

# Saving Energy

*How California Can Launch a  
Statewide Retrofit Program for  
Existing Residences and  
Small Businesses*

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### **About this Report**

This policy paper is the fourth in a series of reports on how climate change will create opportunities for specific sectors of the business community and how policy-makers can facilitate those opportunities. Each paper results from one-day workshop discussions that include representatives from key business, academic, and policy sectors of the targeted industries. The workshops and resulting policy papers are sponsored by Bank of America and produced by a partnership of the UCLA School of Law's Environmental Law Center & Emmett Center on Climate Change and the Environment; UC Berkeley School of Law's Center for Law, Energy & the Environment; and the California Attorney General's Office.

### **Authorship**

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## Preface

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Energy efficiency retrofit programs in California have experienced several major developments since *Saving Energy* was released in May 2010. Implementing one of the central recommendations contained in the report (see page 13), the state launched Energy Upgrade California in March 2011 to centralize retrofit marketing, financing, and technical resources among the various utilities and energy agencies in the state. Energy Upgrade California developed an outreach program, including technical consulting for local energy efficiency programs. By August 2011, the program helped spur 3,200 home energy audits, 1,400 building retrofits in the first few months of operation, and \$35 million under construction (testimony of Panama Bartholomy, State Assembly Select Committee on California's Clean Energy Economy, August 4, 2011). The expiration of funding for the program, which currently comes primarily from stimulus funds under the American Recovery and Reinvestment Act (ARRA), will occur in early 2012, requiring policy makers to find alternative sources of financial support for the effort.

At the same time, the state legislature was unable to reach agreement in 2011 on reauthorizing the public goods charge, which electricity ratepayers pay on their bills to fund a portion of utility energy efficiency programs and other energy-related programs and research. While the California Public Utilities Commission, which administers the program, may be able to authorize the fund collection, legislative action in early 2012 to reauthorize and repurpose the funds could have a significant impact on energy efficiency efforts around the state.

At the local level, cities and counties have been experimenting with diverse strategies for implementing building retrofit programs. One promising strategy involves local governments providing lists of approved retrofit contractors for interested homeowners who may otherwise be suspicious of nongovernment-certified private contractors or of public sector retrofit workers. These cities and counties are critical portals to property owners through their outreach and program coordination efforts.

The financing options for retrofits, however, received a critical setback when cities and counties around the country suspended their Property Assessed Clean Energy (PACE) programs in the wake of a decision by the Federal Housing Finance Agency (FHFA) (PACE programs are discussed in this report on pages 15 and 16). FHFA oversees Fannie Mae and Freddie Mac and viewed PACE programs as a threat to mortgagors in the event of a default by a PACE homeowner (past due PACE assessments would have lien priority over all private debt). FHFA instituted a policy to stop insuring mortgages on properties with PACE assessments. The decision effectively halted residential PACE programs (regulators also raised concerns regarding PACE for commercial properties, but they took no formal action to halt that portion of the programs). A few jurisdictions, such as Sonoma County, decided to continue offering PACE to residential property owners with disclosures.

FHFA's action sparked litigation in federal courts on both coasts, including a lawsuit by the State of California to stop the FHFA from implementing its new policy. East coast federal district courts dismissed three PACE lawsuits for lack of standing, while the California case survived summary judgment. The court in California also required FHFA to begin a formal rulemaking process on its PACE policy. Meanwhile, a bipartisan group of congressional leaders introduced legislation to reverse the federal agency decision. If the litigation and/or legislation are resolved favorably, PACE programs will likely be a widely used tool for financing energy efficiency retrofits. However, that date may be years in the future.

(continued...)

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In the wake of the FHFA decision, California redirected money for PACE programs under ARRA to other energy efficiency purposes, such as Energy Upgrade California. Meanwhile, Governor Brown signed AB X14 (Skinner, Chapter 9, Statutes of 2011) on August 2, 2011, permitting state funding earmarked to support PACE funds to be redirected to other energy efficiency financing efforts.

The PACE decision and the expiration of the public goods charge represent at least temporary setbacks for energy efficiency financing efforts, while the advent of Energy Upgrade California and enthusiasm for nascent local programs by cities and counties indicate positive momentum. In addition, a few pioneers in the solar industry have begun coupling solar photovoltaic installations with energy efficiency audits, spurring increased awareness and action by homeowners on the importance of energy efficiency. While California still requires additional policies to stimulate widespread residential retrofits, the heightened attention of policy makers to this issue, coupled with innovation by cities and counties to overcome the challenges, provide reasons for optimism.

*UCLA / UC Berkeley Schools of Law*  
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## Executive Summary: Comprehensive Retrofits for Existing Residences and Small Businesses

Many of California's existing homes and small businesses are wasting energy and exacerbating climate change. Poorly-insulated walls, air leaks in the building structure, inefficient heating and cooling systems, and outdated lighting technology are just some of the flaws that building owners can address to save energy and reduce the greenhouse gas emissions that cause climate change.

As climate change threatens the state's economy, resources, and quality of life, retrofitting buildings to make them more energy efficient is one of the easiest and most cost-effective steps that citizens can take to reduce the greenhouse gas emissions that cause climate change. Energy use from residential and commercial buildings releases 22 percent of the state's total greenhouse gas emissions,<sup>1</sup> as well as conventional air pollution in the form of smog and particulate matter. Most of the energy drain from these buildings involves heating and cooling (23 percent of the overall demand), water heating (17 percent), cold storage (13 percent), and lighting (12 percent).<sup>2</sup>

Retrofitting existing buildings will also bring economic benefits: it will save owners money and create new jobs for idled construction workers. The California Air Resources Board estimates that household savings from energy retrofits, even with potential increases in energy rates, will be between \$400 and \$500 annually per homeowner, while businesses may gain even more.<sup>3</sup> The California Public Utilities Commission (CPUC) estimates that its \$3.1 billion, three-year "Strategic Plan for Energy Efficiency," adopted in September 2009,<sup>4</sup> will create between 15,000 and 18,000 new jobs by launching the nation's largest home retrofit program.<sup>5</sup> Nationwide, the Center for American Progress estimates that retrofitting 40 percent of the country's building stock (50 million buildings) would directly and indirectly create approximately 625,000 full-time jobs over the next 10 years.<sup>6</sup> Furthermore, the CPUC projects that its retrofit program will avoid the need for three additional 500 megawatt power plants.

Small businesses and residences present the best opportunities for retrofits because they produce the majority of greenhouse gas emissions from buildings and face similar challenges.<sup>7</sup> Policy-makers should direct their efforts to retrofitting these existing buildings because many of them were built before the state introduced energy efficiency building standards in the late 1970s. While these standards ensure that new structures contain energy efficiency features, efficiency improvements in existing buildings lag behind. The situation persists despite the fact that California utilities spend

*Household savings from energy retrofits, even with potential increases in energy rates, will be between \$400 and \$500 annually per homeowner, while businesses may gain even more.*

an unprecedented amount on programs designed to stimulate consumers to make more efficient choices.

One particular local and state government program, developed in California, shows promise in its ability to encourage building owners to undertake retrofits. The Property Assessed Clean Energy program (PACE) allows building owners to receive local and state government funds to cover, among other environmental improvements, the upfront costs of retrofits, which the owners then pay back through increased semiannual property assessments over twenty years. Governments can provide the capital from private investors and, in the long term, from the bond market.

The first PACE pilot programs, in Berkeley, Sonoma County, and Palm Desert, have seen strong demand from building owners, with Sonoma County alone receiving almost \$40 million in funding requests. In addition, construction-related jobs in Sonoma County increased by 7.5 percent during the implementation of the program, despite the loss of similar jobs during the same time period in neighboring counties.

Despite the innovative utility and local government programs, challenges remain to the broad implementation of energy efficiency retrofits. These difficulties include:

- lack of knowledge by building owners about the potential retrofit benefits;
- difficulty securing financing to pay for the improvements;
- lack of incentives for landlords to upgrade a rental unit when the energy savings will go to the tenant;
- a nascent retrofit workforce that does not yet have comprehensive training and licensing programs; and
- reluctance of some building owners to undertake a potentially invasive construction process.

To address these issues, a group of local and state government officials, financial experts, real estate professionals, retrofit contractors, academics, and nonprofit leaders held a workshop at the UCLA School of Law in November 2009. The group offered recommendations for policy-makers and industry leaders to help overcome the obstacles facing large-scale retrofit programs.

Based on the workshop discussion, this paper identifies the short and long-term actions that retrofit advocates, government officials, and public agencies can take to launch a large-scale, statewide retrofit program and improve current efforts underway. Policy-makers and advocates will need to:

- support PACE programs, Energy Efficient Mortgages, which allow homebuyers to add the upfront cost of a retrofit to their mortgage principal, and other financial incentive programs to help building owners cover upfront retrofit costs;
- develop a comprehensive and well-funded consumer marketing campaign; and
- create strong licensing standards to attract a pool of skilled retrofit contractors.

*The Property Assessed Clean Energy program (PACE) allows building owners to receive local and state government funds to cover, among other environmental improvements, the upfront costs of retrofits, which the owners then pay back through increased semiannual property assessments over twenty years.*



## Top Five Barriers to Reducing Greenhouse Gas Emissions through Retrofitting Existing Residences and Small Businesses

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- 1) Lack of awareness of retrofit potential: Many homeowners and small business owners are unaware of the energy inefficiencies in their properties, the opportunities for long-term cost savings through retrofits, and the best retrofit methods for achieving financial benefits.
- 2) Lack of available financing and long payback periods: Many property owners are unaware of existing financing opportunities or are reluctant to devote scarce capital to retrofits.
- 3) Landlord-tenant split incentive: Owners of multifamily rental units or commercial buildings with multiple tenants may be reluctant to invest in retrofit measures that will provide energy savings for the tenants but not for the owners.
- 4) An inconvenient and complicated process: Some property owners are dissuaded by the process of researching and selecting a contractor to perform an energy audit and the retrofit work, deciding which retrofit methods to use, arranging the financing for the process, and then having their homes or businesses disrupted by the retrofit process.
- 5) Lack of a trained and qualified retrofit workforce: building owners may lack assurance that there are enough skilled retrofit contractors to perform the jobs.



