



Berkeley Energy Commission

March 24, 2010

To: Berkeley Energy Commission  
From: Neal De Snoo, Secretary  
Subject: Amendment to Enhance Residential Energy Conservation Ordinance

### INTRODUCTION

The Berkeley Climate Action Plan calls for enhancing the existing Residential Energy Conservation Ordinance (RECO) to achieve deep and sustained energy savings in existing homes. Staff has drafted an amendment to RECO intended to stimulate demand for energy upgrades such as energy audits and retrofits, keep money in the local economy, generate green jobs, and contribute to meeting greenhouse gas (GHG) reductions of 33% by 2020 and 80% by 2050.

This staff report explains the proposed changes for discussion by the Commission. Based on this discussion, staff will draft an amended ordinance and present it at the April 28, 2010 Berkeley Energy Commission meeting for approval and/or modification. The goal is to present the amended ordinance approved by the Energy Commission to the City Council on June 22, 2010 for Council adoption.

### SUMMARY

The existing RECO requires that residential buildings being sold or undergoing substantial renovation have 10 basic energy and water conservation measures installed. The amendment being considered would move from a prescriptive list of energy and water saving measures with limited effectiveness to a “performance-based” approach that encourages deeper savings. Building performance is determined by a series of diagnostic tests to building systems -- such as thermal resistance of walls and air leaks in the floor and attic -- to identify customized cost effective energy improvements. Since the costs of energy performance improvement vary highly from home to home, it is difficult to mandate standard improvements. The proposed RECO amendment proposes two pathways to compliance. The first HERS Rating pathway to compliance may be met with a home energy test and improvement recommendation report, as well as a short list of some of the currently-required prescriptive measures and would cost an estimated \$700 to \$1,600. A second pathway would be available for homeowners who want to take advantage of available energy efficiency retrofit incentives. This pathway would require a basic verified performance improvement package that includes air sealing and attic insulation (which are or will soon be available through subsidized weatherization or utility-funded programs) as well as a short list of some of the currently-required prescriptive measures prescriptive list. The cost of this option would be \$4,000 and up, but could be offset considerably by rebates and

subsidies. A list of currently available and upcoming programs providing subsidies and incentives for home energy retrofits is provided in Attachment 1.

The Home Energy Rating and Report, which is part of the lower cost compliance alternative, provides a rating of the home's relative energy efficiency and provides site specific recommendations with cost and payback analysis on how to reduce use. The information encourages homeowners to voluntarily schedule projects in conjunction with other home repair, remodel and maintenance activities when incremental costs can be minimized. The rating corresponds to eligibility requirements for energy performance improvement rebate programs including the City's free low-income weatherization program, the City's upcoming Energy Efficiency Block Grant Funds, PG&E's upcoming whole home performance program, as well as State and Federal incentives and financing programs. These measures not only save energy and lower utility bills, they also improve comfort, durability and indoor air quality by reducing air and moisture infiltration.

In addition to performance testing and rating, or a basic retrofit package, the following prescriptive measures would be required for eligible RECO transactions:

1. Furnace duct repair
2. Toilets, showerheads and aerators
3. Water piping insulation
4. Door weather-stripping
5. Fireplace closures
6. Multi-unit only – High efficiency common area lighting

These low-cost requirements are consistent with the current Energy Code and contribute to performance improvement by reducing wasted energy used for water and space heating.

Additional changes proposed in the amendment include eliminating requirements for insulation in attics because building science has shown that insulation less effective without proper air sealing, eliminating water heater blanket requirements, which are unnecessary on modern water heaters, updating standards for low-flow plumbing devices to be consistent with current building code, and several process improvements to enhance customer service, accountability and the ability to track outcomes. See Attachment 1 for a comparison to the current RECO and the rationale for the proposed changes.

