a direct cause and effect, but rather a correlation based on the results of the impact analysis. Metrics are based on commercial/multi-family project data and economic impacts. This metric indicates the relationship between each rebate dollar spent and the item (jobs, earnings, etc.) supported. For example, for HVAC, Rebate$ Spent/Job indicates $26,456 of rebates was provided for each job supported. Similarly, $0.18 of rebates was provided for each dollar of investment (project spending). Totals may not add up due to independent rounding.

Table A-20 Colorado County Energy Programs – Commercial/Multi-family Projects Metrics Summary

Annual Utility Bill Saving - Ongoing

Measure	Jobs/$Million Rebate	$Earnings/$Rebate	$Output/$Rebate	$Annual Utility Bill Savings/$Rebate
Office Equipment	7.3	$0.20	$0.25	$1.69
Appliances and other DIY	5.5	$0.15	$0.19	$1.29
Lighting	4.2	$0.12	$0.14	$0.98
Insulation	2.5	$0.07	$0.08	$0.58
Doors and Windows	2.3	$0.06	$0.08	$0.54
Solar Electric	1.8	$0.05	$0.06	$0.41
HVAC	1.4	$0.04	$0.05	$0.33
Solar Hot Water	0.2	$0.01	$0.01	$0.05
Quick Installs	na	na	na	na
Average	**3.6**	**$0.10**	**$0.12**	**$0.85**

Notes:
All dollar values are 2012 dollars.
Metrics are based on commercial/multi-family project data and economic impacts. They do not necessarily imply a direct cause and effect, but rather a correlation based on the results of the impact analysis. This metric indicates the relationship between the item (jobs, earnings, etc.) and dollars of rebates provided. For example, for Lighting, Jobs/$Million rebates indicates that each $1 million of rebates supports 4.2 jobs, based on the current Colorado County Energy programs economic impact analysis of estimated utility bill savings. Similarly, for each dollar of rebates provided for Lighting, $0.98 of annual utility bill savings occurred. Totals may not add up due to independent rounding.

Table A-21 Colorado County Energy Programs – Commercial/Multi-family Projects Metrics Summary

Rebate Payback - Ratio of Utility Bill Savings to Rebate Cost

Measure	5 Years	10 Years	20 Years
Office Equipment	8.5	16.9	33.9
Appliances and other DIY	6.4	12.9	25.7
Lighting	4.9	9.8	19.5
Insulation	2.9	5.8	11.5
Doors and Windows	2.7	5.4	10.9
Solar Electric	2.1	4.1	8.2
HVAC	1.7	3.3	6.6
Solar Hot Water	0.2	0.5	0.9
Quick Installs	na	na	na
Average	**4.2**	**8.5**	**16.9**

Notes:
All dollar values are 2012 dollars.
A value of 1.0 indicates combined annual utility bill savings equal the initial rebate amount. Metrics are based on commercial/multi-family project data and the sum total of all annual estimated utility bill savings for the number of years noted. Totals may not add up due to independent rounding.

A Tiny Ship amidst the Rough Seas

- By Laura Hutchings, CEO of Populus, LLC (speech delivered to Boulder County July 2012)

Just over two years ago, in July of 2010, Populus was a company of three, a tiny ship staying afloat amidst the rough seas of a turbulent recession. As the housing market suffered a financial collapse and the nation hunkered down to weather a recession; our little ship was low on supplies.

I lay awake at night thinking about scurvy, pirates, giant squid and all of the creatures that go bump in the night.

And then I saw a port in the storm. But it was a long shot. A really long shot.

Boulder County had just gone out to bid for a program it called "Two Techs and a Truck". At the time Populus was quite literally "two techs", though we didn't have a truck.

That month, I worked late in the night; spending long stretches of time in my pajamas. My husband and business partner, David, and I talked about nothing else. We drank more than one bottle of wine.

We started with the simple idea that we could insulate Boulder County and we ended up with a vision for a public-private partnership that would accomplish much more. We asked ourselves what we valued, what we wanted for our neighbors, what type of legacy the program would leave, how we would honor the intention of the stimulus funding by fostering economic growth and creating living wage jobs with benefits in our community. The RFP response was my opus, my Jerry McGuire moment. I wrote:

> *Serving as the central administrator for the Program would allow Populus to "ramp up," foster the sustainable growth of the local home performance contracting industry, and move Populus from a small, start-up company to an established, home-grown Boulder County success story.*

I must admit that I was starry eyed and optimistic when I wrote that. And I am pleased to say that I am equally starry eyed and optimistic as I stand here today.

These programs have accomplished so much in such a short period of time.

EnergySmart is more than an energy efficiency program; it's a strong example of a public-private partnership that has advanced the triple bottom line in Boulder County. While the environmental sustainability aspect of the service is fairly obvious, the EnergySmart service in Boulder County has been much more than an energy efficiency program. It has advanced economic growth and social justice in a variety of ways.

I love data and I really love using our customer management system to tell a story with data. But sometimes the data only tells part of the story, or worse, we replace the human story with metrics and dashboards that overshadow the real story. So today, I'm not going to use any data.

Have we created jobs? Yes, we've created jobs. Have we leveraged a lot of private investment – yes, we've done that too.

But there are other questions to think about today. Questions that these programs have helped us answer.

- What does it mean to grow an industry?

It means reaching the "one man and his truck" and helping them adjust to a rapidly changing contracting environment; it means empowering them to find the water heater that might poison a family or understand the reason behind building code requirements.

- What does it mean to provide a living wage job with benefits?

It means that you can grieve the loss of a parent while your company provides a safety net you can rely upon. It means you don't have to ignore chest pains or you can have a cavity filled or go to the doctor for preventative care.

What the data doesn't show is the ripple effect. The subcontractor who was paid to do our bookkeeping, who used those funds to pay for swim lessons and babysitting, the babysitter who used those funds to put herself through school. The employee who used their paycheck to buy produce from a local farmer, the local farmer who paid an employee to sell at a farmer's market; the employee who used their paycheck to take care of an aging parent.

The impact of the Better Buildings funding has been more than gigawatts and dekatherms, more than carbon reductions and conversion rates.

What does it mean to have a community program that's truly cost-effective, what does it mean to have a program that's really efficient?

When I think of efficiency, I think about doing as much as we can with as little as we can.

We spend a lot of time thinking in utility-program terms about TRC and cost-effectiveness when we look at community programs. But I don't think that's the most relevant metric to consider. Do programs need to show measureable results? You bet. Do we need to save kilowatt hours and therms? Absolutely. But what we really need to do is something much bigger.

Let's go back to the idea of the boat. I used to think of Populus as a ship out at sea, charting a course and navigating the waters. But really, we're all on the same boat. One big boat we call planet earth. In the coming century, we'll be weathering a lot storms, some close at home and some far away. We're all in the same bubble; so the impact we make in our communities is just as important as the impact that's being made across the globe.

How's this for efficiency. The ripple effect goes much further than the subcontractors we work with, the employees we hire and the community that saves money on utility bills.

EnergySmart started a ball rolling. Because Boulder County took a chance on us, we've been able to grow beyond providing energy advising in Boulder County. We've taken what we've learned here and started working in Denver with the Denver Energy Challenge. We've taken our

community experience and started working with Xcel Energy, one of the largest utilities in the country. Today, we have 36 people working at Populus and we're still growing.

