Introduction

A growing number of local governments in the Bay Area are considering adopting programs and policies to improve the energy efficiency of existing housing stock. Local governments have an array of policy options available, from promoting voluntary programs to requiring energy disclosure or upgrades. While commercial and residential energy requirements can be implemented simultaneously, this white paper contains guidance relevant only to single family homes.

BayREN seeks to build the capacity of local jurisdictions to evaluate, adopt, and implement residential energy conservation policies. The strategy is to develop a framework for regional consistency, while maintaining flexibility for cities to tailor programs to meet their customized local needs.

This regional approach will:

- create a consistent playing field for homeowners, potential home buyers, construction professionals, and the real estate community
- reduce administrative burdens and costs for cities
- result in more cost-effective GHG reductions than a city-by-city approach

The Residential Sector

In California, improving the energy efficiency of existing residential buildings is an urgent priority for state, regional and local government agencies seeking to meet goals for deep carbon emissions reductions. Making significant improvements to the performance of California’s nine million single-family homes requires coordinated, sustained and multifaceted interventions to motivate investments in energy efficiency.

- Homes in the United States consume more than 20% of our nation’s energy and more than half of the energy used in the buildings sector.
- In California, the residential sector is responsible for producing 18% of total greenhouse gas emissions.
- More than two-thirds of California’s residential buildings were built before 1982 and therefore predated the energy performance requirements from the CEC.
- The number of existing homes sold each year is triple the number of new homes that are built. By improving the existing building stock, GHG emissions can be greatly reduced in a building sector that would otherwise remain relatively stagnant.
• The California Public Utilities Commission Long Term Energy Strategic Plan includes a goal to reduce energy consumption in existing homes by 20% by 2015 and 40% by 2020.

Multiple Benefits

Increasing home energy efficiency has multiple non-energy benefits including improved durability, occupant comfort and indoor air quality, lower utility bills and the creation of green jobs.

Economic benefits:
• annual energy and cost savings
• job creation
• increased property value

Occupant benefits:
• improved comfort
• indoor air quality
• fire/combustion safety

Environmental benefits:
• reduction in GHG emissions and other air pollutants associated with the generation of energy
• water conservation
• reduction in reliance on fossil fuels

Residential Energy Conservation Ordinance (RECO)

In mapping the State’s roadmap to reducing residential energy use, the California Energy Commission and California Public Utilities Commission have long promoted the adoption of RECOs by local governments. RECOs typically mandate that a home meet certain energy (and often water) efficiency requirements, usually at time or sale or major remodel, and establish a process for verifying that such standards have been satisfied. However, this approach has proven very difficult for local governments to adopt and implement. Obstacles include the expense of local government administration and enforcement, political opposition, and the high cost of compliance by homeowners. The cost of meaningful energy improvements varies broadly, exacerbating challenges around implementation and equity.

Many older RECOs were prescriptive in nature, and emphasized installation of a set of measures for every home. There are several problems with compelling a list of minimum energy saving measures.
Prescriptive measures:

- Lag behind the current Title 24 Energy Code
- Become outdated given advances in technology and building science
- Miss opportunities for tailored options, rather than “one size fits all” requirements
- Can be cost-prohibitive and not deliver the maximum energy savings return on investment
- Are not necessarily aligned with rate-payer funded incentive programs

For these reasons, there has been a shift away from prescriptive checklists toward a more integrated approach that better aligns with current performance-based incentive programs. Evolving energy efficiency technologies and a growing focus on whole-house integrated systems to achieve optimal energy reductions has increasingly resulted in performance-based energy improvements. This strategy emphasizes customized, comprehensive, quantifiable measures that foster the greatest energy improvement outcomes for a particular home.

However, mandates to improve home energy performance come with significant compliance cost – estimated at $12,000 on the high end for energy improvements for poor performing, high opportunity single family homes. Moreover, the systems to track, verify, and enforce program compliance have proved challenging and costly to program administrators.

