



# Increasing Energy Efficiency in Existing Multifamily Buildings

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## An Overview of Challenges, Opportunities, and Policy Tools

Prepared by the Cities of Berkeley, Oakland, and Emeryville  
October 2011



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# Executive Summary

This report is designed primarily for local government policy makers. It is one component of a joint project between the cities of Berkeley, Oakland, and Emeryville aimed at developing effective strategies to increase energy efficiency in our communities' multifamily properties, including apartment buildings, cooperatives, and condos. The project, called *Building Energy Efficiency Solutions* (BEES), seeks to develop local solutions to the formidable barriers tenants and building owners face when trying to lower their energy and water consumption and reduce their utility bills. Solutions to address these barriers must not only be designed to increase energy efficiency, but must also be consistent with our communities' existing commitments to diversity and to providing healthy, affordable housing for residents.

Common barriers to increasing energy efficiency in existing multifamily buildings include:

- *Misaligned incentives between property owner and tenant.* When units are individually metered, the building owner has no direct financial incentive to make investments in in-unit energy upgrades. When a building is master-metered, tenants have no direct financial incentive to conserve energy.
- *High initial costs.* Many property owners do not have access to the upfront capital needed to invest in energy upgrades.
- *High transaction costs.* Property owners often feel overwhelmed by the process of identifying relevant upgrade opportunities and matching incentive programs.
- *Uncertain return on investment.* A range of variables affect the actual energy and money savings realized from a property owner's investment in energy efficiency. Many property owners lack access to technical assistance services that can help them to identify cost effective energy efficiency strategies and to calculate the payback.
- *Limited knowledge and motivation.* Property owners and tenants often have limited knowledge of the potential benefits and process of making energy improvements, and limited motivation for engaging in this work.

While government and utility efforts to reduce energy use in existing multifamily buildings remain relatively limited compared to resources aimed at the single-family residential and commercial sectors, there are a growing number of government agencies and utilities across the country that are leveraging ratepayer dollars, one-time stimulus funds, and other resources with private sector investment to remove barriers to energy efficiency in existing multifamily buildings. The ultimate goal is sustained transformation in how the market functions, so that energy efficiency is business-as-usual amongst multifamily property owners, property managers, and tenants.

A fundamental takeaway from interviews with policy makers and multifamily property owners and managers that informed the study for this report is that achieving market transformation requires policy mechanisms that enable property owners to realize an economic return on investments in energy efficiency. Put

another way, unless energy-related capital investments result in increased revenues or increased property value/equity, there is limited economic rationale for a multifamily building owner to make such an investment. Increased revenues can come in several forms, including:

- Increased building sale valuation
- Cost savings due to reduced energy use
- Less tenant turnover and the associated transaction costs and interruptions in rent payments
- Higher rents

This report outlines a range of policy mechanisms local and state governments and utilities are employing to achieve market transformation in existing multifamily buildings:

- *Mandatory improvement and disclosure requirements* designed to capture a baseline level of energy savings across a community's existing multifamily building stock and to make energy efficiency an explicit component of a building or unit's value
- *Rebates* to lower the cost of energy upgrades and to help property owners go beyond the minimum
- *Financing programs* to minimize the upfront cost of energy upgrades and to amortize costs over time
- *Tax-based incentives* to encourage private investment in energy efficiency
- *Strategies that help calculate benefits and align incentives for the affordable multifamily housing sector*, with potential relevance to rent controlled housing
- *Tools for removing the split incentive barrier* by increasing the capacity of property owners to make energy improvements and recoup their costs in a manner that enables appropriate, equitable sharing of costs and benefits between owners and tenants
- *Streamlined technical assistance* designed to minimize property owners' transaction costs associated with identifying upgrade opportunities and matching incentives and financing
- *Workforce development* tailored to the existing multifamily building context
- *Marketing, outreach, and education programs* used to connect multifamily stakeholders with the services available to them and to encourage the behavior changes necessary to achieve increased energy efficiency

The intent of this report is to identify these policy mechanisms and to derive lessons learned that may inform multifamily energy efficiency policy design in the cities of Berkeley, Oakland, Emeryville, and beyond. These lessons will be considered in developing policy recommendations in later phases of the BEES project.

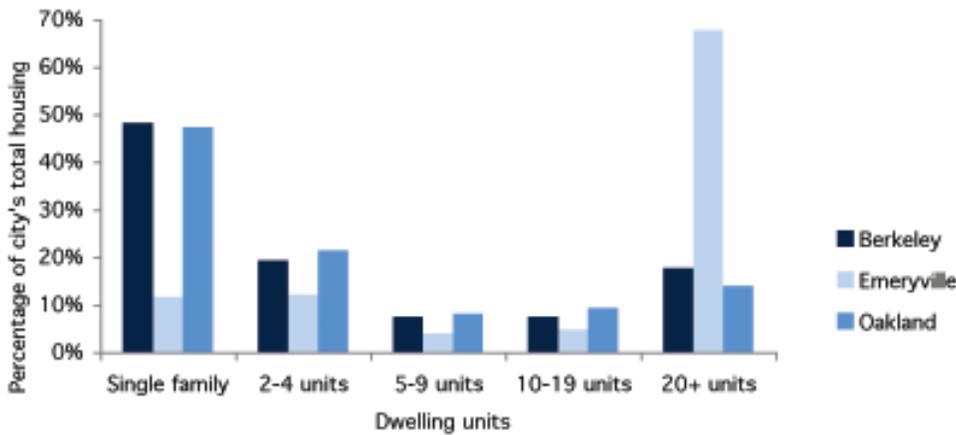
The two-year BEES project is funded by California utility customers and administered by Pacific Gas and Electric Company (PG&E) under the auspices of the California Public Utilities Commission.

# Section 1: Introduction

Climate change represents a present and profound challenge for cities. Rising temperatures affect the availability of natural resources on which our communities depend, result in intensified heat waves, exacerbate local air pollution, and increase the incidence of large wildfires.<sup>1</sup> These and other consequences of our changing climate, along with other profound challenges such as rising energy and water costs and a sputtering global economy, demand urgent action.

An important but often overlooked arena for addressing each of these challenges is the existing multifamily building sector, which accounts for approximately 25% of U.S. households, one-third of California households, and collectively over 50% of households in the cities of Berkeley, Oakland, and Emeryville.<sup>2</sup> Existing multifamily housing represents approximately 9-15% of community-wide greenhouse gas emissions in these three communities.<sup>3</sup>

Figure 1:  
Housing Stock By  
Number Of Dwelling  
Units



Source: U.S. Census Bureau, 2009 American Community Survey

According to national, state-level and local studies the potential for increased energy savings and reduced greenhouse gas emissions in existing multifamily buildings is vast and largely untapped.<sup>4</sup> For example, a report on multifamily energy efficiency potential prepared by the Benningfield Group estimates that the U.S. could achieve electricity savings equivalent to the annual output of 20 coal plants and natural gas savings equivalent to the residential, commercial and industrial natural gas usage in California, Oregon, and Washington.<sup>5</sup> Capturing energy savings in this sector not only helps address the global threat of climate change, but also results in local benefits, such as increased comfort and energy affordability for tenants, job opportunities for energy service providers, and lower operating costs and attractive returns on investment for building owners.

<sup>1</sup> See <http://cal-adapt.org/> for localized data on the impacts of climate change on California cities.

<sup>2</sup> U.S. Census Bureau, 2009 American Community Survey.

<sup>3</sup> Cities of Berkeley, Oakland and Emeryville. "BEES multifamily market characterization study: Oakland, Berkeley, & Emeryville." Sep. 2011.

<sup>4</sup> See the following reports:

Benningfield Group, Inc. "U.S. multifamily energy efficiency potential by 2020" The Energy Foundation, 27 Oct. 2009; Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee.

"Improving California's multifamily buildings: Opportunities and recommendations for green retrofit & rehab programs." 8 Apr. 2011; Cities of Berkeley, Oakland and Emeryville.

"BEES Multifamily market characterization study: Oakland, Berkeley, & Emeryville." Sep. 2011.

<sup>5</sup> Estimated reduction equivalent does not include natural gas usage at power plants.

Despite the significant potential for energy savings and the associated benefits for communities, multiple, persistent barriers exist that slow the adoption of energy upgrades in existing multifamily buildings. As is discussed in greater detail later, barriers include:

- *Misaligned incentives between property owner and tenant.* When units are individually metered, the building owner has no direct financial incentive to make investments in in-unit energy upgrades. When a building is master-metered, tenants have no direct financial incentive to conserve energy.
- *High initial costs.* Many property owners do not have access to the upfront capital needed to invest in energy upgrades.
- *High transaction costs.* Property owners often feel overwhelmed by the process of identifying relevant upgrade opportunities and matching incentive programs.
- *Uncertain return on investment.* A range of variables affect the actual energy and money savings realized from a property owner's investment in energy efficiency. Many property owners lack access to technical assistance services that can help them to identify cost effective energy efficiency strategies and to calculate the payback.
- *Limited knowledge motivation.* Property owners and tenants often have limited knowledge of the potential benefits and process of making energy improvements, and limited motivation for engaging in this work.

It is perhaps in part because of these and other formidable barriers that, when compared to the single-family housing sector, there is historically a dearth of government and utility policies and programs focused specifically on increasing energy efficiency in existing multifamily buildings. And given the fundamental differences between the single-family and multifamily sectors, simply applying single-family programs to multifamily buildings will not achieve the sector's energy-saving potential. As stated in a 2011 report by the Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee (MF HERCC),<sup>6</sup> "The opportunities and challenges unique to the multifamily sector can only be met if there are well-designed and well-coordinated programs and policies that address this sector's specific infrastructure."<sup>7</sup>

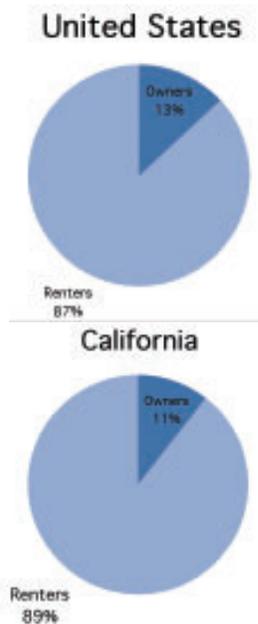
Indeed, even within the multifamily sector there is significant variability in building types, configurations, and ownership structures. Multifamily buildings include low-rise buildings, high-rise mixed use buildings, and small multifamily properties

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<sup>6</sup> Convened by the U.S. EPA Region 9, the Home Energy Retrofit Coordinating Committee is a collaborative of utilities, government agencies, building experts and others working together to develop consistent recommendations and standards for statewide home energy retrofit programs. The Multifamily Subcommittee (MF HERCC) formed to address the unique needs of the multifamily and affordable housing sectors. The MF HERCC is chaired by StopWaste.org.

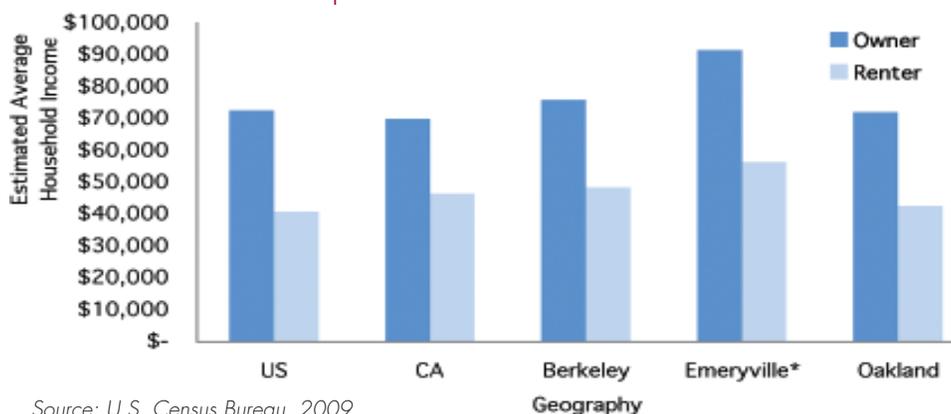
<sup>7</sup> Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee. "Improving California's multifamily buildings: Opportunities and recommendations for green retrofit & rehab programs." 8 Apr. 2011.

Figure 2:  
Multifamily  
occupancy by  
ownership



Source: U.S. Census Bureau, 2009  
American Community Survey

Figure 3:  
Average household  
income by  
geography and  
ownership



Source: U.S. Census Bureau, 2009  
American Community Survey

converted from a single-family home to apartments, among others. Each of these building types, plus factors like whether the units are affordable vs. market rate, owned vs. rented, or individually vs. master-metered for utilities affect the potential for energy efficiency improvements and the strategies and policies through which that potential would be achieved. For policy makers and program providers, understanding these factors and their potential impact on energy consumption is important because it enables policy and program design that focuses on the most strategic energy-saving opportunities and, therefore, the best use of program resources.

For example, programs targeting multifamily buildings can gain economies of scale by serving multiple units in one transaction. Further, because of their shared walls, units in multifamily buildings have less exposure to weather and, hence, less heating and cooling is lost to the exterior. This factor affects energy usage patterns as well as energy-saving opportunities. Less energy savings will come from building envelope and heating, ventilation and air conditioning (HVAC) efficiency measures and more will come from increased efficiency in water heating and appliances. Particularly in areas such as the northern California coast where air conditioning is not widespread, and in scenarios where central water heating systems are present, the largest opportunity for saving energy in multifamily buildings is increasing the efficiency of the water heating system.<sup>8</sup> Improving the efficiency of the boiler or water heater, insulating the hot water distribution system, retrofitting water fixtures, and adjusting controls represent compelling, cost-effective energy-saving opportunities.

Another critical factor in policy and program design is the impact on decision-making of whether a given unit is owner vs. renter-occupied. Close to 90% of single-family homes nationwide are owner-occupied, while nearly 90% of multifamily households are renters (see Figure 2).<sup>9</sup>

Generally, renters have significantly lower incomes than homeowners. In fact, across the U.S. renter household incomes are on average roughly half those of owner households (see Figure 3).<sup>10</sup> Nearly one-fourth of renter households experience severe housing cost burdens (more than 50% of pre-tax household income is spent on housing costs, i.e., rent and utilities), compared with approximately one in eight homeowners.<sup>11</sup>

<sup>8</sup> Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee. "Improving California's multifamily buildings: Opportunities and recommendations for green retrofit & rehab programs." 8 Apr. 2011.

<sup>9</sup> U.S. Census Bureau, 2009 American Community Survey.

<sup>10</sup> Ibid.

<sup>11</sup> Joint Center for Housing Studies of Harvard University. "The state of the nation's housing 2010." 14 Jun. 2010.

At the same time, renters have considerably less control over the energy efficiency of their homes. In the most common tenant/landlord scenario, where tenants are paying their own energy bills, the building owner has no direct economic incentive to invest in making the unit more energy efficient because he or she will not realize an adequate return on that investment. In this scenario, even if energy prices increase, a landlord may continue to supply the tenant with lower cost, inefficient appliances. Likewise, the tenant has little incentive and often little means to invest in a unit that he or she does not own.

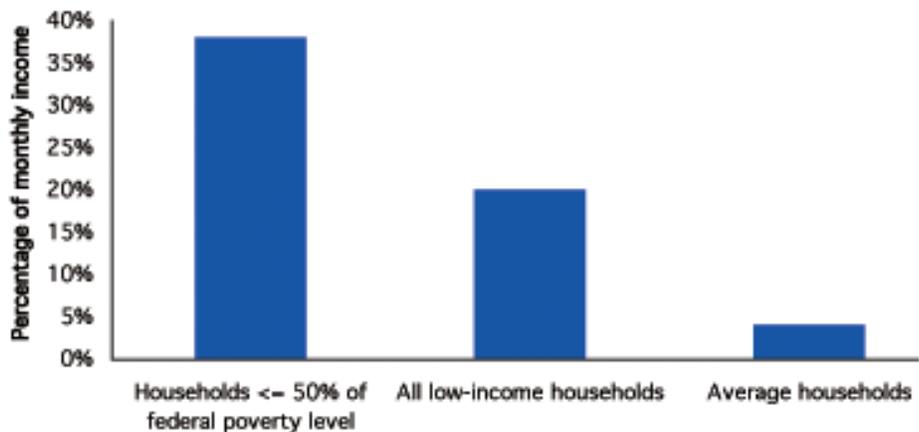
This “split incentive” between building owner and tenant is, at least in part, the reason why rented units often realize less of their energy-saving potential. Research points to evidence that renters are significantly less likely to have energy efficient appliances and that rental units are less well-insulated.<sup>12</sup>

The fact that renters are less able to affect the energy efficiency of their homes is troubling given that low-income households spend more of their monthly income on energy, compared to the average U.S. household. As Figure 4 illustrates, while energy expenditures as a percent of monthly income is a relatively low four percent for the average U.S. household, this expenditure increases to 20% for households at the federal policy level and to nearly 40% for households at or below 50% of the federal poverty level (see Figure 4).