When Populus launches its first program on the east coast or Sweden, or wherever we go, those CO2 reductions, those gigawatt hours and deka therms will cost Boulder County nothing, but will be directly linked to EnergySmart.

To me, that's real efficiency. Finding a way to work with the market to create programs that leave a legacy. To multiply your efforts and do more with less.

And it's not just the story of Populus. It's the story of the subcontractors we work with, our vendors, all of the companies that have hired and scaled and weathered the recession due to these programs.

My goal here is two-fold. First and foremost, to say thank you. These better buildings programs have had a real and tangible impact on the lives of so many more people than you can ever imagine. The families that live in all of the houses we've visited, the contractors, their employees, our energy auditors, our Salesforce consultants, our bookkeepers, the Ikea furniture assemblers.

Second, my goal is to get you thinking about your programs from the perspective of the people and companies that they impact, to view your program through that lens.

As you work with your team to discuss the ins and outs of efficiency programs, whether contractor QA is cost-justified, all of the details that are important, I encourage you to spend some time thinking through the lens of the legacy your program will leave.

I encourage you to continuing developing the private-public partnerships in your community that can leverage the successes you've had to live on beyond the end of ARRA funds.

Yes, the federal funding is running out. Yes, we all knew this day would come. Some programs may find alternate funding, most will be down-sized, some may not continue on at all. But they will all leave a legacy.

Private enterprise, companies like ours, are uniquely positioned to scale and replicate a successful program beyond the borders of your community. But we don't do it all, and we can't do it alone – government, the public sector can start the balling rolling and continue to set the ground rules. You can craft programs that are inclusive of local businesses. You can encourage economic development and competition.

In short, you can create the rising tide that lifts all ships.

EXECUTIVE SUMMARY

The EnergySmart program provides energy advising and financial assistance to households and businesses in all Boulder County communities, including the cities of Boulder, Lafayette, Longmont and Louisville, the towns of Erie, Jamestown, Lyons, Nederland, Superior and Ward, and unincorporated Boulder County. EnergySmart helps residents and businesses identify, prioritize, and implement energy efficiency projects. The program provides a variety of services including rebates, loans, step-by-step energy advising, personalized energy assessments, assistance with finding and working with contractors, technical assistance, and project monitoring and verification.

ENERGYSMART PROGRAM GOALS
Increase energy efficiency investment in Boulder County.
Create jobs & stimulate local economic growth.
Advance energy independence through energy upgrades.
Leverage federal seed funding to generate at least a 5:1 match in energy efficiency retrofits.
Reach 3,000 businesses and 10,000 households by June 2013. These goals represent approximately 26% of Boulder County business sites and 8% of county households.

Boulder County, in collaboration with the City of Boulder Local Environmental Action Division, City of Longmont and Boulder County Public Health, designed the EnergySmart program to address the barriers that residents and businesses face when considering energy efficiency projects. The program launched January 25, 2011. EnergySmart is currently funded by the American Recovery and Reinvestment Act (ARRA) through the U.S. Department of Energy's BetterBuildings Neighborhood Program (BBNP) grant, combined with contributions from the City of Boulder's Climate Action Plan (CAP) tax and the City of Longmont. This report summarizes EnergySmart's progress as of May 31, 2012.

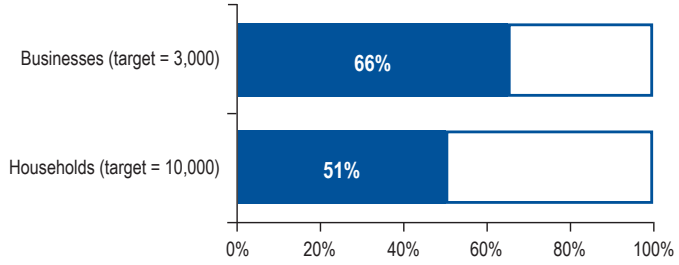
WHAT'S THE PURPOSE OF THIS REPORT?

Boulder County commissioned this report to determine how much progress the EnergySmart program has made towards its goals as of May 31, 2012. Boulder County hired Navigant Consulting to review the program tracking databases, customer testimonials, and other program materials to provide a third-party perspective on program progress and to summarize progress in this public report. The full report includes a two page executive summary, a five page description of EnergySmart's background and progress, a methodology statement and definitions, and additional program data broken down by individual communities within Boulder County. An electronic version of the report is available at **www.EnergySmartYES.com**.

WHAT DID ENERGYSMART ACCOMPLISH THROUGH MAY 31, 2012?

EnergySmart aims to serve 3,000 businesses and 10,000 households by June 2013. As of May 31, 2012, EnergySmart was on track to reach these goals. Figure 1 summarizes the program's progress towards these goals.

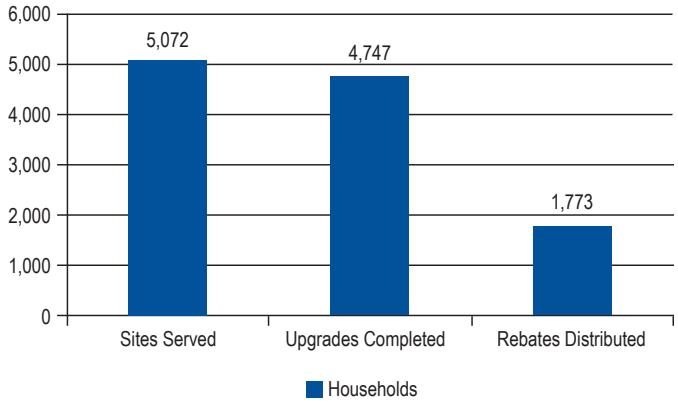
Figure 1: EnergySmart Progress towards Program Goals



Navigant analysis based on EnergySmart program databases. Total number of businesses served = 1,965. Total number of households served = 5,072. See Appendix A for more detail.

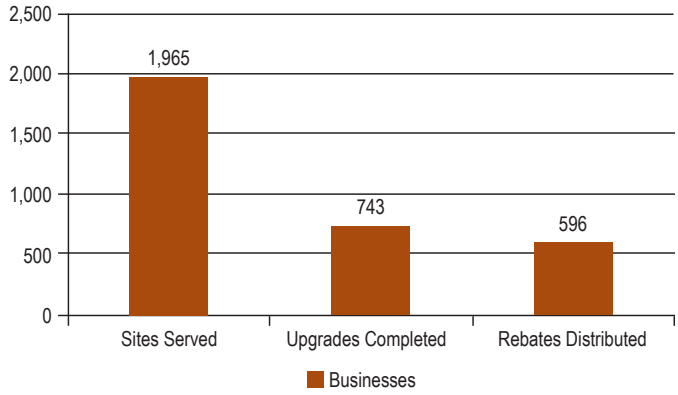
EnergySmart has also made progress in creating jobs and supporting local economic development. Boulder County estimates that the BBNP grant funding has created 86 full time equivalent jobs. In addition, EnergySmart has successfully leveraged the federal grant seed funding to encourage private investment in energy efficiency. Every $1 spent by EnergySmart in the form of rebates corresponds with roughly $6 invested in the community in energy efficiency upgrades.

