Consideration of a Residential Energy Conservation Ordinance (RECO) for Boulder, CO

RECO Basics

Residential Energy Conservation Ordinances (RECOs) are a policy tool for upgrading the energy efficiency and water usage of existing housing. RECOs require targeted building owners (landlords and/or homeowners) to implement specific energy and water efficiency measures if their property doesn't meet a minimum standard. They have been used by cities with demographics similar those of Boulder since as far back as the mid 1980's.

The intent of a RECO is to (a) reduce the amount that tenants and homeowners pay in utility bills – which is particularly important in the case of affordable housing and rental properties, as these residents pay a much high portion of their household income to utility bills, (b) reduce the emissions of greenhouse gases, and mitigate against the effects of global warming, (c) reduce the community's susceptibility to energy price fluctuations, (d) improve local air quality by reducing the emissions of criteria pollutants associated with coal (from electricity) and natural gas combustion, (e) improve the comfort and livability of a living space by reducing drafts and heat imbalances.

RECOs are especially relevant in the rental property sector, where there exists a disincentive for landlords to incur the costs of efficiency improvements when they don't reap the benefits. These properties are often the ones in the greatest need of upgrades. And since rental properties represent about half of the Boulder housing market, the potential energy and greenhouse gas savings associated with slowly but surely bringing the rental housing stock up to par are very large.

RECO Design – Using Other Cities as Examples

In the six different US cities with RECOs currently in place there are both differences and similarities in program design and implementation. Typically, RECOs take effect either when the property changes hands (point of sale) or during the rental license inspection process. RECOs traditionally include a list of proscriptive energy efficiency measures with which property owners must comply. The measures typically include a minimum level of attic insulation, duct sealing and insulation, water heater tank and pipe insulation wrap, and water saving measures. Property owners are generally required to implement the measures and then hire a certified inspector to certify that the dwelling meets the program requirements. A list of the city-specific RECO measures is included at the end of this report.

All of the existing RECO programs include rental housing, and some apply exclusively to rental housing. For example, Burlington, VT, Ann Arbor, MI, and

the State of Wisconsin programs apply only to rental properties. In Burlington and in Ann Arbor, RECO programs only apply specifically to rental housing units where tenants are directly paying electric bills; if the landlord pays utility bills, or if the property is owner-occupied, those properties are exempt from the RECO. In other cities where owner-occupied housing is included in the RECO, certain properties are exempt. Examples include properties constructed after a certain date—perhaps when the city's energy conservation standards for new buildings took effect, any mobile homes, and live/work occupancies. Usually if a building has participated in another energy conservation program then they are exempt as well.

Homeowners and landlords are required to comply with RECO standards either at the time of sale or during periodic safety inspections. Some RECOs also include homes or apartment buildings undergoing significant renovations. The time between when properties are sold varies, but in San Francisco properties on average are sold every five years.

Only one city implemented RECO in conjunction with periodic safety inspections—Ann Arbor. Every 2-3 years when landlords are required to perform a safety inspection, the inspectors also check the energy efficiency features of the rental property. Other cities and agencies have been reluctant to incorporate RECO with safety inspections because the inspectors need to be trained on energy efficiency as well as the standard safety features to look for.

The responsibility for complying with the RECO is typically belongs to the seller, or else the buyer and seller negotiate who will be responsible. If the upgrades aren't completed by the time of sale, the buyer is usually allowed one year to meet the requirements. In the case of Davis, CA, buyers have 90 days after the time of sale to meet the requirements. During that time, money is placed in an escrow account. While the seller traditionally takes on this expense, it is easily absorbed into the purchase price and mortgage, and thus is usually not a noticeable expense for the purchaser.

RECO inspections are either conducted by certified private inspectors or directly by City or State inspectors. One exception is the City of Berkeley, which contracts with a community-based non-profit organization to perform the inspections. In all cases, homeowners are responsible for scheduling and paying for the inspection. The cost for an initial RECO inspection is an average of $100 for a single-family unit and $50 for each additional unit. Some RECO programs include renovations and the initial RECO inspection fee is included in the city's construction permit process. If a re-inspection is necessary, it typically costs $50 for a single-family unit and $25 for each additional unit.