If improvements are required, a jurisdiction should consider:

- maximum threshold for cost to homeowner
- minimum threshold for energy savings
- average value and age of housing stock
- provisions for low-income/hardship/foreclosure
- availability of rebates/financing to offset cost to homeowner
- resources for enforcement and evaluation

**Residential Energy Assessment and Disclosure (READ)**

Given the difficulties in adopting, implementing, and enforcing traditional RECOs, an alternative approach is emerging to address home energy efficiency: Residential Energy Assessment and Disclosure (READ). Energy disclosure is a market transformation tool that makes building energy information more transparent to owners and prospective renters or buyers. It offers the potential to accelerate energy efficiency by providing a compelling action plan that leverages incentives and non-energy benefits to owners while creating transparency in the marketplace to increase the value of efficiency. Energy disclosure has been used more commonly in the commercial building sector, but it is beginning to be used in the residential sector.
Residential Energy Assessment and Disclosure (READ) policies:

- Provide building-specific recommendations to maximize efficiency, health, safety & comfort, reduce energy costs, and increase property values.
- Teach owners how to access valuable financing and incentive opportunities.
- Catalyze property owners to invest in energy-saving improvements, and leverage their investments in the marketplace.
- Allow buyers and renters to take energy efficiency into account when making housing decisions, and enhances consumer understanding about the costs associated with operating a home.
- Increase transparency in the marketplace regarding the energy performance of residential buildings, and stimulate demand for and supply of energy-efficient homes.

An analysis of fourteen READ programs presented at the 2016 American Council for an Energy-Efficient Economy (ACEEE) Summer Study on Energy Efficiency in Buildings concluded with several key findings:

- Energy ratings do not influence home buying decisions (in terms of which property to purchase).
- Ratings and labels provide information that encourages homeowners to upgrade the energy performance of their homes during post-purchase renovations. 12-37% of home buyers act on recommendations.
- READ programs play a key role in market transformation by providing an inventory of energy efficiency features and allowing the market to value energy efficient homes.
- There is a strong correlation between higher-rated houses and increased market value.

Types of Energy Disclosure

There are two main types of energy disclosure policies: Operational ratings and Asset ratings.

- Operational ratings report on energy consumption during a building’s operation as measured by energy data, such as utility bills. Metered energy use data can be analyzed to assess how a building’s energy consumption compares to similar buildings. Actual historic energy use is disclosed, and sometimes software is used to calculate a rating based on past usage to compare similar buildings. Portfolio Manager is the most commonly used commercial building benchmarking tool, but there is no widely established equivalent platform for the residential sector. While utility bill information is readily accessible and may be helpful in comparing the same occupants’ energy use over time, utility use can change dramatically based on occupant behaviors. Therefore, operational ratings are not an objective evaluation of the home’s structural characteristics.
Energy Cost Disclosure Case Study: City of Chicago

Consumer demand for high-performing homes is increasing, yet energy efficiency data is still largely invisible in the residential market. Recently some regions have begun to include energy information in Multiple Listing Services making it more transparent during real estate transactions.

In 2013, the City of Chicago became the first municipality in the country to disclose residential energy costs on home sale listings. When a home is listed for sale on the MLS, realtors can access natural gas and electricity costs for the property from an online, third-party database. The listings display annual and average monthly energy costs for the previous 12 months. The disclosure happens during the real estate selection process so prospective buyers and renters can consider energy cost information.

An analysis of the impact of Chicago’s energy cost disclosure policy on single family homes sales transactions found that:

1) Homes that disclosed energy costs sold at a higher percentage of their original list price than their counterparts.
2) Homes that disclosed energy costs spent fewer days on the market than their counterparts that did not disclose costs, even when they had relatively high energy use.

Engagement and collaboration among key stakeholders including the real estate community, utilities, and local governments have been critical to the effectiveness of Chicago’s disclosure policy. Disclosing energy costs facilitates more informed decisions by all involved in the real estate transaction and highlights the value of energy efficiency in the marketplace.

- Asset ratings are designed to indicate a building’s energy performance as built, based on its physical characteristics, equipment and systems. By definition, an asset rating does not reflect the behavior of building occupants. An asset rating seeks to evaluate a home to allow it to be compared to others based on differences in its fixed characteristics, while holding occupant-determined factors and behaviors constant.
Asset Rating Systems

Building labeling and rating systems allow homeowners, home buyers, renters, lenders and other actors in the real estate transaction chain to better understand how a home with energy efficiency and other green features compares to non-upgraded homes. By evaluating physical characteristics and not attempting to capture operational issues related to the lifestyle and behaviors of the residents, asset ratings are valuable to use during a sale transaction where the occupancy is changing.