Figure 2: EnergySmart Residential Results



Navigant analysis based on EnergySmart program databases. See Appendix A for more detail.

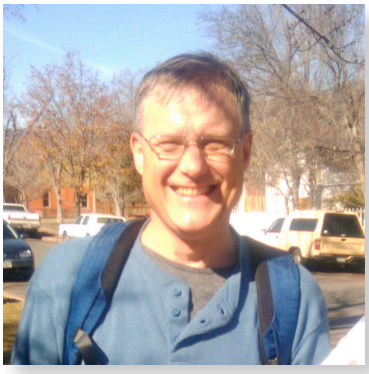
Figure 3: EnergySmart Commercial Results



Navigant analysis based on EnergySmart program databases. See Appendix A for more detail.

5,072 households enrolled in the EnergySmart program. That's **4% of households** in Boulder County. EnergySmart helped residents complete **4,747 energy efficiency upgrades** in their homes. EnergySmart advisors **installed 27,708 low cost conservation items** including efficient light bulbs, water-saving showerheads, and other items. EnergySmart distributed **1,773 rebates** for energy efficiency upgrades. EnergySmart estimates that a participating household **may save an average of $188 per year** on energy costs. A total of **$6.1M was invested** to improve the energy efficiency of homes. EnergySmart households reduced greenhouse emissions equivalent to taking **618 cars off the road**.

EnergySmart provided services to **1,965 business sites** in Boulder County. That's **17% of business sites** in Boulder County. EnergySmart helped businesses complete **743 energy efficiency upgrades** in their establishments. EnergySmart distributed **596 rebates** for energy efficiency upgrades. EnergySmart estimates that a participating business **may save an average of $893** per location on energy costs. A total of **$6.5M was invested** to improve the energy efficiency of businesses. EnergySmart businesses reduced greenhouse emissions equivalent to taking **1,556 cars off the road**.



"My advisor **made it easy to prioritize** what could be done to make my home **more comfortable** year round."

- Tom, Lafayette

WHY ENERGY EFFICIENCY?

Across the nation, local governments and their citizens recognize energy efficiency as a benefit to their communities. According to Boulder County's 2006 Greenhouse Gas Inventory, residential and commercial buildings generate 56% of Boulder County's greenhouse gas (GHG) emissions. The inventory also established electricity and natural gas usage as the largest causes of GHG emissions in Boulder County. Boulder County recognizes energy efficiency as a cost-effective means of reducing energy-related environmental impact. By lowering their energy use, businesses and residents reduce the need for power generation, preventing pollution from occurring in the first place. Boulder County recognizes energy efficiency as an opportunity to create local economic growth and investment.

WHAT'S THE HISTORY BEHIND THE ENERGYSMART PROGRAM?

Boulder County and its partners have a relatively long history with energy efficiency programs. Beginning in 1993, Boulder County Public Health launched the Partners for a Clean Environment (PACE) program. From 2006-2010, Boulder County and municipalities worked with the Center for ReSource Conservation to offer residential energy efficiency audits and services. The City of Boulder also played an important role by laying a foundation of community climate action work, programs and services. As a result of these efforts, Boulder County and its partners have become aware of consumer needs and barriers to energy efficiency adoption. When the U.S. DOE announced the availability of ARRA funding to support energy efficiency at the state and local levels, Boulder County responded with a proposal based on close to 20 years of experience and partnerships.

CITY OF BOULDER SMART REGS

The City of Boulder SmartRegs ordinance, adopted in September of 2010, requires all rental housing to meet a basic energy efficiency standard by 2019. Rental housing represents about half of the City of Boulder's housing stock. Boulder County works closely with the City of Boulder to offer EnergySmart as an easy, voluntary way to achieve the SmartRegs requirements. As a result, many of EnergySmart's residential participants have been property owners working to comply with **SmartRegs**.

TIMELINE OF LOCAL POLICIES AND PROGRAMS

1993
Boulder County Public Health and City of Boulder start **Partners for a Clean Environment (PACE)** for businesses.

1996
City of Boulder launches Green Points, its residential green building code.

2002
Boulder City Council passes **greehouse gas (GHG) reduction resolution**.

2005
Boulder County Commissioners Pass **energy resolution** to reduce GHG emissions and create an action plan.

2006
Boulder City Council adopts the first Climate Action Plan. City of Boulder voters pass a carbon tax to support a **Climate Action Plan (CAP)**; begin research/design of a suite of energy efficiency services. Helps form the basis and funding source for EnergySmart.

2006
Boulder County completes **GHG inventory** to identify main emission sources.

2006
Boulder County and municipalities work with the Center for ReSource Conservation to offer residential energy efficiency audits and services.

2007
Boulder County Public Health and City of Longmont create an advisor and incentive model with the Longmont Matching Grant program. Helps form the basis for EnergySmart.

2008
All cities in Boulder County adopt by resolution the Boulder County **Sustainable Energy Plan**.

2008
Boulder County launches **BuildSmart**, its green building code. Boulder City Council adopts advanced energy efficiency requirements for commercial construction.

2009
Boulder County launches ClimateSmart loan program, property assessed clean energy financing.

2010
Boulder County receives ARRA funds through U.S. DOE **BetterBuildings Neighborhood Program** grant. Funding source for EnergySmart.

2010
Boulder City Council adopts **SmartRegs** ordinance.

2011
Boulder County and partners launch **EnergySmart** services county-wide. City of Boulder launches SmartRegs.

2012
Boulder County and partners launch **Elevations Energy Loans**.

2012
Boulder County begins process of updating GHG inventory.

2010 Boulder County ClimateSmart Loan Program for Commercial Properties

Post-Bonding Summary

November 24, 2010

Collin Tomb (BCPH) and Emily Beam (Finance)

Outcomes

Of the 35 complete applications received, 29 loans were originated between September 27th and October 12th. Twenty-seven contractors, representing 52 contracts, worked with County staff to finalize their bids with the required Davis-Bacon wage information.

The distribution of loan sizes was split: most loans were either under $30,000 or over $100,000. The amounts funded are:

$ 1,737,009.41 In Projects Funded
$ -259,290.00 In Rebates Delivered
$ 1,477,719.41 In Loans Originated
($108,703.32 10-year loans)
($1,369,016.09 5-year loans)

The initial estimated interest rate for the program was 6.5%, and the closing costs were estimated at 9%. The not-to-exceed interest rates at time of origination were much lower: 3.5% interest for the 5-year and 4.5% for the 10-year loans, with 6% closing costs. Actual rates and costs at the time of bond sale were 2.92% interest / 4.27% closing costs for the 10-year, and 1.04 % interest / 8.09% closing costs for the 5-year. The bonds were sold on October 28th and the Notice to Proceed was issued on November 5th, with payments beginning on November 22.