For policy makers, understanding and addressing this disparity is not only an opportunity to improve the multifamily building stock, but also an opportunity to relieve some of the pressure rising energy costs place on individuals and families in our communities.

Another factor of particular relevance to policymakers in a small group of U.S. cities, including the cities of Berkeley and Oakland, is rent control. Rent control is a policy designed to maintain affordable housing and preserve community diversity by stabilizing rents. It does so by limiting the amount that landlords can increase the rent to an allowable annual adjustment rate. The annual adjustment rate is customarily a formula based on the consumer price index (CPI). Most forms of rent control, including in Berkeley and Oakland, are vacancy decontrol, meaning that rents are not regulated when a tenant leaves. For example, the annual allowable rent increase for Oakland in 2010 was 2.7%. A tenant of a rent controlled unit therefore would only have a maximum annual increase of 2.7% for the duration of their tenancy in that

Figure 4:  
Energy expenditure  
as a proportion of  
monthly income



Source: Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee. “Improving California’s Multifamily Buildings: Opportunities and Recommendations for Green Retrofit & Rehab Programs.” 8 Apr. 2011

<sup>12</sup> Davis, Lucas W. “Evaluating the slow adoption of energy efficient investments: Are renters less likely to have energy efficient appliances?” Jun. 2010.

unit. However, once a tenant vacates an apartment, the landlord is then able to adjust the rent to market rate. The new market rate rent is then re-controlled per the annual allowable adjustment until the unit turns over once again. In the relatively few U.S. cities where some form of rent control exists, energy policy makers will need to have a dialogue with rent control policy experts and local property owners of rent controlled units to better understand the effect rent control has on property owners' investment in building upgrades.

## Purpose and Background of this Report

Figure 5:  
Greenhouse gas  
emission  
reduction targets

The State of California and local governments all across the state have set aggressive targets for reducing emissions that cause global warming (see Figure 5).

To say that achieving the targeted reductions in greenhouse gas (GHG) emissions will be difficult is an understatement. It requires an unprecedented all-hands-on-deck

approach that includes examining the GHG reduction potential, and options for achieving that potential, in every sector of society. The purpose of this report is to highlight and derive lessons from a range of existing policies and programs throughout the U.S. and

California Achieve 1990 GHG Levels by 2020		
Berkeley	Oakland	Emeryville
33% below 2000 levels by 2020 80% below 2000 levels by 2050	36% below 2005 levels by 2020 83% below 2005 levels by 2050*	25% below 2004 levels by 2020

\*Oakland's 2050 emissions reduction target was recommended by City Council, but not formally adopted

beyond designed to capture energy savings, reduce GHG emissions, and achieve other community benefits in one sector in particular: existing multifamily buildings.

This report is designed primarily for local government policy makers. It is one component of a joint project between the cities of Berkeley, Oakland, and Emeryville aimed at developing effective strategies to increase energy efficiency in our communities' apartment buildings, cooperatives, and condos. The project, called *Building Energy Efficiency Solutions* (BEES), seeks to develop local solutions to the barriers tenants and building owners face when trying to lower their energy consumption, with particular emphasis on the problem of misaligned incentives between tenants and building owners. BEES is intended to help advance multifamily energy policy not only in Berkeley, Oakland, and Emeryville, but also in cities across the state and country that are grappling with similar challenges.

The two-year BEES project is funded by California utility customers and administered by Pacific Gas and Electric Company (PG&E) under the auspices of the California Public Utilities Commission.

The BEES project includes several main steps toward the ultimate goal of recommending local strategies to make it easier for building owners and tenants to save energy and money.

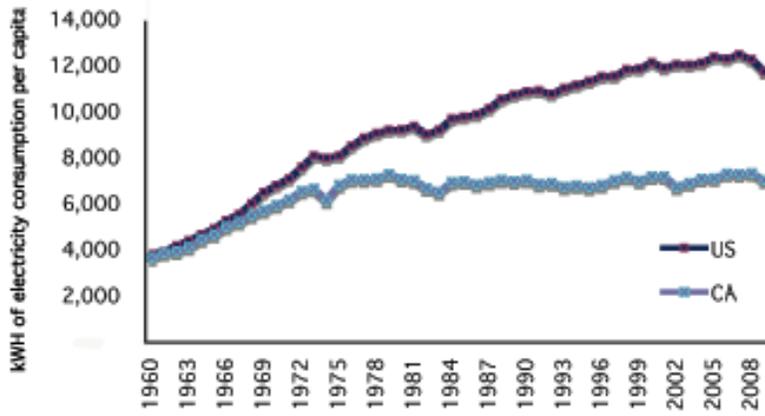
1. **Derive lessons from existing efforts and research** (the focus of this report): Existing efforts by local governments, researchers, and policy experts in several states and countries provide lessons learned that have implications for any entity working to improve energy efficiency in the existing multifamily sector. This component of the BEES project included literature review, a national survey of local government practitioners (see survey summary in Appendix) and dozens of interviews with leading experts in the field.
2. **Analyze barriers, opportunities, and energy saving potential** (the subject of a subsequent report): BEES project partners conducted an analysis of the multifamily market in the cities of Berkeley, Oakland, and Emeryville that estimates the scale of existing multifamily buildings' energy-saving potential and examines common practices and barriers among local building owners, property managers, and tenants.
3. **Gather input from multifamily stakeholders and pilot a range of potential program solutions**: Build on the two reports highlighted above and additional input from multifamily stakeholders by developing and piloting draft program recommendations designed to help achieve the local multifamily sector's energy-saving potential.
4. **Based on project research, pilots, and stakeholder and community input, develop a range of formal policy options for community and City Council consideration**: City leadership and other community members will have the opportunity to weigh the pros and cons of a range of policy and program options and to provide direction regarding which set of options to pursue.

The four steps that make up the BEES project set the stage for each of the three partner cities to further develop and launch thoughtful, effective multifamily energy policy.

## Energy Efficiency: Our Biggest, Lowest Cost Resource

Energy efficiency opportunities in existing buildings are a tremendous, comparatively low-cost resource. If Saudi Arabia represents abundant energy resources, then the U.S. building stock represents the Saudi Arabia of energy efficiency. A 2009 report by McKinsey & Company estimates that, although there are significant barriers that must be overcome, the potential exists for the U.S. economy to reduce annual non-transportation energy consumption by approximately 23%

Figure 6:  
Per capita  
electricity  
consumption



Source: EIA, US Census, California Energy Commission 2009

(9.1 quadrillion BTUs)<sup>13</sup> by 2020, which would eliminate over \$1.2 trillion in wasted energy costs. This reduction in wasted energy would result in a significant reduction in GHG emissions – the equivalent of taking the entire U.S. fleet of passenger vehicles and light trucks off the road.<sup>14</sup> It would also result in improved building comfort and in job opportunities that cannot be outsourced.

The State of California is recognized globally as a leader on energy efficiency. Since the 1970s, per capita electricity consumption in California has remained flat, while increasing 60% in the rest of the country (see Figure 6).<sup>15</sup>

While some of California’s success at flattening per capita electricity use can be explained by a shift in the state’s economy away from energy-intensive manufacturing, a significant portion of the success is also

due to the state’s robust energy efficiency standards for new construction. Achieving aggressive state and local GHG reduction targets requires not only continually ratcheting up standards for new construction, but also unlocking the energy efficiency potential of existing buildings, the majority of which were built prior to California’s Building Efficiency Standards were enacted. The policy and program infrastructure for increasing energy efficiency in existing buildings is comparatively less robust, but many government and utility entities recognize this reality, and opportunities are emerging to shift a higher level of focus to saving energy in existing buildings.

In 2006, the state adopted AB 32, the Global Warming Solutions Act, which caps California’s GHG emissions at 1990 levels by 2020. The Scoping Plan, designed to achieve that target, identifies energy efficiency in existing residential and commercial buildings as the single most important activity to reduce GHG emissions in the electricity and natural gas sectors. In 2008, the California Public Utilities Commission (CPUC) released its California Long Term Energy Efficiency Strategic Plan, which provides a roadmap for the efficiency gains targeted in the AB 32 Scoping Plan. The Strategic Plan also encourages deep, whole-home approaches to energy efficiency in existing structures through mechanisms such as comprehensive energy assessments, rebates, and financing options.

In 2009, unprecedented levels of funding for energy efficiency began to flow. Under the federal American Recovery and Reinvestment Act (ARRA), the U.S. Department of Energy (DOE) authorized over \$12 billion to be awarded to states and local governments to implement strategies that stimulate demand for

<sup>13</sup> McKinsey & Company estimates that 35% of the annual 9.1 quadrillion BTUs of energy that could be reduced in existing buildings could be achieved in the residential sector.

<sup>14</sup> McKinsey & Company. “Unlocking energy efficiency in the U.S. Economy.” Jul. 2009.

<sup>15</sup> EIA, US Census, California Energy Commission 2009.

energy upgrades and the jobs they create. In May 2009, California was awarded \$226 million in ARRA State Energy Program funds, plus an additional \$49.6 million in Energy Efficiency and Conservation Block Grant (EECBG) funds. Local governments across the U.S. and the state, including the cities of Berkeley, Oakland, and Emeryville, were collectively awarded millions of dollars in local ARRA EECBG funds as well. Earlier in 2009, the CPUC approved a three-year \$3.1 billion budget for the state's investor-owned utilities ratepayer-funded energy efficiency programs, a 42% increase over the previous three-year cycle.

These funds represent not only an opportunity to achieve direct, short-term benefits such as energy and cost savings and new jobs, but also an unparalleled boost to public and private sector experience in implementing energy efficiency programs for existing buildings, including programs designed specifically for the existing multifamily building stock.

## Targeting Market Transformation in the Existing Multifamily Building Sector

While government and utility efforts to reduce energy use in existing multifamily buildings remain relatively limited compared to resources aimed at the single-family residential and commercial sectors, there are a growing number of government agencies and utilities across the country that are leveraging ratepayer dollars, one-time stimulus funds, and other resources with private sector investment to remove barriers to energy efficiency in existing multifamily buildings. The goal of these efforts is not only reduced energy use and the associated greenhouse gas emissions. Increasing energy efficiency in the multifamily building stock is also an essential component of communities' existing commitment to provide comfortable, healthy, affordable housing for residents.

Increasing energy efficiency on a large scale in existing multifamily buildings requires transforming how the market functions, so that energy efficiency and the benefits it provides are seen as business-as-usual amongst multifamily property owners, property managers, and tenants. A fundamental takeaway from interviews with policy makers and multifamily property owners and managers that informed the study for this report is that achieving market transformation requires policy mechanisms that enable property owners to realize an economic return on investments in energy efficiency. Put another way, unless energy-related capital investments result in increased revenues or increased property value/equity, there is limited economic rationale for a multifamily building owner to make such an investment. Increased revenues can come in several forms, including:

- Increased building sale valuation;
- Cost savings due to reduced energy use;

- Less tenant turnover and the associated transaction costs and interruptions in rent payments; and/or
- Higher rents.

This report outlines a range of policy mechanisms local and state governments and utilities are employing to achieve market transformation in existing multifamily buildings:

- *Mandatory improvement and disclosure requirements* designed to capture a baseline level of energy savings across a community's existing multifamily building stock and to make energy efficiency an explicit component of a building or unit's value
- *Rebates* to lower the cost of energy upgrades and to help property owners go beyond the minimum
- *Financing programs* to minimize the upfront cost of energy upgrades and to amortize costs over time
- *Tax-based incentives* to encourage private investment in energy efficiency
- *Strategies that help calculate benefits and align incentives for the affordable multifamily housing sector* with potential relevance to rent controlled housing
- *Tools for removing the split incentive barrier* by increasing the capacity of property owners to make energy improvements and recoup their costs in a manner that ensures appropriate, equitable sharing of costs and benefits between owners and tenants
- *Streamlined technical assistance* designed to minimize property owners' transaction costs associated with identifying upgrade opportunities and matching incentives and financing
- *Workforce development* tailored to the existing multifamily building context
- *Marketing, outreach, and education programs* used to connect multifamily stakeholders with the services available to them and to encourage the behavior changes necessary to achieve increased energy efficiency

The intent of the report is to identify these policy mechanisms and to derive lessons learned that may inform multifamily energy efficiency policy design in the cities of Berkeley, Oakland, Emeryville, and beyond. These lessons will be considered in developing policy recommendations in later phases of the BEES project.

Each of the identified policy mechanisms is explained in more detail, including providing program examples and key considerations for policy makers, in Section 3.

## Section 2:

# Overview of Opportunities & Barriers

Several factors point to significant potential for energy savings in existing multifamily buildings.

## Opportunities

### Building vintage

Sixty percent of the nation's multifamily building stock was constructed prior to 1980.<sup>16</sup> In Berkeley, Oakland, and Emeryville, collectively 53% of existing multifamily units were built prior to California's first-in-the-nation building energy efficiency standards were enacted in 1978, a total of approximately 119,000 units.<sup>17</sup> California's building energy efficiency standards have ratcheted up over time, adding energy efficiency measures and construction practices as building science improves and technologies advance. Many older buildings have yet to benefit from these advances. So, it is safe to assert that a vast amount of cost effective upgrades are possible in the *existing* multifamily building stock.<sup>18</sup>

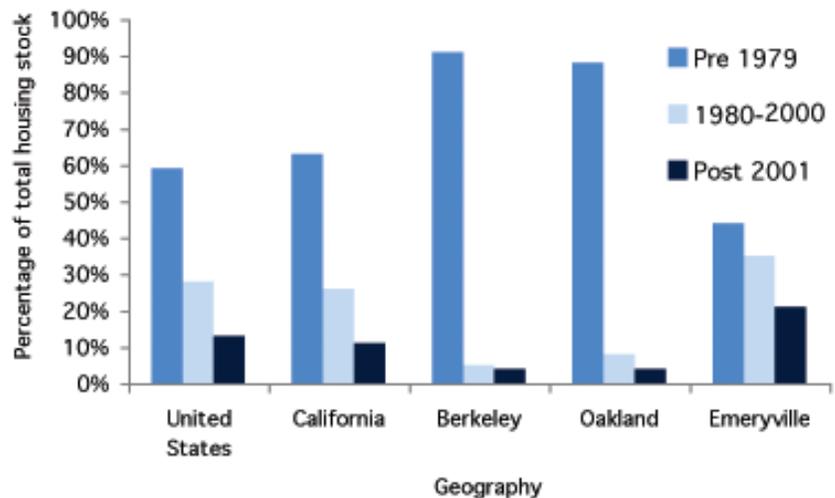
### Centralized systems

Multifamily buildings, especially large ones, often have central domestic hot water systems and other central systems that are inherently more cost effective and efficient to upgrade than upgrading systems in individual units. For example, improving the efficiency of the central water heater and insulating the hot water distribution system often represent improvements with an attractive return on investment.

### Leveraging building management

Many large multifamily properties are operated and maintained by professional building staff.<sup>19</sup> Property and asset management staff may not always be the decision-maker in large rehabilitation projects which require a developer /owner to amass significant amounts of construction capital, but they do tend to have

Figure 7:  
Housing stock by  
vintage and  
geography



Source: U.S. Census Bureau, 2009 American Community Survey

<sup>16</sup> U.S. Census Bureau

<sup>17</sup> U.S. Census Bureau, 2009 American Community Survey

<sup>18</sup> For a more detailed discussion of energy saving potential in existing multifamily buildings see Appendix A in following citation: Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee. "Improving California's multifamily buildings: Opportunities and recommendations for green retrofit & rehab programs." 8 Apr. 2011.

<sup>19</sup> Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee. "Improving California's multifamily buildings: Opportunities and recommendations for green retrofit & rehab programs." 8 Apr. 2011. p.16.

responsibility over operational budgets and make decisions about equipment replacement, maintenance and work done in units at time of unit turn-over. Given the right resources and training, these building professionals can play a critical role in ensuring *sustained* efficiencies post-energy upgrade, enabling energy upgrades over time and the penetration and spread of energy efficiency practices throughout the local multifamily housing market. In many cases, a property management professional who has been trained to spot energy saving opportunities for her clients can put the concepts being discussed here into practice far more quickly and widely than a single owner who has been trained to spot such opportunities in her own portfolio.