Cost to the Homeowner

All of the existing RECO programs place a cap on the amount a homeowner is required to spend on upgrades. Some programs limit total expenditures to a

certain percentage of the sales price. San Francisco, for example, limits the expenditure to 1% of the sales price. Berkeley limits the spending to $0.05 per square foot in a multi-unit dwelling or 1% of renovation costs when a property is undergoing a renovation of $50,000 or more.

The actual cost of the improvements born by the property owner varies depending on the existing condition of the building. In Burlington, the average cost is estimated to be about $650–$750 per apartment. In a January 2005 report, SWEEP estimated RECO upgrades would cost the average homeowner in Nevada $1,000 or more.

Cost to the City

Since homeowners pay for the inspections, the expense to the administrating agency is small. In most cases, all costs are recoverable through filing fees, which range from $15-50. Even in places where employees were hired specifically for RECO purposes, the programs haven't been budget drains. In Wisconsin, for example, four people administer the program and it recovers the entire cost of the program through modest fees charged to parties responsible for complying with the standards. Furthermore, a San Francisco report (from http://www.earthfuture.com/seconomy/sei13.asp) states that "the cost to San Francisco's city budget has been nil, and the cost of enforcement through the city's Housing Inspection Services Division has been very inexpensive."

Energy Savings from Other Programs

Despite all assumed benefits of RECO programs, exact energy savings results are very difficult to come by. Most city and/or state agencies don't have the means or the time to analyze energy savings before and after the RECO measures are implemented. Since the Burlington Electric Department administers the Burlington, VT program, program managers were able to compare *electric* bills (not heating bills) for energy saving purposes. The program manager estimates that each housing unit realizes $240 per year in energy savings. The San Francisco report referenced above claims that average energy efficiency increases by 15%. SWEEP asserts that a 10% efficiency increase in more realistic in Nevada the 15% in San Francisco.

Applicability for Boulder

A RECO in Boulder would potentially be a very effective means of reducing energy use and greenhouse gas emissions, especially in the hard to reach rental and multi-family housing markets, increasing the energy efficiency of the existing building stock by a projected 10-20% per building depending on the stringency of the requirements. The RECO would also improve the quality of the rental housing stock, thereby increasing occupant comfort and resale value for the owner. One potential hurdle would be resistance from Landlords, although it may be that a level playing field would be considered preferable.

Table 1 lists the vintage of Boulder's residential properties. About half of all properties in Boulder are rental units. According to Landlink, there are 11,205 existing residential rental properties. The period from 1960 to 1980 saw the biggest construction increase, and these years also happen to be some of the country's worst in terms of energy efficiency.

Table 1 -- Vintage of Boulder Residential Properties

Year of Construction (# buildings)	Yearly Totals	Cumulative Totals
1867-1899	1%	1%
1900-1919	4%	5%
1920-1939	4%	8%
1940-1949	2%	11%
1950-1959	14%	25%
1960-1969	24%	49%
1970-1979	24%	73%
1980-1989	14%	87%
1990-1994	8%	95%
1995-1999	4%	98%
2000	1%	99%
2001	0%	99%

Questions to Consider

If it is felt that a RECO is both appropriate and politically palatable for Boulder, a further cost benefit analysis by Environmental Affairs staff would be conducted to better determine the overall benefits -- in terms of energy savings, greenhouse gas emission reductions, energy cost savings -- and costs to both the private sector and the city. However, as Boulder considers the form of a customized local RECO, the following are items that should be taken into account in its design:

- Should the program be performance based or measure/checklist based?
- Which property types should be included? Rental, multifamily condo, or all housing?

- When should the RECO take effect? At point of sale, safety inspection, or another trigger event?
- What is the most effective and least costly way for the city to administer a RECO?
- How stringent should the RECO be set? If prescriptive, which measures should it include?
- Should there be an initial compliance window (e.g. 5 years after the RECO initially takes effect)?
- As Xcel rolls out its residential demand side management (DSM) program, the associated rebates can offset the cost born by the property owners. How can the program be set up to best maximize this additional funding?