## Short and Long-Term Solutions

### **SOLUTION #1: Stimulate Increased Market Demand for Retrofits**

#### **Coordinated Marketing and Outreach Campaign by Industry, Local Governments, Utilities, and State Regulators.**

Retrofit contractors and nonprofit retrofit advocates should develop a comprehensive and coordinated marketing campaign to enhance current efforts to promote awareness of retrofit benefits.

Local government leaders should use existing outreach efforts, through PACE programs or local government Climate Action Plans, to support the campaign.

The California Energy Commission (CEC) and California Public Utilities Commission (CPUC) should ensure that utility-funded marketing efforts support this campaign.

#### **Standardized Energy Disclosure Requirements at Time of Sale/Rent.**

State legislators and the governor, in partnership with the CEC, should create policies to require energy audits and/or retrofits when buildings change owners or tenants and disclose the results to new purchasers and renters.

### **SOLUTION #2: Create New Financial and Economic Incentives and Expand Existing Programs**

#### **Introduce and Expand Property Assessed Clean Energy (PACE) Programs.**

Local governments should implement Property Assessed Clean Energy (PACE) programs, which enable participating governments to finance the upfront costs of retrofits for homeowners with capital from the bond market, with the homeowners then paying back the government over twenty years through higher property tax assessments.

Financial institutions and state investment funds should provide short-term financing to help local governments launch PACE programs that will become self-sustaining with capital from the municipal bond market.

State leaders should take steps to encourage, support, and subsidize the creation of a statewide and regional PACE programs.

Congress and the president should authorize the use of tax-exempt bonds for PACE programs and/or provide a federal guarantee to the bonds to reduce the costs of capital.

#### **Promote Energy Efficient Mortgages (EEMs) and Rehabilitation Mortgages.**

Retrofit advocates should promote energy efficient mortgages (EEMs) and rehabilitation mortgages, which allow homebuyers to add the upfront cost of a retrofit job to their mortgage principal, as a payment option to their customers.

They should also educate realtors and mortgage lenders about these programs to ensure that they promote them to homebuyers.

Financial institutions should educate their salespeople about EEMs and rehabilitation mortgages and ensure that they inform customers about them.

The United States Department of Housing and Urban Development, as well as federal lending institutions, should encourage and promote greater use of EEMs and rehabilitation mortgages.

#### **Expand On-Bill Financing.**

Financial institutions and local public utilities should partner to expand the on-bill financing program, which currently permits only commercial customers to pay for retrofits at low or no interest over an extended period of time on their utility bills, to residential customers.

CPUC leaders should encourage private utilities to partner with financial institutions to expand on-bill retrofit financing to residential customers.

#### **Expand Municipal Financing.**

State legislators and the governor should expand Mello-Roos financing programs, which allow voters within a given district to vote to increase property taxes to fund community improvements, to include retrofits.

#### **Create Tax Credits and Rebates for Retrofits.**

Congress and the president should expand tax credits and rebate programs, such as by passing the proposed Home Star legislation, which would provide \$6 billion for energy efficiency improvements in residential buildings, for building owners who complete retrofits.

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### **SOLUTION #3: Landlord Incentives to Retrofit Tenant-Occupied Buildings**

#### **Address Common Area Energy Usage.**

Retrofit contractors, local government, and the CEC and CPUC should target retrofit incentive packages to landlords or homeowners associations with significant common area energy usage.

#### **Facilitate Negotiated Landlord-Tenant Cost-Sharing Agreements.**

Retrofit advocates should facilitate negotiated solutions between renters and landlords to share retrofit costs by developing negotiating templates and terms.

#### **Implement energy audit requirements at time-of-rent.**

As discussed above, state legislators and the governor, in partnership with the CEC, should require energy audits when buildings change tenants and disclose the results to new renters.

#### **Implement energy retrofit requirements at time-of-rent.**

State legislators and the governor, in partnership with the CEC, should consider requiring energy retrofits when rental buildings change tenants or owners or during pre-determined intervals of time.

*Congress and the president should expand tax credits and rebate programs, such as by passing the proposed Home Star legislation which would provide \$6 billion for energy efficiency improvements in residential buildings, for building owners who complete retrofits.*

### **SOLUTION #4: Simplify the Retrofit Process**

#### **Streamline the Permit Process.**

Local government leaders should assess the need to streamline and standardize municipal permit procedures for retrofits and make changes where appropriate.

#### **Streamline the Financing Process.**

Retrofit contractors and nonprofit retrofit advocates should use existing trade

associations and nonprofit groups to lobby financial institutions and state and local officials to standardize the PACE financing process for retrofits.

Financial institutions should provide advance approval for mortgage holders to enter into a PACE financing arrangement to avoid unnecessary delays.

#### **Provide Building Owners with Performance-Based Information on Retrofits.**

Local government leaders and the CEC and CPUC should ensure that building owners have easy access to performance data on retrofit methods when they are deciding which retrofit methods to undertake.

#### **Perform Regional Housing Stock Assessment.**

Retrofit contractors, nonprofit advocates, local and state governments, CPUC leaders, public utilities, mortgage lenders, and universities should partner to develop and map regional housing stock assessments in specific climate zones in order to standardize and target large-scale retrofit efforts toward the areas of greatest need.

Local government leaders and the CEC and CPUC should use housing stock and performance data to develop a menu of standard recommended retrofit options for building owners.

#### **Provide a “One-Stop Shopping” Website with Retrofit Information.**

Retrofit contractors, nonprofit advocates, local and state governments, mortgage lenders, and universities should partner to create a consolidated website with information on retrofits, including a database of qualified contractors and descriptions of retrofit methods with data on their effectiveness.

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### **SOLUTION #5: Develop Workforce Training and Licensing Standards**

Retrofit contractors should develop and draft a trade-based certification and licensing process that ensures a workforce of high-quality retrofit contractors. They should organize to lobby local, state, and federal officials to set high certification and licensing standards for a new green retrofit workforce.

State and Federal regulators should consider developing state and national licensing standards for retrofit contractors with the input of contractor trade associations and retrofit advocates.

### **Conclusion: California’s Opportunities**

The momentum to encourage widespread retrofits has never been greater than the present. The initial success of the PACE program, utility energy efficiency programs, and the backdrop of climate change, rising energy prices, idled construction workers, new innovations in financing, and a proactive federal administration have created a promising foundation for large-scale retrofit programs.

In addition to expanding the success stories, public and private sector advocates will need to partner to overcome the barriers that stymie widespread retrofits. Retrofit contractors and advocates should begin the process by organizing existing trade associations or forming new ones to shape the needed public sector policies, from developing a comprehensive marketing campaign to setting high licensing standards for the industry. Public sector leaders from all levels of government will also need to coordinate their actions to ensure that the financing programs, incentives, workforce training, and outreach efforts maximize effectiveness to make retrofits the norm for existing residences and small business buildings.



## Climate Change and Energy Efficiency in Existing Residential and Small Business Buildings

In 1978, in response to the oil shocks of the 1970s, California adopted mandatory energy efficiency standards for new buildings. As a result of those standards, now known as “Title 24,”<sup>8</sup> utility-sponsored energy efficiency programs, and appliance efficiency standards, the state has led the nation in energy efficiency and savings for building owners. While per capita electricity consumption nationwide has increased almost 50 percent since the mid-1970s, California’s per capita electricity consumption has been relatively flat.<sup>9</sup> And according to the California Energy Commission, California’s building and appliance standards have saved consumers more than \$56 billion in electricity and natural gas costs since 1978 and averted the construction of 15 large power plants.<sup>10</sup>

Today, renewed concern over energy prices, a down economy, and the urgency of climate change have sparked a national effort to promote energy efficiency in our existing residential and small commercial buildings. With its landmark climate change policies and role as a national leader in energy efficiency, California is well-situated to pioneer this effort. The state will now need new policies to encourage widespread retrofits of existing buildings in order to reduce their carbon emissions, create employment, and save consumers energy costs.

### How Retrofits Work

Retrofits to existing buildings generally entail improvements to the building systems that use energy. Every building has unique retrofit needs. Energy efficiency for appliances, such as dishwashers, televisions, and laundry machines, is also critical to reducing energy consumption, though this paper focuses on retrofits to the fixtures and systems of the physical building. Small businesses and residences represent the majority of greenhouse gas emissions from buildings and face similar challenges that constrict retrofit opportunities.<sup>11</sup>

Contractors and energy efficiency experts have numerous techniques to reduce the energy consumption from each building. Because of the diversity of the housing stock and retrofit needs, many building owners undertake an energy audit in advance of any physical work in order to determine these needs. The CEC has developed the Home Energy Rating System (HERS) to establish protocols and procedures for a proper energy audit.<sup>12</sup> An audit documents energy efficiency problems in a building, such as leaks, appliance and heating and cooling system inefficiencies, and behavioral patterns that affect energy use, such as leaving lights on or forgetting to turn the thermostat down at night.