#### CURRENT SITUATION AND ITS EFFECTS

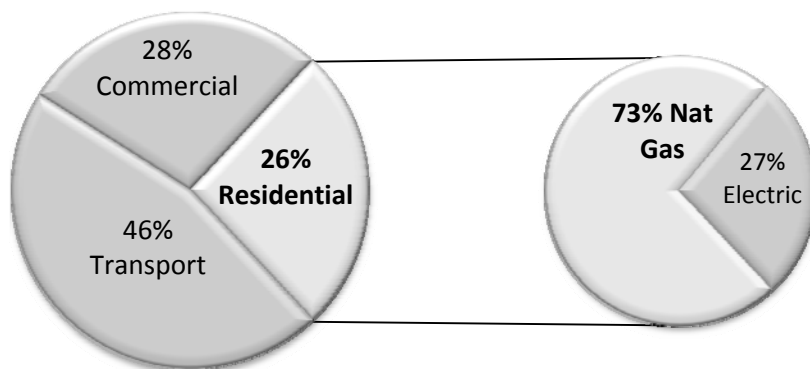
Adopted in 1982, RECO has required approximately 500 to 700 multi and single family buildings sold or renovated each year to install a prescriptive list of water and energy efficiency measures. While some of the measures are no longer consistent with current codes, others are no longer considered appropriate, such as the installation of attic

insulation prior to sealing hidden air leaks. Updates are needed to encourage deeper savings consistent with the scale of effort necessary to achieve the CAP goals. The proposed amendment takes into account our understanding of building science which has vastly improved since RECO was adopted almost 30 years ago and reflects the importance of sequencing measures to maximize effectiveness. The amendment would also provide consistency with other local, State and Federal performance improvement incentive program requirements and position Berkeley property owners to be eligible for rebates and financing opportunities for voluntary performance improvements. By requiring testing to identify the most effective energy-saving strategies and verification of any home performance improvements, home owners are able to verify results and measure expected energy savings.

### BACKGROUND

While Berkeley was the first U.S. city to adopt RECO, six cities, including Davis and San Francisco and the State of Nevada, now have residential energy point-of-sale and renovation laws in place. In addition, the City of Boulder and many Bay Area cities have RECO adoption indicated in their climate action plans. Since Berkeley's adoption of RECO, there have been two amendments; the first in 1987 to update the conservation measures and the second in 1991 to expand the requirement to include buildings undergoing renovation in addition to buildings being sold. An estimated 10,000 residential units have been affected by RECO. The ordinance played a role in achieving a 14% reduction in residential natural gas use over the past 10 years. Because energy savings from RECO are not currently measured or verified, it is impossible to know exactly what role RECO is playing to save energy in our community although total residential natural gas consumption in the community has declined since 2000.

### Berkeley Greenhouse Gas Emmissions from Homes - 73% from Natural Gas



Residential building energy use is responsible for just over a quarter of Berkeley’s GHG emissions. Three quarters of those emissions are from natural gas, primarily for space and water heating. Though Berkeley has a mild climate, 90% of Berkeley homes were built prior to the first energy codes in 1978 and waste a tremendous amount of heating energy. According to home performance contractors, many homes could reduce their greenhouse gas emissions by 25% to 45% with investments from \$5,000 to \$10,000. A successful RECO amendment would establish more effective minimum requirements while also providing a roadmap to homeowners who wish to participate in rebate, tax credit and financing programs to voluntarily capture deeper energy savings.

A Technical Advisory Group (TAG) comprised of national energy experts from Lawrence Berkeley National Laboratory, UC Berkeley, the California Energy Commission, energy service providers, PG&E, and home performance specialists, was convened for a series of meetings to discuss what would be the most effective measures and triggers for RECO and appropriate qualifications for service providers. In addition stakeholder meetings were held with realtors, builders, and green jobs specialists to discuss measures, process improvements and workforce development.

Energy standards and services at all levels of government are rapidly changing to reflect the urgency of climate change and our improved understanding of building science. State and regional financing programs (modeled on the BerkeleyFIRST program), as well as forthcoming utility rebate programs will all be based on performance programs that provide diagnostic tests with verified results. These programs entail some combination of insulating and sealing attics, floors, walls and

heating ducts, depending on the home. This approach is favored by energy experts and building scientists because it results in measureable energy reductions and a host of non-energy benefits, including:

- Improved durability of housing stock by reducing opportunities for moisture damage;
- Improved comfort by reducing drafts and balancing temperature; and
- Improved health and indoor air quality by reducing infiltration of dust, moisture and molds.

