



Save **money,**
save **energy.**

Home Energy 101 Workshop

Spring 2010


ClimateSmart[™]
LOAN PROGRAM



Workshop Agenda

- Energy Efficiency and Supply
- Eligible Energy Efficiency & Renewable Energy Measures
- Financing Mechanisms
- ClimateSmart Loan Program
- Program Structure & Timeline
- Recap
- Questions



Energy Basics



Home Energy Use

Space Heating = 31%

Space Cooling = 12%

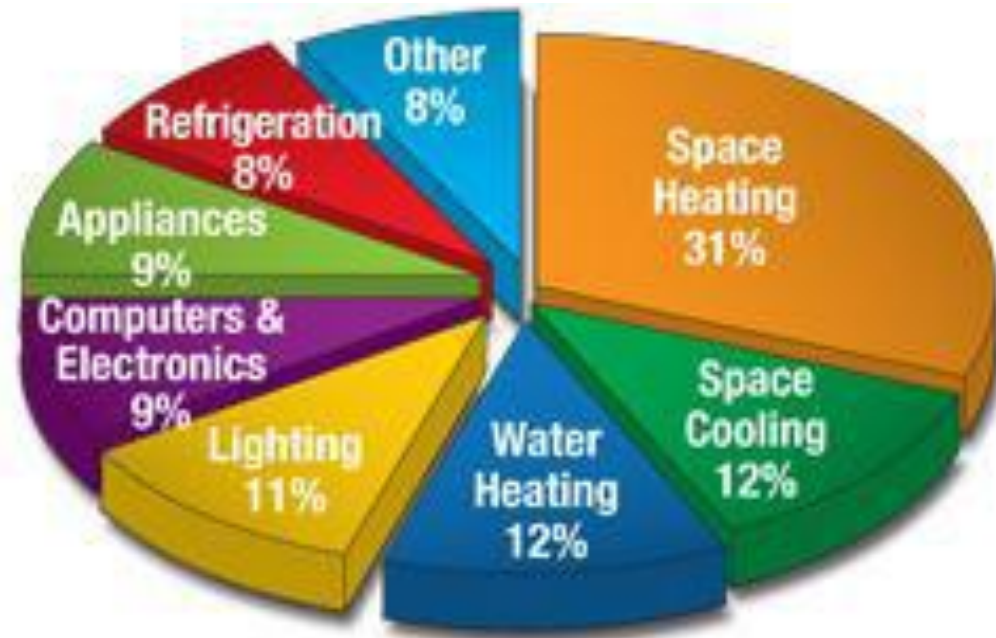
Water Heating = 12%

Lighting = 11%

Electronics = 9%

Appliances = 8%

Refrigeration = 8%



Source: Xcel Energy 2007 Buildings Energy Data Book, Table 4.2.1., 2005 energy cost data.

Heating and cooling comprises nearly half of the average household's energy costs



Energy Efficiency & Supply

Conservation versus
generation





Energy Efficiency First

- 60% of US homes are under-insulated or un-insulated
 - Home built pre-1980, may fall into this category
- Air leakage = leading causes of energy waste in homes
 - Plugging those leaks can save 5% to 30% on utility bills – an average of **\$450** per year for an American household



Energy Audit

- Gives you a personalized set of recommendations to lower your energy bill
- Helps you understand your energy usage
 - Gas vs. electric usage
 - Building envelope and equipment evaluation
 - Ways to save energy and money for free by changing your behavior





CO **HOME ENERGY AUDIT**



Your TOP PRIORITIES

Electric priorities	Natural Gas priorities
1. Replace inefficient refrigerator.	1. General air sealing.
2. Winterize hot tub in cold months	2. Upgrade to a high efficiency furnace.
3. Front load washer & moisture sensing dryer.	3. Targeted sealing- crawlspace.

Outlines top priorities for your home

Your Energy Usage

In the Front Range, Xcel Energy reports that an average 2,500 sq. ft. home uses 70 Therms of natural gas per month (152 in January) and 635 kWh of electricity per month. Here is how your home compares:

Utility Bills				
Usage	Highs	Lows	Monthly Average	2500 ft ² Home Mo. Avg.
Electric (kWh)	669	339	483	635
Gas (Therms)	189	22	76	70

Report includes solutions to help you improve your comfort and reduce your energy use

Your Home Energy Audit report includes solutions to help you improve your comfort and reduce your energy usage.