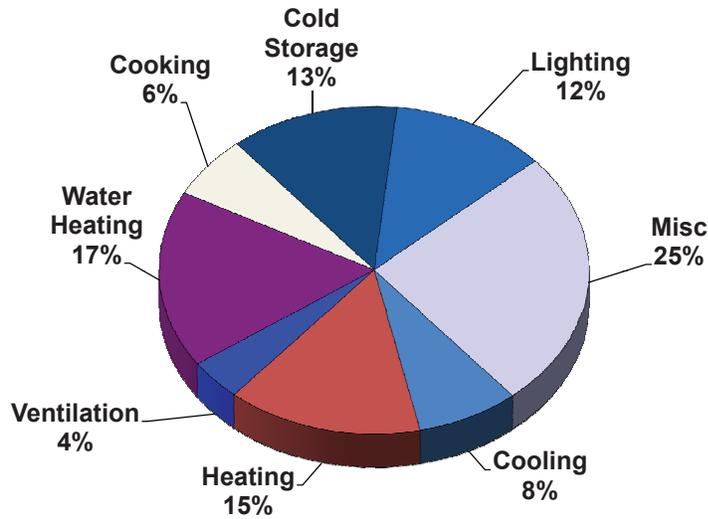


Figure 1. CA Buildings End Use GHG Emissions (2004)

Source: California Energy Commission

Professional auditors use a variety of techniques and equipment to perform an audit, such as blower doors, which measure air leaks in the structure of the building, and infrared cameras, which show areas of air infiltration and missing insulation undetectable by the naked eye. The audits ultimately provide building owners with a menu of retrofit options and their money-saving potential in order to help owners to decide which options to pursue.<sup>13</sup>

Most of the energy use from buildings results from a few key sources (see Figure 1). Of the total energy use by buildings, the top single sources of demand are heating and cooling (comprising 23 percent of the overall demand, with heating requiring 15 percent and cooling eight percent), water heating (17 percent), cold storage (13 percent), and lighting (12 percent).<sup>14</sup>

As the primary source of energy use in a building, heating and cooling efficiency involves closely-related building systems often referred to as “HVAC” (heating, ventilation, and air conditioning). Retrofits to HVAC performance typically involve sealing the building “envelope” or “shell,” which includes the outer walls, ceiling, windows, doors, and floors. Contractors will seal the air leaks and drafts around windows and doors and will use caulk, spray foam, or weatherstripping to seal holes hidden in attics, basements, and crawlspaces. Many buildings may also require new insulation to retain heat or cool air, which can take the form of fiberglass, cellulose, rigid foam board, and spray foam. Finally, contractors can seal the ducts that carry heated or cooled air to the house, as may be required by Title 24, depending on the building type and amount of leakage.<sup>15</sup> In a typical United States house, ducts leak about 20 percent of the air, particularly at connection points. Contractors use duct sealant to seal exposed ducts. These steps can sometimes save building owners up to 20 percent of their heating and cooling energy costs.<sup>16</sup>

Building owners can also reduce heating and cooling costs through technology improvements and roofing. For example, installing programmable thermostats can save building owners money by allowing them to set variable temperatures automatically for different times of the day depending on use

*“As we say in the industry, with energy efficiency, there’s no silver bullet, but there are a million silver BBs.”*

*-- Dan Thomsen  
The Building  
Doctors*



(such as lower heat during winter nights or during the day when the building may be unoccupied). Automated thermostats may also allow the owner to isolate heating and cooling in certain zones of a building depending on their use.<sup>17</sup> In addition, solar reflective “cool roofs” can also reduce cooling costs and are required by Title 24, including for residential roofs in certain climate zones (beginning January 1, 2010).<sup>18</sup> A study by the Lawrence Berkeley National Laboratory found that cool roofs reduced the maximum roof surface temperature of buildings by 60 to 75 degrees Fahrenheit and under-roof temperatures between 32 and 50 degrees Fahrenheit. For most climate zones in California, the study found that cool roofs reduced energy demand by 500 to 1400 kilowatt hours per year per 1000 square feet of roof, resulting in annual savings in electricity costs of 6 to 20 cents per square foot of building.<sup>19</sup>

Water heating represents the second largest source of energy usage. The average household in the United States spends \$400 to \$600 per year on water heating. Advances in water heating technology, such as high-efficiency gas storage, gas condensing, whole-home gas tankless, solar, and heat pump models, can save owners between \$30 and \$220 a year in energy costs from older models.<sup>20</sup>

Saving energy from lighting, which represents the third largest source of energy demand, can involve a number of technologies. Most prominently, compact fluorescent light bulbs (CFLs) save consumers approximately \$30 over their lifetime and pay for themselves in about six months. CFLs use 75 percent less energy than the traditional incandescent bulbs and last about 10 times longer.<sup>21</sup> However, CFLs contain mercury that is hazardous upon accidental release.

The next generation of lighting is likely to be light-emitting diodes (LEDs). These small light sources become illuminated by the movement of electrons through a semiconductor material.<sup>22</sup> Like CFLs, LEDs use at least 75 percent less energy than incandescent lighting, but they last 35 to 50 times longer than incandescent lighting and about two to five times longer than CFL lighting. They also reduce cooling costs because they produce little heat. As an added benefit, they are more durable and do not break like bulbs.<sup>23</sup> Finally, building owners can save electricity by installing motion sensors that automatically turn off lights in unoccupied rooms.

While Title 24 contains lighting efficiency standards,<sup>24</sup> federal law will also soon require more lighting efficiency, as well as efficiency standards for a variety of household appliances such as freezers and dishwashers. The Energy Independence and Security Act of 2007 requires all light bulbs to use 30 percent less energy than our current incandescent bulbs by 2012 through 2014. The gradual phase-out of incandescent bulbs will begin with 100-watt bulbs in January 2012 and end with 40-watt bulbs in January 2014. By 2020, the law requires all light bulbs to be at least 70 percent more efficient than current models, which is effectively the same as CFLs.<sup>25</sup>



## Why Energy Efficiency in Existing Buildings Matters

### Energy Efficiency Will Help the State Meet its Climate Change and Energy Conservation Goals

California's groundbreaking policies on climate change and energy efficiency make the state uniquely situated to pioneer new retrofit efforts. These policies result from concern over the detrimental impacts that climate change will likely have on California's economy, natural resources, and quality of life and the failure of the federal government to address climate change.<sup>26</sup> As a result, the state has mandated reductions in the greenhouse gas emissions that cause climate change. Most importantly, the California Global Warming Solutions Act of 2006 (AB 32) mandates that the state roll back its greenhouse gas emissions to 1990 levels by 2020, which is equivalent to a 30 percent cutback from the business-as-usual scenario projected for that year.<sup>27</sup> And California Governor Arnold Schwarzenegger's Executive Order S-3-05 calls for an eighty percent reduction from 1990 levels by 2050.<sup>28</sup>

California must reduce the energy demand from existing residential and small business buildings in order to meet its greenhouse gas emissions-reduction goals. Energy use from residential and commercial buildings results in 22 percent of the state's total greenhouse gas emissions, with 14 percent from residential and eight percent from commercial buildings (see Figure 2).<sup>29</sup> Because 75 percent of the existing housing stock and 5.25 billion square feet of commercial space was built before the Title 24 energy efficiency standards of 1978, these buildings represent a greater portion of the demand. For example, the energy requirements for space heating, cooling, and water heating in buildings constructed during the 1970s (pre-Title 24) are over twice the energy requirements for comparable systems in houses built in 2005.<sup>30</sup> As a result, the California Air Resources Board (CARB), the agency responsible for implementing AB 32, stated in its draft scoping plan that "expanding and strengthening existing energy efficiency programs as well as building and appliance standards" are key elements of the overall strategy to reduce statewide greenhouse gas emissions.<sup>31</sup>

Improved energy efficiency in buildings will also help the state meet its long-term energy conservation goals. As discussed, energy efficiency has been a part of state policy since the 1970s. In addition, in response to the market manipulations that caused the 2000 and 2001 statewide electricity shortages, the legislature and agencies responsible for developing and implementing California's energy plans made energy efficiency a top priority. Efficiency now must be the first option that utilities pursue to acquire new sources of energy, before building new power plants.<sup>32</sup> Most recently, in 2009, the governor signed AB 758 (Skinner), which requires the CEC to develop a comprehensive program to achieve greater energy savings in the state's existing residential

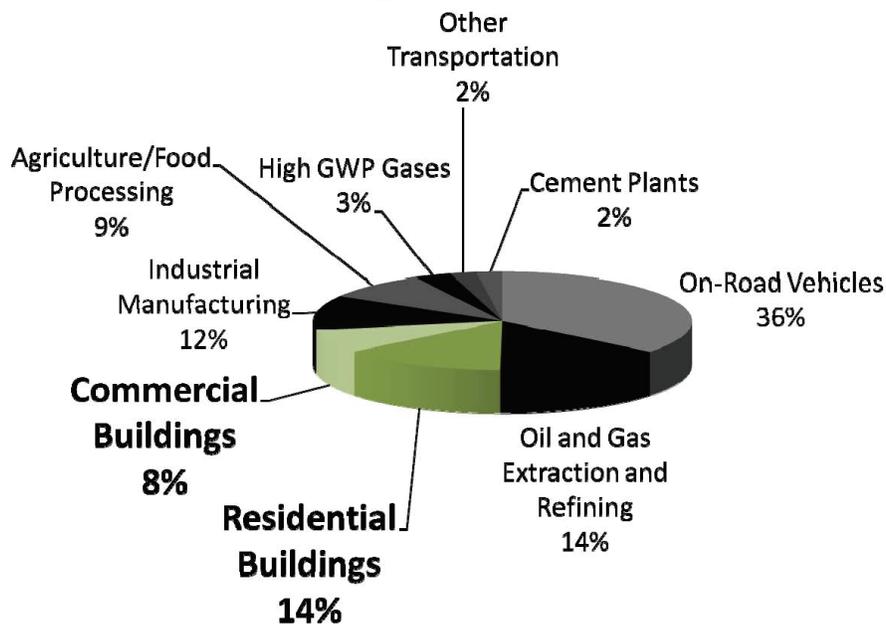


Figure 2. California Greenhouse Emissions by End-uses

Source: California Energy Commission

and nonresidential buildings by March 1, 2010. The law specifies that the CEC consider a broad range of energy assessments, public and private sector financing options for energy efficiency, public outreach and education, and workforce training for retrofit contractors, among other directives. AB 758 also requires the CPUC to investigate the ability of investor-owned utilities to provide various energy efficiency financing options to their customers in order to implement the law.<sup>33</sup>

#### Investing in Better Energy Efficiency from Existing Buildings Will Save Consumers and Small Businesses Money

Reducing energy demand through retrofits represents one of the most cost-effective methods of decreasing greenhouse gas emissions. According to a McKinsey & Company study, even under conservative assumptions, retrofitting existing buildings represents one of the most economical means of reducing greenhouse gas emissions. Many retrofits would in fact have negative costs, meaning that they save building owners money over a full lifecycle.<sup>34</sup> CARB estimates that household savings, even with potential increases in energy rates, will be between \$400 and \$500 annually for homeowners, with business standing to gain even more.<sup>35</sup> And energy efficiency savings promise a strong multiplier effect for the economy as the money saved is usually spent on household goods and services that are more labor intensive than developing fossil fuels.<sup>36</sup>