To be sure, despite the potential for energy savings in existing multifamily buildings discussed above, the barriers and complexities are also not trivial. Consider the following:

## Barriers

### Split incentives

The impact of split financial incentives between landlord and tenant is the most commonly cited barrier to energy upgrades in rental units. It is indeed a fundamental market barrier. When units are individually metered and therefore tenants pay the electricity and natural gas bills, the building owner is often reluctant to invest in energy improvements that offer no direct financial return. As the Benningfield Group points out in a 2009 report on multifamily energy efficiency potential, “An investment without a return is not an investment – it’s a gift.”<sup>20</sup> In this scenario, research suggests that a building owner’s decision-making regarding purchase of in-unit appliances and other systems will be influenced primarily by first-cost considerations as opposed to future cost savings associated with more efficient equipment. Individual metering in multifamily buildings is by far the most common practice. The federal Public Utilities Regulatory Policy Act of 1978 required new apartment buildings to be individually metered for electricity. In Berkeley and Emeryville, approximately 90% of multifamily units are individually metered for electricity, while approximately 62% of units are individually metered for electricity in Oakland. The percentage of units individually metered for natural gas is approximately 65% in Berkeley, 20% in Emeryville, and 36% in Oakland.<sup>21</sup>

The split incentive also affects energy consumption in master metered buildings, i.e., where the landlord is paying the energy bills. In this scenario, it is the tenants who receive no price signal that would motivate energy conservation. For instance, research suggests that these tenants in master metered buildings set

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<sup>20</sup> Benningfield Group Inc. “Addendum report: U.S. Multifamily housing stock energy efficiency potential.” 10 Jun. 2010. p.12.

<sup>21</sup> Metering configuration estimates were made based on data from PG&E on the number of residential account holders in each city. These data were compared to housing stock data to derive an estimate for the number of individually and master-metered units.

their thermostats higher in cold months and are less likely to turn it down when the unit is unoccupied.<sup>22</sup>

## Market fragmentation

The multifamily market is exceedingly diverse in several meaningful ways. First, the building stock itself is diverse, which makes one-size-fits-all policies, programs and services ineffectual. The physical configuration of a building, e.g., low-rise vs. high-rise vs. mixed-use, presence or absence of central systems, and other configurations, affects the types of building systems present as well as the technical protocols and codes and standards that are applied.<sup>23</sup> Second, landlords also differ greatly depending on the size of their holdings, their access to capital, their investment time horizon, their sophistication in terms of building system know-how and access to technical planning and installation assistance, and other variables. These factors affect uptake in energy services and must be considered at the point of program design. Third, there is much diversity among tenants, perhaps most importantly in terms of length of tenancy. Units rented by student tenants typically tend to turn over every few years or more, for example, while an older single adult or young family might stay for a decade or more. These factors, along with others such as whether the units are affordable vs. market rate, owned vs. rented, or individually vs. master-metered for utilities affect the potential for energy efficiency improvements and the strategies by which that potential would be achieved.

## High transaction costs

Several property owners interviewed for this project found the process of identifying relevant incentive programs overwhelming to the point that they do not bother to pursue services available to them. For these individuals, the cost of obtaining the right information, deciphering program requirements, securing financing, and finding the right contractors often outweighs the potential benefits associated with energy savings. Further, it is difficult for property owners to even know what the energy savings and associated cost/benefit from a given set of energy upgrades will be. Add to this the potential disruption to tenants caused by the retrofit, and it is easy to see how transaction costs are a major barrier to energy efficiency improvements in multifamily buildings.<sup>24</sup>

## Initial costs

Property owners have a bevy of competing demands on their pocketbook. Even in scenarios where an initial investment in a given energy measure would ultimately provide an attractive return down the road, they may not have access to the upfront capital needed. This barrier is likely magnified for “mom and pop” property owners with small holdings that do not have access to larger, organizational resources. But

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<sup>22</sup> Maruejols, Lucie & Young, Denise. “Split incentives and energy efficiency in canadian multi-family dwellings.” Dec. 2010. p.2; Levinson, Arik & Niemann, Scott “Energy use by apartment tenants when landlords pay for utilities”. Feb. 2003. p.3.

<sup>23</sup> Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee. “Improving California’s multifamily buildings: Opportunities and recommendations for green retrofit & rehab programs.” 8 Apr. 2011. p.13.

<sup>24</sup> Fuller, Merrian. “Enabling investments in energy efficiency: A study of programs that eliminate first cost barriers for the residential sector.” Aug. 2008. p. 10.

for property owners large and small, lack of streamlined access to attractive rebates plus financing that can help spread the costs out over time as energy cost savings are realized is a significant barrier.

### Uncertain return on investment

A range of variables affect the actual energy and money savings realized from a property owner's investment in energy efficiency. While some energy upgrades in existing multifamily buildings can yield positive returns in as little as 1-2 years, others can take much longer. Many property owners lack access to technical assistance services that can help them identify cost effective energy efficiency strategies and calculate the payback. Furthermore, although there is research that concludes that investments in energy efficiency add to a building's market value, property owners may still be wary.

These and other barriers, especially when taken together, help to explain why comparatively less attention and energy efficiency services have been dedicated to the existing multifamily sector. Fewer complexities stand in the way of capturing energy savings in owner-occupied single-family homes. That being said, there are a range of existing policies and programs, many of which are just emerging and made possible by one-time federal ARRA funds, designed to address the barriers and seize the opportunities outlined above. Policy makers grappling with how to increase existing multifamily sector energy efficiency can benefit from the contribution to the collective knowledge base that these existing efforts make.

## Section 3:

# Overview of Policy Tools and Example Programs

This section reviews several existing policies and programs that can be used in efforts to reduce energy consumption in existing multifamily buildings. This selection should not be viewed as a comprehensive list of successful initiatives, but rather a sampling of programs that have been identified to illustrate the types of policy mechanisms that can be utilized to remove barriers to energy savings in this sector. Information about each of the highlighted initiatives was gathered through literature review as well as interviews with researchers and program implementers.

Clearly, achieving market transformation in the existing multifamily building sector requires a multi-faceted approach. It requires an approach that enables landlords to realize an economic benefit from investments in energy efficiency and that leverages the transactional nature of operating a multifamily building. Transactions occur, for example, when an appliance or other equipment is being replaced, when a unit turns over, or when a building undergoes a major remodel. Each of these “trigger events” can serve as an entry point for engaging property owners in energy upgrade programs.<sup>25</sup> Program outreach can be designed to recognize these entry points, and the energy service programs themselves can be designed to address the barriers highlighted in the previous section.

Below are highlights of existing policy mechanisms (and associated sample programs) designed to create energy savings in existing multifamily buildings. This Phase 1 report serves to outline the landscape of potential strategies, and does not include recommendations regarding which strategies should be pursued. Such recommendations will be considered in future phases of the BEES project. Considerations for policy makers are included for each of the strategies below to foster reflection on key issues should future action be taken in any of these areas.

## Mandatory Improvement & Disclosure Requirements

Robust energy codes for new construction exist at the federal and state government levels. These codes are critical for maximizing energy efficiency at the time of construction, but the majority of the U.S. housing stock, including existing

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<sup>25</sup> Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee. “Improving California’s multifamily buildings: Opportunities and recommendations for green retrofit & rehab programs.” 8 Apr. 2011. p.18.

multifamily buildings, was constructed before energy codes for new construction existed. Achieving state and local GHG reduction targets as well other policy priorities requires unlocking the vast energy efficiency potential in existing buildings, including residential properties.

A growing number of local governments are employing minimum requirements as a means of spurring market transformation in the existing multifamily building stock. These policies are typically triggered by a transaction such as the point of sale, lease, or remodel of the building or housing unit, but can also be required on a fixed schedule set by regulation. The policies take two general forms or a hybrid of each:

- *Mandatory improvements* require that energy and water saving upgrades be completed. The specific improvements may be prescribed by regulation or may be flexible as long as an overall energy efficiency level (or improvement) is reached.

Mandatory improvement ordinances can be effective because they circumvent market barriers such as the split incentive that often stand in the way of landlords and tenants making voluntary investments in basic, cost-effective energy and water-saving measures. These ordinances essentially set a minimum standard for building energy efficiency. Mandatory improvements “level the playing field” for existing building owners. More extensive and expensive levels of energy efficiency can be captured through the provision of incentives, financing, outreach and education, and other policy tools discussed in more detail later in this report.

- *Mandatory disclosure of building energy data* includes the public disclosure of historic energy use or calculated energy ratings for a building or housing unit. The specific details of disclosure and the extent of data collection and analysis needed to gather the disclosed data vary greatly in existing regulations.

Mandatory disclosure ordinances are a market transformation strategy because they help make the energy efficiency of a given building or unit transparent and an explicit component of its value. Property owners then have the potential to market and leverage the energy efficiency of their buildings to become more competitive in the rental and building sale market. Likewise, energy data disclosure also helps prospective tenants and buyers to compare the relative energy efficiency of their housing/building options. Because disclosure has the potential to drive demand for more efficient buildings, rewarding those who invest in efficiency upgrades, it is also used as a voluntary strategy in many regions, particularly within the United States. Disclosure is a market transformation strategy that can be supported by policies that raise the profile of building energy data.

## Mandatory Improvement Ordinances

### Policy summary and program examples

Several municipalities, including Berkeley (CA), Burlington (VT), Boulder (CO), Davis (CA) and San Francisco (CA), have adopted ordinances requiring building owners to install cost-effective energy efficiency measures. Historically such ordinances would impact a building only at the point of sale or remodel, but newer mandatory improvement ordinances tend to require upgrades of all applicable buildings on a set schedule. These municipal ordinances are often developed as a means of meeting state and local energy and carbon savings goals, such as those articulated in a local climate action plan.

Depending on the city and its regulations, mandatory improvement ordinances can require a prescriptive list of energy and water-saving measures to be installed or mandate a performance-based approach that requires diagnostic testing of the building or unit to reveal customized energy-saving opportunities. The cost of compliance for the building owner is usually capped so as to not be onerous.

Ordinances that mandate energy efficiency can impact commercial and/or residential buildings, including multifamily housing. The following examples provided below were selected for their applicability to the existing multifamily building sector.

The *City of Burlington's Residential Rental Housing Time of Sale Energy Efficiency Ordinance* is specifically designed for rental properties and, in an effort to address the split incentive barrier, only applies to apartments where the tenants are responsible for directly paying the heating costs.<sup>26</sup> It was adopted by the city in 1997 due to the recognition that rental properties were suffering from a lack of adequate insulation and overall substandard thermal performance. The ordinance requires certain energy upgrade measures at the time a residential building with rental units is sold. The total cost of the required energy improvements must not exceed three percent of the sale price or \$1,300 per rental unit, whichever is less. Further, the ordinance only mandates installation of measures with a simple payback of seven years or less. Improvements that often qualify include wall, attic, and floor insulation; duct sealing; weather stripping for doors; and general sealing of air leaks throughout the home. The average cost of the energy upgrades is estimated at approximately \$650-\$750 per apartment and who pays for the work is negotiated between the buyer and seller of the building. Technical assistance and resources from local energy service providers are available to help affected property owners comply.

The *City of Berkeley's Residential Energy Conservation Ordinance (RECO)*, first adopted by the City in 1982, is also triggered at the time of sale, as well as at the time of a major renovation valued at \$50,000 or more.<sup>27</sup> It requires installation of a prescriptive set of 10 basic energy and water saving measures, such as faucet aerators, water-efficient shower heads, duct sealing, weather stripping, attic insulation, and high-efficiency lighting in common areas of multifamily buildings. Like Burlington's ordinance, the Berkeley RECO has a cost cap. For multifamily properties the cost limit for the required upgrades is \$0.50 per square foot. Cost of compliance for RECO-affected units is approximately \$170-\$2,500.

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<sup>26</sup> Burlington Electric Department, "Burlington Electric Department – Public Power since 1905." [Online]. Available: [https://www.burlingtonelectric.com/page.php?pid=37&name=ee\\_codes](https://www.burlingtonelectric.com/page.php?pid=37&name=ee_codes).

<sup>27</sup> City of Berkeley, "RECO Information – City of Berkeley, CA." [Online]. Available: <http://www.ci.berkeley.ca.us/ContentDisplay.aspx?id=16030>.

The *City of Boulder's SmartRegs legislation* is an example of the newer style of mandatory improvement regulation in that it requires increased energy efficiency in all rental units by a specific future date rather than the time of sale or renovation triggers mentioned above.<sup>28</sup> The legislation requires that by 2019 landlords meet adopted minimum energy efficiency levels either through a prescriptive 100-point system in which points are achieved by installing a range of energy upgrade measures, or through a performance path in which a given building achieves a specified level of energy performance on the Home Energy Rating System (HERS) Index. Boulder's SmartRegs legislation effectively adds an energy efficiency requirement to the City's existing Rental Housing Inspection and Licensing Program. In this scenario, the trigger for required energy upgrades is a specific future date (2019), and the compliance mechanism is the inspection associated with licensing rental properties.

Although compliance will not be enforced until 2019, the City of Boulder estimates that 500 rental units will comply with the rule by the end of 2011 with the help of rebates and other resources. SmartRegs provides owners and property managers with a one-stop-shop for energy efficiency solutions, including assistance from energy advisors that provide compliance status information, identify rebates and incentives, and help schedule contractors to do the work.

### Mandatory improvement ordinance considerations for policy makers

Below is a selection of issues that should be considered in the course of taking any action in this policy area:

- *Mandatory improvement ordinances have the potential to be controversial.* For example, Realtors often raise concerns that the point of sale trigger adds another element to an already complicated real estate transaction between a homebuyer and a seller. Property owners may also be resistant to the added cost associated with compliance.
- *Mandatory improvement ordinances can negate the significance of the split incentive barrier* by ensuring that basic, cost-effective energy and water saving measures are installed irrespective of the utility metering scenario.
- *Consider mandatory improvements as a gateway.* Work to develop rebates and other incentives that can seamlessly support energy upgrades that go beyond the mandatory improvements.
- *Lower the cost of compliance with mandatory improvement ordinances by simplifying the compliance process and by aligning the policy with existing incentive programs.* In Burlington, Berkeley, and Boulder, some of the cost of compliance can be offset through rebates from the local energy utility. In places such as California, New York and elsewhere, incentive programs exist that promote performance-based energy upgrades. Simplifying compliance procedures will also lower the actual or perceived administrative burden on Realtors and property owners.
- *Consider the trigger.* Potential triggers include the point of sale, lease, or major renovation or a date by which all residential properties within a given jurisdiction must achieve a certain minimum energy requirement. Like with other minimum requirements, identifying an effective trigger for compliance will have a significant impact on the number of units affected and, by association, the scale of energy saved. For example, Berkeley's RECO affects approximately 500-700

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<sup>28</sup> Boulder County, "Climate Smart Loan Program." [Online]. Available: <http://climatesmartloanprogram.org/index.html>.

residential units per year, the overwhelming majority of which are single-family homes. Multifamily buildings are often owned by trusts and therefore are sold or transferred far less frequently than single-family homes. The point of sale trigger therefore has limited reach in Berkeley's existing multifamily building sector. In addition, triggers at the point of lease are harder to verify and enforce because those transactions are typically conducted without a third party like a realty agent or mortgage broker.

- *Consider performance-based rather than prescriptive requirements.* The Berkeley and Burlington mandatory improvement ordinances currently require a prescriptive list of energy and water-saving measures, while Boulder's SmartRegs offers a performance-based compliance mechanism. Berkeley is considering amending its RECO to require a performance assessment of the building or unit that reveals customized energy-saving opportunities. Especially in the context of the diverse multifamily building stock, a customized, audit-based approach should be considered.
- *Establish an effective system for tracking compliance and outcomes.* To streamline and encourage compliance and aid in tracking the effectiveness of the policy a clear system of tracking (and enforcement) of mandatory improvements should be established.

## Mandatory Disclosure of Building Energy Data

### Policy summary and program examples

A variety of local governments, states, and countries have adopted ordinances requiring building owners to disclose building energy data. Ordinances that mandate the public disclosure of energy data are designed to affect the rental and building sale market by making energy efficiency and energy costs an explicit, visible component of a unit or building's value. By making information on energy consumption and its associated costs available for prospective tenants and buyers, these factors then have the potential to transform markets by influencing decision-making.

Existing ordinances differ in the type of building energy data that they require for disclosure and whether the trigger for the disclosure is at a transaction point (sale or lease) or on a fixed schedule. As the examples cited in this report illustrate, the use of energy data disclosure strategies can also be employed as a voluntary market transformation strategy. In addition, at least one municipality has linked disclosure and improvement by requiring improvements in buildings with poor energy performance as revealed through mandatory disclosure.