Energy Efficiency & Renewable Measures



Energy Efficiency Measures

- Air Sealing and Ventilation
- Insulation
- Space Heating and Cooling
- Water Heating
- Lighting
- Daylighting
- Windows, Doors, and Skylights
- Reflective Roof



Air Sealing

- Heated and cooled air can leak out of a home in some obvious (and not-so-obvious) ways
 - Through attic bypasses via dropped ceilings, floor plenums, interior walls, etc.
 - Around windows & doors
 - Through ducts (increases house pressures, leading to infiltration)
 - Around plumbing & electrical penetrations
- Blower door test required before and after air sealing

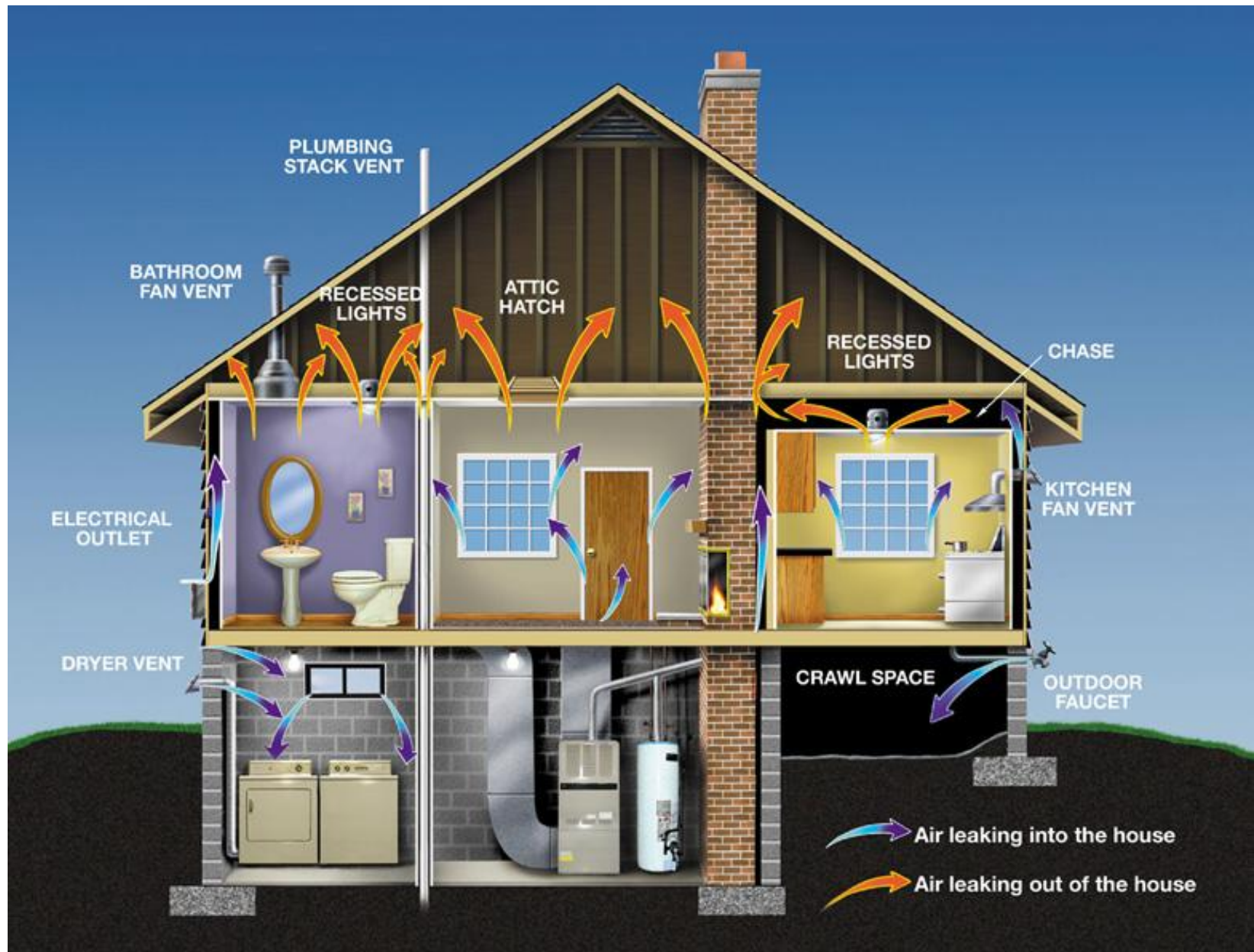


Photo derived from Energy star



Ventilation

- Heat-recovery ventilation saves heating energy and improves air quality
- If the blower door test reveals that the house has become tighter than $.35 \text{ nACH}$, mechanical ventilation will be required to maintain air quality



Insulation

- Maximize insulation levels
 - Attics to R-38 Minimum
 - Gap-filling insulation (foam or blown cellulose) also reduces air leakage





Insulation

- Maximize insulation levels
 - Walls to R-19, or fill wall cavity
 - Can fill from outside or inside
 - Gap-filling insulation (foam or blown cellulose/fiberglass) also reduces air leakage
 - Rigid insulation under siding reduces thermal bridging, air leakage
 - Crawlspace and basement