#### Energy Efficiency Retrofits Will Create Jobs

The contracting work required to do retrofits will generate jobs and a green retrofit workforce during an economic downturn when construction workers have been idled by the real estate collapse. For example, the CPUC estimates that its \$3.1 billion, three-year “Strategic Plan for Energy Efficiency,” adopted in September 2009 with a home retrofit component,<sup>37</sup> will create between 15,000 and 18,000 new jobs by launching the nation’s largest home retrofit program, as well as avoid the need for three additional 500 megawatt power plants.<sup>38</sup> Nationwide, the Center for American Progress estimates that

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retrofitting 40 percent of the country's building stock (50 million buildings) would directly and indirectly create approximately 625,000 full-time jobs over the next 10 years. The effort would require \$500 billion in public and private investment while saving consumers \$32 to \$64 billion annually in energy costs.<sup>39</sup>

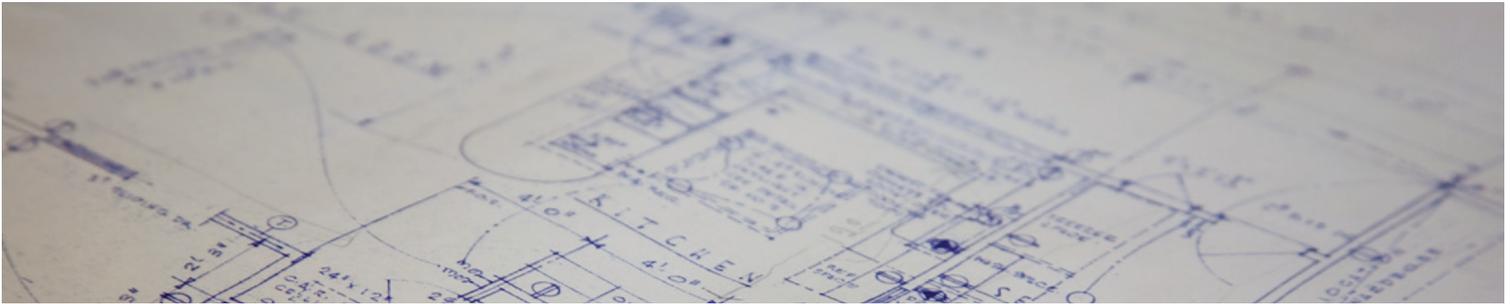
Recognizing the economic potential of retrofits, the Obama Administration has made financing and job training programs for retrofits a priority. The American Recovery and Reinvestment Act of 2009 (ARRA or the "Stimulus") dedicates \$80 billion to energy-related projects, including a significant amount for improving energy efficiency in existing buildings. The money funds local and state retrofit programs. ARRA funds for California total \$49.6 million for block grants for small jurisdictions that can be used for energy efficiency and \$35.6 million for energy efficiency appliance rebates.<sup>40</sup> The White House Council on Environmental Quality has also convened a "recovery through retrofit" task force to make official recommendations to encourage more retrofits.<sup>41</sup>

### **Improved Energy Efficiency is Critical to Reducing Projected Energy Demands from California's Future Population Growth**

California's anticipated population growth promises to place additional strains on our energy infrastructure and ability to meet greenhouse gas emissions goals. The state's population is projected to grow most rapidly in the hotter, central part of the state, where demand for air conditioning during the summer months will be greatest. As a result, energy use will probably continue to outpace our existing energy efficiency measures. Currently, nearly 70 percent of the state's population lives along the coast. But some predictions indicate that inland areas, including the San Joaquin Valley, the Inland Empire in Southern California, and the Sacramento area, will house nearly 40 percent of the state's population – or more than 20 million people – by 2040. The inland population growth will change the pattern of energy use, as the hot summers will generate more peak demand for air conditioners.<sup>42</sup> The CEC projects overall electricity use in the state to increase 1.2 percent annually with peak demand growing at a rate of 1.3 percent per year.<sup>43</sup>

### **Overcoming the Top Five Barriers to Retrofitting**

Despite the existence of cost-saving retrofit techniques and energy efficiency standards and policies, California's diverse housing stock still presents many untapped opportunities for energy savings and economic activity through retrofits. The next section introduces the policies needed to reduce greenhouse gas emissions from existing residences and small businesses in California.



## Barrier #1: Lack of Awareness of Retrofit Potential

As participants noted, retrofitting a home to make it more energy efficient may not be “sexy” when compared to installing solar panels or driving a hybrid car. Insulation and duct sealing may lack the intrinsic appeal necessary to capture the public imagination. Many residential and small commercial property owners are also unaware of the connection between their energy bills and the unseen air leaks, heating and cooling inefficiencies, and myriad other building problems in their houses or small businesses. As a result, they may fail to see the opportunity for long-term cost savings through retrofits and may be unsure about the best retrofit methods to reduce their energy costs.

### **SOLUTION: Stimulate Increased Market Demand for Retrofits**

Retrofit contractors and policy-makers should work together to create a robust marketing campaign to make building owners aware of retrofit opportunities and how energy inefficiencies affect their monthly utility bills. A new marketing campaign should incorporate the lessons learned from previous utility-sponsored efforts and take a creative approach to raising awareness. For example, marketers can rely on word-of-mouth through social marketing and use early adopters and celebrities to spread the word. In addition, mechanisms that require building owners to disclose past energy use at the time of sale or rent may encourage new owners or tenants to seek a retrofit.

### **Coordinated Marketing and Outreach Campaign by Industry, Local Governments, Utilities, and State Regulators**

#### **Retrofit contractors and their trade associations should develop key strategies for marketing based on their experience with customers.**

While contractors may be reluctant to share their marketing techniques with others, the industry in general should pool resources to develop key marketing themes and strategies for a comprehensive and professional campaign. Media events, prominent news articles, celebrity endorsers, and even reality television shows and sponsorships may be some of the techniques necessary to raise awareness among the public. But the contractors should be the first to develop the strategy given their experiences with customer acquisition. They presumably have better insight into how to motivate building owners to undergo a retrofit. Local nonprofits engaged in outreach efforts may also be able to assist this effort.

#### **Local and State officials should use existing funds for energy efficiency retrofits to support the marketing campaign.**

Local governments developing municipal finance programs, state agency officials at the CEC and CPUC, and private and municipal utility leaders should dedicate existing energy efficiency funds to support a comprehensive marketing campaign. Funds can come from ARRA money (specifically ARRA funds for state efforts such as the State Energy Program<sup>44</sup>), revenue from municipal financing efforts

*“You want people to feel like they don’t want to be the last guy on their block to do a retrofit.”*

*-- Cisco DeVries  
Renewable Funding*

*“We had our best month last month, but over 35 percent of our costs went to customer acquisition. We need to increase adoption rates to look better for financing.”*

*-- Matt Golden  
Recurve*

*“The people who contract with me are there for a healthy mix of comfort and energy efficiency reasons. People are worried about their energy bills, but indoor air quality is a big factor.”*

*-- John Shipman  
Energy Efficiency  
Management, Inc.*

*“I’ve sat in meetings to come up with marketing promotions for retrofits. But you know what? I’m an engineer, and there are professionals that are good at doing it. So I said, ‘Why don’t we hire them?’”*

*-- Howard Choy  
County of Los Angeles*

*“We spent \$300 million on outreach, and got very little in return. It isn’t easy to get people to change their behavior. You need to have different levels of marketing.”*

*-- Theresa Cho  
California Public  
Utilities Commission*

and Climate Action Plans, and utility-sponsored energy efficiency programs.

### **Standardized Energy Disclosure Requirements at Time of Sale/Rent**

**State legislators, the governor, the CEC and Federal officials should consider mandatory time-of-sale/rent energy disclosure to inform building owners about the energy needs of their buildings.** New owners, armed with information about a building’s energy use at the time of purchase, may be more motivated to consider retrofits to save on long-term energy costs. The CPUC identified better consumer information as key to improving efficiency in existing homes and found that policy-makers can “create market demand for efficient homes by increasing awareness of, and information on, energy efficiency.”<sup>45</sup> In addition, contractors generally find it easier to retrofit a building before a new owner or tenant occupies it, giving a time-of-sale energy audit further advantages.

California could rely on its existing HERS system, with its certified home energy raters, as a basis for requiring disclosures. The state has passed legislation mandating energy use disclosures for nonresidential building owners under AB 1103 (Saldana),<sup>46</sup> although AB 531 (Saldana), signed by the governor in 2009, delays the implementation of AB 1103 from January 1, 2010 to a date determined by the CEC. Owners must disclose Energy Star Portfolio Manager benchmarking data and ratings for the most recent 12-month period to a prospective buyer, lessee, or lender. Additionally, electric and gas utilities are required to maintain records of the energy consumption data of all nonresidential buildings to which they provide service for at least the most recent 12 months.

Other governments have created similar disclosure mandates. For example, in the United Kingdom, an Energy Performance Certificate (EPC) is required for all homes whenever they are built, rented, or sold. The certificate records the energy efficiency of the building through an A-G ratings system.<sup>47</sup> In 2006, Maine passed a law requiring an energy efficiency disclosure form for rental units in the state. The form lists “aspects of a rental property that influence the amount of energy that the property is likely to use,” including insulation levels and types of heating fuel used.<sup>48</sup> Montgomery County, Maryland, requires sellers of residential homes to disclose their energy bills at time of sale.<sup>49</sup>

Finally, while current outreach and incentive efforts are likely to attract voluntary early adopters, at some point in the future, policy-makers will likely have to require retrofits for certain key times in the life of a building. The initial voluntary programs can help the retrofit industry develop protocols and standards for wide-scale efforts that may become mandatory. Examples of jurisdictions that have taken similar approaches include the city of Austin, Texas (which requires energy audits and disclosures at the time-of-sale)<sup>50</sup> and New York City, which requires owners of buildings larger than 50,000 square feet to undergo energy audits every ten years.<sup>51</sup>



## Barrier #2: Lack of Available Financing & Long Payback Periods

Despite the long-term savings, retrofits are often expensive to implement. A comprehensive energy retrofit can cost thousands of dollars, depending on the building needs. Many property owners lack access to the necessary capital for retrofits or are reluctant to devote existing capital and resources over more immediate needs. For owners that do have the capital, they may be reluctant to invest in retrofits that may require payback periods up to five years or more. Small business owners and real estate investors will also be reluctant to invest scarce capital in retrofits if the return on investment (ROI) is less than the potential return from other uses of capital.