### **Overview of RECO Amendment under Consideration:**

Consistent with TAG recommendations and current building science, the proposed RECO amendment is designed to result in a home energy rating and verifiable voluntary energy improvements. In shifting strategies from prescriptive to home performance, the amendment has a new requirement for a Home Energy Rating and Audit Report, or equivalent verified improvements. The report, estimated to cost in the range of \$600 to \$1,000 for single family homes (\$100 - \$500 per multi-family unit), helps differentiate the relative energy efficiency among Berkeley homes and provides guidance on cost-effective efficiency measures. A short list of low-cost measures consistent with the current building code and energy performance would also be required. The events that trigger RECO, point of sale and substantial renovation, would remain unchanged. What follows is an overview of the main components of the RECO amendment including the home energy rating, raters, triggers, and process improvements.

## **1. Home Energy Rating Pathway OR Verified Basic Retrofit Package Pathway**

### **a. Home Energy Rating and Audit Report Compliance Pathway**

The California Whole House Energy Rating System (HERS Phase II), approved by the California Energy Commission (CEC) in 2009 was designed to allow comparison of the relative energy efficiency of homes and to guide investment in cost effective home energy measures. The HERS Compliance Pathway for RECO would include a Whole House Home Energy Diagnostic Report (HERS II) and a natural gas appliance combustion safety test. The report includes:

- **Rating Certificate** – HERS scale runs from 250 to 0 (0 = zero energy home)
- **Field Audit with data collection and diagnostics** – using audit protocols approved by the CEC including thermal mass, ventilation and infiltration, duct leakage and natural gas combustion safety
- **Energy consumption analysis** – including greenhouse gas emissions, energy consumption and costs
- **Existing energy efficiency features** – high level summary
- **Recommendations for energy efficiency improvement** – generated by CEC-approved modeling software providing cost effective measures with estimated costs and improvement to HERS score in the following areas:

building envelop, distribution systems and equipment tuning, appliances and lighting and HVAC and water heating

**OR**

**b. Basic Verified Retrofit Package Pathway**

A verified basic energy performance improvement verified with a blower door test and duct leakage test, that meets minimum standards for air sealing and attic insulation may also be accepted. This provision would allow income-qualified homeowners to achieve RECO compliance with subsidized weatherization services.

**2. Supplemental List of Prescriptive RECO Measures**

The Raters will also verify the following prescriptive measures:

- Furnace duct repair
- Toilets, showerheads and aerators
- Water piping insulation
- Door weather-stripping
- Fireplace closures
- Multi-unit only – High Efficiency Common area lighting

**3. RECO Raters**

In order to stimulate demand and job growth in the energy efficiency sector, the proposed amendment would rely on private sector individuals who have received training and certification as a Whole House Energy Rater (through the CEC HERS II program) to provide the RECO Rating or Basic Retrofit Verification and verification of prescriptive measures. Qualified RECO raters would be required to register with the City and attend a RECO Rater orientation.

Under the CEC's HERS II program there are two types of HERS raters: independent HERS II Raters who do HERS reports only and Building Performance Contractors who are licensed contractors authorized to provide HERS reports as well as make performance improvements and repairs. Building performance contractors are subject to verification and quality assurance protocols stipulated by the CEC. Either of these service providers may register to become RECO Raters.

**4. Triggering Events and Scope**

RECO alone will not achieve the 80% reduction goal in the residential building sector. It has limited reach and relies on incentive programs to achieve voluntary improvements. It is a critical component of a larger market transformation strategy that includes stimulating demand, leveraging incentives, and developing capacity in the energy efficiency industry. The RECO triggers at time of sale and major renovation are projected to affect approximately 500 housing units per year, or approximately 20% of the single family housing stock over the next 10 years. Programs are being developed at the local, regional, State and Federal level to provide rebates and financing for home performance improvements. Establishing a baseline of a home's

existing energy performance using the HERS II rating is a critical first step in measuring and encouraging targeted improvements. Rebates being offered by the City and PG&E will be contingent on improvements to HERS II scores. Compliance with the proposed RECO amendment will position property owners to take advantage of those and other incentive programs.

Additional triggers were considered by the TAG, such as date certain or time of lease. No changes to the events that trigger RECO are proposed at this time because of difficulties with compliance and enforcement. Point of sale and time of renovation are unique opportunities in which transactions are easily tracked by the City and barriers to entry are reduced.

#### **5. Process Improvements**

The amendment will allow for transfer of responsibility from seller to buyer and provide deferrals for hardships or pending construction work. A software tracking system will facilitate measurement and verification of outcomes, as well as give convenient access to the RECO status to improve customer service.