Windows & Doors

- Windows
- Doors
- Skylights
- Day lighting – tubular skylights, light shelves
- No new openings – replacements only, except for solar tubes
- Must be combined with insulation or air sealing (*or establish that it has already been done*)

High Efficiency Heating

- Efficient heating & cooling equipment can save up to half of the energy required
- All gas fired forced air furnaces must have a minimum 90% AFUE, plus sealed combustion
- Tightening of the home may require ducting the combustion air of old equipment or replacing with direct-vent new equipment





Water Heating



**gas
tankless**



**efficient
gas**

- On-Demand/Tankless
- High Efficiency Natural Gas Storage
- Venting can be an issue for efficient gas appliances



Cooling

- Evaporative cooling is 3-4 times as efficient as air conditioning
- High-efficiency air conditioner to replace existing central A/C
- May not add a new air conditioner
- Roofing material:
 - Light-colored shingles
 - Energy Star listed roofing



Source: KwikCOOL



Ground Source Heat Pumps

- Heat pumps provide both heating and cooling
- Ground-source heat pumps can also provide hot water
- Heat pumps are electric, but have the effective carbon emissions and operating cost impact of natural gas



Other efficiency measures

- These measures not funded, but a great idea
- Appliances
 - Refrigerator efficiency has improved 60%.
 - Dishwashers & Clothes washers
 - Freezers
- Compact fluorescent lighting
 - 75% more efficient than incandescent, and lasts much longer. Plan for proper disposal at HHW
- LED lighting
- Low-flow showerheads



Renewable Energy

- Solar Hot Water
- Solar Electric (PV)
- Small Wind
- Wood or Pellet Stoves (*no gas*)



Solar Hot Water/Solar Thermal

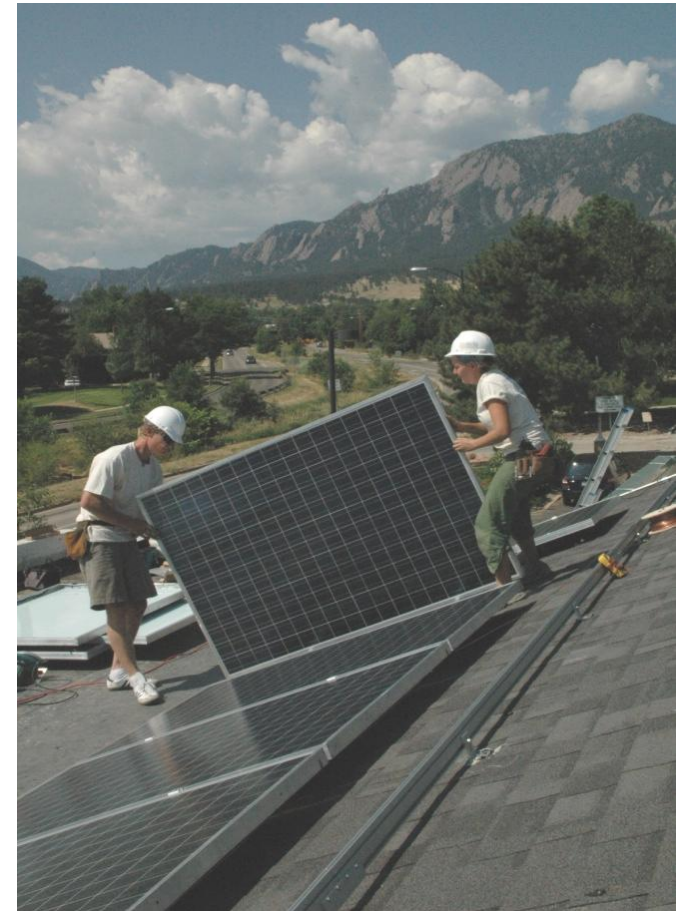
- Hot water &/or space heating
- Rooftop
 - New systems
 - Replacement/repairs for orphan systems
- Pools
- Hot tubs





Solar PV/ Solar Electric

- Net metering: meter may run backwards in sunny seasons
- Can produce much or all of the electricity you use
- In Xcel service territory, homeowners can receive rebates and RECs.
 - Rebates change frequently
- Limited rebates available from other utilities