### **SOLUTION: Create New Economic Incentives and Expand Existing Programs**

Recent innovations in municipal financing schemes, like the PACE program, wider use of energy efficient mortgages, and changes to utility billing practices will provide building owners with available sources of capital that they can repay over time at lower rates than their energy savings. These programs may promote investment in retrofits because building owners will not have to provide the upfront capital.

### **Introduce and Expand Property Assessed Clean Energy (PACE) Programs**

**Local and State leaders, with the assistance of the financial sector, should encourage, support, and subsidize the creation of PACE programs throughout the state.** The Property Assessed Clean Energy (PACE) financing program represents an innovative approach to providing capital for energy efficient retrofits, among other environmentally-friendly improvements to a building structure. PACE programs work by allowing a government entity to provide the upfront capital for a building owner to invest in a retrofit. The government raises the money from the municipal or state bond market. The building owner then pays the government back via an increase to the semiannual property tax assessment. Bond holders invest in the program with the assurance that the financing for the retrofit takes the same priority as a traditional property tax lien and assessment. The advantage for a homeowner is that the payments stay with the property and not with the owner, in the event that the owner sells the property before he or she can pay off the retrofit lien.

The California legislature authorized local governments to create these programs in 2008 through AB 811 (Levine).<sup>52</sup> Currently, at least one government in every major metropolitan area in California is attempting to

*“The costs are very expensive in the first year of the PACE program. In Sonoma County alone we need one billion dollars to finance our PACE retrofit program, with a population of only half a million people. You have to set up applications, loan, train, and market. Local governments are reluctant to get into it because it’s not their business, so we have to create an easy package for counties to implement.”*

*-- Rod Dole  
Sonoma County Treasurer*

create a PACE financing program. Early pioneers of this program include Berkeley, Sonoma County, and Palm Desert, which have all experienced promising success with their programs (Berkeley has concluded its program and will join the statewide PACE effort). For example, in the first nine months of its program, Sonoma County received almost \$40 million worth of funding requests from building owners, with almost \$30 million approved. The county also received 11,065 phone, walk-in, and email inquiries about the program, which netted 1137 project applications.<sup>53</sup> Of these, almost half of the requests were for energy efficiency upgrades, such as cool roofs, insulation, HVAC, and windows.<sup>54</sup> Berkeley and Palm Desert have achieved similar results with their PACE programs. Berkeley, whose initial program focused on photovoltaic installations, reached the maximum funding limit on its program within eight minutes, and Palm Desert reached its maximum funding amount within a few months.<sup>55</sup>

*“To do retrofits at the scale we need, we need \$200 billion in California alone. So it starts to look like the bond market, and municipal governments have a 100-year history of using these tools.”*

*-- Cisco DeVries  
Renewable Funding*

In addition, preliminary evidence indicates that PACE programs may serve as an economic catalyst. In Sonoma County, construction-related jobs increased 7.5 percent in from January 2009 to October 2009, compared to neighboring Napa and Solano Counties which experienced decreased job growth during the same time period. These other counties lack a program similar to Sonoma County's PACE program.<sup>56</sup>

Despite these early successes, some local governments have not developed PACE programs of their own. These local leaders should make the implementation of the program a priority.

**Financial institutions and state investment funds should consider providing short-term financing to launch PACE programs across the state and make them self-sustaining.**

Financial institutions and state investment funds, such as California Public Employees' Retirement System (CalPERS) and the California State Teachers' Retirement System (CalSTRS), could greatly assist the development of PACE programs throughout the state by providing short-term financing. Once PACE programs generate enough volume of activity, the program administrators can sell bonds to raise capital and make them self-sustaining. Until that point, however, they will need short-term capital to get started, and many local governments are unable or unwilling to bear the risk associated with short-term loans. State investment funds, such as CalPERS and CalSTRS, can bridge the gap by taking on the short-term risk and the potential for high long-term returns. This infusion of capital will be critical for local governments to implement PACE programs at a large scale.

**Congress and the president should authorize the use of tax-exempt bonds for PACE programs and/or provide a federal guarantee to the bonds to reduce the costs of capital.**

In order to ensure that the repayment rate for the bonds that finance PACE retrofits remains low, the federal government should authorize tax-exempt bonds to finance the program or provide a federal guarantee to the bonds. These steps will provide long-term stability for PACE programs by keeping the repayment rate low and thereby attracting more investors to the program. The House of Representatives has been debating H.R. 3525 (Rep. Thompson), which proposes authorizing tax-exempt bonds for this purpose.

### Promote Energy Efficient Mortgages (EEMs)

**Retrofit contractors should better promote energy efficient mortgages and rehabilitation mortgages to potential customers.**

Energy Efficient Mortgages (EEMs) and rehabilitation mortgages, through the federal Section 203(k) program,<sup>57</sup> allow upfront retrofit costs to become part of the home mortgage. These programs package the financing for the energy efficiency work as part of the single mortgage and allow borrowers to qualify for a larger loan amount to cover the extra costs. The idea is that the energy efficiency work will save the consumer more money in reduced energy costs on a monthly basis than the cost of the additional payment on the mortgage. However, many homebuyers, realtors, and mortgage lenders are unaware of these programs. They therefore have tremendous potential for greater utilization.

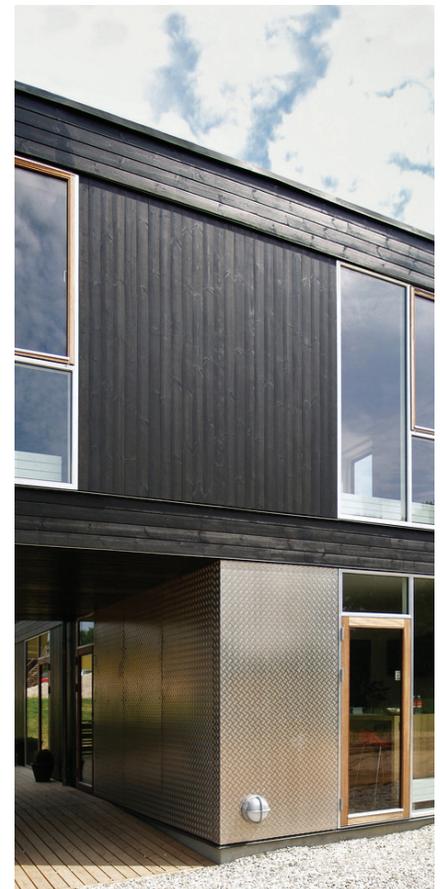
Perhaps as part of the overall marketing campaign to raise awareness about the benefits of retrofits, contractors should promote EEMs and rehabilitation mortgages in their marketing materials. In addition, contractors, through their various trade associations, should develop a campaign to educate realtors and mortgage lenders about these programs to ensure that they inform homebuyers about the opportunities.

**Financial institutions must train mortgage lender representatives to educate home-buyers about the opportunity for EEMs and rehabilitation mortgages.** Mortgage lenders need to train employees to promote EEMs and rehabilitation mortgages. Many mortgage brokers in financial institutions are unaware of these programs. As a result, when homebuyers first meet with them to secure a loan for their building purchase, they fail to inform customers about them. Retrofit contractors and energy efficiency advocates should encourage financial institutions to undergo this internal training process.

**Federal policy-makers should encourage federal lending institutions to promote EEMs and rehabilitation mortgages.** Federal agencies, such as the United States Department of Housing and Urban Development (HUD), that oversee loans for low-income residents should ensure that EEMs and rehabilitation mortgages are widely-available, promoted, and utilized. The Federal Housing Administration (FHA) should also take similar steps to promote EEMs and rehabilitation mortgages for FHA-backed mortgages.

### Expand On-Bill Financing

**CPUC, public and private utilities, and financial institutions should expand on-bill financing for retrofits to residential customers.** “On-bill financing” programs allow electric utility customers to finance energy efficiency measures through their energy bills at low or no interest, with the upfront money provided by the utilities. The CPUC has directed private utilities to develop pilot programs for small business customers.<sup>58</sup> However, the utilities have expressed concern that expanding the program to residential customers may place them in violation of consumer credit lending laws. In order to avoid this liability, utilities can work with financial institutions that already comply with these lending laws to provide the financing, with the utilities becoming the vehicle for delivering the payments. While the CPUC directed private utilities to explore these partnerships, retrofit contractors, CPUC leaders, and energy efficiency advocates should ensure that utilities in fact pursue these partnerships. Similarly, they should encourage financial institutions to collaborate with utilities. Finally, public utilities should work with financial institutions to expand this program to



residential customers.

### Expand Municipal Financing

**Local and state leaders should expand Mello-Roos financing programs to include retrofits.** Under California's Mello-Roos law, any county, city, school district, or other special district can form a community facilities districts (CFD) to finance public improvements and services within its jurisdiction. The CFD imposes a special tax lien on the properties within it. A CFD requires a two-thirds majority vote of residents living within the boundaries of the political jurisdiction. SB 279 (Hancock), which was vetoed by the governor in 2009, would have allowed Mello-Roos CFDs to finance energy efficiency retrofits. The legislature and the governor should revisit this proposal in the current legislative year.

*“Even if consumers want to obtain rehab financing, they typically don't know what the next step is. But the programs are there today.”*

*-- Dyon Taylor  
Bank of America*

### Expand Tax Credits and Offer Rebates for Retrofits

**Congress and the president should expand tax credits and deductions for building owners who undergo retrofits.** The federal and state governments should consider providing tax credits to homebuyers who undergo energy audits and retrofits on newly-purchased homes. The federal government could also make the principal on a loan for energy efficiency improvements tax-deductible.