#### **6. Costs**

Current compliance costs for a single family home for the existing RECO range from \$170 to \$2,520. Total estimated costs of the proposed RECO revision range from \$800 to \$1,200 for a single family and \$100 to \$500 per unit for a multi-family building, with the unit cost decreasing as the number of units increases.

#### **7. Deferrals**

One year deferrals will be available for point of sale triggers to accommodate distressed sellers, bank-owned properties and other situations. An additional one year deferral will be available if remodeling work is planned on the property.

#### POSSIBLE FUTURE ACTIONS

The proposed timeline is set forth below.

|                 |   |
|-----------------|---|
| March 2010      | Report to Berkeley Energy Commission    |
| April 2010      | Ordinance to Berkeley Energy Commission |
| June 2010       | Ordinance Adoption by Council           |
| July - Aug 2010 | Rater registration and workshops        |
| July – Dec 2010 | Outreach and education                  |
| January 2011    | Enhanced RECO Required                  |

#### FISCAL IMPACTS OF POSSIBLE ACTION TAKEN

The RECO program is intended to be fully cost-recovering through fees. There is currently a \$20 filing fee paid by the property owner for RECO. That fee will be set to recover costs of administration of the amended ordinance.

CONTACT PERSON

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Attachment 1: Overview RECO Enhancements

Attachment 2: Sample Home Energy Rating Certificate

## Attachment 1 RECO Enhancement Summary

**Table 1. Summary of Proposed Enhancements**

|                                     | <b>Current RECO</b>   | <b>Enhanced RECO</b>   | <b>Rationale</b>   |
|-------------------------------------|---|--|--|
| <b>Requirements</b>                 | Prescriptive list   | Home Energy Audit and Rating plus Prescriptive List<br><br><b>OR</b><br>Basic Retrofit Package plus Prescriptive List  | Encourage deep emissions reductions<br>Based on building science<br>Verifiable outcomes<br>Consistent standards<br>Eligibility to leverage other resources   |
| <b>Triggering Event</b>             | Point of Sale<br>Substantial Remodel  | Point of Sale<br>Substantial Remodel   | Transactions with notification and reduced barriers to entry   |
| <b>Cost Range</b>                   | Total \$120-\$2,120<br>\$0 - \$2,000 Measures<br>\$100 Audit fee<br>\$20 Filing fee | Total \$700-\$1,600<br>\$0 - \$500 Measures<br>~\$100 Filing Fee (estimate)<br>\$600-\$1,000 HERS Rating and measure verification  | Test provides an asset rating, road map and baseline from which to measure deep energy savings and leverage efficiency incentives  |
| <b>RECO Rater/Auditor</b>           | Community Energy Services for sales & City Building Inspector for renovations       | Any Certified HERS Whole House Home Energy Rater   | Standards consistent with protocols set by California Energy Commission (CEC)  |
| <b>Deferrals</b>                    | 12 months upon buyer acceptance at point of sale                                    | 12 months upon buyer acceptance at point of sale and<br>Additional 12 months if repair work is planned   | Buyers often do some remodeling work in the first two years. The second deferral would integrate RECO with work that didn't occur within the first year.   |
| <b>RECO REQUIREMENTS</b>            |   |  |  |
| <b>Home Energy Audit and Rating</b> | Not currently required  | <ul style="list-style-type: none"> <li>• HERS Rating Certificate</li> <li>• Field Audit with data collection &amp; diagnostics</li> <li>• Energy consumption analysis</li> <li>• Existing energy efficiency features</li> <li>• Recommendations for improvements</li> <li>• Verification of Prescriptive List</li> </ul> | Performance tests provide asset rating and recommendations for energy improvements. They are required for Berkeley's Rebate Program, PACE financing and utility funded retrofit rebates (#1 thru 4 on the Voluntary Incentive Programs Table). |