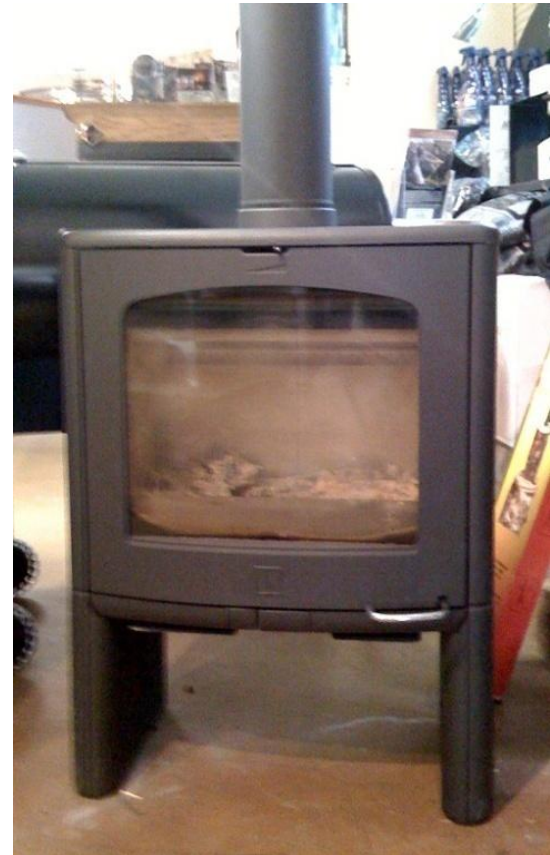
Small Wind Systems





Wood/Pellet Stoves

- High efficiency fireplaces and inserts.
- Advanced combustion/gasification wood or pellet stoves
- **New installations allowed only in fully electric homes with no access to natural gas**





Value of Combining Measures

- Windows and wall insulation go together
- Insulation/air sealing and heating/cooling systems complement each other
- Energy efficiency partners with renewable energy:
 - Efficient cooling and photovoltaics
 - Heat pumps and photovoltaics



Financing Options



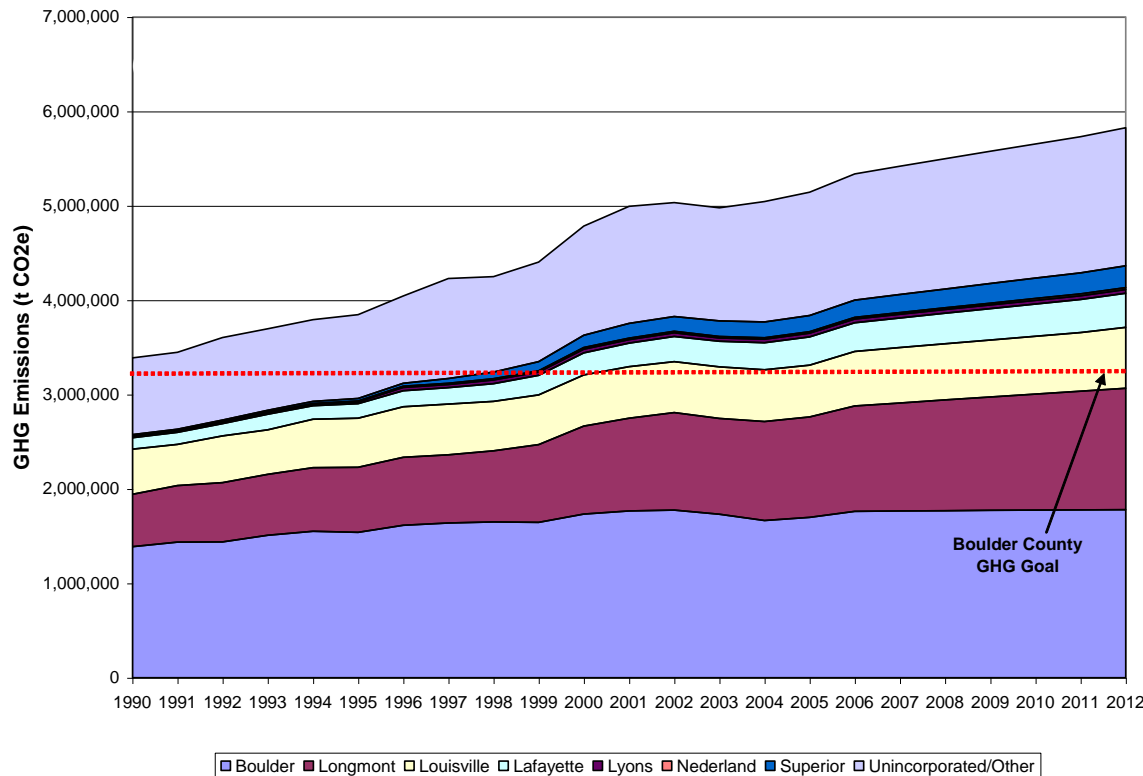
Financing Options

- HELOC (*Home Equity Line of Credit*)
- HEILs (*Home Equity Installment Loan*)
- Third Party Financing for Solar PV
 - Private solar companies may help fund your system.
- ClimateSmart Loan Program