Loan Totals by Municipality			
City	Loan Total	Percent of total	Number of Loans
Boulder	$ 1,423,689.95	96%	22
Longmont	$ 29,805.46	2%	5
Lyons	$ 14,224.00	1%	1
Nederland	$ 10,000.00	1%	1
	$ 1,477,719.41	**100%**	**29**

Loan Totals for Property Types			
Type	Loan Total	Percent of total	Number of Loans
Business	$ 1,402,302.09	95%	20
Nonprofit	$ 17,805.16	1%	3
Multifamily	$ 57,612.16	4%	6
	$ 1,477,719.41	**100%**	**29**

Loan Sizes				
Loan Size	before rebates		after rebates	
	total loans	average loan size	total loans	average loan size
Large (over $80K) (9 loans)	$ 1,378,092.44	$ 153,121.38	$ 1,288,092.44	$ 143,121.38
Small (under $80K) (20 loans)	$ 358,916.97	$ 17,945.85	$ 189,626.97	$ 9,481.35

The wide array of technologies represented in the ClimateSmart Loan Program is a very different profile than we see in most commercial sector rebate programs that emphasize financial return and demand savings and tend to be heavy on lighting. The ClimateSmart Loan Program and associated rebates ushered in a high percentage of longer-payback items such as windows and doors, large HVAC units and renewable energy. We also saw a good number of insulation and cool roof projects, which usually don't receive utility rebates, and tend to be overlooked in commercial properties. Solar thermal technology, uncommon in the commercial sector, appeared here in several applications: one scuba pool and three breweries chose solar thermal technology to pre-heat water.

Top Projects Financed by the Bonds		
Uses of Assessed Loans	Dollar Amount	% of Total
HVAC upgrades	$ 571,725.78	34%
PV System	$ 195,380.18	11%
Cool Roof	$ 187,717.66	11%
Insulating Windows	$ 127,529.24	7%
Direct Digital Control (DDC)	$ 111,542.10	6%
Solar Thermal Water Heating	$ 89,783.20	5%
Wall Insulation	$ 67,924.71	4%
Other	$ 385,406.54	22%
	$ 1,737,009.41	100%

Types of Projects	Number of Projects
HEATING/COOLING	**20**
Gas/Electric Package Units	9
Central Split Systems	1
Rooftop AC Units/Economizers	2
Evaporative Coolers	1
High-Efficiency Gas Furnaces	2
Condensing Hot-Water Boilers	1
Tankless Water Heaters	1
Efficient Electric Water Heaters	1
Refrigeration Repair, Upgrade	1
Air Destratification Fans	1
LIGHTING	**15**
Incandescent,T12 Lighting Upgrade to T-5, T-8	7
CFL Lighting Upgrade with Socket Lock-it	1
LED Lighting	2
Ceramic Metal Halide Lighting Upgrade	1
LED Exit and other Signs	1
Automatic Lighting Controls	2
Daylighting	1
BUILDING ENVELOPE	**41**
Cool Roof	8
Roof Insulation	8
Wall Insulation	4
Insulating Windows and Doors	12
Storefront Window Systems	1
Low-E Window Films	1
Permanent Solar Shades	3
Air Sealing	3
Duct Sealing	1
ENERGY MANAGEMENT	**4**
Recommissioning	1
Energy Management System/Direct Digital Control	3
RENEWABLE ENERGY	**9**
Solar Thermal Water Heating	6
Photovoltaic System	3

Several contractors took hold of the opportunity to use the rebates to sell the Loan Program to customers. Two contractors in particular, and one developer, leveraged the program to capture over half a million dollars in work. One of the highest goals of any commercial energy program is to engage the trade community in promoting high-efficiency installations while simultaneously providing economic stimulus to those who do.

This wide variety of projects will yield an array of case studies. We will be able to compare the estimated with the actual savings from individual technologies, and compare one technology with another in terms of energy savings, cost savings and emissions reductions. The case studies can also be used to inform future program offerings, promote our participants, and encourage participation by other businesses.

2011 to 2013 Progress Report

GARFIELD CLEAN ENERGY

Communities joining for a clean energy economy

Garfield Clean Energy boosts local economy

State's first clean energy authority saving $1.7 million/year on energy

The Garfield Clean Energy Collaborative is a countywide partnership helping households, businesses, schools, organizations and local governments throughout Garfield County, Colo., cut energy costs and use affordable clean energy.

The Collaborative is Colorado's first-ever community clean energy authority, and its efforts are already yielding countywide energy savings of more than $1.7 million each year.

"The vision of the Garfield Clean Energy Collaborative is for Garfield County to be the most energy efficient county in the United States. Every step we take toward reaching that goal saves money on energy and builds economic resilience," says Leo McKinney, chairman of Garfield Clean Energy.

By joining forces, the 10 local government partners in the Garfield Clean Energy Collaborative are saving energy, saving money, growing the demand for clean energy businesses, and using energy efficiency to strengthen the economy.

CLEER: Clean Energy Economy for the Region, an organization based in Carbondale, manages programs and services for Garfield Clean Energy.

This report highlights the clean energy achievements of Garfield Clean Energy and its hundreds of local partners in 2011, 2012 and through September 2013.

Garfield Clean Energy Collaborative
www.GarfieldCleanEnergy.org
managed by
CLEER: Clean Energy Economy for the Region
P. O. Box 428 · Carbondale, Colorado 81623
(970) 704-9200

GARFIELD CLEAN ENERGY

Communities joining for a clean energy economy

"The quality of the lighting in the building is as good or better than it was before. We were very fortunate to be able to obtain the funding to complete a project that will benefit the center for many years to come." — Anne Huber, Grand Valley Rec Center

ENERGY EFFICIENCY FOR ECONOMIC DEVELOPMENT

RESIDENTIAL

Garfield Clean Energy Challenge for Homes
Free energy coaching helps households plan efficiency upgrades, find local contractors and review bids, maximize utility rebates and tax credits, and enjoy a more comfortable home with lower utility bills.

Challenge for Homes rebates Provided for energy assessments, insulation, high-efficiency heating and cooling, heat tape timers, appliances, solar PV and solar hot water.

Energy Challenge household participants: 533
Home energy assessments: 127
Home energy upgrades: 378
GCE & partner rebates: $146,000
Utility rebates: $32,757
Total investment: $1.1 million
Estimated total energy savings: $44,495/year
* All figures Jan. 1, 2011, to Sept. 25, 2013

Garfield Clean Energy Residential Revolving Loan Fund A $295,000 loan fund, created by Garfield Clean Energy and managed by EnergySmart Partners LLC, offering loans up to $25,000 for home energy efficiency upgrades.

BUSINESS AND COMMERCIAL

Garfield Clean Energy Challenge for Business
Free energy coaching helps businesses and commercial property owners make wise investments in energy upgrades that improve workplace comfort, spruce up retail sales areas, and increase profit.

Energy Challenge business participants: 175
Commercial energy upgrades: 115
GCE & partner rebates: $394,000
Utility rebates: $126,000
Total investment: $1.6 million
Estimated total energy savings: $277,460/year
* All figures Jan. 1, 2011, to Sept. 25, 2013

Training Workshops held in 2011, 2012 and 2013 for facility managers to compare energy savings techniques, for building contractors on best practices for air sealing and ventilation, and for HVAC professionals on maximizing energy savings in HVAC systems.
Lighting workshops held in 2011 and 2013 on emerging LED bulb and fixture technology, products and lighting best practices.