There is a range of energy information and assessments that may be required as part of existing mandatory disclosure ordinances. Individual regulations will dictate the specific details of the building energy data that is required and how it is collected and assessed. In general, one of two types of energy rating systems (or a combination of the two) is used to generate information on the energy performance of a building (or unit):

- *Operational ratings* are one type of assessment that can be used to estimate the energy use of a building. "Operational" ratings use actual energy consumption over a given period to calculate its rating. In its simplest form, historic utility bills alone may be mandated for disclosure. In more sophisticated models, operational ratings will be normalized to remove some occupancy and weather

impacts and to provide a benchmark that can be used as the basis of comparison. Operational ratings are the cheapest and simplest to collect and calculate, but also the most influenced by individual occupant behavior. Because individual behavior varies this information may or may not be predictive of future energy use or costs.

- *Asset ratings* model the energy efficiency of a building by inputting the building's physical characteristics, typically based on findings during an energy audit, under standardized weather and occupancy conditions. Ratings that combine operational and asset assessments are the most expensive to generate, but also provide the most robust results.

The output of a building energy rating system can be communicated or displayed in a variety of ways, as the following examples will demonstrate. Operational ratings are often used to benchmark the assessed property against other similar properties. Current regulation in the U.S. which mandates disclosure of building energy data requires utility records or operational ratings.

Voluntary programs in the U.S. and mandatory regulations in other countries require "energy labels" to brand and broadcast the results of building energy ratings, particularly those based on asset ratings. These energy labels are similar to miles per gallon stickers on new cars and can provide standardized information such as a dwelling unit's expected energy use, a measure of how that energy use compares to other similar homes, an indication of the GHG emissions associated with the energy use, and the potential to reduce energy consumption and GHG emissions.

Policy makers should be aware of the range of energy rating tools in the context of analyzing or developing mandatory (or voluntary) energy data disclosure ordinances. Each of the assessment options has relative advantages and costs. The program examples below are included to illustrate some existing energy data disclosure ordinances that are applicable to the multifamily building sector.

The *State of Maine* adopted an *Act Regarding Energy Efficiency Standards for Residential Rental Properties* in 2006 requiring that historical energy consumption data be disclosed at a multifamily residential unit's point of lease.<sup>29</sup> The law also requires landlords to provide potential renters with an Energy Efficiency Disclosure Form that lists aspects of the property that affect energy consumption, such as level of insulation and types of appliances. The form indicates minimum efficiency standards for each aspect of the building. The law requires that the form be posted in a prominent place in the apartment when the unit is being shown as well as presented to the tenant prior to signing the lease or paying an initial deposit for the rent.

The purpose of Maine's law is to provide potential renters with an understanding of how much energy a property uses prior to deciding whether or not to rent the property. The law is intended to result in improved energy efficiency over time as landlords and tenants become more knowledgeable about sources of wasted energy and energy upgrade opportunities.

Rather than developing their own equivalent of an Energy Efficiency Disclosure Form, the City of Seattle relied on the U.S. EPA's ENERGY STAR Portfolio Manager Tool when creating their regulation. Passed in 2010, *Seattle's Energy Disclosure and Benchmarking Ordinance* was designed to help Seattle meet its

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<sup>29</sup> State of Maine, "Energy Efficiency Disclosure Form for Rental Units in Maine: Fact Sheet." [Online]. Available: <http://www.maine.gov/mpuc/online/forms/FactSheetPDF.pdf>

goal of achieving a 20% improvement in the energy performance of existing buildings by 2020.<sup>30</sup> The ordinance established energy performance measurement standards and reporting requirements for non-residential buildings of at least 10,000 square feet and multifamily buildings with five or more dwelling units. Building owners are required to benchmark the energy performance of their buildings using the U.S. EPA's ENERGY STAR Portfolio Manager, a free online energy management tool that tracks the energy and water consumption of a building or building portfolio.

Benchmarking information is an example of an operational rating (see box at right). The benchmarking information must be disclosed to any prospective tenant, buyer, or lender involved in providing financing for the building. The benchmarking information must also be reported to the city government; multifamily properties are required to provide the City with a benchmarking report every three years beginning April 2012. The benchmarking reports will help inform city government efforts to target incentives and other programs to where the energy saving potential is greatest.

The municipal utility in Seattle, Seattle City Light, is tasked with working with building owners and managers to provide them with the energy data they need to comply with the ordinance. In addition, each tenant located in an affected building must provide any data that cannot otherwise be acquired by the building owner and that is needed to comply with the ordinance. Failure to provide the requested information to the

**Energy ratings** for a building (or unit) can be “operational” ratings, “asset” ratings, or a blend of the two:

- **Operational ratings** are based on actual energy consumption over a specific time period and are typically normalized to minimize weather and occupant impacts. An operational rating reflects a combination of the physical systems of a building and how they are operated. Typically used in the non-residential sector, operational ratings may have limited applicability to future occupants if operational behaviors such as thermostat settings, lighting and shower use, and plug loads (computers, televisions, etc.) vary dramatically. However, there may be a case for operational ratings in the multifamily sector because the occupants are more fluid and energy use is averaged over the number of units, making it less specific to the behavior of a single occupant.
- **Asset ratings** are based on an energy audit of the fixed characteristics (or assets) of a home including its windows, walls, roof, heating equipment, ducts, and heating and cooling equipment. The applicable climate, based on the building location, is also inputted into the modeling software. A standard set of operating parameters (such as the thermostat settings and plug loads) are used to determine the energy efficiency of the building features, rather than the specific habits of the current occupants. An asset rating standardizes many assumptions to remove behavioral factors and make it easier to compare one home to another. However, the cost of the audit and modeling may be high and the modeled energy use may not actually reflect actual energy use.
- **Blended operational/asset ratings** use operational data to normalize or correct the asset rating provided by a computer simulation model and may be the most valuable, but also the most expensive.

<sup>30</sup> City of Seattle, “City Green Building – Energy Benchmarking & Disclosure: Overview.” [Online]. Available: <http://www.seattle.gov/dpd/GreenBuilding/OurProgram/EnergyBenchmarkingDisclosure/Overview/>.

building owner within 30 days can result in penalties. Also, if the building owner does not comply with the ordinance the City may issue a citation and associated fee of \$150 (\$500 for repeat violations) to the building owner. Approximately 9,000 buildings will be subject to the energy information disclosure requirements.

Along with Seattle, both Washington DC and New York City have enacted ordinances that mandate the measurement and disclosure of energy use for applicable multifamily buildings based on operational ratings. While several regions of the U.S. require disclosure of operational ratings, it is primarily areas outside of the U.S. that utilize asset ratings generated from energy audits. Other countries have mandated the use of asset ratings to generate information, including energy labels, which must be disclosed on multifamily properties and other residential properties.

Within the U.S. the disclosure of building information based on asset ratings has primarily been through voluntary home energy label programs developed by non-profit organizations and the Federal government, including the Energy Smart Home Scale (E-Scale), ENERGY STAR programs like ENERGY STAR for Homes, and the new Home Energy Score (HES). Of these programs, the HES is particularly interesting because it is designed specifically for existing homes. Although currently being piloted on single family homes, the HES will be expanding to the multifamily homes as well. In addition, the State of California is actively working to implement a disclosure program based on an asset rating that will impact the multifamily building sector.

The California Energy Commission is currently working to fully adopt the *California Home Energy Rating System* (CA HERS) Program for residential buildings as mandated by the Public Resources Code Section (PRC) 25942.<sup>31</sup> This current Phase II is working to extend the CA HERS program to cover whole-house home energy ratings of existing (and newly constructed) homes including labeling procedures “that will meet the needs of home buyers, homeowners, renters, the real estate industry, and mortgage lenders with an interest in home energy ratings” (PRC 25942). In addition to creating home energy labels, CA HERS Phase II is working to explicitly include rater training and evaluation of multifamily buildings.

Outside the U.S., countries within Europe and the government of Australia have laws mandating the disclosure of building energy use based on asset ratings generated by energy audits and displayed on standardized energy labels. The energy labels that are generated by this process are typically required at the time of construction, sale, or lease.

In the United Kingdom all residential buildings, including multifamily, are required to have an energy audit to model the energy consumption for that unit or building. The energy assessor uses standardized assessment procedures for new and existing homes and has standard assumptions to proportion the efficiency of centralized heating systems across units in multifamily buildings. The energy assessor provides the output of the energy assessment and modeled energy consumption (on a per square meter basis) in a standardized report and on a set energy label called an *Energy Performance Certificate* (EPC).<sup>32</sup> The cost and responsibility of obtaining an EPC falls on the current owner at the time a building is constructed, sold, or rented. An EPC is valid for 10 years.

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<sup>31</sup> California Energy Commission, “Home Energy Rating System Program (HERS).” [Online]. Available: <http://www.energy.ca.gov/HERS/>.

<sup>32</sup> Directgov, UK, “Energy Performance Certificates: Directgov – Home and community.” [Online]. Available: <http://www.direct.gov.uk/en/HomeAndCommunity/BuyingAndSellingYourHome/Energyperformancecertificates/index.htm>.

The unit or building's energy efficiency is illustrated on an A through G scale on the EPC, with an A being very efficient. The EPC also includes the potential energy use for the building or unit if energy saving measures were to be undertaken.

A similar asset rating system is in use in the northwestern part of the U.S., although the disclosure of its findings is currently voluntary rather than mandated by existing regulation. The *Energy Performance Score* (EPS) was developed by Earth Advantage Institute with funding from the Energy Trust of Oregon and used in the States of Washington and Oregon for new and existing homes.<sup>33</sup> EPS methodology was tested with a pilot program on 300 existing homes in 2008 and launched in 2010 as a voluntary program in Oregon and Washington for new and existing homes. In October 2010 the DOE provided funding to also pilot EPS programs in parts of Massachusetts, Virginia, and Alabama. In addition, the Energy Trust of Oregon has implemented a 2011 EPS Pilot which involves a visual in-home assessment and a comparison of various modeling tools.

An EPS requires a home energy audit, conducted by a Building Performance Institute (BPI) auditor with online EPS certification. The auditor collects information on the ways energy (electricity, natural gas, propane, and heating oil) is used in the home while accounting for the home's size, location, and assets. Standardized assumptions on occupancy, occupant behavior, and regional weather are used to determine normal energy use for the home. The resulting EPS label includes estimated energy consumption from all sources (converted and reported as kWh/yr), potential consumption after upgrades and comparisons to the state average and target all on a relative scale. In addition, the EPS includes present and potential carbon emissions (tons/yr) along with comparisons, also placed on a graphic scale. Along with the audit and scorecard, EPS includes a recommendation report on potential energy upgrades based on cost effectiveness.

As seen above, there are a variety of ordinances that mandate either the disclosure of building energy information or energy efficiency improvements. Increasingly, there are opportunities for these separate ordinances to work hand-in-hand. Specifically the disclosure of building energy information can inform and determine what type of improvement, if any, will be most effective.

One example of this "hybrid" type of mandatory ordinance is the *Austin, TX, Energy Conservation Audit and Disclosure (ECAD) Ordinance*.<sup>34</sup> The ECAD was approved by City Council in 2008 and amendments adopted in 2011 specifically impacted the requirements in multifamily properties (apartment or condominium buildings with five or more units). An owner of a multifamily property that receives electricity from the municipal utility, Austin Energy, must hire a certified ECAD auditor to conduct an energy audit of the building in the calendar year the building turns 10 years old (or by June 2011 if older).

The ECAD auditor checks about 10% of each type of floor plan in each building and pressure tests the duct system, identifies windows with at least an hour of direct sunlight each day, and inspects attic insulation. The resulting energy audit report must be posted at the multifamily property, provided to current and prospective tenants, and submitted to Austin Energy for entry into their database.

<sup>33</sup> Energy Performance Score, "EPS Audit." [Online]. Available: <http://www.energy-performance-score.com/>.

<sup>34</sup> Austin Energy, "About the Energy Conservation Audit and Disclosure (ECAD) Ordinance." [Online]. Available: <http://www.austinenergy.com/about%20us/environmental%20initiatives/ordinance/index.htm>. [Accessed: 04-Oct-2011].

Austin Energy will notify any multifamily property owner whose energy audit reveals that their property uses more than 150% of the average energy use per square foot of the multifamily properties in the Austin Energy service area. At the time of the notice, these owners must disclose to current and potential tenants that their electric bills will be higher than if they lived in a more energy efficient comparable property. In addition, within 18 months of receiving the notice, the property owner must make energy upgrades that reduce the energy use of the building by 20%. Preliminary estimates suggest that about 50 of the almost 1,000 apartment complexes in Austin will have energy use above 150% of the average.

## Mandatory disclosure ordinance considerations for policy makers

Below is a selection of issues that should be considered in the course of taking any action in this policy area:

- *Mandatory disclosure ordinances can negate some of the effect of the split incentive barrier* by making energy efficiency improvements a transparent, explicit part of a building or unit's value. This added value has the potential to be translated into an economic benefit for the property owner.
- *Consider the direct relationship between cost and accuracy of generating an energy rating.* Operational ratings are cheaper and easier to generate, but can be problematic when tenants are individually metered both because of the influence of individual behavior and privacy issues restricting access to tenants utility data. Asset ratings typically require an energy audit which can be expensive, particularly in a large, complex multifamily building. Because an asset rating is based on energy modeling rather than actual consumption, its accuracy may also be imperfect. Cost, accuracy, and application considerations are critical in selecting an energy rating system to support mandatory disclosure.
- *Involve the local utility from the beginning.* The utility will be a critical partner in enabling building owners to easily access energy consumption data in a form that meets ordinance requirements. Many local governments that enact disclosure requirements based on operational ratings have municipally-owned utilities and therefore may have more control over and access to utility data compared to local governments where municipal utilities do not exist.
- *Develop a standard, easy to follow energy reporting procedure for building owners and tenants.* The process for reporting data and knowing which data to report must be easy to follow for building owners and, when necessary, tenants. Consider aligning reporting requirements with the outputs of existing tools, such as ENERGY STAR Portfolio Manager, which enable automatic data uploads from the utility.
- *Consider the trigger for initial and ongoing compliance.* Define an appropriate trigger for initial energy disclosure as well as for renewing compliance after a defined period of time.
- *Involve Realtors and other stakeholders from the beginning.* Realtors will have specific concerns that the local government must understand and may have insights into the mandatory reporting of building energy data. Their understanding and promotion of building energy data within the real estate community will be essential to achieving the desired market transformation goals.
- *Support market transformation.* Promote the value and desirability of a highly rated building. Facilitate the communication of energy ratings by listing them with publicly-maintained property information and by making sure they are readily accessible. In order to have the greatest impact on the market, a disclosure policy should be mandatory, widespread, and strictly enforced.

# Cash Rebates to help property owners go beyond the minimum

Rebates are used by all levels of government and utilities to lower the cost of minimum requirements and to stimulate demand for upgrades that go beyond the minimum that is required. This policy mechanism is designed to help address the initial cost barrier discussed above. Lowering the initial cost of a given upgrade, in combination with attractive financing, streamlined technical assistance and other services and policies discussed in this report, can help a project achieve financial feasibility.

Broadly, there are a couple types of rebate programs designed to stimulate demand for energy upgrades in existing multifamily buildings:

- *Prescriptive rebates* are commonly offered by utilities throughout the U.S. and are designed to provide an incentive for specific energy-saving devices.
- *Performance-based rebates* require that certain levels of energy efficiency improvement be met in order to qualify for the incentive.

## Prescriptive Rebates

### Policy summary and program examples

Rebates for the installation of specific energy efficiency devices in existing buildings, known as prescriptive rebates, are commonly offered by utilities and also by some governmental organizations throughout the United States. These programs are relatively easy to administer, are typically available on a first-come, first-serve policy, and can complement other energy efficiency programs.

For utilities, offering rebates for specific energy-saving devices to lower peak energy demand and long term energy use is a more cost-effective and environmentally beneficial option than adding additional energy-production capacity. Utility energy efficiency rebate and incentive programs are typically financed through utility ratepayer fees. For local, state, and federal governments, prescriptive rebates can be an effective tool for helping residents and businesses lower energy consumption and associated costs.

*The California Statewide Multifamily Energy Efficiency Rebate Program (MFEERP)* is one of the few programs in the nation that tailors a portion of its rebate offerings to the existing multifamily sector.<sup>35</sup>

MFEERP is administered by the state's four investor-owned utilities (IOUs). Guidelines and incentive levels are established by the California Public Utilities Commission, which regulates the IOUs. MFEERP offers prescribed rebates on a range of lighting, appliance, and building envelope energy efficiency improvements to existing multifamily buildings with two or more dwelling units in the IOU service areas.

MFEERP rebates are available for in-unit measures as well as for common areas. Example in-unit measures for which there is a rebate include lighting, ceiling fans, dishwashers, and more. Example common

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<sup>35</sup> "CA Statewide Multifamily Rebate Program (MFEERP)." [Online]. Available: [http://www.eebestpractices.com/pdf/SummaryProfileReport\\_R52.PDF](http://www.eebestpractices.com/pdf/SummaryProfileReport_R52.PDF)

area rebates include those for central water heaters, LED exit signs, occupancy sensors, and clothes washers. Tens of thousands of customers have taken advantage of MFEERP rebates since the program's inception in 2002.