|  | <b>Current RECO</b>                                       | <b>Enhanced RECO</b>  | <b>Rationale</b>  |
|--|---|---|---|
| <b>Optional Basic Retrofit Package (in lieu of Home Energy Audit and Rating)</b> | Not currently required                                    | <ul style="list-style-type: none"> <li>• Air sealing to State and Federal blower door standards</li> <li>• R-38 Attic insulation</li> <li>• Combustion safety test</li> <li>• Verification</li> </ul> | Basic Retrofit verified by blower door test provided by fully subsidized weatherization or utility funded programs (# 5 thru 7 on Voluntary Incentive Programs Table) |
| <b>Prescriptive list in addition to one of the options above:</b>                |   |   |   |
| <b>Attic insulation</b>  | Insulate to R-30 value or greater                         | No longer required  | Air leaks in attic must be sealed prior to installation in order for insulation to be effective   |
| <b>Water heater blankets</b>   | Insulation wrap of R-12 value                             | No longer required  | Not necessary for modern water heaters  |
| <b>Toilets</b>   | 1.6 gal/flush, or flow reduction devices                  | 1.6 gal/flush or High Efficiency Toilet (HET)1.3 gal/flush or   | Current code is 1.6 gal/flush. EBMUD HET rebates up to \$50   |
| <b>Showerheads</b>   | 3.0 GMP   | 2.5 GPM   | Current code<br>Free devices from EBMUD   |
| <b>Faucet aerators</b>   | 2.75 gal/min. flow rate kitchen & bathroom                | Kitchen-1.5 gal/min<br>Bathroom-1 gal/min   | Current code<br>Free devices from EBMUD   |
| <b>Hot &amp; Cold Water Piping</b>   | Insulate the first two feet from the heater to R-3 value  | Same  | Highly cost effective   |
| <b>Hot Water Piping in Re-circulating Heating Systems</b>                        | Insulate all exposed pipes to R-3 value                   | Same  | Highly cost effective   |
| <b>Door Weather-stripping</b>  | Permanently affix weather-stripping on exterior doors     | Permanently affix weather-stripping on all doors leading to unconditioned space   | Current code  |
| <b>Furnace duct work</b>   | Seal duct joints add insulation to R-3 value              | Same  | Current code  |
| <b>Fireplace chimneys</b>  | Must have dampers, doors or closures                      | Same  | Current code  |
| <b>Common area lighting (multi-unit buildings)</b>                               | Replace incandescent bulbs with compact fluorescent lamps | Replace incandescent bulbs with high efficiency lighting  | Allow for additional high efficiency lighting types   |

**Table 2. Voluntary Incentives Programs Table: Energy Efficiency Audits & Retrofits**

| Programs   | Incentive Estimates   | Date Available | Eligibility Standards  |
|--|---|----------------|--|
| 1. <b>Berkeley Energy Efficiency Block Grant (Federal Stimulus) Incentives</b>   |   | July 2010      | Improvements must be made from a baseline <b>Home Energy Audit and Rating</b>  |
| a. Single Family Rebates   | Average rebate \$200 for audit and approx. \$2,000 for retrofit                 |                |  |
| b. Multi-family Grant Program  | Based on competitive proposals  |                |  |
| 2. <b>Property Assessed Clean Energy (PACE) Financing</b> – Managed by Alameda County with Federal Stimulus funds                  | Property-based loan to qualifying property owners for comprehensive retrofit    | Summer 2010    |  |
| 3. <b>PG&amp;E Comprehensive Retrofit Package Rebate</b> – mandated by the CPUC funded by rate payers                              | Up to \$3,500 for single family property owners for comprehensive retrofit      | Summer 2010    |  |
| 4. <b>Home Star Program GOLD</b> – Proposed Federal program not yet funded by Congress   | Up to \$12,000 for comprehensive retrofits                                      | TBD            |  |
| 5. <b>Home Star Program SILVER</b> – Proposed Federal program not yet funded by Congress   | Up to \$4,000 for Basic Retrofit Package  | TBD            | <b>Basic Retrofit Package</b> <ul style="list-style-type: none"> <li>• Air sealing to State and Federal blower door test standards</li> <li>• R-38 attic insulation</li> <li>• Combustion safety test</li> </ul> |
| 6. <b>PG&amp;E Basic Retrofit Package Rebate</b> – mandated by the CPUC funded by rate payers                                      | Up to \$1,000 for single family property owner for Basic Retrofit verified work | Summer 2010    |  |
| 7. <b>Income-Qualified Weatherization Assistance Basic Retrofit Program</b> – fully subsidized by State funds and Federal Stimulus | Fully-subsidized Basic Retrofit for low to moderate income qualified residents  | Current        |  |
| 8. <b>Federal Energy Tax Credits</b>   | Up to \$1,500 tax credit for materials  | Current        | Energy Star equipment and materials  |

# Attachment 2 Sample Home Energy Rating Certificate

## California Home Energy Rating Certificate