"Jobs and Money" workshop held in 2011 documenting how energy efficiency stimulates economic development.

Case studies 26 reports on Clean Energy Challenge for Business participants explaining energy upgrades and cost savings.

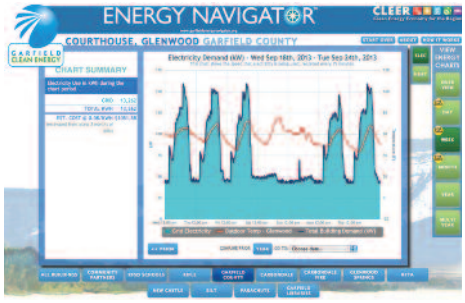
Commercial energy codes Consultation with the Town of Carbondale for its 2013 adoption of the International Green Construction Code, including a solar PV requirement for new and remodeled commercial buildings.

GOVERNMENT BUILDINGS

Performance Contracting Begun in 2010 with energy assessments of 50 public buildings. Garfield County, Rifle, Glenwood Springs and Carbondale used contracts in 2011 to finance upgrades in lighting, heating, cooling and controls in selected buildings.

Government buildings Annual energy savings tallies in 2012 and 2013 compared to 2009:
- Garfield County: $94,979
- Garfield Public Libraries: $26,334
- Town of Carbondale: $58,585
- City of Glenwood Springs: $57,636
- Town of New Castle: $25,246
- Town of Silt: $6,967
- City of Rifle: $24,766
- Town of Parachute: $9,330

Garfield Energy Navigator Web-based energy reporting tool tracks utility bills for more than 90 public buildings. High-use buildings are equipped with data loggers that report power use every 15 minutes and display a read-out



the following day. The Navigator gives facility managers timely data to spot problems and see results of efficiency experiments.

Active Energy Management Training and direct consultation with government facility managers to measure energy use, explore energy-saving practices and share positive results with other governmental partners.

Active Energy Management policy Resolution passed by Garfield Clean Energy Board and member boards in 2013 to empower elected officials and staff to be champions for energy-saving upgrades and action.

"I would definitely go through an energy audit and see what can be done. It only makes common sense to do everything you can, unless you have money to throw away."
— Ken Kimberlin, owner, Advanced Automotive and Truck Repair, Rifle

"If it wasn't for the Garfield Clean Energy Challenge, I probably would have never thought of doing upgrades in efficiency to my home. The costs have been reasonable, and the results have been very noticeable in comfort and on the pocketbook." — Ron Mittleider, Silt

PETROLEUM INDEPENDENCE

Bike and Walk to School Challenge Annual events involved more than 5,000 students at 12 to 17 schools competing for prizes awarded for highest rates of walking, biking, carpooling and riding the bus to school.

Active Transportation Policy and planning advocacy for expanded, safe routes and trails for cyclists and pedestrians of all ages.

CASEO: Clean Air at Schools Engines Off Public awareness campaign at schools, part of the Colorado Engines Off! anti-idling campaign. Afternoon vehicle-idling counts gauge results.

Project FEVER: Fostering Electric Vehicle Expansion in the Rockies Technical assistance and policy advocacy to create a statewide electric vehicle infrastructure readiness plan.

Vehicle Fleets Workshop April 2012 event built local knowledge and expanded investment in alternative-fuel vehicles and fueling stations.

Electric Vehicles Technical and grant-writing assistance to partner governments for installation of charging stations and understanding electric vehicle technology.

Western Slope CNG Collaborative Formation in 2012 and ongoing staffing of an information-sharing network of advocates for compressed natural gas (CNG) as an alternative vehicle fuel. This work is funded by annual grants from Encana Natural Gas Inc.

Refuel Colorado Fleets A one-year pilot project offering free energy coaching to vehicle fleet owners, part of a nine-county project funded by the Colorado Energy Office to accelerate the transition to alternative fuels.

RENEWABLE ENERGY

Renewable Energy for Garfield Clean Energy Partners Solar energy projects installed in 2010-2011 on 16 public facilities countywide — town halls, community centers, water plants, maintenance shops, libraries, senior housing and a riding arena — generate 372 kilowatts of clean energy, saving local governments an estimated $20,000 per year.

Power Purchase Agreements Assistance to local governments for solar arrays. Rifle installed 425 kW of solar panels on eight facilities, saving $440,000 over 20 years and making each site net-zero. Carbondale installed 157 kW of solar panels at three sites, saving $227,500 over 25 years.

Glenwood Springs Electric Rebates The city's municipal utility provided $104,772 in rebates in 2011-13 for energy assessments, insulation, HVAC upgrades and solar electric. Customers invested $521,000 on 75 projects.

Solar in the Schools "Energy in the Classroom" led by Solar Energy International tested energy lessons with elementary school students. "Solar Rollers" students built solar-powered remote-control cars for statewide competition.

GARFIELD CLEAN ENERGY COLLABORATIVE

One Stop Shop website GarfieldCleanEnergy.org is a directory of resources for taking action. Information on rebates, contractor listings, legislation, events and how-to advice on topics from electric vehicles to heat tape.

Public education More than 100 stories and photos about real-life energy efficiency projects published and aired by local media.

Strategic Plan Garfield Clean Energy's vision, mission and goals guide its Strategic Plans, which describe measurable action steps for immediate and long-term energy savings.

Grant awards Garfield Clean Energy's countywide partnership model brought more than $1 million in grant awards to Garfield County. The **Main Street grant** from the Colorado Energy Office and the **Better Buildings grant** from the U.S. Dept. of Energy funded coaching and rebates for households and businesses. Both were funded by the American Recovery and Reinvestment Act.

Clean Energy Innovation Awards Annual events recognized clean energy high-achievers in business, government and education.

BIG SAVINGS ACHIEVED

Case study Rick Orrison, owner of Orrison Distributing, knew the electric bills would be lower after he invested in a January 2012 lighting retrofit in his 39,000-square-foot Glenwood Springs warehouse. But when he started crunching electric bill numbers in September 2012, he was floored. From February through August 2012, the company saved $16,775 on electricity compared to the same period in 2011.
"It's definitely paying off, " Orrison said.

GARFIELD CLEAN ENERGY

Communities joining for a clean energy economy

The Garfield Clean Energy Collaborative is Colorado's first intergovernmental clean energy authority. The partnership of 10 local governments is teaming up with businesses and households to save energy, save money and build economic resilience.

GARFIELD CLEAN ENERGY COLLABORATIVE BOARD

Garfield Clean Energy Collaborative, launched in January 2012, is Colorado's first intergovernmental clean energy authority; 10 local government partners fund the Collaborative; appointed board members from each partner government meet monthly to set policy and guide clean energy efforts.

Standing, from left: Nancy Genova, Colorado Mountain College; Ted Edmonds, Roaring Fork Transportation Authority; Leo McKinney, City of Glenwood Springs; Judith Hayward, Town of Parachute.

Seated, from left: David Sturges, City of Glenwood Springs; Greg Russi, Town of New Castle; Tom Jankovsky, Garfield County; Allyn Harvey, Town of Carbondale; Rick Aluise, Town of Silt.