In conjunction with ratepayer-funded programs administered by PG&E, the City and County of San Francisco is using \$2.1 million in one-time ARRA funds to launch the *San Francisco Boiler Systems Incentive Program*.<sup>36</sup> The program provides rebates designed to increase installation of more modern, energy efficient boilers in multifamily properties. Many multifamily properties in San Francisco still use old, inefficient boilers, some of which date back to the 1920s and 1930s. These boilers can be a headache for property owners because they are prone to breaking down and consume copious amounts of energy. But the cost of replacing them is high, so many remain on line. Recognizing this problem, the city dedicated a portion of its ARRA funds to providing generous cash rebates specifically for boilers. Rebates cover approximately 30-40% of project cost. The program is expected to result in significant energy savings – approximately 400,000 therms – and reduce GHG emissions by over 2,100 metric tons annually. The boiler replacement program is run in conjunction with the Energy Watch program, which is overseen by PG&E and provides rebates for lighting and HVAC systems.

Another example of an effective prescriptive rebate program is the *Con Edison Multifamily Energy Efficiency Program in New York*.<sup>37</sup> The program targets small to mid-sized multifamily buildings. It includes a free walk-through survey that identifies potential upgrades to building systems. Each upgrade has an associated rebate. The owner can choose what upgrades to act on and then move forward with bringing in a private contractor to do the work. Once the upgrades are installed, Con Edison performs quality control by ensuring that equipment was installed correctly and is serving its intended purpose. The program works fast. Importantly, it also interfaces with federal Weatherization Assistance Program (WAP) funding so that Con Edison and WAP funds can be used together to offset the cost of the improvements.

In addition to providing rebates for building-wide measures, the Con Edison program provides free in-unit energy and water-saving devices, such as CFLs, power strips, and faucet aerators. Tenants also have access to rebates for additional measures, including ENERGY STAR air conditioners and energy efficient refrigerators.

### Prescriptive rebate considerations for policy makers

Below is a selection of issues that should be considered in the course of taking any action in this policy area:

- *Develop and/or promote rebates for both building owners and tenants.* Although building owners hold much of the decision-making authority related to upgrading building systems and major appliances, tenants can play a role by choosing energy efficient electronic equipment and minor appliances such as microwaves. The Con Edison Multifamily Energy Efficiency Program is one of several programs that provide services designed for both tenants and building owners.
- *Prescriptive rebates are most effective when part of an integrated strategy or package.* Given that a range of barriers need to be addressed in order to make it easier and economically

<sup>36</sup> City of San Francisco, "sfenvironment.org: our city's programs: Energy: Energy Efficiency: Boiler Systems Incentive Program." [Online]. Available: [http://www.sfenvironment.org/our\\_programs/interests.html?ssi=1&ti=14&ii=267](http://www.sfenvironment.org/our_programs/interests.html?ssi=1&ti=14&ii=267).

<sup>37</sup> Con Edison, NY, "Con Edison: Energy Efficiency – Multi-Family Residences Can Save by Upgrading to High-Efficiency Equipment." [Online]. Available: [http://www.coned.com/energyefficiency/residential\\_multifamily.asp](http://www.coned.com/energyefficiency/residential_multifamily.asp).

feasible for multifamily building owners to invest in energy efficiency, successful programs will include not only rebates, but also other services such as streamlined technical assistance, low-cost financing, and marketing and recognition.

- *Prioritize public awareness and program accessibility.* Work with partners such as utilities and community-based organizations such as property owner associations to develop an outreach strategy to effectively and efficiently inform the target audience. In the San Francisco and New York examples above, contractors are a key partner as they are eager to promote the incentives in order to help generate business.
- *Reduce transaction costs for the customer by integrating various program incentives in order to streamline service delivery.* The Con Edison Multifamily Energy Efficiency Program highlighted above interfaces with federal WAP funding. The initial free energy survey provided through the program identifies upgrades that can be funded by both federal WAP funding and Con Edison and then employs funding from both programs to help lower the cost of the combined energy upgrade scope. This service integration lowers staff costs and makes it easier for the consumer to participate and benefit.
- *The timing of when the rebate is delivered may affect uptake.* Rebates are typically issued after an energy measure has been purchased and installed. This requires building owners to make the upfront investment and then process the reimbursement. If the owner does not have the necessary upfront capital and/or is not able to take on additional debt, the rebate may not be a motivator.

## Performance-Based Rebates

### Policy summary and program examples

While traditional prescriptive rebate programs can be effective at capturing energy savings in existing multifamily buildings, especially in the context of upgrading individual appliances or pieces of equipment, the existing multifamily sector also demands **performance-based incentives** that are sensitive to the diverse nature of multifamily building types and building systems. As opposed to providing a prescriptive, one-size-fits-all list of recommended upgrades, the performance-based approach employs energy audits and/or diagnostic testing of the building or unit that reveals customized energy-saving opportunities. Performance-based rebate programs require that specific levels of energy efficiency improvement be met in order to qualify. The Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee recommended in its 2011 report that utility-funded rebate and technical assistance programs require a minimum of 10% to 20% energy savings depending on building vintage.<sup>38</sup> In California, the percentage energy savings of a given set of measures is modeled based on state-level protocols.

The *Sacramento Municipal Utility District (SMUD) Home Performance Program for Multifamily* is using ARRA funding to supplement prescriptive rebates with performance-based incentives for multifamily properties of five or more units.<sup>39</sup> Under the program, owners of buildings that install upgrades modeled to achieve a 20% energy improvement can receive \$2,300 (at the time of this writing) per dwelling unit,

<sup>38</sup> Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee. "Improving California's multifamily buildings: Opportunities and recommendations for green retrofit & rehab programs." 8 Apr. 2011. p.36.

<sup>39</sup> Sacramento Municipal Utility District, "Making multi-family buildings energy efficient | Home Performance Program | SMUD." [Online]. Available: <http://hpp.smud.org/multi-family-program>.

plus an incremental increase of \$50 per dwelling unit for each additional percentage point improvement above 20%. Rebates are capped at \$3,800 per dwelling unit for improvements of 50% or more.

Qualifying property owners must first hire an independent, certified home energy rater to conduct a whole-building energy assessment. The rater suggests building upgrades based on cost-effectiveness. Building owners may select any contractor to complete the upgrades. The rater then verifies the upgrade installation and conducts a final analysis of the projected energy savings, at which time the SMUD rebate is paid.

The SMUD Home Performance Program for Multifamily, as well as other ARRA-funded performance-based programs in Los Angeles and San Diego, CA, benefit from lessons learned from an earlier California-based program called Designed for Comfort (DfC). Administered by California's investor-owned utilities, DfC was California's first comprehensive, performance-based incentive program for existing multifamily buildings. DfC is now discontinued. But the DfC program, along with the SMUD program and others now emerging with support from ARRA and state-level funds, are serving as models for the multifamily component of a new statewide program called Energy Upgrade California.

*Energy Upgrade California* is a collaborative effort between state regulatory agencies, local governments, utilities, and others to coordinate resources to promote energy efficiency and renewable energy projects for homes and businesses across the State.<sup>40</sup> Energy Upgrade California has leveraged more than \$1.2 billion including \$146 million from the ARRA State Energy Programs.

Energy Upgrade California provides cash rebates for performance-based energy upgrades in single-family and multifamily homes. Utility rebates for single family became available as of early 2011. Multifamily rebates and programs are currently available only in select areas where other sources of ARRA funding are being utilized, including Sacramento, Alameda, Los Angeles, and San Diego Counties. For example, Energy Upgrade California in Alameda County is offering free technical assistance followed by green labeling rebates for projects that achieve certification in the GreenPoint Rated Existing Home Multifamily program. Specific rebates and programs will continue to vary by county, but utility rebates are expected to roll out statewide in 2012.

Several other programs exist in other parts of the U.S. including the Chicago-based *Center for Neighborhood Technology's Energy Savers Program*.<sup>41</sup> This program includes performance-based rebates in a one-stop energy efficiency shop for multifamily property owners. It packages a free whole-building energy assessment with financing options, assistance coordinating tax benefits, and assistance with contractor oversight and bid review. On average, participating buildings achieve 30-35% energy savings with a 6-7 year payback.

### Performance-based rebate program considerations for policy makers

Below is a selection of issues that should be considered in the course of taking any action in this policy area:

- *Performance-based rebate programs offer flexibility to serve a variety of building scenarios in the multifamily sector.* The multifamily building stock varies dramatically by building vintage, size, type of utility metering, and other physical factors. As such, performance-based programs offer

<sup>40</sup> Energy Upgrade California, "Energy Upgrade California | Reduce Energy Use. Save Money. Create Jobs." [Online]. Available: <https://energyupgradeca.org/overview>.

<sup>41</sup> CNT Energy, "Energy Savers CNT Energy." [Online]. Available: <http://www.cntenergy.org/buildings/energysavers/>.

flexibility and a tailored approach that could not be replicated through a set package of whole-building prescriptive measures.

- *Set significant, yet achievable, energy use reduction thresholds.* This approach, as exemplified by the SMUD and Center for Neighborhood Technology programs, targets a given percentage reduction in energy usage, and offers tiered incentives for additional energy savings.
- *Consider linking performance-based energy rebates with other programs to streamline and enhance achievements.* The individualized nature of a performance-based energy program could be expanded to incorporate other environmental goals, including reduced potable water usage and landfilled material, as seen through the Energy Upgrade California in Alameda County program's green building label incentive. Integrating various programs also eases the transaction costs, a common barrier for multifamily property owners.

## Financing to minimize upfront costs and amortize costs over time

Loan programs provided by the government, utilities, or other private-sector lenders provide financing that can help multifamily property owners overcome the initial cost barrier by spreading out, or amortizing, the cost of an upgrade over time.

Many multifamily property owners are experienced at employing a range of financing mechanisms and sources to conduct necessary building rehabilitation and retrofits. Financing designed to enable energy upgrades in multifamily buildings must complement traditional financing sources property owners use to conduct other common retrofits, such as seismic improvements, roof replacement, installation of new building systems, and more.<sup>42</sup> It is important for policy makers and program administrators to recognize these events as entry points for making energy upgrades part of the retrofit scope.

As well as traditional sources of financing such as bank loans, other forms of special financing exist that are specifically designed to enable energy upgrades:

- *On-bill financing* has the potential to help address the split incentive barrier by enabling building owners and tenants to invest in building-wide and in-unit energy upgrades without any upfront cost. On-bill financing is paid back over time through a line item on the utility bill.
- *Property assessed clean energy financing (PACE)* also enables property owners to make energy upgrades with no upfront cost. PACE financing is paid back through a line item on the building owner's property tax bill.

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<sup>42</sup> Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee. "Improving California's multifamily buildings: Opportunities and recommendations for green retrofit & rehab programs." 8 Apr. 2011. p. 15.

Another financing option we explored as part of our research is **Energy Service Companies**, commonly known as ESCOs. An ESCO is a private business that provides comprehensive energy services for a given building or set of buildings, usually in the municipal or large commercial context, and is paid for those services by the dollar savings achieved through efficiency gains. ESCOs may assume the risk that the upgrade project will save an estimated amount of energy, but this is an important stipulation that must be clearly articulated in the contract. ESCOs have had limited application in the existing multifamily building sector, but examples do exist and the model would seem to hold potential. Although not explored in detail in this report, the cities of Oakland, Berkeley, and Emeryville will include this model in considerations moving forward.

## On-Bill Financing

### Policy summary and program examples

On-bill financing is an innovative option for removing barriers to multifamily energy upgrades. This type of financing could be an attractive option for building owners as well as tenants. On-bill financing eliminates the upfront cost of a given improvement or set of improvements and enables the borrower to pay back the financing over time from the energy savings associated with the upgrade. In some on-bill programs, the financing is tied to the meter rather than the building owner or tenant. This set up is especially important in the multifamily sector as it enables the current occupant to move and the next occupant to pick up the on-bill payments. Monthly payments are designed to be lower than the expected energy bill savings associated with the upgrade.

Several on-bill programs are sustained by a **revolving loan fund**. As in the Efficiency Kansas example highlighted below, governments can use seed money in the form of grants or other funding to begin providing financing for energy upgrades. As repayments are made, funds become available for new loans to other residents or businesses. Hence, the funding revolves from one entity to another as repayments replenish the fund.

**Efficiency Kansas** is a state-run program supported by \$37 million in ARRA funds.<sup>43</sup> The program includes several utility partners that utilize Efficiency Kansas funds to provide financing to their customers. The financing is tied to the meter. For residents (and businesses) the process starts with a comprehensive energy audit conducted by a state-approved auditor. The auditor provides a recommended package of energy upgrades. The package is designed to generate enough energy savings to pay back the Efficiency Kansas loan over a maximum of 15 years (180 monthly bill payments). The customer then solicits bids from contractors and gets the work done. The auditor conducts a post-retrofit inspection to ensure quality. The subsequent monthly charge on the customer's utility bill does not exceed 90% of the projected energy savings. This is an important program feature designed to guarantee that any upgrades undertaken do not result in an additional financial burden. The maximum residential loan amount is \$20,000.

Given on-bill financing programs' potential to address major barriers affecting energy efficiency efforts in multifamily buildings, it is a policy tool worth consideration. That being said, establishing such a program is complicated and therefore requires the full buy-in of participating utilities. On-bill financing requires changes to a utility's billing system and development of repayment allocation procedures that take time and money to generate.

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<sup>43</sup> "Efficiency Kansas: Home." [Online]. Available: <http://www.encykansas.com/>.

## On-bill financing considerations for policy makers

Below is a selection of issues that should be considered in the course of taking any action in this policy area:

- *The efficacy of on-bill financing in multifamily properties is unclear.* Certainly low or zero-interest on-bill financing has the potential to serve as an effective tool for property owners and tenants alike in terms of removing barriers to investing in efficiency improvements that will lower their energy bills. What is unclear is the impact on-bill financing has in buildings where units are individually metered. In this scenario, the split incentive barrier may still persist.
- *Design a simple, user-friendly application process.* The Efficiency Kansas program places high priority on minimizing hassle and associated transaction costs for their customers. The program includes accessible web-based information and online applications, an emphasis on fast turnaround time for loan approvals, streamlined technical assistance to identify appropriate energy upgrades, a system for quality control, and easy on-bill loan repayment.
- *Tying the loan to the meter, as opposed to the building owner or tenant, may help to ease concerns related to the payback period for certain investments in energy upgrades.* For example, Efficiency Kansas program participants not only experience no out-of-pocket costs to make energy upgrades, but also are not responsible for paying back the financing once they move. The loan repayment stays with the property, which may enable even relatively short-term occupants to choose to make energy upgrades.
- *Promote energy upgrade financing as part of an integrated package.* Like rebates, streamlined technical assistance, marketing assistance and other resources for multifamily stakeholders, financing is only one component of a successful program to capture increased energy savings in existing multifamily buildings.
- *Partner with contractors.* Successful marketing of a multifamily financing program depends on partnering with contractors and supporting their efforts to understand and promote the program. Informed contractors can utilize attractive financing and other incentives as tools for marketing their own services.

## Property Assessed Clean Energy Financing

### Policy summary and program examples

Property assessed clean energy (PACE) programs enable local governments to provide financing to residential and commercial property owners for energy upgrades and renewable energy projects. Participating property owners then pay the financing back over a set number of years via a charge on the building owner's property tax bill. The financing is secured with a lien on the property, which is senior to the mortgage. There is little to no upfront cost to the property owner to participate, and if the property is sold before the end of the repayment period, the new owner inherits both the repayment obligation and financed energy improvements.

PACE programs tap into existing mechanisms that local governments are already familiar with, such as special tax districts or assessment districts, and allow these mechanisms to support clean energy projects. PACE programs can be funded through internal public agency funds or through issuance of bonds.

PACE can offer several benefits for property owners. One major benefit is the ability of participating property owners to achieve energy upgrades at little upfront cost and to amortize the repayment over a longer period (20 years) compared to many conventional financing programs. The long repayment period is designed to enable the payments to closely match the energy savings associated with the financed improvement. Because the repayment is also tied to the property as opposed to the property owner, current owners can invest in energy upgrades today knowing that repayment would be transferred to a new owner if he/she decides to sell the property in the future.

PACE was first proposed by the City of Berkeley in 2007. Several other PACE programs subsequently emerged throughout the U.S., but due to federal regulatory issues related to PACE liens being senior to the mortgage, residential PACE program development is suspended as of this writing. Despite suspension of development of new residential PACE programs, there are still a handful of active residential PACE programs as well as some local governments actively developing or administering commercial PACE financing.