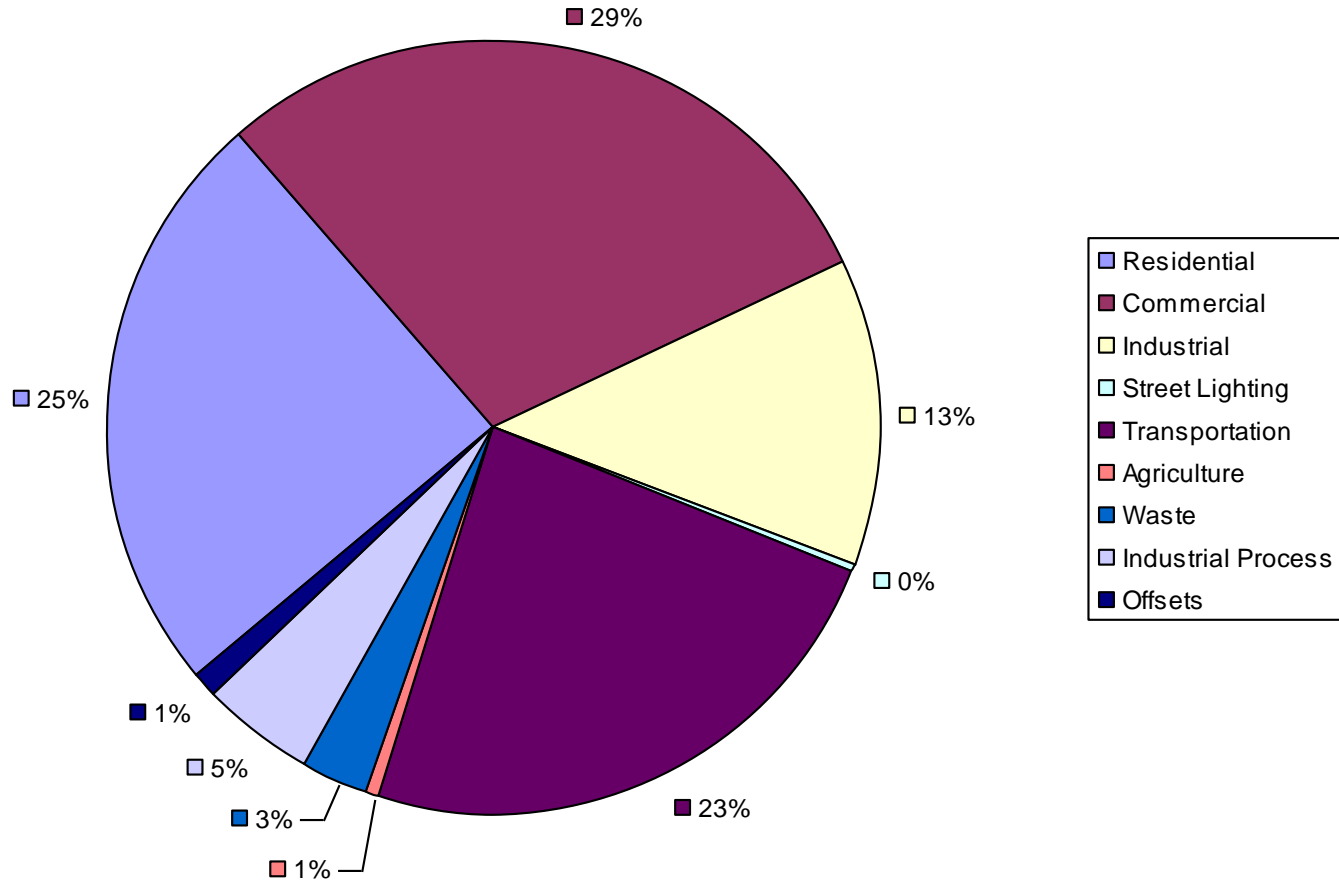
ClimateSmart Loan Program

GHG Inventory Results

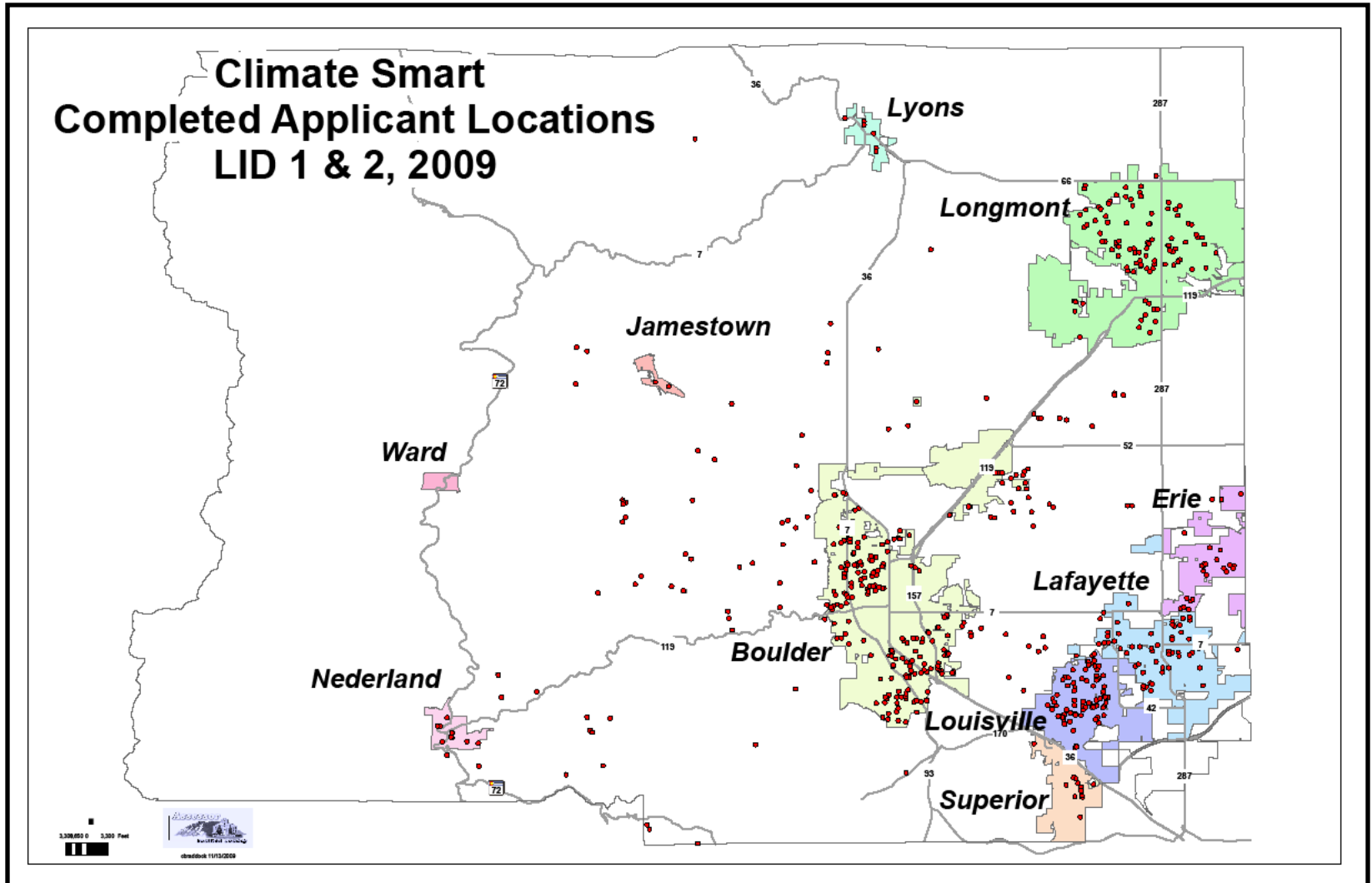


- Large increase in GHG emissions across the county
- 2012 trajectory = **85% above** 1990 Kyoto target
- Long term carbon neutrality goal

Boulder County's Emissions by Sector



Program Success



- 612 participants, totaling nearly \$10 million
- Local stimulus program, funded over 282 contractors



ClimateSmart Loan Program

- All residential property owners who are current on their taxes and assessments within Boulder County can participate (*except mobile homes*)
- Countywide pool of funds obtained through sale of bonds
- Up to the full cost of improvement is loaned
- **Min** = \$3,000 per home
- **Max** = 20% of statutory actual value of property or \$50,000, *whichever is less*



ClimateSmart Loan Program

Compared with Conventional Private Loans:

- Debt is tied to property, not to borrower
- Longer repayment period (lower annual payments)
- Easier to obtain than private loans in current market
- The County pays contractor directly
- Paid back through a special assessment on your property taxes
 - Tax bills payable in 2011 will include first installment payment



Tracking Success

- Participants will be required to sign a utility bill release (during loan origination) so we can monitor the impact of the program
- We will also monitor the distribution of loans throughout the county



Important Program Information



Loan Types

Open Household – a little higher interest rate

Moderate Income Household – lower interest

Persons in Household	115% of AMI
1 -2	HH income less than \$99,754.92
3 and up	HH income less than \$114,718.16

Based on Form 1040, line 22; Form 1040EZ, line 4; Form 1040A, line 15 for entire household, using most recent filing.



Assessment Rates

Rates	Moderate-Income	Open Loan
Not to Exceed	4.5%	7.75%
Estimated Rates	3%	6.75%

Bond market interest rates change daily

- Rates set at the time of bond sale
- Bond sale as early as June 16th, 2010



Program Fees & Costs

- Non-refundable \$75 application fee (*paid online*)
- Closing Costs & Cost of Issuance: 4% max
- **Debt Service Reserve Fund: 5% (*expected to drop*)**
 - Helps achieve a better bond rating & interest rate
 - Acts like an escrow account
 - If the default rate on these loans is low, the County may payoff the bond before the end of its term using these funds. If this occurs, the County will be able to release borrowers from any remaining payments at that time.