Two California based asset ratings for existing homes are:

- HERS II, the whole-house version of the Home Energy Rating System, which scores a home’s energy use based on a standardized scale called the HERS index, and
- GreenPoint Rated for Existing Homes, which scores a home’s environmental impacts in five categories: community, energy, indoor air quality/health, resources and water.

However, both HERS II and the Green Point Rated labels are complex, time consuming, and expensive, making them problematic for local government to mandate for single family homes.

A new alternative asset rating, the DOE’s Home Energy Score, is now being used in utility and local programs throughout the country.

- Home Energy Score (HES) is a rating system that uses a simple metric similar to a vehicle’s mile-per-gallon rating. Homes are scored on a scale from 1 to 10, with 10 representing a highly efficient home, and 1 representing a low efficiency home, relative to other homes in the same climate zone. The rating reflects the home’s expected energy performance based on its building energy efficiency characteristics.

- Home Energy Score offers ease of deployment, and a standardized way to compare a home’s efficiency (and long-term energy costs) to comparable homes of similar size within the same climate zone. The HES assessment process is simpler, less expensive, and less time consuming than other rating systems. It takes approximately 1.5 hours, and in some cases a score can be generated onsite. The cost ranges from $150-$250. This asset rating can be completed as a stand-alone service in a single visit, or as an add-on to a home inspection, remodeling, or energy upgrade project.
READ Case Study: Berkeley Building Energy Saving Ordinance

The City of Berkeley has adopted the first Residential Energy Assessment and Disclosure (READ) policy in California. The 2015 Building Energy Saving Ordinance (BESO) eliminates the former RECO and CECO energy and water efficiency requirements and replaces them with a requirement for property owners to conduct and publicly disclose an assessment of a building’s energy efficiency.

The ordinance mandates that single family homes that undergo a sales transaction must obtain a Home Energy Score, or equivalent rating. The City did extensive outreach to the real estate community prior to adopting the policy. Based on their input, the assessment can be deferred to the homebuyer to complete within one year of the sale date.

The assessment serves as a basis for actionable recommendations to the homeowner that identify cost effective opportunities, rebates and incentives, and health, comfort, and safety benefits of energy improvements. Most home buyers undertake improvements within the first two years of occupying a new home, which is an excellent opportunity to incorporate energy upgrades.

By adopting Home Energy Score as the requirement for BESO, Berkeley sought to leverage a broader workforce rather than hiring a contractor directly to handle compliance. BESO provides several exemption provisions, including for highly efficient buildings, distressed sales, and financial hardship.

Trigger Events

The most fundamental decision for any local jurisdiction considering an energy conservation ordinance is the trigger event for compliance. The most common triggers are:

- Time of building sale
- Time of major remodeling permit
- Date certain
- Time of rental housing inspection/permit
Because a home sale transaction does not require local government approval, the burden of enforcement of an energy efficiency ordinance triggered by time-of-sale would fall heavily on the private sector. Time-of-sale triggers have spurred political opposition from realtors because they may become default enforcers of the ordinance among their client base. This can cause delays in an already complex sales transaction.

In contrast major remodels require a building permit, so there is an existing process for engagement with local government. An energy assessment could be required as part of the building permit application. While major renovation is subject to energy efficiency standards under CALGreen, a whole house energy assessment could reveal other improvement opportunities. Using a remodeling trigger could be an effective approach because an energy assessment would add only a small marginal cost to the homeowner, would not impose an administrative burden on the jurisdiction to implement and enforce, and is less likely to engender strong political resistance.

Another mechanism for activating a residential energy ordinance is to establish a deadline by which all covered buildings must comply, an approach known as a date certain trigger. This would potentially capture a greater proportion of buildings, since only a fraction of homes will undergo a sales transaction or major remodel. However, this option can be logistically challenging because there is no existing administrative infrastructure for a jurisdiction to reach all homeowners, and therefore monitoring and enforcement would be difficult. Such an approach may also be politically unpopular, and residents might delay obtaining energy audits, especially if assessments were coupled with mandatory upgrades.