One such program is the *ClimateSmart Loan Program in Boulder County, CO*.<sup>44</sup> This program is one of a handful of PACE programs that was active before the Federal Housing Finance Agency (FHFA) effectively placed a moratorium on such programs in July 2010. ClimateSmart offered one round of commercial PACE loans in fall 2010, but the residential ClimateSmart Loan program was suspended.

ClimateSmart for the residential sector began accepting applications in 2009. Phase 1 of the residential program financed approximately \$9.8 million in energy retrofits. Eligible improvements included air sealing, insulation, lighting retrofits, reflective roofs, landscaping (e.g., planting trees on south side of house), solar hot water systems, solar photovoltaic systems, and wood/pellet stoves, among others. The program was designed to take applications before the county issued bonds to finance the improvements. The first application period in April 2009 closed with 393 applications for over \$7.5 million in financing. The county then issued a bond to cover this amount.

According to a 2011 analysis of ClimateSmart by the U.S. Department of Energy,<sup>45</sup> residential ClimateSmart program spending in Boulder County contributed to 85 short-term jobs, more than \$5 million in earnings, and almost \$14 million in economic activity within the county. Reduced energy use from the upgrades saved participants approximately \$125,000 during the first year. Phase 1 program costs totaled about \$13 million, which means that short-term in-county benefits alone exceeded the initial investment in the program.

Businesses and multifamily properties were eligible for Boulder County's commercial ClimateSmart loans. Of the approximately \$1.5 million in loans originated in September/October 2010, approximately \$57,600 in loans were for energy upgrades in multifamily properties. Six multifamily properties participated, five of which replaced windows and one of which upgraded a furnace.

### PACE financing considerations for policy makers

Below is a selection of issues that should be considered in the course of taking any action in this policy area:

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<sup>44</sup> Boulder County, "Climate Smart: Loan Program." [Online]. Available: <http://climatesmartloanprogram.org/index.html>.

<sup>45</sup> Goldberg, Marshall and Cliburn, Jill K. & Coughlin, Jason. "Economic impacts from the Boulder County, Colorado, ClimateSmart loan program: Using property-assessed clean energy financing." 2010

- *PACE financing can address multiple major barriers to investment in energy efficiency in existing multifamily buildings.* It can reduce the “high initial cost” barrier by eliminating or greatly minimizing upfront costs of making energy improvements. It can also make ongoing loan repayments easier by enabling the payments to closely match the energy savings achieved through the upgrade.
- *Prime the pump with rebates and other services.* Like other forms of financing, PACE financing will be more attractive to multifamily property owners if rebates exist to lower the cost of the energy upgrades and to lower the loan amount.
- *Partner with contractors to market the program.* Contractors will leverage PACE and other incentives to enlist clients.
- *Capture and report outcomes.* Given that PACE is a relatively new strategy that is still being tested, effectively tracking and reporting outcomes and case studies will not only assist with internal project management and planning but will also benefit other local governments considering PACE as an option.
- *PACE financing has been applied in existing multifamily buildings.* Six multifamily properties participated in the first round of Boulder County’s ClimateSmart Loan program. Other PACE programs have also served multifamily property owners too.
- *The future of PACE is uncertain, but is worth monitoring.* There are currently four active commercial PACE programs. There are several more commercial PACE programs that are in the design or planning stage.<sup>46</sup>

## Tax-based incentives to encourage energy efficiency investments

**Tax incentives**, both income and property-based, can be used to encourage private investment in energy efficiency. Tax incentives are ultimately designed to reduce total project costs by reducing the amount of taxes owed by the consumer. Tax incentives can come in the form of a tax credit, which directly reduces the amount of income taxes or property taxes due by the credit amount; or in the form of a tax deduction, which reduces a consumer’s taxable income and, therefore, the taxes that are due. Ideally, reduced government tax revenue due to the provision of tax incentives is offset by additional tax revenue gained from job creation spurred by increased investment in energy upgrades.

In addition to income tax credit and deductions opportunities, local governments might also elect to reduce property taxes as a means of offering incentives to building owners that do energy efficiency or renewable energy projects. At a minimum, local and state governments should take care to make sure that such projects will not subject the building owner to additional property taxes.

<sup>46</sup> Renewable Funding, Lawrence Berkeley National Laboratory, Clinton Climate Initiative. “Policy brief: Property assessed clean energy financing: Update on commercial programs.” Mar. 2011.

Current tax incentives for energy efficiency improvements that impact the multifamily sector are available at all levels of government:

- *Federal tax incentives* for energy efficiency tend to be short in duration and, like the Residential Energy Efficiency Tax Credit, may be modified during their tenure. The Low Income Housing Tax Credit is an enduring Federal tax incentive that can include energy efficiency and has been used extensively in the creation of affordable multifamily housing.
- *State tax incentives* include limits to income tax liability for projects that advance energy efficiency in buildings including multifamily housing developments.
- *Local tax incentives* use property tax credits or abatement to encourage development or redevelopment that is energy efficient.

## Federal tax incentives

### Policy summary and program examples

Federal tax incentives, available nationwide, can help remove barriers to energy upgrades. Targeted at property owners or developers, there are current Federal tax deductions and tax credits available to the multifamily building sector. In addition, there are also Federal tax incentives to support the installation of renewable energy systems, including geothermal heat pumps, small wind turbines, solar energy systems, and fuel cells, which may apply to selected multifamily units or buildings. However, the applicability of the multifamily sector is difficult to determine and is worked into legislation designed to apply to either a commercial building owner or a homeowner. Therefore, assistance at the local level may be needed to help identify and fully utilize the available Federal incentives.

The *Energy Efficient Commercial Buildings Deduction* was initially established as part of the Energy Policy Act of 2005, has been extended several times, and currently expires at the end of 2013.<sup>47</sup> Owners of new or existing commercial buildings are eligible for tax deductions from \$0.30-\$1.80 per square foot for installing energy efficiency measures such as improvements in interior lighting, building envelope, HVAC, or hot water systems that meet specific energy reduction targets. Although not immediately obvious, multifamily high rise buildings (with four or more habitable stories) are a type of commercial building eligible for the tax deductions allowed by this regulation.

Specific tax incentives also exist to encourage development of energy efficient, affordable rental housing for low-income households. The *Low Income Housing Tax Credit* (LIHTC) program provides the private market with an incentive to invest in affordable rental housing. Federal housing tax credits are awarded to non-profit affordable housing developers of qualified projects.<sup>48</sup> Non-profit developers then sell these credits to investors to raise capital for their projects, which reduces the debt that the developer would otherwise have to borrow. Because the debt is lower, a tax credit property can in turn offer lower, more affordable rents.

<sup>47</sup> "Commercial Building Tax Deduction Coalition." [Online]. Available: <http://www.efficientbuildings.org/>.

<sup>48</sup> U.S. Department of Housing and Urban Development, "Low-Income Housing Tax Credits | HUD USER." [Online]. Available: <http://huduser.org/portal/datasets/lihtc.html>.

Investors receive a dollar-for-dollar credit against their Federal tax liability each year over a period of 10 years. The amount of the annual credit is based on the amount invested in the affordable housing. This federal tax credit program is administered and allocated at the state-level. As of the Housing and Economic Recovery Act of 2008, Federal code requires that the energy efficiency of a project must be one of the considerations in a state's priority and allocation of LIHTC. In New Jersey and other states, for example, affordable housing developers competing for the LIHTC must build to the ENERGY STAR for Homes qualification and can earn points by including various clean energy measures in the development.

## State tax incentives

### Policy summary and program examples

In addition to Federal income tax incentives, and the state programs to administer LIHTC funds, some states have created programs that limit tax liability for projects that advance energy efficiency in buildings, including multifamily housing developments.

The State of Oregon operates the longest running, and perhaps most innovative, tax incentive program in the U.S. designed to increase investment in clean energy. The *Oregon Business Energy Tax Credit* (BETC) was adopted in 1979 and is operated by the Oregon Department of Energy.<sup>49</sup> Qualifying business owners, including rental property owners, can deduct 35% of eligible energy efficiency and renewable energy project costs from their state income tax liability, up to a maximum of \$10 million. The tax credit is based on the incremental difference in cost between the existing equipment and the new, more efficient equipment. New equipment must be at least 10% more efficient than existing equipment; lighting retrofits must be at least 25% more efficient.<sup>50</sup>

The BETC includes an innovative feature that enables the owner of an energy project to transfer the tax credit to another entity in exchange for a lump-sum payment. Although the lump-sum payment, which is set by the Oregon Department of Energy, is lower than the tax credit value, it can still be attractive for businesses or property owners who would rather have the payment in advance of the tax refund.

In addition, several states, including New Mexico and Oregon, have created legislation that grants corporate or personal income tax credits for buildings that are built or renovated to strict energy standards. Funds for the State of Maryland's program are currently exhausted, but did include multifamily buildings with at least 12 units as one type of eligible project.

## Local tax incentives

### Policy summary and program examples

At the local level, communities may choose to offer property tax incentives to encourage development, redevelopment or retrofits that are energy efficient.

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<sup>49</sup> Oregon Department of Energy, "ODOE: Information for Businesses Business Energy Tax Credits." [Online]. Available: <http://www.oregon.gov/ENERGY/CONS/BUS/BETC.shtml>.

<sup>50</sup> Asia Pacific Partnership on Clean Development and Climate, Renewable Energy & Energy Efficiency Partnership, Alliance to Save Energy, American Council on Renewable Energy. "Compendium of best practices: Sharing local and state successes in energy efficiency and renewable energy from the United States." Apr. 2010. p.64.

*Howard County, Maryland*, for example, offers several types of property tax credits to encourage energy efficiency and green building practices.<sup>51</sup> The County's offerings include both a High Performance Building Tax Credit and a Green Building Tax Credit for buildings that receive the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver certification or above. In addition, the Energy Device Conservation Credit is available to homeowners that install new heating, hot water or electric generation systems using a renewable energy source like solar or geothermal.

The *City of Cincinnati, Ohio* currently offers property tax abatement for new LEED construction of 1-3 unit residential buildings, including condominiums, for 100% for 15 years (up to \$546,400).<sup>52</sup> In addition, renovated LEED residential buildings can qualify for a 10-year tax abatement on the improvements.

### Federal, state, and local tax incentive considerations for policy makers

Consider the items below in the course of taking any action in this policy area:

- *Assistance is needed to identify improvements eligible for tax incentives.* Determining whether multifamily buildings are eligible for existing Federal, state, and local tax incentives is often not trivial, particularly as incentives are altered over time. Local outreach and assistance to multifamily building owners and residents should include regularly updated identification of applicable tax incentives.
- *Consider opportunities to tailor incentives to the multifamily sector.* There are few tax incentives that are tailored to the multifamily sector. As national efforts to capture energy savings in multifamily buildings evolve, finding opportunities to provide strategic tax incentives to multifamily building owners may hold potential.

## Strategies for affordable housing and with potential relevance to rent controlled housing

Each of the policy tools outlined in this report is relevant to the affordable multifamily housing sector. The purpose of this section is to highlight specific tools currently in use only in the existing multifamily affordable housing (i.e., government-owned or subsidized) sector. The tools identified below are tailored to this sector's unique complexities, but are also relevant, in concept, to the rent controlled market.

Note that although there are many important efforts underway to better align and streamline energy services, incentives, and workforce training in the multifamily

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<sup>51</sup> Howard County, Maryland, "Howard County – Real Property Tax Information." [Online]. Available: <http://countyofhowardmd.us/Departments.aspx?ID=1465#anch71808>.

<sup>52</sup> City of Cincinnati, "City of Cincinnati – LEED-CRA Green Commercial Tax Abatement." [Online]. Available: <http://www.cincinnati-oh.gov/cdap/pages/-16940/>.

affordable housing sector, the scope of this report does not include a comprehensive review of existing efforts.

One policy mechanism used by the Tax Credit Allocation Committee<sup>53</sup> (TCAC) in California to remove barriers to energy efficiency in the affordable housing sector is the *California Utility Allowance Calculator (CUAC)*.<sup>54</sup> The CUAC is designed to make utility allowances affecting tenants' rents more accurately reflect the true energy costs in a given building.<sup>55</sup> We highlight the CUAC for its potential to help developers of affordable multifamily housing recoup investments in energy efficiency in their buildings while improving occupant comfort at the same time. We also highlight the CUAC for its potential relevance in concept, not in current practice, to rent controlled and non-rent controlled market rate housing.

Currently, the CUAC is intended for use in new affordable housing construction or substantial rehabilitation projects receiving Low Income Housing Tax Credits and that include energy efficiency improvements beyond those required by the 2008 California Building Energy Efficiency Standards<sup>56</sup> and/or onsite solar photovoltaic systems.

Utility allowances are provided by public housing authorities to cover the cost of qualified tenants' energy utilities in public housing and U.S. Department of Housing and Urban Development (HUD)-assisted housing. The public housing authorities' utility allowance calculation is an estimate based on existing housing stock and other variables. This estimate often does not reflect energy efficiency gains (and associated lower energy costs) made in new or upgraded construction. This can have the effect of creating a disincentive for affordable housing developers to invest in energy efficiency.

Public housing authorities and TCAC cap the housing burden of the tenants they serve to 30% of adjusted gross income (AGI). The housing burden includes rent plus an estimate of utility costs. If, for example, a tenant's AGI is \$800 per month, the housing burden (rent plus utilities) would be capped at \$240. If the utility allowance is \$40 per month, then rent to the building owner is effectively \$200. If, based on property-specific knowledge of utility cost savings from energy upgrades calculated by the CUAC, the utility allowance is decreased to \$25 per month, then the rent to the building owner increases to \$215. The extra \$15/month to the building owner helps to offset the cost of his/her investment in the energy upgrades or other capital improvements that benefit the tenant.

A critical component of the example above is the property-specific knowledge of utility cost savings from an energy upgrade. This estimate is conducted through a

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<sup>53</sup> The California Tax Credit Allocation Committee (TCAC) administers the federal and state Low Income Housing Tax Credit Programs. Find more information on TCAC here: <http://www.treasurer.ca.gov/ctcac/>

<sup>54</sup> Go Solar California, "California Utility Allowance Calculator (CUAC) for the New Solar Homes Partnership." [Online]. Available: <http://www.gosolarcalifornia.org/affordable/cuac/index.php>.

<sup>55</sup> The utility allowance is the amount affordable housing tenants are expected to pay each month for utilities, as a portion of the HUD maximum allowable "housing burden" (total amount residents are expected to pay for combined rent and utilities).

<sup>56</sup> For affordable housing projects done in 2009 the applicable state Building Energy Efficiency Standards is the 2005 version.

software model used by qualified professionals approved by the State of California to calculate project-specific utility allowances. The accuracy of the estimate is critical as it affects the utility allowance provided to the income-qualified tenant. The professional using CUAC must verify that a given project is actually more energy efficient than the default. Specific energy upgrade measures must be closely verified by a third party through visual inspection, review of manufacturer specifications for installed appliances, and other forms of diligence.

Property-specific knowledge of utility cost savings from an energy upgrade is a critical component of the CUAC; that is also the component of this tool that is potentially conceptually relevant to rent controlled and non-rent controlled market rate existing multifamily buildings. If, for example, an owner of a rent controlled, individually metered multifamily property conducts an energy upgrade to his/her building that reduces tenants' utility bills, and the impact of the energy upgrade on the tenants' utility bills can be reliably quantified and verified by a third party, then the potential also exists that the costs and benefits of the energy upgrade can be equitably shared between owner and tenant. Such a mechanism would squarely address the split incentive barrier. This concept will be considered in developing policy recommendations in later phases of the BEES project.

A tool related to the CUAC, the *Energy Efficiency-Based Utility Allowance (EEBUA)*, is also designed to help affordable housing developers achieve a payback for investment in energy efficiency. Unlike the CUAC, the EEBUA does not provide a property-specific calculation of the utility cost savings from energy upgrades. Instead the EEBUA is established by a given public housing authority for any building within the housing authority's jurisdiction that achieves a certain minimum level of energy efficiency. The EEBUA level represents the average energy savings of projects within the housing authority's jurisdiction that achieve a minimum verifiable level of efficiency.<sup>57</sup>

Finally, in addition to the tools identified above, also under consideration in the cities of Berkeley, Oakland, and Emeryville are additional strategies to create incentives for increased energy efficiency for property owners that have tenants with Section 8 vouchers.

### CUAC and EEBUA considerations for policy makers

Below is a selection of issues that should be considered in the course of taking any action in this policy area:

- *The CUAC and the EEBUA have the potential to help create an incentive for affordable housing property owners to invest in energy upgrades. These tools can enable property owners to recoup some*

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<sup>56</sup> For a detailed discussion of utility allowance options see: Enterprise Green Communities. "Utility allowance options for investments in energy efficiency: Resource guide." May 2011.

of their investment in energy upgrades. Such investments make housing units healthier and more comfortable for tenants.