Not pictured: Amelia Shelley and Jerry Morris, Garfield County Public Library District; Pete Waller, Colorado Mountain College; Jason White, Roaring Fork Transportation Authority; Juanita Williams, Town of Parachute; Keith Lambert, Jay Miller and Barb Clifton, City of Rifle; Janet Aluise, Town of Silt; Tom Baker, Town of New Castle; Pam Zentmyer, Town of Carbondale.

GARFIELD CLEAN ENERGY COLLABORATIVE VISION, MISSION AND GOALS

Vision Garfield County will be the most energy efficient county in the United States.

Mission To provide energy efficiency solutions, education and alternative and renewable energy opportunities to all individuals and organizations, in order to build a stronger, more resilient and more energy-secure economy for citizens of Garfield County.

Goals (compared to the 2009 baseline)
1. Increase per capita energy efficiency by 20% by 2020.
2. Reduce petroleum consumption 25% by 2020.
3. Obtain 35% of our energy from renewable sources by 2020.

GARFIELD CLEAN ENERGY BY THE NUMBERS, 2011-2013

Clean energy program beneficiaries:
- Local government buildings and vehicle fleets: 90
- Schools: 24
- Businesses and commercial properties: 175
- Churches: 8
- Senior housing facilities: 5
- Households: 533
- Contractors and materials suppliers: 169

Estimated total annual energy savings: $1.7 million
Total energy efficiency investments in buildings: $6 million
Total investments in CNG fueling and vehicles: $4.5 million
Residential Revolving Loan Fund capital: $295,000
Loan fund borrowers: 8 households borrowing $68,745
Website: 22,000 unique visitors, 81,000 page views

www.GarfieldCleanEnergy.org

GARFIELD CLEAN ENERGY COLLABORATIVE MEMBER GOVERNMENTS

Colorado Mountain College

Rifle

New Castle — Authentically Colorado

City of Glenwood Springs Colorado — Spa in the Mountains — 1885

Town of Carbondale — Established 1887

Garfield County Libraries

Town of Parachute — Incorporated 1908

Town of Silt

Garfield County

RFTA — Roaring Fork Transportation Authority

Garfield Clean Energy Collaborative
www.GarfieldCleanEnergy.org
managed by
CLEER
Clean Energy Economy for the Region
P. O. Box 428
Carbondale, Colorado 81623
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Energy Efficiency: Productivity Benefits to Power Colorado Jobs and the Economy

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A Working Paper Analyzing Results of Energy Efficiency Programs of

GCE – Garfield Clean Energy and

CLEER - Clean Energy Economy for the Region

October 2012

Introduction

Garfield County, Colorado has tremendous opportunity to improve its economy-wide energy productivity and provide a net increase in jobs that might be available within the region. The on-going energy efficiency programs implemented by CLEER—Clean Energy Economy for the Region on behalf of Garfield Clean Energy—since 2009 have already had a significantly positive impact. The current success over the past four years has laid the foundation for dozens of jobs now supported within the county. By building on those successes, and by extending the energy efficiency improvements to save 20 percent of the county's energy expenditures by 2020, more than 350 total new jobs could be supported. This report describes how productive investments by energy service providers and their customers will save energy and money, and how those dollars savings will disperse through the regional economy and create new jobs.

Colorado's Labor Economy

Despite the importance of energy to Colorado's economy, the energy industries are not especially labor intensive compared to the state's economy as a whole. The labor intensities of key Colorado economic sectors (based on 2009 economic accounts for the state) are summarized in Chart 1 on the following page (IMPLAN 2011).[1] These are expressed as the number of jobs per millions of 2009 dollars for both energy suppliers and the average among all other critical economic sectors within the state.

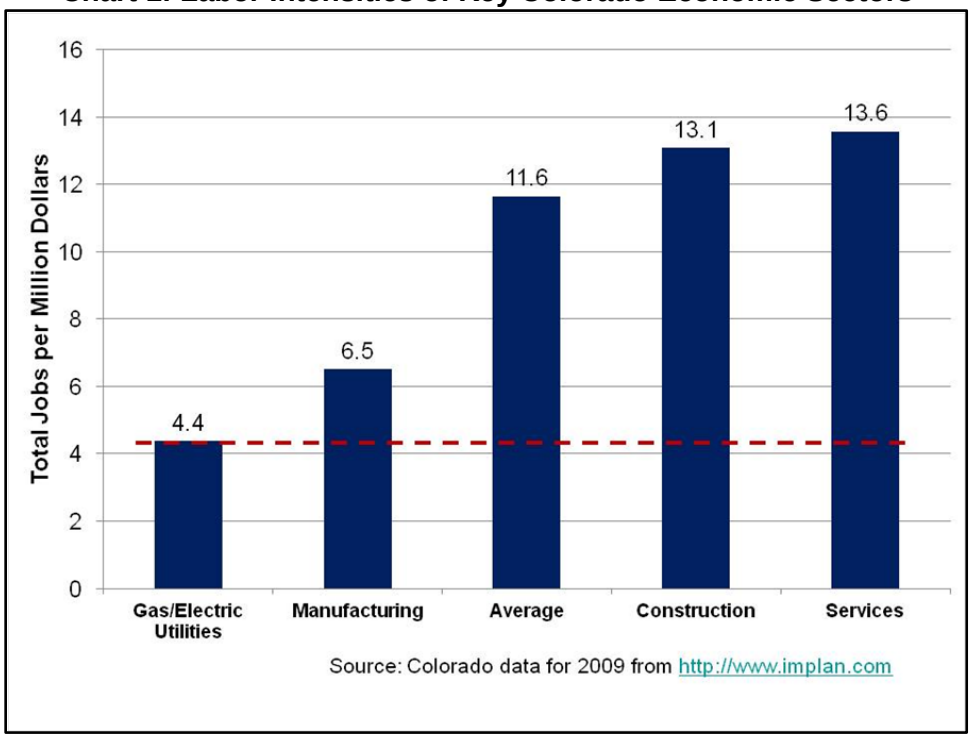
According to Colorado-specific IMPLAN economic data, the state's electric and natural gas utility sectors provide fewer than 2.0 direct jobs per million dollars of revenue. These include jobs of those who work directly for the utility companies, gas drillers and others who provide access to energy resources. They consist of pipeline and power plant operating crews as well as the accountants, engineers, and administrative staff necessary to maintain the business. If indirect jobs—those who supply the state's energy companies with other necessary operations materials, as well as jobs induced by the re-spending of wages within the state are also included, the labor intensity grows to about 4.4 jobs per million dollars of revenue. All other sectors of the economy—ranging from agriculture, manufacturing, and construction to wholesale and retail trade, business and financial services as well as government services—provide, on average, 11.6 total jobs per million dollars of revenue (IMPLAN 2011), which is a significantly higher level of employment.

This economic context is not unique to Colorado; throughout all regions of the U.S., energy-related sectors support fewer total jobs per dollar of revenue than almost all other business activities. This means that when Colorado invests in greater levels of energy efficiency—in ways that save money for consumers and businesses, the resulting energy bill savings will allow homes and businesses to shift their spending from energy toward other goods and services.

[1] IMPLAN® (**IM**pact analysis for **PLAN**ning) is a national database and a set of analytical software tools that provide an array of economic and structural data for both the U.S. and for each of the states and counties within the U.S. For more information, see http://www.implan.com.