Actual Costs Previous Rounds

Amount you apply for	Approximate Closing Costs*	Assessment Rate	Annual Assessment
\$5,000	\$632	5.2%	\$550
\$13,000	\$1,486	5.2%	\$1,350
\$10,000	\$1,594	6.68%	\$1,248

* This amount includes 2009 interest, which was rolled into the principal amount.



Repayment Options

- Annual amount due, same options as with property taxes
- Full remaining balance on loan
- No partial prepayment
- Interest is tax deductible
- There is no legal requirement that the loan be paid off when you refinance or sell your home. *However, this may be an item subject to negotiation with a future buyer and mortgage lender.*



Multiple Properties and HOAs

- Owners of individual units may apply for loans for their own unit if the condominium/townhome declaration permits owner alterations.
- HOAs in general will probably not qualify as the association usually does not own the common elements or limited common elements of the condominiums
- HOAs may contact the County Attorney's Office if they believe they qualify
- If you own and are applying for a loan for multiple properties, you need to see the registration table to list your other addresses.



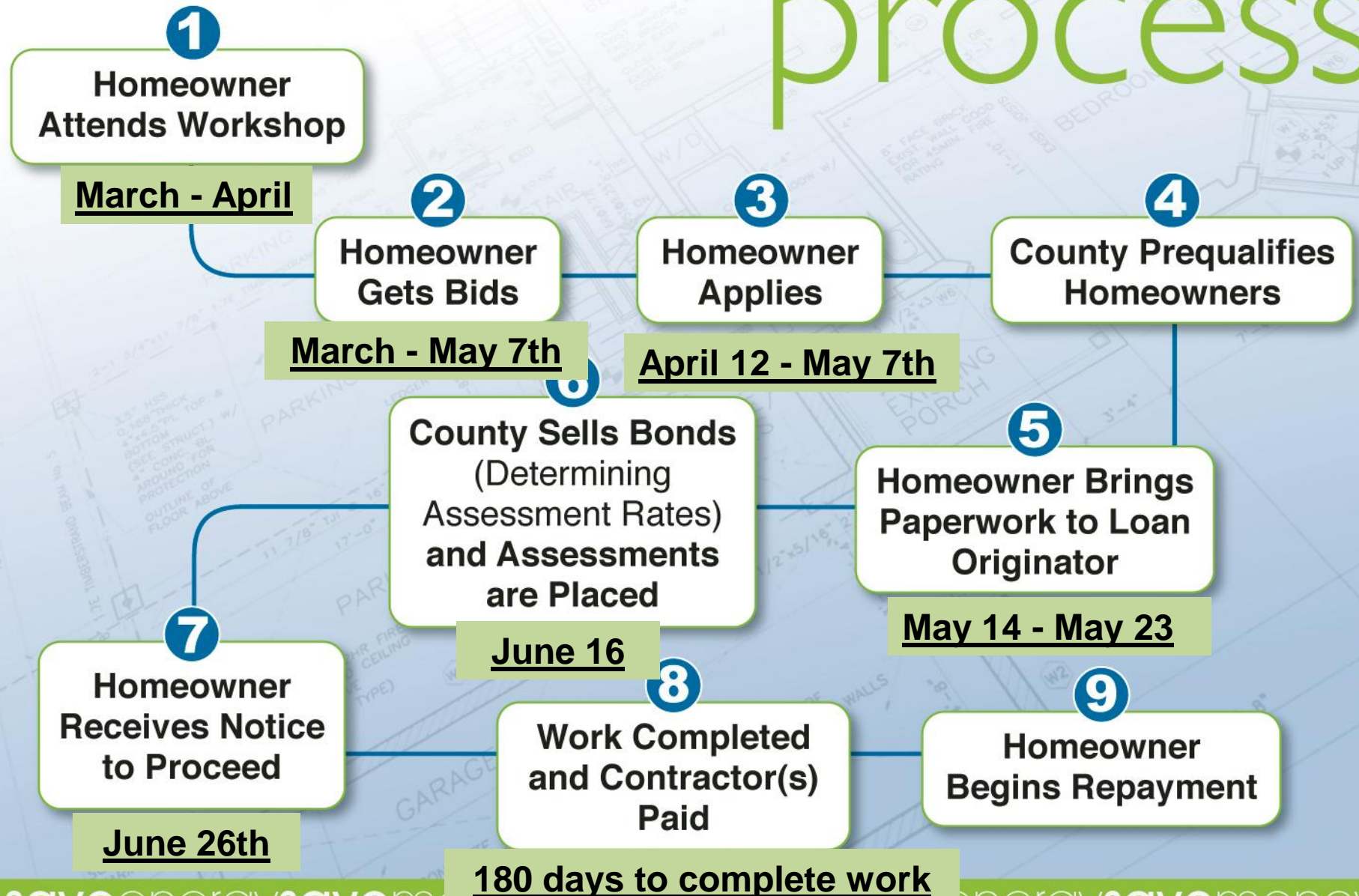
Rebates & Incentives

- The County will not deduct the ITC (Federal) amounts from loans (property owners can if they wish – consult your tax advisor).
- Solar * Rewards (Xcel) payments shall be deducted from amount requested.
- Talk to your installer now about how to lock in rebates.
- Otherwise, rebates/incentives may be deducted from requested amount at homeowners' discretion.