**Congress and the president should offer rebates for homeowners who undergo retrofits.** The federal government can provide strong financial incentives through rebates to induce homeowners to undergo retrofits. The benefits include decreased energy costs for homeowners and increased economic activity from the employment boost to retrofit contractors. The proposed “Home Star Act of 2010” (also known as “cash for caulkers”) would realize some of these benefits by dedicating \$6 billion for specific energy efficiency retrofits in residential buildings.<sup>59</sup> The bill is currently being debated in the Congress.



## Barrier #3: Landlord-Tenant Split Incentives

Forty-three percent of the housing stock in California is occupied by renters.<sup>60</sup> Yet tenants are unlikely to invest in retrofit measures when they may not occupy the building long enough to see a return. Similarly, owners are unlikely to make a building more energy efficient if the tenant pays the energy bills and benefits from these savings. This dilemma is commonly referred to as a problem of “split incentives,” where tenants would benefit from the retrofits but have no incentive to make permanent and expensive improvements to the building.

### **SOLUTION: Create Incentives for Landlords to Retrofit Tenant-Occupied Buildings**

Policy-makers can address the split incentive problem by targeting multi-tenant buildings where the landlord pays significant energy costs for common areas, such as hallways, pools, and central water heaters. Nonprofit retrofit advocates and contractors can also work with tenant groups to establish negotiation templates that allow renters and landlords to share the costs of retrofits equitably. In addition, policy-makers can require landlords to disclose the energy use of a building to prospective tenants in order to stimulate renter demand for more energy-efficient properties. They can also mandate energy efficiency retrofits at time-of-rent to ensure improved energy performance of pre-Title 24 buildings.

### **Address common area energy usage in multitenant buildings**

**Local and state officials and retrofit advocates should promote retrofit incentive packages to landlords or homeowners associations with significant common area energy usage.** Public officials and nonprofits that promote retrofits should target landlords and homeowners associations that incur significant energy costs from common areas of a multitenant building or housing complex. For example, in some jurisdictions, a large majority of landlords pay the energy bills for central water heating for the entire building. Landlords and homeowners associations may also pay the energy costs for shared pools, hallways, and lobbies. Because the landlords or homeowners associations are responsible for these bills, the split incentive problem does not apply. Retrofit program advocates and contractors could therefore encourage them to improve the energy performance of these common areas.

### **Develop templates for negotiated solutions between renters and landlords**

**Nonprofit advocates and retrofit contractors should encourage negotiated solutions between renters and landlords by developing negotiating template and terms and facilitating the negotiations.** Nonprofit leaders and retrofit contractor associations could take the lead

in helping groups of tenants negotiate retrofit packages with landlords. Renters could agree to dedicate some of their savings from energy efficiency measures to higher rent payments for landlords. Advocates and contractors should target multifamily and multitenant buildings with significant cost-saving potential. Ultimately, the viability of these agreements depends on solid data about the likely energy savings that would occur. They also require standardization to save transaction costs and allow for larger-scale negotiation processes by similarly-situated tenants and landlords to maximize returns from the investment of time and resources.

### **Require energy performance disclosures to prospective tenants**

**State and Federal officials should consider legislating disclosure requirements for landlords.** If building owners had to report the energy consumption data of a building or unit to prospective tenants, renters would be more likely to choose energy efficient buildings. By responding to this demand, owners could increase their property values and rental rates. Retrofits would therefore make their properties more attractive to renters. Landlords could market their properties as “green” to add value.

*“75 percent of homes were built before 1970. I don’t usually work with new homes.”*

*-- John Shipman  
Energy Efficiency  
Management, Inc.*

### **Require energy retrofits for rental properties**

**State legislators and the governor, in partnership with the CEC, should consider requiring energy retrofits when buildings change tenants.** The Title 24 energy efficiency standards only apply to buildings built after 1978. With the large stock of housing built before 1978 – some of it multifamily or multitenant – policy-makers could require commercial and residential landlords to upgrade their properties to make them as energy efficient as post-1978 buildings. The AB 758 process may address this issue in the coming year and could assist landlords by making the upgrades financially feasible and less onerous.



## Barrier #4: An Inconvenient and Complicated Process

Retrofitting a building is typically not a simple process. Structural retrofits require a building or homeowner to 1) perform an energy audit (which can require researching and selecting a professional auditor), 2) decide which of the retrofit options the owner wants to pursue, 3) research and select a contractor to perform the work, and 4) schedule the work and endure having a contractor work on the home or business. In addition, an owner that has to rely on loans or municipal financing schemes like the PACE program will also have to investigate this process and spend time filling out the requisite forms.

Buildings also have distinct flaws that make a standard retrofit package almost impossible for policy-makers to implement. Depending on the age, construction methods, location, and status of upkeep, a building can have vastly different energy problems. As a result, policy-makers face challenges trying to implement large-scale retrofit efforts given the diversity of the housing stock. The quality of the retrofits also becomes hard to guarantee and enforce given the lack of performance-based standards for retrofit methods. Unpredictable factors in every building may affect the theoretical performance of an energy efficiency technique. Until common retrofit methods, such as duct sealing, new HVAC systems, and repairing air leaks, are implemented at a large scale, policy-makers do not know what the methods' actual energy savings will be. The result is that only a motivated property owner will want to follow through on retrofits. For busy building owners who do not place a high value on energy savings, the process can seem overwhelming, time-consuming, and not worthwhile.

### **SOLUTION: Simplify the Retrofit Process**

In order to overcome the inconvenience and time required for many home retrofits, policy-makers need to assess the permit and financing process for retrofits in order to determine opportunities for streamlining. They should also provide building owners with better and more standardized information about retrofit opportunities and data on current retrofit programs to determine the actual performance of retrofit methods. They should also engage utilities, nonprofits, and local governments to develop a comprehensive assessment of the housing stock in various regions around the state to determine common building types and energy efficiency needs. Finally, utilities, local governments, and retrofit contractors should streamline and standardize the retrofit process by developing simple forms for the financing and by providing resources, including a database of qualified contractors and information on retrofit options and performance.

### **Streamline the Permit Process**

**Local officials should improve the retrofit process where possible.**

Local government leaders should develop standardized permit procedures

for retrofits. They should make permit applications and processes easy and affordable to minimize delays and costs to building owners.

### Streamline the Financing Process

**Retrofit contractors, financial institutions, and State and local officials should streamline the retrofit financing process where possible.**

The PACE program can involve complicated interactions between local governments, financial institutions, and building owners. Retrofit contractors and nonprofit retrofit advocates should therefore use existing trade associations and nonprofit groups to lobby financial institutions and state and local officials to ensure that the PACE financing process for retrofits is as streamlined and standardized as possible. The process should be straightforward and simple, perhaps with simple forms and brochures. The same principle applies to other financing methods, such as EEMs and on-bill financing. In addition, when permits are required for retrofits, local governments should collapse these permits into the overall municipal financing package, where applicable, or streamline the approval process to minimize delays and cost to the consumer.

*“The transaction costs are too high. If you save enough to buy a latte, that’s not enough.”*

*-- Matt Golden  
Recurve*

**Financial leaders should provide advance approval for mortgage holders to enter into a PACE financing arrangement.**

Financial institutions and mortgage lenders can facilitate the PACE process by offering PACE districts advance approvals to expedite the process. The PACE process in California requires commercial property owners to obtain an acknowledgement from the first mortgage lender that the mortgage holder’s participation in the PACE program will not violate any provisions of the mortgage agreement. Some lenders have offered PACE districts blanket approval to avoid case-by-case sign-offs. However, those lenders who have not yet given this advance approval should consider doing so in order to facilitate retrofit financing under this program.

*“I hope we don’t create all of this financing infrastructure, and then nobody comes to the party.”*

*-- Cisco DeVries  
Renewable  
Funding*

### Track and Provide Performance-Based Information on Retrofits

**Local and state officials should gather performance data on retrofit methods.** As more government-sponsored retrofit programs become available, public officials and the utilities that operate these programs should collect data on the retrofit methods chosen by building owners and the resulting energy cost-savings over time. Because these data are subject to privacy concerns, the data will have to be stripped of specific identifiers, or participants will have to give their consent. The result will be better information for policy-makers and retrofit contractors to determine what methods are cost-effective and more accurate data for consumers about the likely energy savings from retrofits. It will also help building owners prioritize and select retrofit methods for their buildings.

### Perform regional housing stock and energy needs assessments

**Local and state officials, CPUC leaders, public utilities, and nonprofits and universities should work together to perform regional housing stock assessments to standardize and target large-scale retrofit efforts.** Building owners across California should have easy access to data about the typical retrofit needs for their building’s age and type, as well as for their neighborhood and climate. The more standardized the retrofit recommendations, the easier for building owners to decide to begin the process. Policy-makers should therefore dedicate existing energy efficiency funds to finance grants for universities and nonprofits to perform an assessment of the housing stock in specific climate zones.

**Nonprofit and university researchers, with assistance from the CPUC and public utilities, should develop a methodology to perform a regional assessment** Nonprofits or university researchers should take the lead to develop a methodology to assess the general physical qualities of the regional housing stock, as well as typical energy usage and climate. For example, the Energy Policy Initiatives Center at the University of San Diego School of Law has proposed one such mapping technique using the Geographical Information System (GIS). The GIS would create layered maps of every building within a geographical area (such as a city, region, or utility service territory) with data on the general building characteristics (such as age, type, and floor space) and electric and natural gas billing data that would document the energy-intensity for all buildings in an area.<sup>61</sup> Utility-provided data on energy use within these areas will be critical to making the data more accurate and accessible to researchers.

*“It’s tough to standardize this work, but some things always work, like new HVAC and insulation.”*

*-- Matt Golden  
Recurve*

**Local, state and federal officials should use the mapping data to target the most energy-inefficient homes and regions.** The mapping data provided by these assessments will help policy-makers target the most cost-effective areas for retrofit programs. For example, state and local governments could focus retrofit incentives and financing programs on areas with older and inefficient homes in inland zones that have significant temperature fluctuations. Conversely, they may recognize that government or nonprofit efforts to encourage retrofits in areas with newer, more energy-efficient homes in the temperate coastal zones may yield less improvement.