This ultimately increases the total number of jobs supported by the state's economy as more dollars are channeled into more labor intensive sectors within the state and county.

Chart 1: Labor Intensities of Key Colorado Economic Sectors



An Economic Thought Experiment

In 1991, the American Council for an Energy-Efficient Economy (ACEEE) and others documented the potential of a 40 percent economy-wide energy efficiency savings over the period 1992 through 2010 (AEC 1991). This 40 percent energy efficiency gain was not achieved but as we shall see, had the cost-effective energy efficiency investments actually been adopted, the Colorado economy might have seen a sizeable increase in overall employment compared to what the data suggest today. As it turns out, Colorado spent an estimated total of $16.8 billion on energy in 2010, according to Energy Information Administration (EIA 2012a). Using this information, in addition to the Colorado economic employment data adapted from the chart above, we can determine the potential magnitude of impact on the Colorado economy had the state been 40 percent more energy-efficient in its overall energy use. Using the relevant data in the equation that follows, we can estimate the potential upper bound of efficiency gains on the state's net employment opportunities:

$$16{,}800 * 0.40 * (11.6 - 4.4) = 48{,}384 \text{ net jobs}$$

In other words, had Colorado promoted a slightly different mix of investments beginning in 1991 so that the state was 40 percent more energy-efficient in 2010 than it might have otherwise been, it could have supported about 48,000 more jobs than it does now. Based on a percentage of population, Garfield County today might have had an additional 500 jobs benefiting the region. While these numbers seem small compared to a total population of 5 million people in

the state, or 56,000 people within the county, those extra jobs would have provided a significant boost for the economy.

Examining the Financial and Economic Impact of Energy Efficiency

Against this backdrop we can explore the net employment benefits of the various energy efficiency programs now being supported by CLEER, beginning in 2009 and going forward through 2102. And we can then provide a reasonable estimate of how an expanded set of energy efficiency improvements might positively impact the regional economy through the year 2025.

As it turns out, Garfield Clean Energy will have spent cumulative of $1.9 million on various program efforts in Garfield County to promote the more efficient use of energy over the period 2009 through 2012. Those programs catalyzed an estimated $8.9 million in productive investment within the county over that same period. That combined set of efforts is projected to save county homes, schools, and businesses $2.7 million in 2012 alone. These typically are investments that will pay for themselves in about three or four years. As suggested in the Table below, the current plans are to slowly increase annual investments so that total efficiency, including past, present and future electricity savings, will grow to about 20 percent of 2009 energy expenditures by 2020 and continuing to increase to nearly 40 percent by 2025.

We can examine the economic impacts of these annual investments and resulting energy bill savings by integrating relevant financial information into an economic policy modeling framework. In this case we tap into economic structural data for Colorado, which provides the critical employment coefficients (IMPLAN 2011) — similar to those shown in the chart on the previous page—as well as the anticipated long-term labor productivity and price indexing trends suggested by the Annual Energy Outlook (EIA 2012b).[2]

The Table on the following page highlights the likely program impacts in constant 2012 dollars and in net annual jobs for benchmark years 2009 through 2025. The historical and current year program activities are highlighted in a red font while future annual program activities are highlighted in blue. The program expenditures, investments, and energy bill savings are all reported in millions of constant 2012 dollars while the net employment benefits are shown as estimated total jobs.

As observed in the table, as energy efficiency program efforts continue, investments in energy efficiency upgrades also increase. At the same time, the savings also continue to grow, rising more than 100-fold over the period 2009 through 2025, and growing almost 20-fold from the year 2012—from $2.7 million in 2012 to $53.2 million by 2025. Assuming a five-percent discount rate, the expenditure and total energy bill savings shows a total resource cost, or benefit-cost ratio, of 1.58. This means that over the examined time horizon, every dollar of program cost and consumer contribution will generate a minimum savings of $1.58.[3] This suggests that the

[2] For additional background material on how this kind of impact assessment is undertaken, see a characterization of the ACEEE **D**ynamic **E**nergy **E**fficiency **P**olicy **E**valuation **R**outine, or DEEPER Modeling System, as summarized in a similar assessment for Texas (Laitner 2011).

[3] The cost for many energy efficiency improvements could be significantly less than what we've seen to date, especially as program costs are reduced over time and as other non-energy benefits increase the larger productivity of the economy (For more on this last point, see the discussion in the Appendix that

energy efficiency improvements catalyzed by the CLEER program efforts should be highly cost-effective. And as suggested previously, a cost-effective energy efficiency program that redirects money from low-labor intensive economic activity, or the various energy supply companies, into higher labor-intensive economic sectors in the rest of the economy should provide a net positive employment impact for Garfield County. Therefore, despite negative net energy bill savings in the first several years of operation, job impacts will still be positive throughout the program's duration. The table above underscores this point by showing a net gain in jobs that rises from 19 and 35 net total jobs in 2009 and 2012, respectively, to an estimated 356 total jobs by 2025.

Table 1: Financial/Economic Impacts of Energy Efficiency Investments in Garfield County

	2009	2010	2011	2012	2015	2020	2025
Program Administrative Cost	0.4	0.4	0.5	0.6	1.3	3.4	3.1
Energy Efficiency Investments	1.8	1.9	2.2	3.0	7.2	18.5	16.7
Gross Investment in Energy Efficiency	2.2	2.3	2.7	3.6	8.5	21.9	19.8
Annual Efficiency Payments	0.4	0.9	1.4	2.1	5.6	15.6	20.7
Energy Bill Savings	0.2	0.6	1.4	2.7	8.6	28.6	53.2
Net Energy Bill Savings	-0.6	-0.7	-0.5	-0.0	1.7	9.6	29.4
Net County Economic Activity	1.4	1.9	3.1	5.3	16.1	51.7	88.4
Net County Jobs (actual)	19	19	24	35	95	273	356

Note: Historical or actual values are shown in black font while projected values are highlighted in blue.

The economy is also showing a higher level of robustness under the energy efficiency standards. This can be seen by the positive net gains in net county economic activity (as measured by in constant 2012 Gross Regional Product) that move from $1.4 million in 2009 to just over $88 million by 2025.

Conclusions

Based on the available data, exploiting Colorado's energy efficiency opportunities using programs and incentives already implemented by Colorado utilities should both create jobs and be a cost effective investment for utility customers. This analysis shows that the policies in place are stimulating a more productive investment pattern, which provides Colorado and the U.S. with needed goods and services, delivered much more efficiently.

Cumulative investments and benefits in Garfield County of meeting the 2020 Goals result in a benefit to cost ratio of $1.58 returned for every $1 dollar invested:

Investments: $85 invested in energy upgrades & $16m invested in program implementation
Benefits: **$215m + 273 jobs by 2020**, by accelerating existing efficiency programs
Benefits: **$578m + 356 jobs by 2025,** without increasing program cost after 2020

The year-by-year projection of the annual economic and financial impacts is shown in Chart 2 on the following page.