A significant opportunity for improving energy efficiency may exist in the rental market. Rental housing is a segment of the residential sector that local government is engaged with through regulations and licensing requirements. Jurisdictions could choose to leverage this existing infrastructure to require energy assessments or upgrades for rental properties. When considering a rental housing policy, jurisdictions should consider the impact on housing affordability if landlords pass on the cost of required upgrades to tenants.
Rental RECO Case Study: Boulder SmartRegs

The Boulder City Council adopted a SmartRegs ordinance in 2010. SmartRegs require all rental housing, about half of Boulder’s housing stock, to meet a basic energy efficiency standard by January 2019. In Boulder, all rental properties are required to maintain a valid rental license. If a rental does not pass a SmartRegs inspection and achieve a compliance designation by 12/31/2018, the rental license will expire and the property owner will be unable to receive or renew a rental license until compliance with the minimum energy standards is met.

Property owners can comply with the energy efficiency requirements by following either a performance or prescriptive path.

1. The performance path requires a Home Energy Rating System (HERS) score of 120. The HERS index is used for the verification of energy performance. A HERS score must be performed by an accredited rater.

2. The prescriptive path entails a checklist designed as an alternative to the performance path. To meet the requirements, each unit must achieve 100 points on the energy checklist, in addition to specific mandatory water conservation measures.

The energy inspection costs approximately $150. In the event that a rental unit fails the inspection, specific energy upgrade improvements are recommended. A free EnergySmart Advisor service is offered to assist with evaluating upgrade options. By recommending the most cost-effective measures with proven energy savings, the program aims to ensure that any rent increase (that may be passed on to recoup owner investments in efficiency) is balanced by utility cost savings to the tenant.

As of September 2015, more 11,000 licensed rental units have been evaluated of which 8,500 are compliant with the required energy efficiency standard. Improving energy performance in existing rental housing is an effective strategy to reduce Boulder’s greenhouse gas emissions and meet community climate objectives.
Home Energy Score in California

In California, there is growing interest in using the DOE’s Home Energy Score. The Center for Sustainable Energy ran a Home Energy Score pilot program in San Diego with home inspectors. In the San Francisco Bay Area, StopWaste is a regional partner for Qualified Assessors that provide a home energy assessment using the Home Energy Scoring Tool. The state’s Investor Owned Utilities (IOUs) are also looking to incorporate Home Energy Score into their existing rebate programs. In addition, the Building Performance Institute (BPI) and Association of Home Inspectors (ASHI) are national partners that can offer the Score to their members in California.

Home Energy Score is a simple and low-cost way to increase awareness and spur investment in home energy efficiency. A Home Energy Score report provides not only the Score, but customized recommendations, associated energy and cost saving estimates, and referrals to rebate programs, incentives, and financing tools. The HES report becomes a critical link between information and action. Linking the rating to supporting resources encourages homeowners to identify opportunities, make the improvements that will result in increased efficiency and comfort, and leverage investment in home energy upgrades in the marketplace.

BayREN, in collaboration with StopWaste, is providing support to local governments that are interested in promoting Home Energy Score in their jurisdictions. BayREN has enabled the recruitment and training of HES qualified assessors, developed HES program protocols, and created a customized HES Energy Improvement Recommendations form that aligns with the Home Upgrade program. Home Upgrade Advisors follow up with homeowners of low scoring homes with free independent guidance on prioritizing recommendations and accessing financing opportunities.

In the City of Berkeley, BayREN has supported technical and workforce development for the new Building Energy Saving Ordinance (BESO) that requires single family homes to obtain a Home Energy Score at time of sale. In the rest of the Bay Area, BayREN offers an incentive for Home Energy Score. To encourage voluntary participation in Home Energy Score, BayREN supports contractor-led marketing and offers mentoring to help Assessors gain experience in the field. HES Assessors are eligible for rebates of $300 for completing their first assessment and $150 for each subsequent one. Contractors who complete an Advanced Home Upgrade Assessment and a Home Energy Score may apply for up to $400 in rebates.
Positive Drivers

For jurisdictions that are not interested in pursuing mandatory policies, there are positive drivers that can incentivize building owners to assess building efficiency and install improvements. Examples include local tax credits tied to improvements or ratings, mortgage incentives for installing efficiency measures, rebates, and innovative financing tools. (See Appendix A for a comprehensive list.)

Colorado Case Study: Energy Saving Mortgage Incentive

The Colorado Energy Office works with diverse stakeholders to increase the energy efficiency of Colorado homes. It is leading efforts to integrate Home Energy Score into a variety of programs, with a goal of including it in the state’s Multiple Listing Services. This would allow prospective buyers and others to make energy-informed decisions at point of sale.