Steps of the Process

ClimateSmart loan program application & financing process



Step 1: Review eligible measures



LOAN PROGRAM Residential Eligible Measures List

ENERGY EFFICIENCY MEASURES

Category	Measure	Minimum Efficiency / Certification Requirements
Air Sealing and Ventilation	Air sealing	Air sealing level must be measured by a blower door before and after improvement is made, and mechanical ventilation must be installed if air sealing reduces air
	Duct sealing	
	Energy or heat recovery ventilator	
	Whole house fan	Must have controls (thermostat or timer, multi-speed). Fan opening must be properly insulated and sealed in winter.
	Attic fan	Must have controls (thermostat or timer, multi-speed). Fan opening must be properly insulated and sealed in winter. May be solar-powered.
Insulation	Attic	R-38 minimum required in open attic; cathedral ceilings will vary.
	Wall	R-19 minimum, or fill wall cavity (e.g. for 2x4, R-13 will fill wall cavity)
	Floor (over unconditioned space)	R-19 minimum
	Ducts (in unconditioned)	R-8 minimum
	Perimeter (foundation)	R-10 minimum

Over 40 different measures

Defines “minimum efficiency requirements”

Example: Attic insulation

R-38 minimum required in open attic; cathedral ceilings will vary.

Step 2: Obtain bids/estimates

- Contractor must fill out our “**Contractor Cover Sheet**” and provide you with a written bid or estimate
- Within the individual measure amounts, have your contractor **include:**
 - 1.) General contractor fees
 - 2.) Anticipated permit and/or inspection fees



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Contractor Bid/Estimate Cover Sheet

Please review the approved eligible measures list to make sure your projects meet the minimum requirements as specified on the list. To review the eligible measures list please visit www.climatesmartloanprogram.org and search under important documents.

Contractor Name: _____

Contractor Address: _____

Contractor Phone: _____

Contractor Email: _____

Homeowner Names: _____

Property Address: _____

***If you are a general contractor please incorporate your general contractor fees within the cost of each measure. There is not a separate category for general contractor fees or inspection/permit fees, so please include these costs within the individual measure amounts.

Step 3: Apply online

Application open April 12-May 7

Homeowner enters:



- 1.) Personal contact information
- 2.) Property address
- 3.) “Not to exceed” dollar amount for each individual measure
 - You do not need to upload any documents
- 4.) Pays \$75 application fee online
- 5.) Continue to update application, if needed, until May 7

Step 4: Loan Origination

May 14 - May 23

- Loan originators provide in-person meetings with **all** property owners
- You bring all documents to loan originator
- You will review the loan fees and terms of the loan
- You will sign your loan agreement – the official contract with County
- **After you sign the loan agreement, you cannot withdraw from the program and you cannot change your total loan amount**

Step 5: Complete your projects



HOMEOWNER'S ACKNOWLEDGEMENT FORM

This form (and a PDF version of the form) can be found online at www.ClimateSmartLoanProgram.org

I/We _____ (enter all property owner(s) names)

hereby acknowledge that _____ (enter the specific project, e.g.: boiler, solar PV, wall insulation) project by

_____ (enter contractor's name) in the amount of: \$ _____, _____ (enter specific project amount) has been completed.

Boulder County may send a check to my contractor for \$ _____, _____ to the address below:

Contractor's Address: _____

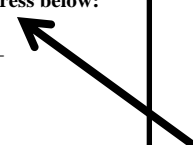
Property address (where the work occurred): _____

Wait until you receive your "Notice to Proceed"

- You have 180 days to complete your projects

Once work is completed you submit:

- 1.) Homeowner acknowledgement form
- 2.) Final invoice from contractor
- 3.) Copies of required permits and/or inspections



Required Permits/Inspections

- You must provide copies of all permits and/or inspections required by the jurisdiction where your property is located
- Please check our permit/inspection form online to see whether your project needs a permit





Thank you!

www.ClimateSmartLoanProgram.org
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303.441.4565

The logo for the ClimateSmart Loan Program. It features a blue curved line above the text "ClimateSmart" in green and blue, with "LOAN PROGRAM" in black below it.

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