*“The commercial sector for green building got ratcheted up with LEED silver, gold, and platinum. Retrofit standards could be similar, where people might pay a premium for a marker. But there’s not an equivalent for residential retrofits.”*

*-- Greg Ames  
Trammell Crow  
Company*

**Local government leaders and the CEC and CPUC should develop a menu of standard recommended retrofit options for building owners.** The regional housing stock and performance data will help policy-makers develop a menu of standard recommended retrofit options for building owners in a given class of building types, ages, neighborhoods, and climate zones. In addition, the data could help policy-makers devise improved building codes to standardize the type of appliances, fixtures, and construction methods to make retrofits possible at a large scale.

### **Provide Retrofit Information on a “One-Stop Shopping” Website**

**Local and state government leaders, financial institutions, and retrofit contractors should provide resources for building owners interested in retrofits.** Local and state governments, financial institutions, and retrofit contractors should partner to develop an informational database for building owners interested in retrofits. A “one-stop shopping” website, with information on financing options, qualified retrofit contractors, and the latest retrofit methods would help consumers navigate what can otherwise be a confusing and overwhelming process.



## Barrier #5: Lack of a Trained and Qualified Retrofit Workforce

Without standards for contractors, policy-makers and building owners are concerned about uneven job performance and a dearth of available and qualified retrofit contractors. A poorly-trained or incompetent contractor can cost consumers money and damage the reputation of the process, making a large-scale retrofit program difficult to implement. Policy-makers must address these workforce issues before implementing widespread retrofit programs.

### **SOLUTION: Develop Performance and Workforce Training Standards**

The retrofit contractor industry and policy-makers must set high-quality training and certification standards for contractors. These certification standards must be stringent enough to ensure that retrofits are done by quality professionals. Effective job training and certification will also help address the challenge of the diverse housing stock by weeding out incompetent contractors, as trained retrofit contractors will be better able to handle diverse retrofits across different housing types and needs. Finally, these standards may serve as an incentive to encourage more construction workers to become certified.

**Retrofit contractors need to agree upon a trade-based certification process.** While independent certification programs exist for retrofit contractors, such as the Building Performance Institute (BPI), there are no state or federally-approved certification programs for retrofit contractors. As a result, members of the public will have a difficult time determining who is a qualified retrofit contractor. Retrofit contractors must organize politically through their existing trade associations or groups like BPI to make these certifications standards mandatory for licensed retrofit contractors.

**State and federal policy-makers must ensure that an independent government agency develops and enforces licensing standards for retrofits.** Once contractors and other stakeholders have agreed upon reasonable standards for licensing, policy-makers must begin the process of making these standards mandatory and part of their retrofit financing or mandate programs.

### **Conclusion: Time to Save Energy**

The momentum to encourage widespread retrofits has never been greater than the present. With the unprecedented level of utility spending on efficiency programs, early success of PACE programs, and the backdrop of concerns over climate change and greenhouse gas emissions, rising energy prices, a down economy that has idled construction workers and made it harder for many Americans to pay their energy bills, and a federal administration that has made retrofits a national priority, the time is ripe to implement large-scale retrofits. Retrofit contractors and advocates, however, must organize politically to shape the policies (such as developing workforce standards, marketing campaigns, and financing programs) to meet the reality of consumer demands and concerns. They will have to partner with public sector actors to make retrofits the norm for California's buildings.

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## List of Resources

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### GOVERNMENT ENERGY EFFICIENCY PROGRAMS:

#### **White House Council on Environmental Quality**

Recovery Through Retrofit program:

[http://www.whitehouse.gov/assets/documents/Recovery\\_Through\\_Retrofit\\_Final\\_Report.pdf](http://www.whitehouse.gov/assets/documents/Recovery_Through_Retrofit_Final_Report.pdf)

#### **California Energy Commission**

Retrofit program request for proposals:

[http://www.energy.ca.gov/contracts/RFP\\_400-09-403/RFP\\_400-09-403.PDF](http://www.energy.ca.gov/contracts/RFP_400-09-403/RFP_400-09-403.PDF)

#### **California Energy Commission**

State Energy Program:

<http://www.energy.ca.gov/recovery/sep.html>

#### **California Public Utilities Commission**

Energy efficiency programs information:

<http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/>

#### **AB 758**

Fact Sheet:

[http://democrats.assembly.ca.gov/members/a14/pdf/AB758\\_FactSheet.pdf](http://democrats.assembly.ca.gov/members/a14/pdf/AB758_FactSheet.pdf)

#### **Fresno Green**

<http://www.fresnogreen.net/>

#### **Alameda County StopWaste.org**

<http://www.stopwaste.org/home/index.asp>

#### **Sonoma County Energy Independence Program**

<http://www.sonomacountyenergy.org/>

### NONPROFIT ENERGY EFFICIENCY PROGRAMS

#### **Community Environmental Council**

<http://www.cecsb.org/>

#### **Global Green**

<http://www.globalgreen.org/>

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## Participant Bios

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### Gregory B. Ames

#### Trammell Crow Company

Greg is engaged in the management of the finance and execution side of the Los Angeles Business Unit, including accountability for all budgets, schedules, project management and development activities. He performs the initial site selection, programming, selects and manages the required consultants, and budgets the conceptual program. Greg is responsible for the Office & Industrial initiatives and is the team leader for the JPMorgan account.

### Scott Anders

#### Energy Policy Initiatives Center, University of San Diego School of Law

Mr. Anders is the Director of the Energy Policy Initiatives Center (EPIC). He joined EPIC in October 2005 as its inaugural director and developed both its academic and research programs. Mr. Anders' work at EPIC has focused on regulatory and policy issues related to developing efficient and low-carbon energy sources. Prior to joining EPIC, Mr. Anders was director for policy and planning at the California Center for Sustainable Energy (CCSE). Mr. Anders has authored or co-authored a number of papers and reports related to energy policy. Most recently he was a lead author on the report entitled, Potential for Renewable Energy in the San Diego Region. In 1999, Mr. Anders was a policy researcher for the Washington D.C. think tank Center for a Sustainable Economy, now part of Redefining Progress, where he researched market-based mechanisms as a policy tool for the energy sector. Mr. Anders was a Peace Corps Volunteer in Mali, West Africa. He holds a B.A. in international politics from Muhlenberg College (Allentown, PA) and an M.A. in public policy, with a concentration in environmental policy, from the University of Maryland's School of Public Policy.

### Keith Bergthold

#### City of Fresno

Keith Bergthold has served as both Acting and Interim Planning and Development Director for the City of Fresno since February 2007. Keith holds a Masters Degree in Organizational Behavior from the School of Professional Psychology in Fresno and a BA Degree in Sociology from California State University, Fresno. Keith was born in Fresno, is proud of it, and believes that the San Joaquin Valley is a gift from God, ordained to be sagaciously developed, or woe be to us and our heirs. Keith loves to read and sometimes composes coherent prose from the back bedroom of the home he shares with his wife Debbie in Clovis. He also loves BMW motorcycles and long rides to Canada, and gratefully travels each day down Highway 168 to explore the possibilities germinating from his current day job as Interim Director of Planning and Development for the City of Fresno.

### Theresa Cho

#### California Public Utilities Commission

Theresa Cho is Chief of Staff in the Office of Commissioner Dian Grueneich at the California Public Utilities Commission. At the Commission, Ms. Cho focuses on development of policies and programs to promote energy efficiency, emerging technologies, and to address climate change. Recently, Ms. Cho played a key role in the development of the CPUC's California Energy Efficiency Strategic Plan. Ms. Cho is an attorney with extensive experience in energy, environmental and land use matters. Prior to joining Commissioner Grueneich's staff, Ms. Cho served as Counsel to Grueneich Resource Advocates, where she advised public agencies, businesses, and environmental organizations on a broad range of energy related issues and transactions. Ms. Cho also served as Counsel at PG&E Energy Services, where she negotiated

energy related deals and was responsible for developing and implementing the corporation's regulatory compliance program. She also worked as an Associate in the California energy group of Cameron McKenna, and was Associate General Counsel for the City of Emeryville and the City of Emeryville Redevelopment Agency. Ms. Cho holds a B.A. with Honors from Wesleyan University, and a J.D. from the Boalt Hall School of Law at the University of California, Berkeley.

### **Howard Choy** **County of Los Angeles**

Howard Choy' career in the energy industry includes assignments with the nation's largest municipal utility, as a utility industry consultant and as Energy Division Manager for Los Angeles County. His experience includes power plant design and commissioning, utility marketing and customer service, energy economic analysis, and corporate energy management. During the past several years he has helped the County meet growing regulatory and policy directives through the development and implementation of the County Energy & Environmental Policy and the County Office of Sustainability. This Policy and the County Office direct and oversee energy and environmental programs for internal County operations and for constituents. Currently, Howard is helping develop the County's Property Assessed Clean Energy financing program for implementation throughout Los Angeles County.

### **Francisco DeVries** **Renewable Funding**

Francisco DeVries has made a career of solving complex policy, political, and communication challenges in both the government and private sectors. He has worked for three members of President Clinton's cabinet, members of Congress, mayors, state legislators, Fortune 500 corporations, start-up companies, and non-profit organizations. For five years, he served as chief of staff to Berkeley Mayor Tom Bates, where he developed innovative environmental and climate policies. Francisco envisioned and led the initial development of Berkeley FIRST, a nationally recognized city program allowing property owners to pay for solar installations as a voluntary 20-year assessment on their property tax bill. While with the San Francisco firm Staton & Hughes, DeVries provided policy, media, and political assistance for a wide variety of clients – including Members of Congress and the California Legislature, non-profit organizations, transportation firms, and renewable energy companies. During the Clinton Administration, DeVries served as an aide to the U.S. Secretary of Transportation and, later, the U.S. Secretary of Energy. DeVries holds a bachelor's degree in Political Science from the University of California, San Diego and a Master's degree from the Goldman School of Public Policy at the University of California, Berkeley. He lives in Oakland, California with his wife and son. He also sits on the Board of the Oakland Museum of Children's Art.