The state has tied Home Energy Score to its Energy Saving Mortgage Incentive, which provides homeowners up to $3000 if they improve their score by making energy efficiency upgrades ($750 for every point increase on the HEScore scale, up to four points). A maximum of $3000 can be credited towards the homeowner’s principal mortgage amount.

Colorado has been a leader in its engagement with the real estate community, coordinating closely with MLSs to enable sharing of energy information, integrating green fields that list Scores, sponsoring appraisal valuation studies, and educating real estate agents on the value of energy efficiency.

Due to API integration, Home Energy Score can be offered with all utility sponsored energy efficiency audits throughout Colorado. The state also coordinates with home inspectors to offer the Score at point of sale. Inspectors then connect homebuyers with an independent energy advisor to follow up with customized recommendations for energy improvements.
Addressing the upfront costs of energy efficiency upgrades to homeowners is one of the most significant ways in which policymakers can drive residential energy efficiency. Although homeowners can expect to see bill savings from energy upgrades, these savings are realized over long periods of time. This upfront cost represents a significant financial investment and a primary deterrent for many homeowners who might otherwise be interested in upgrading their homes.

Policymakers have two broad strategies for helping homeowners manage these upfront costs:

- Incentives, including tax credits and/or rebates for energy efficiency measures.
- Financing, including traditional consumer loans as well as more innovative forms of financing and repayment, such as on-bill programs and Property Assessed Clean Energy (PACE) programs.

**Emerging Market Trends**

Private-sector initiatives that increase the transparency of building energy information are also emerging. One example of a market-based approach to scaling home energy efficiency is UtilityScore. It has partnered with Zillow Group and other real estate listing sites across the country to help homebuyers and renters compare utility and energy costs of single-family homes. Scoring and utility cost estimates are embedded in real estate listings and are based on local utility rates, home size and age, and the regional climate. Homes are scored on a 1-100 scale, with 100 representing very low utility bills. UtilityScore also provides recommendations for home efficiency projects to reduce energy and water bills, as well as referrals to financing options.

Home buyer-focused portals (such as Realtor.com, Zillow.com, and Trulia.com) are beginning to include annual energy cost and ratings. This is an emerging trend that will have a significant impact as this information becomes more widely and freely distributed, enabling the market to value energy efficient homes. As such tools become more fine-tuned, there may be less need for local governments to adopt residential energy disclosure policies.
### Appendix A

## Incentive Options for Residential Asset Ratings

<table>
<thead>
<tr>
<th>Incentive Category</th>
<th>Type</th>
<th>Description</th>
<th>Potential Implementers</th>
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<tbody>
<tr>
<td><strong>Rebates</strong></td>
<td>Subsidized score</td>
<td>A simple rebate could subsidize or cover the cost of obtaining an asset rating.</td>
<td>Local governments, IOUs, others</td>
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|                    | Integration into existing rebate programs | Under Energy Upgrade California, rebates available for home improvements already use trained contractors and require a test-out, as well as quality assurance protocols. An asset rating can be bundled into these programs by:  
  - Training participating contractors to become asset rating providers  
  - Requiring or incentivizing asset ratings to be generated during test-out  
  - Streamlining the test-out and asset rating requirements to match as closely as possible and, ideally, allow software integration  
  - Coordinating QA programs between the rebate program and asset rating program | Program implementers |
|                    | Rebates for improvement | Asset ratings can support a deemed saving rebate for home improvement. For example, a home that moves from a Home Energy Score of 4 up to 7 might receive a rebate of $2,000. | Local governments, program implementers |
| **Tax Credits**    | Local property tax credit | Could be a small credit (e.g., $200–$500) for obtaining an asset rating or a larger amount for an energy improvement. | Local governments |
|                    | State income tax credit | Could be provided for an improvement in asset rating score or a reduction in Btus. This type of tax credit is likely to appeal to real estate professionals and their clients because it would provide a clear benefit for obtaining an asset rating even for underperforming homes. | State government |
| **Mortgage Incentives** | Incentive for improvements | Working through mortgage lenders, a jurisdiction can promote energy efficacy by providing a matching loan benefit to homeowners based on tiered rebate scale. | Governments partnered with mortgage lenders |