Other resources

Policy Options for Improving Existing Housing Efficiency (ACEEE book)
http://www.aceee.org/pubs/a971.htm

Nevada Energy Efficiency Strategy, SWEEP analysis for Nevada State Office of Energy and the Nevada Renewable Energy and Energy Conservation Task Force (January 2005)
http://www.swenergy.org/pubs/Nevada_Energy_Efficiency_Strategy.pdf
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Energy Efficiency in Rental Housing: A Case Study of Boulder, CO, study by Jeff Lyng and Seth Kassels for Center for ReSource Conservation (Fall 2003)

This paper was written by Rachel Reiss, and edited by Josh Radoff, City of Boulder OEA.

Berkeley	
Toilets	1.6 gal./flush toilet, or flow reduction devices
Showerheads	3.0 gal./min. flow rate
Faucets	2.75 gal./min. flow rate for kitchen and bathrooms
Water Heaters	Insulation wrap of R-12 value
Hot & Cold Water Piping	Insulate first two feet from water heater to R-3 value
Hot Water Piping in Pumped, Recirculating Heating Systems	Insulate all piping to R-3 value
Exterior Door Weather-Stripping	Permanently affixed weather-stripping, and door sweeps or door shoes
Furnace Duct Work	Seal duct joints, add insulation wrap to R-3 value
Fireplace Chimneys	Dampers, doors, or closures
Attic Insulation	Insulate to a minimum of R-30 value
Common Area Lighting (multi-unit buildings only)	Replace incandescent with compact fluorescent lamps (CFL) of at least 25 lumens per watt

San Francisco	
Attic insulation	R-19; existing R-11 is deemed acceptable
Weatherstrip	All doors leading from heated to unheated areas
Insulate hot water heaters	R-6 jacket on heater and the first 4 feet of hot water line insulated to R-4
Low-flow showerhead	Maximum 2.5 gallons per minute
Reduce infiltration	Caulk and seal cracks in building exterior greater than 1/4 inch wide
Insulate ducts	R-3 insulation for all heating and cooling ducts and not sealed with duct tape
Faucet aerator	Sinks designed to accept aerators are to be equiped with a flow restrictor
Low-flush toilets	3.5 gallons per flush or less, or retrofitted to use less gallons per flush
Clean and tune boilers	Repair boiler leaks and time clock control on the burner

Wisconsin	
Building Element	**Amount of Insulation**
Attics:	
If currently R-0 to R-10.9	bring to R-38 level
" " R-11 to R-18.9	add R-19
" " R-19 or more	no action needed
Box sills:	
If currently R-0 to R-2.5	bring to R-19
" " R-2.6 to R-10.9	then
" " R-11 or more,	no action needed
Heating supply ducts located in vented spaces	R-5
Steam heating pipes in vented space	R-4

Hydronic heating pipes in vented space	R-2
Water heater piping in vented spaces	R-2
Horizontal attic access panels	R-19
Vertical attic access panels	R-5

Burlington	
Exterior wall insulation and sloped roof cavities	R-11 or as much as will fit
Attic insulation	R-40 or as much as will fit
Horizontal attic access panels	R-20
Vertical attic access panels	R-10
Box sills insulation	R-10
Electric water heater insulation	R-10
Floors over basements, crawl spaces, outdoor spaces insulation	R-19*
Ducts in attics insulation	R-10 if less than R-5 exists
Ducts in unheated attics	sealed with proper duct mastic
Space heating and domestic hot water piping insulation	R-4 if less than R-2 exists
HVAC distribution system pressure differential	less than 2 pascals between conditioned space and outdoors
Windows	Double-glazed or storm windows
Operable windows	Functioning latches which close windows tightly
Doors and hatches to outside	Functioning weatherstripping and latches which close doors tightly
Air leakage rate	No greater than 1,500 cfm at 50 pascals or less than 0.6 average air changes per hour
Combusion appliances and equipment	Tested for operational safety and corrected deficiencies within 12 months of the title transfer date
Heating system components	In good working order
*unless already has R-11, the basement contains no equipment used for space heating, or the basement or crawl space isn't vented to the outdoors	

Recommended measures for **Nevada** from SWEEP:

- Minimum attic insulation level (R-19) in accessible attics
- Double pane low solar heat gain low-E windows, reflective low-E window film, or
- Air conditioner tune-up including refrigerant charge adjustment
- Sealing and insulating accessible heating and cooling ducts
- Caulking, weatherstripping, and other building envelope air sealing
- Programmable thermostat
- Installing at least 5 compact fluorescent lamps in commonly used light sockets
- Low-flow showerheads and faucet aerators