### **Rodney Dole** **Sonoma County**

Mr. Dole is the elected Auditor-Controller-Treasurer-Tax Collector of Sonoma County. He is responsible for the County's \$1.5 billion dollar short term pooled portfolio and is a Trustee of the Sonoma County Employee Retirement Fund, which totals \$1.4 billion. Prior to being elected Auditor-Controller-Treasurer-Tax Collector, Mr. Dole served as the elected Auditor-Controller for 20 years. He is a member of the State Controller's Statewide Accounting Standards Committee and Advisory Committee on Property Taxes, and of the County Auditors Committee on Accounting Standards & Procedures. He has served as president of the State Association of County Auditor-Controllers. He holds a BS in Business administration with major study in accounting from California State University, Hayward. His accomplishments include authoring the State Legislation "Teeter Credit", chairing the Committee on Property Tax Shift Guidelines "ERAF" and Prop 111 "Spending Limits Guideline", and securing over 10 consecutive years of national GFOA awards for Financial Statements, Budgets, and Citizens' Reports.

## Matt Golden

### Recurve

Matt Golden is the co-founder and president of Recurve, formerly Sustainable Spaces. Prior to founding the company in 2004, Matt worked as an Energy Consultant for homeowners and businesses. He realized that he was offering only a single solution and not truly addressing most homeowners' desire to make their homes and lives more sustainable. Matt developed the concept for Sustainable Spaces to meet this market demand by providing a single, full-service resource and brand homeowners can trust to help them improve the comfort, health, and efficiency of their home. He speaks extensively on building science and integrated green design to groups such as the AIA (American Institute of Architects), West Coast Green, Build It Green, USGBC, and to policy makers from California to Washington DC. He is author of a number of articles for Home Energy Magazine and has been featured in the San Francisco Chronicle, USA Today, Forbes, New York Times, Wall Street Journal and the Ellen Degeneres Show. Matt serves on the National Home Performance Council, Building Performance Institute (BPI), California Building Performance Contractors Association (CBPCA), Build It Green, Fine Home Building Magazine Green Building Advisory Board, and is a co-founder and current president of Efficiency First, a trade association representing the home performance workforce. Matt holds a bachelors degree from Georgetown University.

## John Hagen

### CB Richard Ellis

As Technical Program Manager for CB Richard Ellis Technical Services, John Hagen is responsible for leadership and deployment of energy optimization services for the property and facilities management portfolio across the Americas. These services include building benchmarking, energy assessments, project implementation, and validation providing expertise in assisting clients customizing an approach to reducing energy costs, achieving LEED certification criteria, and sustaining results. He has a BS in Engineering from the University of Wisconsin.

## John Shipman

### Energy Efficiency Management, Inc.

John Shipman is the CEO of Energy Efficiency Management, Inc., a green energy efficiency consulting, auditing/analysis, training and green solutions based corporation specializing in residential, commercial, educational institutions and local government applications. He is a Certified Home Energy Rating System (HERS) Rater/Auditor/Analyst, Certified Green Home Performance Contractor with Energy Star (CBPCA), Certified with the Building Performance Institute (BPI), Certified Building Envelope Analyst, Licensed General Building Contractor, Certified Green Builder and GreenPoint Rater for new and existing homes with Build It Green, An EPA/DOE Energy Star partner, Certified Infrared Thermographer, Certified HVAC Analyst, Certified Solar Rater, Certified Energy Efficient Mortgage (EEM) specialist for FHA/HUD loans. He is program coordinator and Instructor for California State University Long Beach, Center for Continuing Education and Professional Development's Certificate Program for Green and Sustainable Building, Instructor/Trainer for the National Association of Realtors Green Designation, as well as the Residential Green Elective Course and Certification, Instructor/Trainer for the California Association of Realtors and a Licensed California Realtor.

## Lindsey Taggart

### Community Environmental Council

Lindsey is responsible for reducing energy consumption in buildings. Lindsey works with residences, small and large business owners, and local governments to create awareness, employ energy efficiency measures and provide information and access to funding sources, rebates and cost savings. Lindsey regularly performs energy audits on small businesses and schools, and works with local stakeholders to establish energy efficiency programs for both new and existing buildings. Lindsey comes to CEC from UCSB's Bren School, where she obtained her Masters in Environmental Science & Management. While at Bren, Lindsey focused on Corporate Environmental Management and Green Buildings. As a graduate intern at UCSB, Lindsey was responsible for managing the LEED EB Portfolio Program, under which UCSB is certifying 25 buildings under LEED for Existing Buildings. Lindsey is Chair of the Santa Barbara Regional Council for the US Green Building Council's California Central Coast Chapter (USGBC-C4) and organizes a monthly Green Building Speaker Series.

**Dyon Taylor****Bank of America**

Dyon Taylor is a seasoned professional with over 17 years of real estate finance experience with an emphasis on consumer and commercial construction financing. He has worked in variety of areas within the real estate finance arena, including Origination, Operations Management, Sales Management, and Product Development. He is currently a Senior Vice President with Bank of America Home Loans where he is the Product Management Executive for Government Lending, Rehabilitation/Remodel, and Builder mortgage products.

**Daniel Thomsen****The Building Doctors**

Dan Thomsen is the president and founder of The Building Doctors ([www.thebuildingdoctors.com](http://www.thebuildingdoctors.com)), a Home Performance Contracting Company that does Building Performance testing and energy efficiency retrofitting. Dan is a life long environmentalist, which started in the Boy Scouts, where he achieved his Eagle Scout. Dan received a Bachelor of Science from the College of Agriculture and Forestry at West Virginia University and a Master of Science from the School of Forestry at North Carolina State University. He is a member of The California Building Performance Contractors Association (CBPCA), is certified with the Building Performance Institute (BPI) as a Building Analyst Professional, is certified through CHEERS as an existing home rater and can make the HERS report needed for Energy Efficient Mortgages (EEM's), a certified Green Building Professional with Build It Green, and a founding member of Efficiency First, an organization dedicated to increasing the efficiency of homes (where he is the National Membership Chair). Dan has completed the course with The Infrared Training Center for Infrared imaging for home inspectors, energy audits, and disaster restoration contractors. He has received a certificate of appreciation from The City of Los Angeles for his volunteer work with planting drought tolerant gardens and has an active Real Estate license.

**Walker Wells****Global Green USA**

Walker Wells' responsibilities include working with building industry stakeholders, affordable housing developers, and municipalities to further sustain able development practices, primarily through developing and implementing viable and cost-effective green building practices and programs. Former Senior Urban Designer with Gruen Associates in Los Angeles, Associate Planner with the City of Santa Monica, and Urban Planner for the City of Malmo, Sweden. Walker is a member of the American Institute of City Planners and is a LEED Accredited Professional. He has Bachelor's degrees in Sociology and Environmental Studies from the University of California Santa Barbara, and an M.A. in City and Regional Planning from California Polytechnic University San Luis Obispo.

**Gary Wolff****Stopwaste.org**

Gary Wolff, P.E., Ph.D., is the Executive Director of StopWaste.Org. He previously served as Vice Chair of the California Water Resources Control Board and as member of the San Francisco Bay Water Board. From 2001 to 2006, he served as principal economist and engineer for the Pacific Institute for Studies in Environment, Development and Security. Gary is an expert in the economics and engineering of resource use, including water quality; water, energy, and materials end-use efficiency; and incentive policies. His professional career has included solar energy construction contracting, water quality regulation for the State of California, design engineer at a wastewater treatment plant, founder and president of an engineering consulting firm, a post-doctoral fellowship at the Center for Conservation Biology at Stanford University, and a visiting professorship at the Graduate School of International Policy Studies at the Monterey Institute of International Studies. Gary Wolff received his Doctoral degree in Resource Economics from the University of California at Berkeley, his Masters Degree in Civil and Environmental Engineering from Stanford University and his Bachelors Degree in Renewable Energy Engineering Technology from Jordan College.

## Endnotes

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- 32 In 2003, the California Public Utilities Commission (CPUC, the agency responsible for regulating investor-owned utilities) and the California Energy Commission (CEC, the agency responsible for setting energy efficiency standards) adopted an “Energy Action Plan” that prioritized how the state should meet its future energy needs. The plan placed energy efficiency first in the “loading order,” or highest priority. See State of California, *Energy Action Plan*, May 8, 2003. Available at: [http://www.energy.ca.gov/energy\\_action\\_plan/2003-05-08\\_ACTION\\_PLAN.PDF](http://www.energy.ca.gov/energy_action_plan/2003-05-08_ACTION_PLAN.PDF) The legislature then codified this goal in 2005 with SB 1037 (Kehoe), which requires electric utilities to meet their resource needs first with energy efficiency. See

- California Senate Bill 1037, Statutes of 2005, Chapter 366. The legislation sets targets for statewide annual energy demand reductions equivalent to enough power to supply more than five million homes and to avert construction of approximately ten new 500 megawatt power plants (one megawatt can power 750 homes for a year). See California Air Resources Board, *Climate Change Scoping Plan*, December 2008, p. 41. Additional legislation has furthered these energy efficiency efforts. In 2006, the governor signed AB 2021 (Levine), which requires the CEC, in consultation with the CPUC and publicly-owned utilities, to produce a statewide estimate of “all potentially achievable cost-effective electricity and natural gas efficiency savings and establish targets for statewide annual energy efficiency savings and demand reduction for the next 10-year period.” See Assembly Bill 2021, Statutes of 2006, Chapter 734.
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- 49 For more information on the energy disclosure requirement in Maryland, visit: <http://www.montgomerycountymd.gov/ocptmpl.asp?url=/content/ocp/Energy/faq.asp>
- 50 City of Austin, Ordinance No. 20081106-047. Available at: [http://www.ci.austin.tx.us/acpp/downloads/EEU\\_Ordinance\\_20081106-047.pdf](http://www.ci.austin.tx.us/acpp/downloads/EEU_Ordinance_20081106-047.pdf)
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