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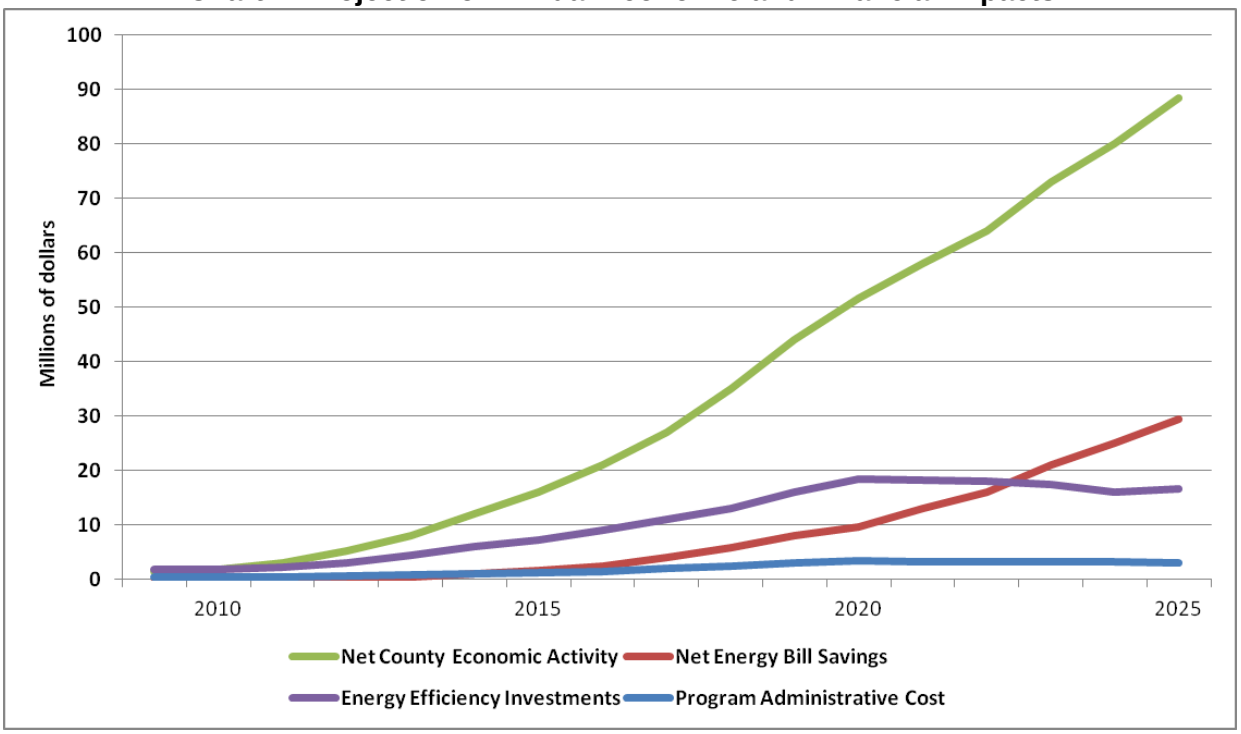
follows). This would suggest a significantly larger benefit-cost ratio and net increase in regional jobs than suggested in this particular assessment.

Chart 2: Projection of Annual Economic and Financial Impacts



Beyond, the analytical findings reported here, and those provided by other Colorado-specific energy efficiency studies (see, for example, Laitner and Goldberg 1996), are entirely consistent with many past studies included in a 48-study meta-review covering state and regional energy policy assessments in the United States (Laitner and McKinney 2008). In short, this analysis suggests that an innovation-led energy policy strategy—one emphasizing a cost-effective substitution of energy productivity gains for inefficient energy consumption—will lead to a net positive economic impact for Colorado as well as the United States as a whole.

Appendix: Key Assumptions and Data

The data used in this analysis are pulled from a database used to track the various energy efficiency programs operated by CLEER. The analysis begins with a working baseline of the county's historical energy consumption. It then examines how the various investments and dollar flows reduce total energy expenditures each year of the analysis. The table below provides this data in millions of non-inflation adjusted dollars.

Table A1. Key Annual Program Costs and Benefits (in Millions of Current Dollars)

	2009	2010	2011	2012	2015	2020	2025
Administrative and Program Costs	0.4	0.4	0.5	0.6	1.4	3.9	3.9
Rebates and Incentives	0.8	0.6	0.5	0.5	0.8	2.1	2.1
Consumer Match	0.9	1.2	1.7	2.5	6.8	19.2	19.2
Total Cost of Efficiency Improvements	2.1	2.2	2.7	3.6	8.9	25.2	25.2
Electricity Savings	0.1	0.3	0.7	1.3	4.1	15.1	31.1
Natural Gas Savings	0.1	0.3	0.7	1.3	4.1	15.1	31.1
Petroleum Savings	0.0	0.0	0.0	0.1	0.8	2.8	5.8
Total Annual Savings	0.2	0.6	1.4	2.7	9.0	33.0	67.9

Note: Historical or actual values are shown in black font while projected values are highlighted in blue.

CLEER has taken a multi-pronged approach to addressing energy efficiency and production in the areas of government, commercial and residential buildings, renewable energy installations and transportation. CLEER provides support for these Garfield Clean Energy programs in a variety of ways including, Active Energy Management and live data tracking through use of the 'Garfield Energy Navigator' for government buildings and large commercial buildings, aggressive marketing programs, technical assistance and energy coaching for businesses and residences. Training and retraining for contractors and subcontractors on implementing energy conservation measures, working with politicians, town and county staff members and community leaders has been critical to gaining acceptance of proposed energy conservation targets and programs throughout the county. Working with and utilizing utility rebates and state and national grants has leveraged owner investments.

Energy savings in Table A1 are an acceleration of existing Garfield Clean Energy building and transportation programs, accelerated to reach a 2020 20% energy savings target. Petroleum savings shown above are a small percentage of savings compared to building energy based on historical results, meaning that building energy savings in this forecast delivered the bulk of the savings required to meet 2020 target. Balancing energy efficiency investments and program administration to increase petroleum savings is recommended and would provide the additional benefit of reducing economic risks associated with the price volatility of petroleum.

Other Non-Energy Benefits

This working assessment is made even more plausible as the efficiency investments are likely to generate several "non-energy" benefits such as maintenance cost savings and revenue increases from greater production often result in addition to the anticipated energy savings.

Often, the magnitude of non-energy benefits from energy efficiency measures is significant. These added savings or productivity gains range from reduced maintenance costs and lower waste of both water and chemicals to increased product yield and greater product quality. In one study of 52 industrial efficiency upgrades, all undertaken in separate industrial facilities, Worrell et al. (2003) found that these non-energy benefits were sufficiently large that they lowered the aggregate simple payback for energy efficiency projects from 4.2 years to 1.9 years. Several other studies have also quantified non-energy benefits from energy efficiency measures. In one, the simple payback from energy savings alone for 81 separate industrial energy efficiency projects was less than 2 years, indicating annual returns higher than 50%. When non-energy benefits were factored into the analysis, the simple payback fell to just under one year (Lung et al. 2005). In residential buildings, non-energy benefits have been estimated to represent between 10 to 50 percent of household energy savings (Amann 2006). If the additional benefits from energy efficiency measures would be captured in conventional performance models, such figures would make them even more compelling.

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