- *The CUAC currently only applies to new affordable housing construction receiving Low-Income Housing Tax Credits. Applying the CUAC to existing construction is a potential next step, but verifying energy improvements would be more complicated in this context.*
- *TCAC employs a sophisticated process for conducting verification of accurate energy modeling as well as verification of installation of energy efficiency improvements that would result in energy and utility cost savings. Any city or county public housing authority or other entity proposing to rely on the CUAC will need to have a mechanism for ensuring the same level of quality control.*

## Tools for removing the split incentive barrier

Split financial incentives between multifamily building owners and tenants are commonly cited as a barrier to making energy upgrades, especially where units are individually metered for energy use as is commonly the case in the East Bay. Building owners are often reluctant to invest in energy improvements that reduce energy costs for tenants but offer no direct financial return for the owner. In buildings without individual meters where owners pay utility costs, tenants likewise receive no direct financial incentive to conserve energy. It may be possible to accelerate the implementation of energy efficiency upgrades if tools can be developed to directly remove the split incentive barrier.

Tools could be designed to remove the split incentive barrier by increasing the capacity of property owners to make energy improvements and recoup their costs in a manner that pays for the improvements made while ensuring appropriate sharing of costs and benefits between owners and tenants and protections of both parties (e.g., owners cannot impose additional payments upon renters at a rate greater than energy cost savings realized by renters). Assuming accurate and transparent projections can be derived for energy improvement project implementation costs, energy savings and cost savings, it may be possible to enable repayment by either party to the implementing party through a variety of mechanisms. It would be necessary to meet cost protection and other needs of both owners and tenants, and to enable appropriate sharing of the net benefits created through energy efficiency.

Despite being a potentially significant strategy, few examples of model actions in this area have been identified in use in other jurisdictions.

Tools to remove the split incentive barrier could potentially take several forms, including:

- Development of legally vetted model lease language that property owners would be encouraged to incorporate into their lease agreements designed to enable energy improvements to be made under specified conditions with a clear process for identifying costs and benefits to both parties and a structure for enabling costs to be recouped in an appropriate manner;
- Adoption of policy changes if needed to enable such lease language to be incorporated; and,
- Development of technical tools for projecting cost savings associated with certain energy improvements to existing multifamily buildings to help all parties establish a ceiling on potential repayment obligations passed on to tenants (e.g., enhanced version of the CUAC).

Several organizations (e.g., Building Owners and Managers Association) have developed model green lease language for owner-tenant relationships in the commercial sector that may have application in the multifamily residential sector as well.

## Streamlined technical assistance

### Policy summary and program examples

Streamlined technical assistance can significantly advance efforts to engage multifamily property owners in conducting energy and green upgrades in their building and in taking advantage of programs and services designed to help them do so. Effective technical assistance includes the following components:

- Preliminary design assistance and scoping for individual energy upgrade projects
- Independent evaluation of energy upgrade opportunities in a building or portfolio of buildings, including input on prioritization, integration with asset management plans and clear communication of costs and benefits, such as return on investment
- Tailored identification of and connection to rebates, financing, tax incentives and other services that will lower the cost and otherwise make energy upgrades economically feasible for a building owner
- Assistance identifying contractors and other energy services professionals as necessary
- Assistance with ongoing monitoring of building performance post-energy audit and upgrade

It is important that such assistance be coordinated and easy to access for property owners. Feedback from property owners and managers gathered for this report pointed to the need for a “one-stop shop” or single point of contact that

would reduce the transaction costs and stress associated with developing a project scope and securing the necessary incentives.

The two program examples highlighted below exemplify the start to finish, streamlined technical assistance that can mitigate transaction costs for multifamily property owners:

- *Energy Upgrade California* is a program designed to provide incentives and customized guidance to multifamily property owners to help identify deep energy savings at the lowest possible cost.
- *Smart Lights* is a successful San Francisco Bay Area-based program that functions as an independent one-stop-shop for lighting and refrigeration upgrades in small businesses.<sup>58</sup> The streamlined, integrated nature of the program provides lessons for multifamily energy programs.

*Energy Upgrade California* is ultimately envisioned to serve as a streamlined energy efficiency upgrade resource for California residents. At the current time, the resources available through Energy Upgrade California are limited to single-family residents, except for selected markets.

For example, the Energy Upgrade California in Alameda County program is using funding from the U.S. DOE Better Buildings Program to provide multifamily building owners a free consultation with a green building expert to help establish upgrade goals for a building or portfolio. This customized guidance helps building owners access additional resources and maximize the energy and other green benefits, including water savings, of the upgrades while minimizing cost. As part of Energy Upgrade California in Alameda County, existing multifamily buildings are also eligible to receive rebates for the third-party green building certification GreenPoint Rated. The certification provides recognition and marketing benefits for green upgrades.

Efforts are also under way to develop an online “Navigation Tool” that effectively provides the streamlined technical assistance offered by Energy Upgrade California in Alameda County. StopWaste.Org, in partnership with Heschong Mahone Group, Incorporated (HMG), is developing the logic model and promoting the tool to potential users. Renewable Funding is responsible for programming the tool and integrating it with the state’s Energy Upgrade California web portal.

Users of the Navigation Tool will input basic property data, including building locations, vintages, and utility billing data, in addition to anticipated building rehabilitation projects (or goals) and available funding. For each building, users will add detail on each building component and system, such as the type, age, and efficiency of the boiler.

The Navigation Tool’s output will include upgrade opportunities and recommendations based on the extensiveness of the upgrade approach. A customized list of

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<sup>58</sup> Community Energy Services Corporation, “CESC – Community Energy Services Corporation – Smart Lights.” [Online]. Available: <http://www.ebenergy.org/smartlights/>.

available upgrade incentive programs, matched to the identified upgrade opportunities, will also be created for the user. The tool will help the user in ranking the priority of the potential projects and buildings within the portfolio. In customizing the potential pool of programs to those that are applicable based on the building characteristics and the owner's rehabilitation priorities, the Navigational Tool reduces administrative costs and barriers for the building owner. The Navigational Tool also encourages the maximum leveraging (and layering) of programs and resources. Rather than forcing an "all or nothing" approach, the Navigational Tool is designed to inspire action through customized recommendations.

The Navigation Tool will ultimately be housed on the Energy Upgrade California website. A log-in will allow for repeated visits to update information and check in on the prioritized list of portfolio properties and their corresponding incentive program recommendations. A related project, the Tracking Tool, will integrate with the Navigation Tool and allow managers of multifamily buildings to monitor their buildings and upgrades over time.

The technical assistance being provided through Energy Upgrade California has many of the same components that make the *Smart Lights Program* an effective service for small businesses and multifamily property owners in the East Bay of the San Francisco Bay Area. Administered by the Community Energy Services Corporation (CESC), Smart Lights offers small businesses and common areas of multifamily buildings free start-to-finish technical assistance and instant rebates to reduce the cost of upgrades such as comprehensive lighting retrofits and refrigeration tune-ups. The Smart Lights service includes:

- An independent, single point of contact for the client
- A free no-obligation energy efficiency assessment
- Clear, upfront communication of a project's cost/benefit analysis
- Instant rebates that typically range from 50%-70% of total project costs and up to 90% in some instances
- Low-cost equipment through negotiated volume pricing with qualified installation contractors
- Free start-to-finish project management and quality control
- Rebates paid directly to contractor to help defray the client's out-of-pocket and transaction costs
- Referrals to other energy-efficiency programs as needed

At the time of this writing, CESC is also piloting an integrated audit that identifies improvement opportunities beyond lighting and refrigeration upgrades.

In Berkeley alone Smart Lights provided high quality energy-efficient lighting and refrigeration improvements to 25% of the approximately 3,500 Berkeley

businesses between 2002 and summer 2011. As of August 2011, annual savings on energy bills across all Berkeley businesses served by Smart Lights exceed \$1 million. The corresponding energy saved annually across all projects is approximately 6.4 million KWh.

The Smart Lights program is funded by California ratepayers through PG&E under the auspices of the California Public Utilities Commission.

### Streamlined technical assistance considerations for policy makers

Below is an issue that should be considered in the course of taking any action in this policy area:

- *Multifamily property owners desire streamlined, start-to-finish, one-stop-shop technical assistance that is independent of a profit motive.* The current energy program landscape is confusing and daunting for multifamily stakeholders. This causes missed opportunities for energy upgrades. Programs like Smart Lights and Energy Upgrade California can provide valuable lessons for how to design an effective technical assistance package that improves access to other existing programs and services.

## Workforce development

As discussed in this report, existing multifamily buildings are diverse in several ways and include complexities and barriers that do not exist in single-family homes. The vintage and physical configuration of a multifamily building affects the types of building systems present as well as the technical protocols and applicable codes and standards. As such, the multifamily sector requires programs and services designed specifically for multifamily buildings. It follows that the energy professionals doing the work must also participate in specialized training geared toward the multifamily context.

In its 2011 report, the California Home Energy Retrofit Coordinating Committee (HERCC) recommends targeting specialized training at four types of professionals that have important roles in capturing energy savings in multifamily buildings:<sup>59</sup>

- *Energy raters/verifiers:* Training for these professionals should ensure that they are well-versed in energy program and incentive requirements and have the expertise to evaluate and recommend energy-saving opportunities in multifamily buildings and verify the quality of completed upgrades. The HERCC supported the development of a multifamily-specific training curriculum for raters/verifiers.

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<sup>59</sup> Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee. "Improving California's multifamily buildings: Opportunities and recommendations for green retrofit & rehab programs." 8 Apr. 2011. p.29.

- *Building operators*: Training should be designed to empower building operators to sustain energy savings over time and to help educate tenants about a building's green features and resident-oriented rebates and services.
- *Central water heating contractors*: Given the significant potential for energy savings associated with improving water heating systems in multifamily buildings, the HERCC recommends targeted training for the professionals that work on such systems.
- *Energy analysts*: Training for these individuals includes instruction in the use of software tools necessary to model energy baseline and energy reduction opportunities.

Importantly, the HERCC also recommends that professional qualifications and trainings required for various energy programs offered throughout the state should be coordinated so trained workers can work across programs while limiting the amount of separate trainings and certifications required of them.<sup>60</sup>

As multifamily-specific training programs emerge and evolve throughout California and the U.S., we cite here one innovative training program example that exemplifies the HERCC's recommendation above regarding empowering building operators maximize energy efficiency in their buildings.

Based in New York City, the *Green Supers Program* is a cooperative effort between the city, property managers, superintendents, and SEIU local 32BJ, the largest private sector union in the state.<sup>61</sup> During the course of five weeks, building superintendents and resident managers are trained on how to operate their buildings in a way that maximizes energy and water efficiency and minimizes utility bills. The 40-hour training covers everything from building science basics, to optimizing heating and cooling systems, to monitoring indoor air quality. Concepts like green cleaning and pest control are also covered, and electives are offered on topics ranging from green roofs, to renewable energy, to water reuse.

The class is a mix of classroom learning and hands-on training. Upon completion of written and field tests each participant is awarded green building certifications from the Building Performance Institute and the Urban Green Council.

Local 32BJ is a key partner in helping to recruit participants for the training. The union has contact information for its members, which makes marketing the program to them relatively easy. Contributing to the success of the program has also been property management companies' support for having their employees participate in the training. Management companies have been approving employees' requests to enroll

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<sup>60</sup> Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee. "Improving California's multifamily buildings: Opportunities and recommendations for green retrofit & rehab programs." 8 Apr. 2011. p.29.

<sup>61</sup> "1,000 Green Building Superintendents – Our Plan for a Greener New York City." [Online]. Available: <http://www.1000supers.com/about.php>.

in the 40-hour course and many have also provided building space in which students learn practical field applications.

The Green Supers Program is funded by the U.S. Department of Labor and administered by the Thomas Shortman Fund.

### Workforce development considerations for policy makers

Below is a selection of issues that should be considered in the course of taking any action in this policy area:

- *Building energy professionals need specialized training designed specifically for multifamily buildings.*
- *Professional qualifications and trainings required for various multifamily energy programs funded by utilities and government should be coordinated so trained workers can work across programs while limiting the amount of separate trainings and certifications required.*
- *Building operators, superintendents and other building staff are a key audience that requires training and support in order to maximize and sustain the benefits of energy upgrades. The Green Supers Program effectively empowers these stakeholders to better understand their buildings and the systems, appliances, and products within.*

## Marketing, outreach and education

Multifamily property and owners and tenants often have limited knowledge of the potential benefits and process of making energy improvements, and limited motivation for engaging in this work. Property owners lack access to resources that can illustrate the scale of energy (and money) saving potential in their buildings. Even for property owners seeking to increase energy efficiency in their buildings, the prospect of identifying appropriate improvements and the energy programs and services that support getting those improvements done can be overwhelming and frustrating. Marketing, outreach and education efforts can help to foster interest in energy efficiency and to address this frustration by raising awareness of existing services relevant to the existing multifamily sector and demystifying the process of taking advantage of them.

Collectively, marketing, outreach and education can connect multifamily stakeholders with the services available to them and to encourage the behavior changes necessary to achieve reduced energy use and the associated emissions. For the purposes of this report, marketing, outreach and education activities are grouped into three broad categories:

- *Targeted outreach* activities identify the key audience and tap into trusted and existing networks. Target audiences for the multifamily sector are often contractors, property owners, managers, building operations staff, and tenants.

- *Marketing and engagement* raises awareness and creates demand for a program. Marketing can be used to motivate or provide publicity as positive reinforcement to those who participate in energy efficiency programs.
- *Consumer education* teaches tenants and building owners and managers about maximizing energy performance and minimizing energy use. Technology can assist in educating consumers about energy consumption through mechanisms such as smart bills or smart meters.

## Targeted outreach

### Policy summary and program examples

Outreach to key stakeholders in the development phase of a project can create support for new programs or policies. Once a program is ready to launch, outreach is vital to increasing participation. Local energy efficiency contractors and other industry partners can be key allies in targeted outreach efforts. It is in the best interest of contractors to be engaged and informed regarding available incentive programs as such programs can be a selling point for their services. Some outreach programs utilize contractors as the primary point of contact for both identifying energy upgrade opportunities and in educating owners on applicable rebates and incentives.

Property owners can be another key target audience for outreach efforts, as they are the ultimate decision-makers regarding major capital investments. Local property owner associations that represent property owner interests and often have regular meetings and newsletters can be a valuable outreach avenue. Reaching property owners and managers in the early stages of a building retrofit project, before decisions about scope and the associated financing are made, is critical.

Other audiences of importance include building operators and managers. Many multifamily buildings have professional building operation staff persons who communicate with building owners regarding large purchasing decisions, and who are also in charge of building system maintenance, tenant relations, and other matters. These individuals are the frontline for all building related matters and therefore need appropriate training for how to identify and sustain energy efficiency opportunities. They can be equipped to inform tenants and building owners about incentives that are available to them. Highlighted in the previous section, the *Green Supers* program in New York City works effectively through the local union to train on-site building managers on the importance of energy efficiency and how to operate and maintain a green apartment building.

Although tenants are not empowered to make many of the decisions required to achieve deep energy savings in a multifamily rental building, they are nonetheless an important audience for outreach and education. Collectively, their preferences regarding unit comfort and energy efficiency can affect the market over time by nudging landlords toward more investment in energy upgrades. Further, tenants are often empowered to make some basic in-unit upgrades, such as appliance and lighting upgrades and weatherization.

In Berkeley, *Rising Sun Energy Center* operates a program called *California Youth Energy Services (CYES)* that is available to homeowners and tenants alike.<sup>62</sup> Rising Sun hires youth ages 15-22 and trains

<sup>62</sup> "Rising Sun Energy Center: California Youth Energy Services." [Online]. Available: <http://www.risingsunenergy.org/content/cyes.html>.

them to conduct basis energy and water use assessments and to install free energy and water-saving devices such as CFLs, clotheslines, and faucet aerators. The CYES teams also provide personalized recommendations for further savings and associated incentives. The program is funded by utility ratepayer dollars. It is a free service and is one of the few energy service programs that specifically targets renters.

## Marketing and engagement

### Policy summary and program examples

Marketing, through broadcast media, peer-to-peer messaging or even competition, can increase participation and give validity to an energy efficiency program or service. Marketing is also used to showcase program outcomes and recognize the work of landlords who demonstrate leadership in energy efficiency.

*Weatherize DC*, for example, is achieving results in the single-family energy retrofit market by using a combination of high-level media marketing and house meetings where neighbors share their experiences in making energy upgrades.<sup>63</sup> Also targeting neighborhood relationships is *Energy Smackdown*, an energy efficiency competition that pits neighborhoods against one another to see which group can save the most energy.<sup>64</sup> Energy Smackdown also piloted a reality television program to motivate and challenge the home audience to save energy and water and reduce waste.

Marketing a building's green features when it is available for rent or sale helps educate buyers and tenants about key green attributes or potential energy savings. Green certification, through a third-party organization like LEED or GreenPoint Rated, can give validity to these claims and potentially influence buyer and tenant decision-making. The marketability of green building certification, or other green features, is greatly enhanced if tied into the real estate Multiple Listing Service (MLS) or standard rental listing. A rental or for-sale listing service that adds additional fields to identify green features including the energy efficiency of the home recognizes building owners for creating high performance homes. Portland successfully incorporated green criteria into the *Portland Regional Multiple Listing Service* (Portland RMLS) in 2007.<sup>65</sup> The additional fields included a green certification field and drop down menus of green features, such as ENERGY STAR appliances, recycled content for materials, and solar. A training program for real estate professionals was concurrently offered to standardize terms and educate agents on how to market green features to homebuyers.

<sup>63</sup> The DC Project, "Weatherize D.C." [Online]. Available: <http://www.weatherizedc.org/>.

<sup>64</sup> BrainShift Foundation, Inc., "Energy Smackdown." [Online]. Available: <http://www.energysmackdown.com/>.

<sup>65</sup> "RMLS.com™ Regional Multiple Listing Service – Home." [Online]. Available: <http://www.rmls.com/RC2/UI/Home.asp>

## Consumer education

### Policy summary and program examples:

Regardless of who is paying the utility bill, it is important that both renters and property owners understand how energy efficiency and conservation actions can be taken and what the benefits of such action would be. Tailored consumer education can help educate both the landlord and the end-user on energy efficiency.

Most tenant education involves a checklist of simple activities designed to reduce consumption. Providing tips about turning off lights or turning down thermostats can encourage end-users to conserve but may not have long-term results. An effective education campaign however, provides ongoing feedback and information to help the consumer move towards a set of goals. Education is also needed when new technologies are installed to help tenants understand how to optimize use and limit frustration with automated technologies.

When tenants pay the utility bill, real-time access to energy data can be used to motivate energy use reductions. Technologies such as home energy monitors that communicate energy use on user-friendly displays can provide consumers with information about the cost of the energy they consume and demonstrate how changes in behavior can alter energy consumption and expenditures. Utility bills inserts that leverage social norms can also encourage behavior change of the energy end-user by showing their usage compared to other similar customers. *Sacramento Municipal Utility District (SMUD)* in partnership with *Positive Energy* piloted a *Home Energy Reporting System* to better use their customer data to engage residential customers.<sup>66</sup> Customers receive monthly reports alongside their bill where they are compared against similar households, in order to give each household a true “benchmark” about how they were doing in terms of relative consumption. The monthly bill reports can be customized in order to best target messaging, are designed to be easy to read, and are received on an opt-out basis rather than opt-in. Initial results for this program showed that households receiving the reports reduce energy consumption by approximately 2%.<sup>67</sup>

### Consumer education considerations for policy makers

Below is a selection of issues that should be considered in the course of taking any action in this policy area:

- *Know your audience.* Messaging should be relevant and useful to your chosen audience (building owners, property managers, building supervisors, tenants, etc.).
- *Provide tools for property owners to market their green choices.* Property owners and managers who invest to upgrade or green their buildings need mechanisms to communicate to consumers that they have a superior product.
- *Reach property owners through building owner associations.*
- *Incorporate tenant engagement and education.*
- *Without repeated social, physical, or emotional reinforcement, new information will probably be ignored and recommendations will go unheeded.* Education campaigns that generate multiple encounters with the information over a moderate period of time and through multiple sensory and social channels (social peers, newspapers/media, visual signage, etc.) are more likely to work.

<sup>66</sup> California Energy Commission, “Home Energy Rating System Program (HERS).” [Online]. Available: <http://www.energy.ca.gov/HERS/>.

<sup>67</sup> Positive Energy Written Testimony submitted to PA PUC on 11/14/2008 see Docket No. M-0061884 <http://www.puc.state.pa.us/electric/pdf/EnBanc-DSR/Ttmy-PE111908.pdf>

# Conclusion

Capturing energy savings in existing multifamily buildings is an important but often overlooked arena for reducing global warming emissions, increasing energy affordability, and creating jobs. Our review of the research, plus interviews with economists and building experts working in the multifamily context, not only illustrated the significant energy-saving potential in this sector, but also the need to capture that potential in our communities.

But while the potential is clear, the barriers to achieving it are not trivial. These include split financial incentives between landlords and tenants, a highly diverse and fragmented market for which one-size-fits-all strategies will not work, and high transaction costs that stand in the way of engaging property owners in energy upgrade efforts.

Several governments in the U.S. and beyond are employing innovative policy mechanisms to address these barriers. In doing so they are contributing solutions not only for the benefit of their own communities, but also for the benefit of other policy makers grappling with the same challenge. This report benefited from these on-the-ground actions and is designed to inform future action, not only in Berkeley, Oakland and Emeryville, but for a broader audience as well.

Clearly, achieving market transformation in existing multifamily buildings requires a multi-pronged approach. A combination of minimum standards and requirements; incentives that enable going beyond the minimum required; and outreach, technical assistance and other strategies that remove barriers to accessing the resources and services that are available are needed. This report is not meant to serve as a comprehensive review of all such programs and policies, but, rather, a selection of efforts that help illustrate the types of policy mechanisms that are available.

Our review of existing efforts is the first step in an effort by the cities of Berkeley, Oakland, and Emeryville to develop enhanced local strategies to increase energy efficiency, improve occupant comfort and safety, and lower the energy cost burden in our communities' apartment buildings, cooperatives, and condos. A companion to this report includes an analysis of the energy-saving potential of the local multifamily building stock. Using these two reports as a foundation, the next steps for the BEES project are to develop, gather community input on, and pilot potential strategies for implementation in our communities.

# Appendix

## Multifamily Energy Efficiency Survey

### Purpose and methodology

In March 2011, the cities of Berkeley, Oakland, and Emeryville, CA conducted a Multifamily Energy Efficiency Survey of local governments across the U.S. to glean best practices and identify commonly faced hurdles. The survey was a first step in our research. Survey responses helped the three cities to begin to understand the multifamily energy efficiency policy landscape. This report, *Increasing Energy Efficiency in Existing Multifamily Buildings: An Overview of Challenges, Opportunities & Policy Tools*, benefited from the survey responses summarized below as well as literature review and interviews with leading experts in the field.

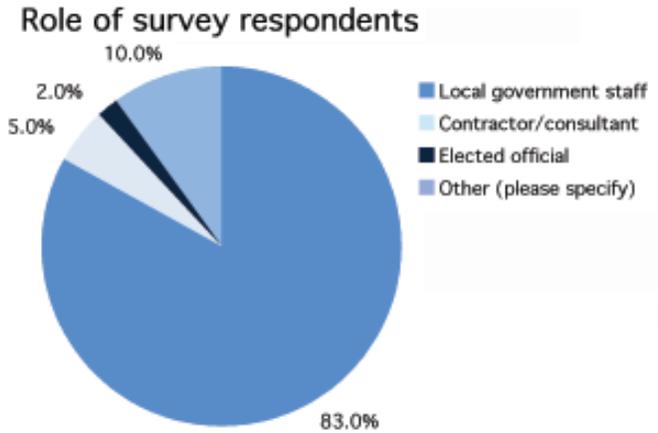
The survey contained 9 questions and was administered online using Survey Monkey. The survey received 100 responses; the number of complete survey responses totaled 51 (n=51). It was distributed to over 2,000 recipients, mainly through existing local government networks and membership organizations, including:

- Green Cities California
- ICLEI – Local Governments for Sustainability
- League of California Cities
- Local Government Commission
- Urban Sustainability Directors Network

For more information about the survey please contact Timothy Burroughs, City of Berkeley Climate Action Coordinator, at [tburroughs@cityofberkeley.info](mailto:tburroughs@cityofberkeley.info).

# Response Summary:

Q1: What is your role at the local government for which you work? (n=100)



Q2: For which local government do you work or consult? (n=95)

The majority of responses came from communities in California. Because most of the survey responses came from California, and because the cities of Berkeley, Oakland, and Emeryville are also in California, the focus of the report is weighted toward California-based policy. That said, we did receive a handful of survey responses from East Coast and Midwest communities and we believe that the report findings are relevant to cities across the U.S.

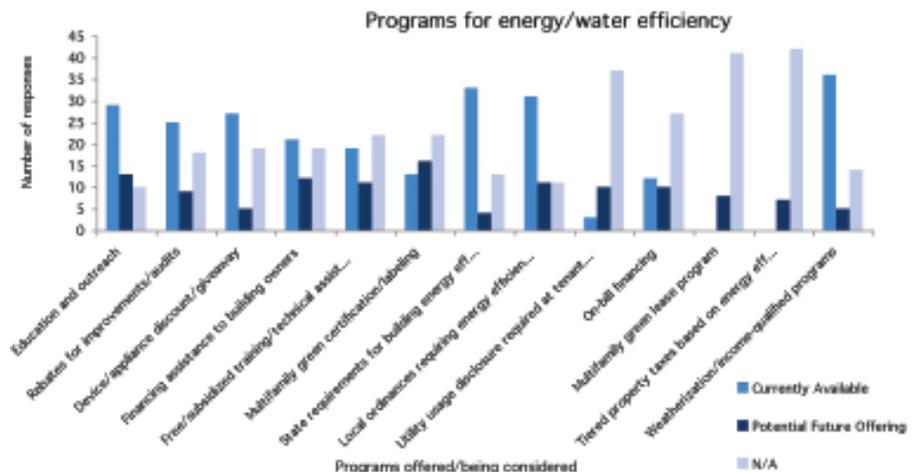


Geographic distribution of survey responses.

Q3: Please indicate programs or efforts that are currently offered, or are being considered, to increase energy and/or water efficiency in your community's multifamily buildings. These efforts may be offered by your local government or another organization such as a utility. (n=56)

The top three programs/efforts that are currently offered are:

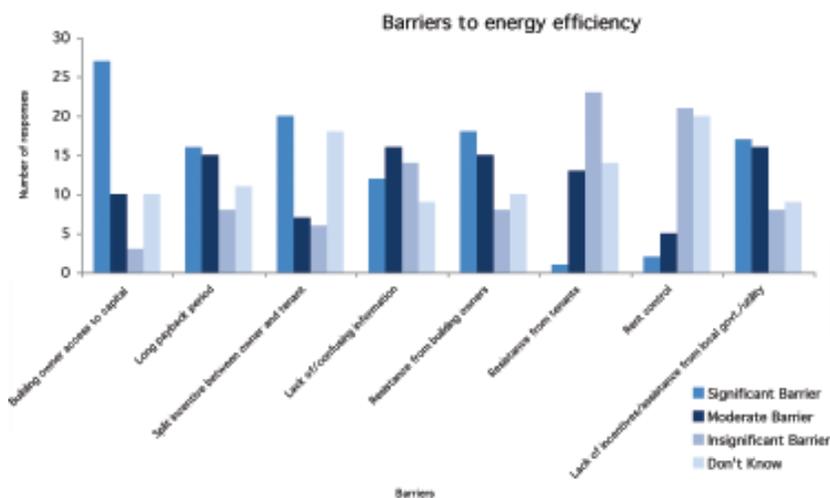
- Weatherization/income-qualified programs
- State-level energy efficiency requirements for buildings
- Local building ordinances with energy efficiency requirements



The top three programs/efforts that are being considered are:

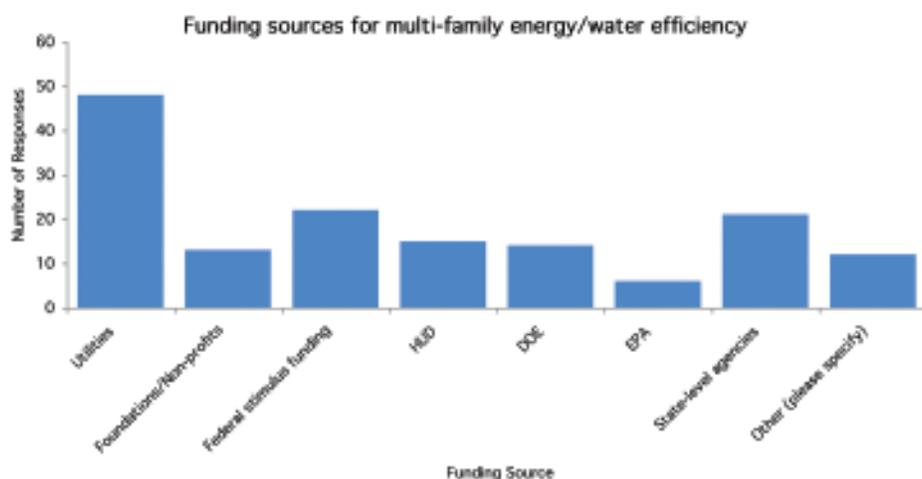
- Multifamily green certification or green labeling programs
- Education and outreach to tenants and building owners
- Financing assistance to building owners for energy efficiency measures

Q4. Please provide a brief description for each of the existing or anticipated programs you indicated on the previous question. If possible, provide a link to more program information.



Rebates for purchase of energy efficient appliances, and on-bill financing for larger expenses like solar, incorporating energy into rental safety inspections and audits at time-of-sale were some of the existing or anticipated programs that are being offered or considered. We highlight specific programs and discuss the broader mechanisms these represent in this report.

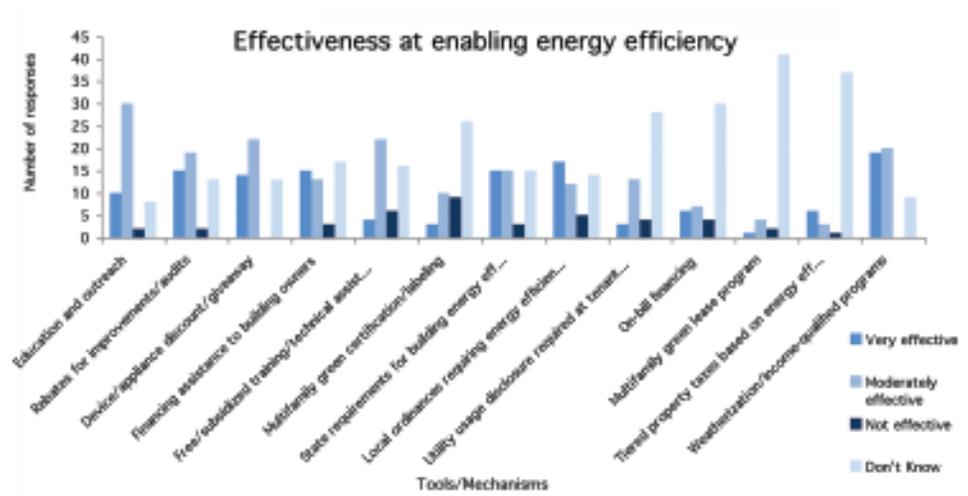
Q5. Based on your experience, please rate the following barriers to energy efficiency in multifamily buildings. (n=51)



Responses indicate that building owners' access to capital, split incentives, and lack of incentives/assistance available from the local government or utility are important barriers. These and other barriers are discussed in the body of this report.

Q6. What are the funding sources for multifamily energy/water efficiency programs in your community? Please check all that apply. (n=53)

Over 90% of the respondents to this question checked utilities as a funding source for energy efficiency programs. Federal stimulus and state-level agencies are mentioned by approximately 40% of respondents. A high-level discussion of funding for energy efficiency efforts in existing multifamily buildings is discussed in Section 1 of the report, with particular emphasis on funding for multifamily energy efficiency programs in California.



Q7. Based on your experience, please rate the following on their effectiveness at enabling energy efficiency in multifamily buildings. (n=50)

Weatherization/income-qualified programs, local building ordinances with energy efficiency requirements, rebates for capital improvements or energy audits, and financing assistance to building owners for energy efficiency measures are all perceived to be very effective at enabling energy efficiency in existing multifamily buildings. These and other strategies are explained further in the body of the report, Section 3.

Q8. If you are aware of particularly effective programs or resources for encouraging energy and/or water efficiency in multifamily buildings in other communities, please share (provide links if possible). (n=11)

Responses received are integrated into the main report.

Q9. In addition to energy or water efficiency programs, does your community have other programs directed towards multifamily buildings (for example, occupant health and safety programs or requirements, seismic retrofit program, etc.)? If so, please provide a brief description of each. (n=21)

Recycling and solid waste management programs for multifamily buildings were mentioned often. Other mentions included smoking ban ordinances to protect health in multifamily buildings, and hazardous material remediation.